NATURAL RESOURCE DEVELOPMENT AND THE
ROLE OF THE STATE:
THE CASE OF HYDROELECTRIC POWER PLANNING IN
BRITISH COLUMBIA

by
RAYMOND W. PAYNE
B.A., McGill University, 1971
M.A., Simon Fraser University, 1979

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Department of Community and Regional Planning

The University of British Columbia
1956 Main Mall
Vancouver, Canada
V6T 1Y3

Date August 24, 1987
This thesis explores the role played by the state at the provincial level in the planning of hydro-electric power development in British Columbia. The electric power industry has been a primary focus for government intervention in the economic affairs of most western industrialized countries. Not only has the structure and scope of the state's regulatory activity in the industry been more extensive than most others, but governments have often gone beyond such regulatory supervision to assume a more direct role in the production of the commodity itself.

In British Columbia, however, the direct entrepreneurial role played by successive provincial governments led to major planning failures. Serious social and environmental costs were ignored in development decisions, economically dubious projects were constructed, and the electric power system as a whole was seriously overbuilt.

This thesis argues that the problems associated with state-directed hydro-electric power development were institutional rather than technical in nature. Two types of institutional factors are shown to have played a key role. First, the scope of power planning has been limited by the role played by the provincial state in the broader political economy of British Columbia. This role has been basically non-interventionist in nature, with the exceptional interventions in economic affairs being associated with the removal of barriers to the private exploitation of the natural resource base. This broad economic role has conflicted with the state's central position as arbiter among opposing societal interests and has biased subsequent government planning activities toward facilitating the supply of electric power rather than evaluating the demand for it.
Second, rigidities within the institutions employed by the state to undertake power planning activities inhibited the adaptation of these activities to a changing economic environment. Organized structures were created to implement particular power policy initiatives, and these organizations developed their own set of interests and priorities. Hence, a bias against the re-evaluation of previous policy and planning approaches was created, even in the face of clear evidence of their failings.

In Chapter 2, the conceptual and theoretical groundwork for the study is laid with an examination of four alternative approaches to the economic role of the state in western capitalist societies. The key questions explored are the rationale for state intervention, the choice of policy instruments employed, and the effectiveness of these instruments in undertaking goal oriented planning.

In Chapter 3, the stage for the analysis of power policy is set with an overview of the economic context of electric power production in British Columbia. This chapter establishes the staple-based nature of the B.C. economy and analyses the changing role played by electric power in this economy.

Chapters 4 through 8 detail the historical evolution of power planning and policy in British Columbia. Chapter 4 documents the predominantly laissez-faire approach to power policy during the pre-World War II period and the gradual emergence of demands for a more active regulatory role by government.

Chapter 5 documents both the implementation of electric power regulation during the 1950s and the emerging policy preoccupation with underwriting the development of British Columbia's large-scale hydro resources. The chapter focuses on the links between this overall role, the creation of a dominant Crown corporation in the power industry, the
decision to undertake an economically dubious sequence of hydro
development, and the lack of attention given to environmental issues.

In Chapter 6, the focus is on the use of the Crown hydro corporation
as an economic policy instrument during the 1960s. The preoccupation with
initiating large-scale hydro developments shifted to a concern with
producing power at the lowest possible direct cost to the consumer.

Chapters 7 and 8 focus on the shift from power policy to power
planning. From the late 1960s through the 1970s, policy making at the
provincial level was largely replaced by an institutionalized, formally
rational decision making process dominated by technical experts. This
shift, by creating a powerful set of established interests within the
provincial power utility, gave added momentum to the expansionary power
policies of the 1950s and '60s during a period when their underlying
justification was being increasingly questioned. Finally, Chapter 8
concludes by examining the re-assertion of regulatory control by the
provincial state over the now publicly-owned power industry.

The conclusion summarizes and interprets the evidence presented in
Chapters 4 through 8 in light of the theoretical concepts introduced in
Chapter 2. The central problem of state involvement in the electric power
industry is shown to be the representativeness and adaptability of policy
and planning institutions. A number of recommendations are made to
overcome the deficiencies identified in the study.
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CHAPTER 1
INTRODUCTION

1.1 Overview: Electric Power Planning and the Role of the State

The steady growth of the role of the state in the economic affairs of the western capitalist societies has emerged as a central public policy issue of the post-war period. On the one hand, the seemingly inexorable trend toward a greater government presence in such economies, with its substitution of collective, goal-oriented planning for private, market-based transactions, has been widely documented. On the other, this trend has given rise to widespread concern and criticism, especially since the mid 1970s. Doubts have been expressed regarding both the legitimacy of the rationale for government involvement and the ability of the state to achieve the goals which purportedly constitute this rationale.

The electric power industry has been a primary focus for government intervention in virtually all western industrialized societies. Not only has the structure and scope of the state's regulatory activity in this industry been more extensive than most others, but governments have often gone beyond such regulatory supervision to assume a more direct role in the production of the commodity itself.

This thesis explores the broader issues associated with the economic planning role assumed by the state by focusing on the electric power industry of British Columbia. In Canada as a whole, the tendency for provincial governments to take an active role in directing the development of their electric power systems has been widespread. In Ontario, the government's adoption of public ownership in 1906 was eventually followed by other provinces. Today, provincial Crown utilities are the rule rather than the exception in the power industry.
In British Columbia, nationalization of most of the province's electric power industry did not occur until 1961. However, it was undertaken by an administration with both a clear overall bias toward private economic initiative and a previously strong stance in favour of private power utilities. Moreover, when the Social Credit administration under W.A.C. Bennett did move to create a virtual Crown monopoly in the power industry, it did so with very high expectations regarding the economic and social benefits to be derived from greater government control. New government-sponsored hydro projects, declared Premier Bennett in 1968, were to be "... the base upon which the great expansion in the province during the next decade will be built." They would, "... more than any other factor of production, be the measure of success in achieving our potential output" (Quoted in Vancouver Sun, Feb. 20, 1968, p. 4.).

Yet, from the mid-1970s on, a number of problems emerged related both to the socio-economic impacts of the state's role in the electric power industry and to the ability of governments to undertake the effective planning of the electric power system. In broad terms, the events of the late 1970s and early 1980s raised serious questions as to whether the benefits of two decades of large scale public power developments were worth the costs.

One major element of this general question was the increasing controversy over the environmental and social costs of the developments being pursued by the British Columbia Hydro and Power Authority. Both the widely publicized impacts of the hydro projects built during the 1960s and the promotion by the Crown utility of more potentially harmful developments during the 1970s led to a growing level of public debate. With each successive public hearing into a large scale hydro project, the number of
intervenors increased along with the vehemence of their objections. In the words of one observer,

. . . the devastation wreaked by Hydro produced, in many of those who were forced to sit helplessly by, a strong commitment to fight the extensive series of projects on Hydro's agenda for the 1970s and 1980s. These people. . . formed the nucleus of the powerful "rein in Hydro" movement which dogged the utility's every move in the 1970s (Wilson, 1983, p. 3).

In addition to the concerns associated with these uncounted costs, questions were raised concerning the ability of British Columbia's Crown utility to produce the economic benefits which might justify them. B.C. Hydro persisted in forecasting large increases in provincial load growth throughout the 1970s, despite a growing volume of evidence to the contrary. B.C. Hydro's 1974 forecast for 1980/81 proved to be off by 30 percent (even before considering the impact of the subsequent recession). The utility failed to adjust its expansion plans quickly enough, and, as a result, the lag between the completion and utilization of each successive project grew larger. The Seven-Mile facility, completed in 1979, was surplus for two years; the Peace Canyon project, completed in 1980, was surplus for four years; and the Revelstoke Dam, completed in 1984, proved entirely surplus to provincial demand. With large fixed costs and the lack of available export markets, provincial consumers were faced with the prospect of rapidly increasing power costs by the mid-1980s. These developments led one observer to assert that ". . .the electric power policies pursued by British Columbia have transformed a large share of the province's extensive hydroelectric power resources into an enormous liability to the provincial economy. . ." (Fox, 1983, p. 2).

Finally, as a consequence of the two problems just outlined, concerns began to be raised regarding the accountability of government agencies
involved in electric power planning decisions. Whereas private power planning had previously been criticized for its emphasis on corporate profits at the expense of the overall economic well-being of the province, public power was soon viewed by many as responsive mainly to the priorities and aspirations of bureaucrats within the public corporation. Starting in the early 1970s, there was a growing perception that public power was not synonymous with the public interest, and that the need for external regulatory control was just as important as it had been when privately owned utilities had predominated. The result, in the early 1980s, was a number of legislative initiatives which significantly eroded the autonomy enjoyed by B.C. Hydro since its creation in 1961.

1.2 Theoretical Focus

The problems described above are, in a generic sense, planning ones. Society, through the institutions of the state, has replaced the outcomes generated by the economic marketplace with a systematic matching of means to collective ends. Broadly, to the extent that subsequent planning errors cannot be traced entirely to the influence of unforeseeable events, there are two classes of explanation for them. First, planning has failed primarily for lack of technical capability. Hence, an electric power system is overbuilt because forecasting is not competently undertaken, or because the techniques required are not available. Environmental impacts are not adequately included either because satisfactory means of measuring them do not exist, or because planners lack the competence to utilize them. The accountability problem, then, arises out of public dissatisfaction with the competence of planners and policy makers, and the solutions to planning failures (while not necessarily simple) are straightforward. More
resources must be invested in planning capability, and to the extent to which this is not feasible, the public must accept the resulting shortcomings as the inevitable price paid for the benefits of a modern industrial society.

The other type of explanation is political/institutional in nature. The problem lies not so much in the technical problems associated with the planning process as in the institutional structure within which planning takes place. In other words, the failure to plan effectively arises out of the inability of existing institutional structures to translate an underlying social purpose into a collective societal goal, or to convert such a goal into the concrete measures necessary to achieve it. If a planning failure is associated with such broader, policy-related problems, then no amount of technical expertise will suffice in the absence of more fundamental institutional restructuring.

This thesis argues that the failures of electric power planning in the post-war period are of this second type. More specifically, it contends that:

1. The problems faced by British Columbia in the area of electric power planning are due, in large measure, to the consequences of past policy choice, and
2. Two specific institutional limitations, characteristic of state planning in most industrialized capitalist societies, have combined to generate these problems.

First, the scope of power planning has been limited by the role played by the state (in this case successive provincial governments) in the broader political economy of British Columbia. As will be elaborated in more detail, the provincial state has perceived its economic role as basically non-interventionist in nature, with its more interventionist
policy initiatives being centred around a desire to quicken the pace of industrial expansion.

While, as we shall see, in the following chapter, such a role is more or less characteristic of most industrial capitalist societies, it tends to be particularly pronounced in regions which rely heavily on the export of staple products. In such regions, the more pronounced interventions of the state in economic life have been traditionally associated with the removal of barriers to the private exploitation of the natural resource base.

This overriding rationale has had two consequences for the policy and planning process, consequences which are clearly observable in the case of electric power. First, the state approaches its central role as arbiter among the interests of different socio-economic interests in a less than neutral fashion. Those whose interests lie in regulating or otherwise restricting the production of goods and services to protect other values find themselves opposed, not only by producing groups, but by the goals of the state itself.

Second, the initial rationale for intervention tends to bias the focus of subsequent state planning toward facilitating the supply of particular commodities rather than toward ensuring a demand for them. Policy makers assume a version of Say's Law in which the supply of a commodity (in this case electric power) is assumed to create its own demand.

This initial presumption has, in turn, a perverse impact on the planning process, in which the analytical attention devoted to specific issues bears an inverse relationship to their ultimate importance. Hence, in the areas of electric power, the focus of analytical attention has progressed gradually (and grudgingly) from an almost exclusive preoccupation with resource supply problems, to the environmental and
social impacts of resource development, to an assessment of the demand for the commodity, to the ultimate economic rationale for state involvement in the industry. The history of electric power planning to the early 1980s shows a tendency to work up this list of issues, with the initial lack of attention given to the latter three creating many of the problems which faced subsequent policy makers.

The second major institutional constraint on the electric power planning process tends to accentuate the problems generated by the first. This constraint involves the rigidities which tend to develop within the institutions employed by the state to influence the course of economic events. Organized structures are created to implement particular policy initiatives, and these organizations tend to develop their own set of interests and policy priorities. Hence, a bias against any fundamental re-examination of past planning approaches is created, even when there is clear evidence of their failings. Since the self-questioning, critical element essential for adapting the orientation of the institutions of the state to changing perceptions of the general public interest is lacking, the correction of planning problems lags well behind their recognition.

1.3 Organization of the Study

Following the approach just outlined, this thesis traces the role of the state at the provincial level in the electric power industry of British Columbia and the impact of this role in the planning of the electric power system. Chapter 2 elaborates, in some depth, the alternative theoretical interpretations of the role of the state in economic affairs. The key questions examined are the rationale for state intervention, the policy instruments employed, and the effectiveness of these instruments in undertaking goal-oriented planning activities.
In Chapter 3, the stage for the analysis of power policy is set with an overview of the economic context of electric power production in British Columbia. This chapter seeks to establish the staple-based nature of the B.C. economy and to identify the role played by electric power in this economy.

Chapters 4 through 8 detail the evolution of electric power policy and planning in British Columbia. Each of these periods represents the dominance of a particular approach to the policy questions associated with electric power, the increasing pressures to implement fundamental changes to this approach, and the culminations of these pressures in major new policy initiatives. These initiatives then set the stage for the approaches and policy instruments characteristic of the succeeding period.

Chapter 4 documents the predominantly laissez-faire approach to policy during the pre-World War II period, culminating in the introduction of regulatory control over the dominant private utilities and the inauguration of public power production on a limited scale.

Chapter 5 documents the implementation of these new policy measures during the 1950s and the provincial government's preoccupation with encouraging the development of its hydro resources. The failure to promote such development by encouraging private enterprise, combined with a growing mutual incompatibility of the policy instruments employed during this period, culminated in nationalization and the predominance of direct public ownership.

In Chapter 6, the focus is on the use of the Crown Corporation as a policy instrument during the 1960s. Whereas the policy preoccupation of the 1950s was with the initiation of large-scale hydro developments, that of the 1960s was concerned with the production of power at the lowest
possible direct cost to the consumer. The result of these policies, however, was a growing awareness of their indirect costs, culminating in a fundamental questioning of the assumptions underlying them.

In Chapter 7, we focus on the simultaneous impact of two developments. The first, particularly during the term of an NDP administration elected in 1972, was the attempt to introduce a broader socio-economic perspective into the electric power planning process, and to overcome its analytical deficiencies. The second was the emergence of a greater sense of self-identity within the government's principal policy instrument, the B.C. Hydro and Power Authority. The decision to build Hydro's last major project, the Revelstoke dam and generating facility, is interpreted as arising out of a clash between these two forces, with the latter emerging victorious.

Chapter 8 documents the growing pressures to "rein in" B.C. Hydro and to create an alternative institutional structure for electric power policy and planning. The period culminates with two seminal events; the introduction of a new regulatory structure to govern the activities of the Crown Hydro Corporation and the hearing into B.C. Hydro's application to construct the Site C Project on the Peace River.

The conclusion in Chapter 9 analyses the key determinants of the policy process with reference to the theoretical perspectives elaborated in Chapter 2. The major focus is on assessing the limitations which government institutions have placed on the planning process and on suggesting ways in which these can be overcome.
1.4 References


CHAPTER 2

ECONOMIC POLICY AND THE ROLE OF THE STATE

2.1 Introduction

In this chapter we elaborate the two themes which form the basis of this thesis. The first is that the rationale for government intervention in the area of hydro-electric power development has led to a number of distinctive (largely undesirable) outcomes in the subsequent power planning process. The second is that the institutional mechanisms employed to pursue public goals have intensified these tendencies and inhibited the adaptation of power planning to changing circumstances.

Since the focus of our inquiry is electric power planning, it is useful to begin with an examination of what is implied by the term "planning." In its generic sense, both planning and policy making have been used to denote rational choice aimed at bringing about some state of the world consistent with a predetermined collective end. In other words, planning represents a particular type of behaviour which seeks to impose on the course of events an outcome which would not otherwise occur.

Hence, for example, Banfield defines planning as the determination of:

...a course of action which can be carried into effect which can be expected to lead to the attainment of the ends sought and which someone (an effectuating organization) intends to carry into effect. (Myerson and Banfield, 1955, p. 312).

Hudson (1979), echoing Davidoff and Reiner (1962) defines planning as "foresight in formulating and implementing programs and policies." In a way which differs only in emphasis, Bauer (1968) defines policy-making as "course setting involving decision of the widest ramification and longest time perspective in the life of an organization."
Planning as a species of rational behaviour has generally been broken down into a number of discrete steps; the elaboration of a guiding objective, the projection of the consequences associated with various alternative actions, the evaluation of these alternatives to select an optimal outcome in terms of the stated goal, and the implementation of this alternative to ensure that it does, in fact, achieve a state of affairs consistent with the original goal (Carley, 1980, pp. 10-20).

Lowi (1970, p. 317), however, takes exception to this rather generalized "process" approach to the delineation of planning policy-making as a field of study. Such a standpoint operates "...as though the substantive character or level of that output is of no consequence to the process by which the output becomes an output." However, once rational goal seeking behaviour becomes a collective as opposed to a purely individual activity, this "...substantive character or level..." becomes critical. Since planning as an activity attempts to influence broader political and economic conditions, it cannot help but be profoundly influenced by them.

A key question in this regard revolves around the role of the state in directing the course of economic events. Why and under what circumstances does goal oriented behaviour associated with the production of goods and services become a collective, rather than an individual matter, to be decided for society as a whole on the basis of authoritatively binding decisions? This question focuses on the understanding of goal articulation at the broadest level of societal decision making.

In this chapter we examine the theoretical answers to this question provided by four schools of thought, both generally and in relation to electric power; welfare economics, institutional economics, neo-marxism and neo-conservatism.
Another key element of the state's role in directing the course of economic events revolves around the instruments employed. Once governments have decided to undertake planning activity in a given area, how do they approach the task? Under what circumstances are particular institutional structures employed?

While a number of different ways of classifying policy instruments have been advanced (Young, 1981; Trebilcock, et. al., 1982), this study focuses on three types - allocation, regulation and entrepreneurship. Governments can achieve their objective by selectively allocating resources over which they exercise control to private parties. These resources could include land and other property rights or fiscal resources raised by taxation. In this way, private behaviour is encouraged, through inducement, to conform to publicly determined goals. Alternatively, private behaviour can be directly controlled by regulations making some specified activities mandatory and prohibiting others. Finally, the state can ensure the provision of particular goods by undertaking to produce them itself, thus performing the entrepreneurial role which is generally left to private parties.*

Finally, this chapter looks at the question of the impact of the role played by the state on the way in which planning is undertaken. Specifically, once governments have intervened in economic affairs using a particular combination of instruments, what forces act to inhibit their capacity for change and adaptation? While both welfare economists and the work of institutionalist theorists point to the key importance of this capacity in maintaining the viability of planning in the public domain,

*This classification is based on the one advanced by Young (1981), though I have used different terminology. Young's categories are devolution, regulation, and operation.
both Marxist and Neo-Conservative theorists see it as being systematically undermined by the role which the state is forced to play in contemporary capitalist society.

2.2 The Rationale for Government Involvement in Economic Affairs

The dominant conceptual framework governing the discussion of the role of the state in economic affairs of western societies (particularly the Anglo-Saxon ones) can be traced to Adam Smith. Especially important were Smith's well-known ideas concerning the power of the economic marketplace as an "invisible hand," capable of co-ordinating extensive areas of social behaviour without the need of external regulation by the state. Founded on this concept was a specific theory of economic behaviour based on the autonomy of the individual as the ultimate point of reference. By matching individual wants and desires with productive capacities, the market was seen as uniquely capable of translating both into an optimal aggregate outcome. The outcome associated with market forces was considered optimal because it achieved the greatest possible level of overall economic satisfaction with the least possible exertion of human effort, it ensured the greatest possible scope for voluntary behaviour, and it facilitated the productive innovation which was necessary for continued secular progress (Heilbroner, 1980, pp. 40-72).

When combined with a redefined role of the state originating largely with Hobbes, capitalism became more than simply a method of economic production and consumption. It took on the character of a more general theory of social organization. Whereas previously the role of the state in directing social and economic life had been interpreted in terms of maintaining the viability of a traditional social order and its dominant
elites, Hobbes portrayed this role as one of maintaining order among a collectivity of discrete self-seeking individuals.

This state thus came to be viewed essentially as a device through which society could avoid the unpleasant consequences of individualism while enjoying the more agreeable ones. If men pursued interests which were fundamentally individual (or egotistical) then conflict between them was inevitable, resulting in a war of all against all in which life was nasty, brutish and short. In order to avoid this eventuality, men could be viewed as having delegated a portion of their individual power to a single sovereign, whose absolute right to employ coercion would then enable him to keep the peace (Wolin, 1960).

While the Hobbesian view was absolutist in that it categorically rejected men's right to overthrow the state (almost any government was preferable to no government), its rationale defined the state's role as an inherently limited one. If it was simply a device whereby individuals sacrificed some of their powers and liberties to ensure a peaceable enjoyment of the remainder, then the role of the state could not encompass such things as the realization of other collective purposes by employing its coercive powers. This implication, of course, was expanded and made quite explicit by later liberal theorists like Locke and Mill. In terms of more contemporary thought, this powerful ideal has been termed the "rebuttable presumption" by Charles Shultze (1977). The social outcomes produced by the economic marketplace are viewed as optimal unless their shortcomings can be clearly demonstrated.

In the two hundred years or so since Smith's influential treatise, economic and social theorists have been faced with explaining and evaluating a seemingly inexorable trend toward greater state involvement in the economic life of western capitalist societies. In seeking to answer
the question of why governments have consistently undertaken such involvement, it is convenient to focus on four theoretical traditions, each offering a distinct type of answer. These are: (1) welfare economists, who view government involvement in terms of the need to overcome barriers to economic efficiency in unregulated markets; (2) institutional theorists who view the state's role as one of facilitating an adjustment between the economy and the broader needs of society as a whole; (3) neo-marxists, who view the role of the state in terms of maintaining the interests of the economically dominant social class, and (4) neo-conservatives and public choice theorists, who view state involvement in terms of the pursuit of individual self-interest by both the governors and governed.

While the great majority of economic theorists have focused their attention on the role of markets in achieving allocative efficiency, they have had to face the historical fact of the growing scope of government, the deployment of a wider range of policy instruments, and increasingly "political" nature of economic allocation. The market failure approach, developed mainly in the work of welfare economists, represents an attempt both to explain and to justify these phenomena. Briefly stated, the approach posits a number of physical and institutional impediments which prevent markets from operating in an efficient manner. Any government policy initiatives which remove these barriers and result in a greater level of economic output for any given level of input are clearly justifiable. In fact, they are called for by the logic and ethical assumptions of the market itself (Mishan, 1975, pp. 382-389).

This justification is often stated in terms of the concept of Pareto optimality, which refers to an ideal distribution of society's economic output in which it is impossible to make anyone better off without making someone else correspondingly worse off. In any social state falling below
this ideal, some people can be made better off without the necessity of making others worse off, and a "Pareto improvement" is said to be possible. The less restrictive idea of a "potential Pareto improvement" is more commonly relied on. Here it is sufficient only that the gainers from any economic change be able to compensate the losers, regardless of whether they actually do (Zajac, 1978, pp. 7-11).

Put into analytical terms, the market failure approach can be stated in terms of the following three propositions: (1) That policy makers can be conceived of as a unitary decision maker with an unambiguous objective; i.e. to achieve, as much as possible, an efficient allocation of society's resources. (2) That certain features of the physical and social environment lead existing markets to produce outcomes which are less efficient than they could be. (3) Since there is a discrepancy between existing economic conditions and the state's presumed policy objective, action to remove this inconsistency results.

The key to the market failure approach then becomes the identification of instances where markets produce inefficient outcomes, since such conditions are the ultimate determinant of state intervention. The prerequisites for the efficient functioning of markets can be identified as follows:

1) Each industry producing goods and services is characterized by a large enough number of firms to prevent any one of them from exercising market control.

2) There are no barriers to entry or exit in each industry.

3) There is no uncertainty regarding the costs and benefits relevant to economic transactions.

4) Markets exist for all the significant costs and benefits relevant to economic transactions. In other words, the costs of transactions cannot
be externalized onto third parties and these third parties cannot appropriate benefits which they do not pay for.

5) The tastes, preferences or utilities of individuals are independent of one another.

The realization of the theoretical social benefits of unregulated economic activity is dependent on competition. However, if a seller, or group of sellers can achieve a monopoly or oligopoly position in any market, the expected economic outcome is radically altered. Under these conditions, the buyer has no choice among competing sellers, thus giving the monopolist (or oligopolistic cartel) control over price and output. As has been demonstrated theoretically and observed in practice, the monopolist behaviour in pursuit of his own self-interest will result in a lower than optimal supply of the good in question at a higher than necessary price (Waters, 1979; Stanbury, 1979). Removal of such monopoly conditions, as for example by legal prohibition, can thus produce a potential pareto improvement.

The lack of barriers to entry is equally important. If artificial barriers can be erected, potentially more efficient suppliers of the good in question are kept out, thus artificially driving up costs and prices, and lowering demand. The existence of such barriers also provides an incentive for larger, more profitable firms to drive out financially weaker competitors, thereby achieving monopoly or oligopoly control.

When monopoly or collusive oligopoly are artificially created, the obvious answer appears to be legal prohibition. But, it has been demonstrated that some industries are characterized by technical conditions which create natural barriers to entry, leading to the emergence of monopoly. An industry within a market area may be based on a single non-divisible
natural resource (as in the case of a power company holding the only suitable hydro generating site).

More generally though, industries with large fixed costs, a high ratio of fixed to variable costs, and declining marginal costs over a significant range of output, will exhibit a tendency toward "natural" monopoly. The size of the initial investment necessary to enter the market will create barriers to entry, perhaps compounded by lack of access to complex technological processes. In a given trading area, an already established firm can supply new incremental demand at a price lower than any potential competitor. This tendency toward monopoly cannot be efficiently controlled by legal prohibition because competition would require the extensive duplication of capital equipment. The answer is to accept monopoly as necessary and exercise control over the discretion that accompanies it.

Two types of certainty are crucial for the efficient functioning of markets. The first is certainty concerning the goods and bads associated with economic transactions. Uncertainty as to the qualities of a product provides no basis for rational choice, leaving its consumer open to manipulation via false or distorted information provided by the seller.

Second, since economic calculations are inherently dependent on the assessment of future costs and benefits, lack of information regarding future states can severely distort economic behaviour. A vivid example is the speculative property boom, where expectations of future price increases cause demand to rise rather than fall in response to price escalation.

This second type of uncertainty can also limit the efficient functioning of capital markets, leading to sub-optimal levels of investment. According to Krutilla and Eckstein (1958, p. 48):

.. reluctance of investors to lend except at increasingly greater risk premiums and reluctance of management to risk dilution of control by
employing more equity capital, qualify the assumption of unrestricted access to the capital market at the prevailing rate of interest and willingness to push investment to the point where the promised returns at the margin only equal the interest cost.

The idea that significant costs and benefits of market activity are often borne by parties not directly involved in transactions is a problem at the very core of welfare economics. As originally argued by Pigou (1932), if all significant costs and benefits are not taken into account, then the market is, by definition, not allocating resources efficiently (i.e. translating individual desires and capacities into the mix of aggregate output which best reflects them). Pareto, or potential Pareto improvements could be made if public policy induced private parties to incorporate these previously uncounted values into their market transactions.

There are two dominant models of the way in which externalities arise in market transactions. One identifies a class of "collective" or "public goods." These are produced by human effort, but technical characteristics prevent their producer from restricting supply to those who contribute to their production costs. Some classic examples are law and order, national defence and lighthouses. Alternatively, in cases such as public roads, the costs of creating enforceable property rights are considered to be impracticably high.

The second is the case of the common property resource. Here a natural resource is viewed as providing a range of goods, but property rights cannot be devised to restrict access to it. In addition, there exist a number of negative externalities among users, so that one man's enjoyment automatically diminishes that of all other users (Howe, 1979, pp. 241-255).
The market failure approach to policy analysis is particularly relevant to the case of electric power. First, it is highly capital intensive with a high proportion of fixed to variable costs. In particular, the costs of hydro electric generating plants are almost entirely fixed and those of nuclear and conventional thermal plants progressively less so. Historically, there has been a definite trend toward increasing capital intensity as firms have sought to exploit economies of scale (Jameson, 1977; Messing, et al, 1979). Similarly, the costs of transmission are fixed over significant ranges of output. The result is that the initial or most dominant supplier in any region will have an advantage in meeting new increments of demand, and will have a strong incentive to drive out competitors.

In addition, competition is technically and economically inefficient because of the duplication of facilities it involves. The waste involved in the duplication of transmission and distribution facilities is straightforward. However, even in the area of generation, system integration under a single management has inherent advantages. Electricity cannot be stored after it is generated, so that supply must be continuously adjusted to demand. Because demand fluctuates both diurnally and seasonally, an electric utility always requires some level of reserve generating capacity. The larger and more diversified an integrated system is, the less reserve is required, and the lower the overall costs of generation. In addition, a wider market area often allows larger generating plants to be employed, thus creating economies of scale.

Not only is the electric power industry capital intensive, but the increasing scale of the technology employed means that it typically expands by rather large increments. Hence, it is often prone to the uncertainties of the capital market outlined above. Particularly if the utility is
small, lenders may demand a substantial risk premium to finance a large increment of generating capacity.

The electric power industry makes much more extensive use of natural resources as inputs than most other types of economic endeavour. The use of these resources has generated an extensive set of negative externalities for other users, creating a problem which has dominated the more recent debates concerning the social costs and benefits of electric power. Hydro generation, especially when it involves the construction of regulating dams, leads to extensive modification of river systems, many of them destructive of other water resources. Extensive areas of land may be permanently removed from resource production and settlement, and a large number of negative impacts on the biological productivity of the river basins have been identified (Larkin, 1972; Efford, 1975; Chambers, 1979).

There are, however, a number of positive externalities associated with hydro development. A dam upstream can produce public goods for downstream water users in terms of increased power potential, sewage disposal, navigation and flood control. It also can produce general public goods for the region in terms of new recreation and irrigation potential (Krutilla and Eckstein, 1957, pp. 4-19 and 55-70).

Thermal power generation involves a number of well-known air pollution problems, of which acid rain is the most recent. All thermal technologies create heat disposal problems affecting air and water quality, while coal burning generators produce large quantities of solid waste. The newest thermal technology, nuclear power, is associated with a host of potential environmental problems, the severity of which remain highly uncertain (Fowler, 1975, pp. 136-256).

Regardless of the generation technologies employed, the transmission of electricity also imposes environmental costs on society. It has often
produced a serious deterioration of the visual qualities of land and water, interfered with other uses of land such as farming and forestry, and created damage associated with the use of herbicides to clear rights of way (Ontario Royal Commission, 1980).

The market failure explanation throws a great deal of light on the actual trend of government policy in the area of electric power. The state has consistently intervened to control electric power monopolies through either public ownership or regulation, and, as we shall see, has been instrumental in promoting schemes by which the positive externalities of new power developments could be realized. It has also become increasingly involved in regulating the production of electricity as the negative externalities have become more pronounced.

The market failure approach is in an important sense an institutionalist one. Bargaining via markets and prices is viewed as producing optimal social outcomes, but the necessary market institutions do not exist. However, from the turn of the twentieth century onward, a smaller group of economists known as "institutionalists" has gone much further and rejected the value premises central to welfare economics. While this body of literature has remained outside the mainstream of the discipline of economics, its central premises have been extremely influential in defining the dominant pluralist approach in the fields of planning, policy analysis and public administration.

The degree of rejection varies among writers, but all would, to some degree, question the assertion that allocative efficiency is, in itself, equivalent to the public interest. The state can quite legitimately pursue other goals, and these goals can constitute desirable constraints on market choice and the achievement of economic efficiency. Economic behaviour is viewed as only one aspect of a more inclusive pattern of social behaviour,
and government policy making is essentially a means of making economic activity both feasible and acceptable within this broader frame of reference.

A key starting point for the policy analysis of institutional economists is an attack on the supposed self-regulating properties of the economic system. The market represents not a "natural" or self-balancing allocative mechanism which requires only occasional adjustment to correct for the exceptional conditions identified by welfare economists. Rather, it represents a specific set of institutional relations which must be maintained in a changing social and technological setting. The state's role can be stated in terms of facilitating the necessary adaptations, and public policy becomes a critical link between the economic process and its social context.

The general character of this role is illuminated by the economic historian Karl Polanyi (1957). Polanyi, in looking back over the development of the capitalist market economy in Britain, was struck by the rapidity with which market controls had been replaced by political ones, especially in the critical areas of land, labour and monetary control. The explanation, he contended, could be found in two critical functions which the state performed in this type of economy.

First, since the market itself was not a "natural" state of affairs, it could not be implemented as a social principle merely by dismantling the authoritarian controls of an earlier age. Rather, it represented an organizational artifact which had to be provided externally, and the only force capable of providing it was the state. While this assertion would certainly not be questioned by most liberal economists, Polanyi emphasized both the magnitude of the effort involved and its ultimate incompatibility with the classical ideal of limited government:
There was nothing natural about laissez-faire; free markets could never have come into being merely by allowing things to take their course. . . The (eighteen) thirties and forties saw not only an outburst of legislation repealing restrictive regulations, but also an enormous increase in the administrative functions of the state, which was now being endowed with a central bureaucracy able to fulfill the tasks set by the adherents of liberalism. . . Of the three things needed for economic success -- inclination, knowledge and power -- the private person possessed only inclination (Polanyi, p. 139).

Second, according to Polanyi, the organization of production on the basis of market capitalism tended to produce a continuous series of disruptions in the overall fabric of social life, which in turn produced a growing number of demands for state intervention to limit the operation of markets. The introduction of laissez-faire meant, essentially, that aspects of life which were deeply embedded in the traditional value system of society became simply factors of production.

This process was particularly disruptive in respect to land, which was a finite resource underlying the entire social system of production and distribution, and in relation to labour, in which a central aspect of man's social self-definition was transformed into a commodity. However, while Marx saw these tendencies as contradictions leading inexorably toward social breakdown and revolution, Polanyi saw them as a continuing source of ad hoc demands for state intervention on behalf of affected social groups. Paradoxically, "while the laissez-faire economy was the product of deliberate state action, subsequent restrictions of laissez-faire started in a spontaneous way, laissez-faire was planned; planning was not" (Polanyi, p. 141).

Institutionalist theorists have identified a number of specific areas in which the state has been called on to modify capitalist economic institutions in the interests of broader social values and aspiration. Two
themes of particular relevance to this study are the impact of technological change on the organization of production and the incompatibility of unregulated market forces with the economic aspirations of particular regions.

The development in the 19th century of productive techniques which were both increasingly powerful and ever more capital intensive, had a profound influence on prevailing conceptions of the role of the state in economic life.

As Eric Kierans (1983) has recently pointed out, the entire structure of classical liberal economic thought was elaborated in the age of the small, individual entrepreneur. Subsequently, the unprecedented technological changes of the nineteenth and early twentieth centuries led to the emergence of the large-scale, highly capital-intensive enterprise as the dominant economic force. These changes were reinforced by the creation of the corporation as a legal form. The corporation, while legally a person, was an organization which could amass wealth and power well beyond the life span of any individual.

Just after the turn of the century, Veblen identified the tensions which had arisen between the rapidly changing technological and institutional conditions under which most production took place and the disruptive tendencies inherent in a laissez-faire market system (Dorfman, 1959, pp. 352-360). Galbraith (1978), combining Veblen’s idea with the burgeoning literature on organizational behaviour, described an economic structure which bore little resemblance to classical liberal assumptions. By the mid-twentieth century, Galbraith asserted, the technological and organizational imperatives of production had seriously undermined the coordinating role of markets. In those dominant sectors of the economy
characterized by large scale production, markets are being continuously undermined by conscious planning and administration.

The growing size of the business enterprise leads to more and more productive activity taking place within, rather than between corporate entities, thus increasing the role of administration in coordinating production. When the production of new goods and services (or new methods of producing old ones) requires a substantial commitment of resources, competitive markets involve substantial risks. The production of a good requiring such a commitment cannot be contemplated unless there is some way of ensuring that these inputs will be available at prices and quantities dictated well in advance. Thus, markets are supplanted by the vertical integration of large firms and the fixed contractual arrangements with labour and suppliers become common.

In such a situation, the need to exercise control over the final consumers of goods is equally strong. While various types of market research might indicate a demand for a product, a firm can no longer simply afford to hope that this demand will materialize on its own at the appropriate moment. Increasingly it will perceive the necessity of ensuring that the required demand will exist.

Galbraith's portrayal of the institutional and technological underpinnings of contemporary capitalism directly questions two of the most critical assumptions of the self-regulating market: consumer sovereignty and profit maximization. The validity of the notion of the autonomous consumer (in whose ultimate service the entire productive system is said to operate) is fatally undermined in two ways. First (following from the above discussion) there is increasing pressure on the firm to interfere with consumer preferences. Second, the peripheral and psychic character of much modern consumption lends itself to manipulation. Under these conditions,
the demand for a wide range of goods becomes largely a function of what is produced and how it is marketed.

Profit maximization, which treats the motivational structure of economic organizations as equivalent to that of individuals, becomes irrational when allowance is made for the structure of the productive institutions in which the relevant individuals must function. As management becomes distinct from ownership, managers have only limited incentives to maximize profits on behalf of a large and diversified group of owners, who, in any case, have difficulty ascertaining whether profits are at their maximum possible level.

Rather, large corporations come to be run according to a hierarchy of motives having to do with the survival and growth of the organization and the advancement of the careers of its senior employees. Organizational autonomy, which requires some minimum level of profitability is paramount because it is vital for the effectiveness and morale of managers. Corporate growth, by offering new avenues for career advancement and "empire building," serves the interest of the corporation's actual decision-makers much more directly than profit maximization. Similarly, the pursuit of technological achievement enhances the prestige of the corporation's image in a society where such achievement is highly prized.

What is the significance of this interpretation for the role of the state in regulating the operation of the modern capitalist economy? First, its role as underwriter or facilitator of private business activity becomes a much more critical one. The more the large corporation and its management become committed to planning, the more the state is required to provide economic stability. Thus, manipulation of aggregate demand ensures private purchasing power, while military and civilian procurement creates an assured market for technically complex products. The role of the state
in ensuring the availability of critical inputs to the productive process (e.g. educated manpower, strategic raw materials transportation and communications infrastructure) and in policing market arrangements also becomes more demanding as the operations of the corporation increase in scale and complexity.

In addition, the increased ability of private corporations to influence the economic and social environment through planning increases the need for the state to assume an overall guiding or coordinating role. In the words of Rexford Tugwell, a prominent administrator and policy theorist of the New Deal Era:

Planning is not direction when it is at the service of special interests in society; it becomes direction only when it can affect economic divisiveness; becoming a unifying, cohesive, constructive, and truly general force. Its importance in our affairs was certainly gained through sheer effectiveness. The fact that this smoothness and efficiency accentuates conflicts by making both sides more effective implies, however, that a point in its growth and extension is reached at which it must be subordinated to a general rather than special purposes on penalty of its results becoming destructive to society -- and incidentally to itself (Tugwell, 1975).

In Galbraith's (1978, pp. 332-333) words, the state is forced to perform the demanding task of protecting "...the neglected dimensions of life against the powerful adaptive motivation of the corporate planning system... There must be some political force for accomplishing what the planning system ignores and, indeed, holds to be unimportant."

The dual role of the state in both facilitating the functioning of the private market economy and in altering its outcomes in the interest of broader societal goals has been viewed as particularly important in relation to the political economy of particular regions. Even if the market were capable of producing an optimal allocation of resources from a
global standpoint, there is no reason to suppose that it will produce outcomes satisfactory to regional interests. While traditional economics views markets as allowing all regions to realize their comparative economic advantages through trade, these advantages are not always fixed. In a variety of ways they can be altered by collective action. Hence, states, in the name of facilitating economic development have tended to become quite intimately involved in facilitating or underwriting the economic growth of particular regions. The extent of this role will vary from place to place according to the extent to which such barriers to economic activity exist and are susceptible to removal by public policy initiatives.

One variant of this theme which is particularly important for this study is the "staple approach" to political economy, developed by the pre-war scholarship of two Canadian economists, W.A. MacIntosh (1964) and Harold A. Innis (1933) to describe the development of resource dependent regions like Canada. In its most basic terms, the approach posits a process of regional economic development centered around the extraction and export of staple products to meet the demands of more industrialized areas. A "staple" refers to a natural resource based product in which the value added by the resource is high relative to that added by further processing.

Hence, the economic development of new "empty lands" like North America was pursued by combining the available indigenous resources with imported technology, and the characteristics of the resulting staples (e.g. their geographical location, bulkiness and processing requirements) were fundamental determinants of future growth patterns.

This broad interpretation was given a more systematic theoretical content in the post-war period with the incorporation of the idea of linkages by the American scholars Hirschman (1958), North (1955), and Perloff and Wingo (1961), followed by Watkins' (1963) theoretical
reformulation. Depending on the production function of the staple in question, its extraction and export stimulates two types of linked industries. Forward linkages refer to those industries for which the resource in question is an input to the production of a more processed product. The potential for such linkages can range from very low (e.g., trapping) to moderate (wheat cultivation and fishing) to very high (as in forestry and metal mining), and the extent to which they are actually developed depends on a complex combination of locational, economic and institutional factors.

Backward linkages refer to industries producing those goods and services which serve as productive inputs to particular staple extracting industries. These also vary with the character of the staple. For example, products which are bulky relative to value (e.g., mineral ores, lumber and wheat) tend to develop more extensive transportation linkages relative to those (e.g., fish and furs) which are less so. Both the extraction of the staple itself and the linked industries associated with it, create a series of final demand linkages as the returns to the factors of production employed are re-spent in the region, creating a multiplier effect. This effect is limited not only by the success in developing forward linkages, but also by the propensity of a particular region to import rather than to produce goods locally.

The staple approach sees a typical resource-rich region developing through the elaboration of these linkages. According to the version suggested by MacIntosh (1964) and elaborated theoretically by North (1955), such a region begins by importing both capital and labour in response to an external demand for a particular staple product. As staple production expands, both backward and forward linkages begin to multiply as entrepreneurs and new capital move in to exploit these increasingly
attractive production possibilities. At the same time, final demand linkages create a market for a range of consumer goods, and as it grows, many of these begin to be produced locally rather than imported. Eventually, the region generates its own capital requirements and its industrial activity becomes progressively less tied to the original staple base. According to North (1955 p. 256):

At this point a region is no longer young. . . . As a region matures, the staple base will become less distinguishable, since its production will be so varied. We may expect therefore that the differences between regions will become less marked, that secondary industry will tend to be more equalized and indeed in economic terms, that regionalism will tend to disappear.

Initially the role of the state in this developmental process arises out of the need to overcome the frictions inherent in utilizing European productive technology in the "empty land." Before the production of bulky staples like wheat, timber and minerals could occur, large investments in transportation and other infrastructure were required, and both national and regional governments were inevitably called on to underwrite the risk that these entailed.

At the same time the facilitative role of the state was enhanced by the fact that it initially held title to the great bulk of land and resources, so that the emerging pattern of economic activity depended, to a large degree, on the allocative policies pursued at the political level. During the later stages of the development process the state is often called upon to facilitate the development of forward linkages into resource processing, many of which are also capital intensive and require extensive infrastructure (e.g. metal smelting and pulp and paper).

While some aspects of this role can be interpreted as the removal of particular instances of market failure, there is an inevitable tendency for
the governments of staple-dependent regions to become concerned mainly with growth rather than economic efficiency. North notes that "...the political attitudes of the region will be largely directed toward improving the position of its export base" (North, 1955, p. 251), while Canadian economists like Pearse (1970) and Bucovetsky (1971) have noted a tendency for such attitudes to result in the promotion of new resource developments regardless of their economic merits. For example, Bucovetsky identifies a dominant belief in "mineral fundamentalism," a view that implies "...that since there are undiscovered minerals in the good earth of Canada, it would be wasteful not to unearth them. If costs exceed commercially valued benefits, so much the greater reason for public subsidy..." (1971, p. 57).

The demands of the staple economy, when combined with the tendencies toward corporate power identified in our other strand of institutionalist thought, have also produced pressures on the state to alter market outcomes to make them more consistent with broader regional interests. Both the capital intensive nature of many staple based industries and the initial reliance by the region on imported capital lead to the dominance of large externally based private corporations. As Gunton (1981) has noted, the planning activities of these corporations tend to be based in their home regions, with the development of the resource based region having a relatively low priority. In such situations comparative advantage in the development of linked industries can be created by public and decision-making aimed at influencing the procurement of productive inputs so as to achieve greater regional diversification through backward linkages.

The existence of economic rent, arising out of the production of many staples, has also led governments to alter economic outcomes in the public interest. As elaborated by Kierans (1973), Richards and Pratt (1979), and
Gunton and Richards (1987), rent resulting from the superior qualities of the natural resource base, represents a key regional attribute in the developmental process. To the extent that it is appropriated by externally based corporations, the region loses a major source of new capital formation. In addition, the retention of such rent by private corporations can lead to productive inefficiencies in resource industries and the distortion of regional economies. Since the 1960s, governments in resource-dependent areas throughout the world have moved to appropriate rent in a variety of ways.

The existing literature on the historical trend of electric power policy and planning provides interesting illustrations of some of the themes explored above. First, the large-scale capital intensive characteristics of the power industry, combined with its key importance as a technical force in the development of contemporary productive processes, has made unrestrained capitalism incompatible with public expectations. Hence, the early prevalence of demands for regulation and the assumption by the state of the role of social arbiter between producers and consumers. The subsequent lack of any outstanding public issues during the early post-war period of significant expansion and falling costs led writers like Bernstein (1955) to suggest that regulatory commissions had been captured by the interests they were supposed to regulate.

Nevertheless, when the twin problems of growing externalities and rising marginal costs began to be felt by other segments of society, the pattern of regulatory policy changed significantly. The forces which had previously resulted in regulatory capture waned as new group pressures were brought to bear on the agency. A much more dynamic pattern of policy outputs resulted, including such innovations as the pricing of exter-
nalities, more emphasis on marginal cost pricing and the introduction of "lifeline" electricity rates for disadvantaged groups (Anderson, 1981).

But, in electric power, the role of the state has gone much further than that of a social arbiter between producing and consuming interests. Electric power has been widely regarded as a powerful tool of both national and regional economic developments, one which would remove barriers to economic expansion and profoundly improve the fortunes of particular regions. From its earliest beginnings as a viable technology, electricity was viewed as having the potential to create a second industrial revolution, the social and environmental effects of which would go a long way toward eliminating the evils associated with the first. The centralization of coal-fired heavy industry in crowded, smog-filled cities would be replaced by a significant decentralization of economic activity to regions in need of such development, along with the revitalization of stagnant agricultural communities (Bruere, 1925). As multiple purpose river basin development replaced the wasteful extraction of combustible fuels, a socially disruptive pattern of population migration would be reversed and efficient use of a nation's or region's resource base would result.* As Mumford (1934, pp. 255-256) evocatively put it:

The smoke pall of paleotechnic industry begins to lift; with electricity the clear sky and the clean waters of the paleotechnic [or pre-industrial revolution] phase come back again: the water that runs through the immaculate disks of the turbine, unlike the water-filled washings of the coal seams or the refuse of the old chemical factories, is just as pure as when it

*It is worth noting the relationship between electric power development and the support of urban and regional planners for more decentralized communities. This relationship was consciously recognized by the American regional planning movements of the 1920s, particularly the Regional Planning Association of America. See Sussman (1976) and Friedmann and Weaver (1979).
emerges. Hydro-electricity, moreover, gives rise to geotechnics: forest cover protection, stream control, the building of reservoirs and power dams.

In the United States, this vision became particularly compelling during the depression of the 1930s, when public corporations like the Tennessee Valley Authority were organized to transform the resources of the river basin so as to create new more dynamic regional economies.

The idea that government involvement in the transformation of hydro resources into electric power could provide a powerful impetus for economic development was particularly prevalent in Canada. Beginning with Innis, (1933), the relationship of electric power to the problem of economic development has been viewed as critical to an understanding of the substantial government presence in the industry. The dependence of frontier development on forestry and mineral extraction made energy a critical economic input, especially in the pursuit of linked industries.

Similarly in the manufacturing heartland of Ontario, the overcoming of several economic disadvantages relative to the United States led to the perception that rapid exploitation of a miraculous new power source was essential (Nelles, 1974). Hence, both on the frontier and in the emerging manufacturing heartland, the provision of large quantities of cheap electric power became a key (often the key) to economic progress.

The natural monopoly characteristics of electric power when combined with this concern for economic development, led to the widespread adoption of public enterprise as a policy instrument. The high fixed costs associated with the most economically promising technology, hydro generation, in itself made reliance on private corporations difficult without significant underwriting by government. At the same time the natural monopoly characteristics of the industry gave its management the
ability to exert a determining influence on the economy it served. In Dales' (1957, pp. 10-11) words:

...to speak of complete independence between supply and demand is always suspect in an industry where, as one writer put it "the consumer and the company are tied to each other physically by...cables." ...the effective limits to the expansion of an electrical enterprise take the form not so much of the shapes and slopes of the cost and revenue curves, but of resource limitations, government policy, public opinion, and the fighting ability of rival enterprises (Dales, 1957, pp. 10-11).

Entrepreneurial control over the production of electric power automatically involved a degree of control over the structure and future direction of the economy as a whole. While the regulation of private firms could effectively limit the excess profits generated by monopoly control, it was inherently less able to influence the other underlying costs of production, or to force private firms to expand in pursuit of new economies of scale.

The tendency of the state to intervene in economic markets in order to achieve goals which transcend the principle of pure economic efficiency has led a number of social scientists to stress the importance of political markets. In an influential study of the political economy of post-war industrial society, Dahl and Lindblom (1953) sought to integrate markets and the techniques of socio-political decision making into an overall theory of social choice. Truman (1951), elaborating on the earlier work of A.F. Bentley, posited the idea of a self-regulating political marketplace in which the lobbying activities of competing interest groups resulted in government policy responding to a full range of societal values. This seminal idea, adopted by Lindblom (1959) in his influential view of the policy process (see below, pp. 58 - 59) has been characterized by Lowi (1969, p. 29) as the dominant public philosophy of the post-war period:
the remaining self regulating mechanisms have shifted in very large part from the market competition to group competition -- from self-regulation through economics to self-regulation through politics. These factors become sort of a one-two punch. The first led finally to an acceptance of statism; i.e., the overwhelming proportion of leaders embraced positive government. With its rise began a long dialogue with laissez-faire over the value of public control that led to the reclassification of laissez-faire as a conservative doctrine. The second led to pluralism, the intellectual core of the new liberalism which would eventually replace capitalism as the public philosophy by a process of absorption. The new public philosophy, interest-group liberalism, is the amalgam of capitalism, statism and pluralism.

The neo-marxist approach, particularly the more recent literature on the theory of the state, follows the institutionalists in locating the impetus for government involvement in economic life in the interaction between society and the institutions of the capitalist economy. But, the marxist approach has two distinguishing features; an ethical critique of capitalism stemming from the original work of Marx, and a view that the role of the state is inherently concerned with maintaining this undesirable economic system because of its subordination to the interests of the dominant economic class.

Central to the ethical critique is the idea that private ownership of the means of production gives the capitalist both the means and the incentives to exploit those who work for him. On one level, this exploitation is conceptualized (in terms of Smith's and Ricardo's labour theory of value) as the extraction of a portion of the product (the surplus value) produced by the worker's labour (Heilbroner, 1980, pp. 133-167). In more general terms it questions the classical liberal's association of the market mechanisms and individual freedom (McPherson, 1968).
The Marxian vision of economic life is not one of voluntary mutual adjustment, but of an exploitative hierarchy based on coercion, in which the freedom of those at the apex is obtained at the expense of those at the base. Through its enforcement of private property, the state is viewed as delegating its coercive function to private economic interests, thereby vitiating the liberal's association of markets and voluntary association.

While the view of the state as a "...committee for managing the common affairs of the whole bourgeoisie" goes back to the original writings of Marx and Engels (Panitch, 1977, p. 3), the recent neo-marxist literature has emphasized that this key determinant of government intervention remains paramount despite the state's obvious growth in size, scope and complexity.

With the growth of the scale and complexity of economic life, the state must take an ever more important role in what Poulantzis terms the "organization of hegemony" (Poulantzis, 1975; Mahon, 1977). The interests of specific segments of the owning class and its representatives periodically diverge and these must be reconciled if the long term interests of the group as a whole are to be protected. However, in order to achieve this goal, the state must have a degree of "relative autonomy" from these specific interests.

In relation to economic life as a whole, the neo-marxist approach follows the institutionalist one in emphasizing the role of the state in supporting the capitalist structure, while, at the same time, modifying it to take account of broader social needs. These are termed respectively, the "accumulation" and "legitimation" functions (O'Connor, 1973). The interpretation of the former follows roughly along the lines presented above in relation to the institutionalists. The continuation of
opportunities for private accumulation is viewed as depending on ever greater support from the state.

Unlike the protective function identified in the writing of the institutionalists, the Marxian legitimation function is clearly perceived as deriving from, and subordinated to, the state's role in facilitating private accumulation (i.e., it merely legitimizes private accumulation, thus allowing it to continue). Some neo-Marxist writers like Miliband (1964) and Poulantzis (1974), portray this function largely or wholly in symbolic terms. The state does not really make the economic system more acceptable to the non-privileged classes by altering the system so much as change their perceptions of the system. This is seen as being achieved through such ideological metaphors as a "healthy economy," "formal equality" and "democratic government" as well as by the propagation of upper class social norms via the mass media and educational system (Mahon, 1977, p. 172; Clement, 1975, pp. 270-366).

Others like O'Connor (1973) stress the role of legitimation in changing social conditions themselves. However, because such changes are undertaken primarily to maintain rather than alter the economic system, they are viewed as necessarily limited in scope.

The viability of the above conception depends on a demonstration that the economically dominant class is able to control the agenda of a relatively autonomous state. The literature contains two lines of interpretation in this regard, which have been termed "instrumentalist" and "structuralist."

The instrumentalist perspective simply asserts that the class which rules economically is able to rule politically. The pluralist model, which posits the responsiveness of the state to a broad spectrum of interests, is explicitly repudiated. Rather, it is held, the economic ruling class,
through direct interaction and common class ties with the political elites, is able to consistently and systematically control the direction of public policy. If the economic and political elites come from similar back­grounds, attend the same schools, and absorb the same beliefs, then they will behave in ways which mutually reinforce one another. Since such relationships permeate the complex institutional structure of the modern state, the possibility of fundamentally altering the workings of the economic system in favour of less privileged classes (e.g. through the election of a socialist party) is seen as remote.*

As Habermas (1975) has pointed out, there are a number of difficulties with this approach. In the first place an enormous measure of rational foresight must be attributed to the ruling class if it is to identify successfully its real long-term interests and decide whether particular "legitimation" measures are consistent with it. There seems to be no inherent reason why other class interests could not take advantage of both the increasingly fragmented nature of the capitalist class and the "relative autonomy" of the state to pursue at least some non-capitalist ends.

Even if it could be demonstrated that the elements of the capitalist class could reconcile their diverse interests under the leadership of a "hegemonic fraction," the assumption that the state apparatus can

*It should be noted that, while this interpretation is used to justify a marxist portrayal of the state, it is (as Poulantzis takes pains to point out) not itself marxist. It owes more to the institutionalist interpretation in which the concentration of ownership in the economic system allow the rulers of industry to behave as a cohesive political unit, and to elite theory, in which modern society is portrayed in terms of a number of centers of institutionally-based power, each controlled by a small cohesive group at the top. See, for example, Galbraith, (1978) Mills (1956), and Porter (1965).
actively plan, put forward, and carry through a central economic strategy, in whoever's interest, cannot be empirically verified" (Habermas, 1975, p. 59). Finally:

The theory of state-monopolistic capitalism overestimates (in the same way as western elitist theories do) the significance of personal contacts and direct regulation of transactions. Investigations into the recruitment, composition, and interaction of various power elites cannot adequately explain the functional connections between economic and administrative systems (Habermas, 1975, pp. 59-60).

These limitations have led a number of marxist scholars to put forward an alternative "structuralist" interpretation. According to Offe (1975), while the state has become increasingly important to the functioning of capitalist societies, its freedom of action is subject to basic structural limits. Although the state has an explicit "...mandate to create and sustain conditions of accumulation," it is barred from direct participation in it. "...Enterprises are said to be free in the sense of 'exempt from state control'" (Offe, 1975, p. 126).

These limitations are reinforced by the fact that the state's fiscal resources (and thus much of its power) are derived solely from the accumulation activities of private enterprise, and thus depend directly on its success. These conditions, in a general sense, combine to give those who control the means of production a veto power over public policy and place limits on the extent to which legitimation can be concrete as opposed to merely symbolic. Or, to put the matter more precisely, the state, no matter who actually controls it, is forced to give priority to the demands of the dominant economic classes (Block, 1977).

Although there are no detailed accounts of electric power policy from an explicitly neo-marxist perspective, the logic of the interpretation suggests that the extension of state control over the industry can be
traced to the fact that demands for this intervention are made by dominant class interests. This interpretation is certainly consistent with the documented facts in the case of Ontario. Nelles has emphasized that the struggle over public power in Ontario was mainly waged between two groups of capitalists, the manufacturers and the financiers with the former being successful in pursuing its interests through the provincial state (Nelles, 1974).

More generally, Stevenson (1979) has argued that the active role played by provincial governments in promoting resource based development has resulted from the demands emanating from particular "fractions" of the capitalist class:

Class fractions that perceive the central government as more sympathetic to opposing interests than to their own will tend to seek redress by strengthening the provincial level of government, particularly if they are geographically distributed in such a way that one provincial government represents a geographical area within which one of the frustrated class fractions is particularly important and influential. In such circumstances, the provincial government in question will become in a sense the spokesman for the class fraction concerned, as well as carrying out on its behalf the Canadian state's traditional function as the ally and supporter of private enterprise (Stevenson, 1979, p. 83).

Provincial ownership of natural resources makes that level of government a particular focus for that "class fraction" representing the multinational resource corporation.

The idea that political markets are fundamentally biased in favour of certain societal groups and that the role of the state can be explained in terms of the efforts of these groups to further their own interests is not confined to neo-marxist writings. Two groups of social theorists, the neo-conservatives and the public choice theorists have used the basic
economic assumption that individuals behave in a rationally self-interested manner to demonstrate the shortcomings of political markets. Contrary to the more idealistic assumptions of political philosophers, these theorists assume that such self-interested rationality is not abandoned in favour of more altruistic behaviour when individuals move from the economic to the political sphere.

The normative foundation of this approach was laid in the pre-World War II writings of the Chicago School's founding figures, Frank Knight and Henry C. Simons. The core of this scholarship represented a re-affirmation of the ethical basis of the classical liberal model of society as outlined above. The emphasis was placed squarely on the ideal of individual freedom, with a competitive, free-market system being viewed as its essential prerequisite.

Simons (1948) took pains to emphasize that "economic efficiency" referred specifically to the responsiveness of the productive system to individual demands, thus linking it ultimately with freedom. Frank Knight (1947) emphasized the nature of economics as ethical or "assumer" discipline (Hirsch and Hirsch, 1976). In other words, the empirical accuracy of the propositions of classical economics, while important, were irrelevant to the ultimate validity of the system. These assumptions were desirable ethical postulates, and the science of economics made predictions of social outcomes possible to the extent that they could be implemented institutionally.

This ethical stance is reflected in Simons' treatment of both the institutional prerequisites of a classical political economy and the role of the state in securing them. The dispersion of economic (and thus political) power is viewed as particularly vital. Not only is this condition necessary to ensure competition and efficiency, but more
importantly, its abrogation leads to the emergence of private centres of power, and the usurpation of the state's control over production. Once government begins to regulate the relationship between competing centres of "countervailing power," both political rule based on law (or general principle) and truly democratic procedures become impossible.

During the post-war period, two variants of this overall orientation have emerged. In the Chicago School writings of Milton Friedman and his followers there is a marked move toward the view that the status quo, though imperfect, bears a plausible resemblance to classical liberal ideals. The danger lies not in any fundamental underlying changes in the economic system itself (such as those summarized by Galbraith or the neo-marxists), but in the intervention of the state in its operation.

While the work of the public choice school has proceeded from the same basic analysis of the consequences of individual self-interested behaviour for the functioning of governmental institutions (cf. Stigler, 1971; Olson, 1971), both its scope and normative emphasis have been somewhat different. First, more sustained effort has been given to establishing empirically the proposition that policy outputs can be explained on the basis of the self-interest of the participants in the decision making process (Russell, 1979).

More fundamentally, although Russell (1979, p. 8) has pointed to the "...conservative tone of much of the public choice literature," one of its distinctive features has been a concern with redesigning governmental institutions in order to translate more effectively the preferences of individuals into collective societal decisions (Buchanan and Tullock, 1962; Haefele, 1973; Ostrom and Ostrom, 1971; Ostrom, 1973, 1975). Rather than simply accepting the shortcomings of existing governmental institutions as
an argument for a return to laissez-faire, Ostrom (1973, p. 64), for example, argues that:

If individuals are to surmount the problems inherent in the tragedy of commons and are to avoid the pathologies of the fully developed bureaucracy, they are confronted with the task of conceptualizing alternative institutional arrangements for the organization of collective or public enterprises. The structure of events inherent in a common-property resource or a public-good situation provides us with a basis for conceptualizing the community of interests which need to be taken into account in designing alternative institutional arrangements.

Whether accompanied by an explicit value position concerning the role of the state or not, all neo-conservative and public choice analysts accept the assumption that individuals behave in an economically rational manner. That is, they try to obtain as much individual benefit as possible from their activities for the least expenditure of valued resources. Therefore, in the discussion which follows, both schools are treated as a common approach with distinctive differences of interpretation being identified as they arise.

For both neo-conservatives and public choice theorists, the state cannot be treated as a single rational decision-maker for society as a whole, an assumption underlying the market failure approach and much of the analysis in the institutionalist/pluralist tradition. Rather, the state represents an institutional arena through which the demands of rational self-interested actors are imposed on society as a whole. Politics constitutes another type of marketplace, but unlike economic markets, it is one where the outcome of the bargaining process is less than ideal.

The well known work of Mancur Olson (1971) uses the postulate of rational behaviour to argue that, contrary to the assumptions of much pluralist writing, the political bargaining process is inherently biased in
favor of some types of interest and against others. Fundamentally, this restriction arises out of the fact that any gains which a group manages to extract from the state have the character of public goods for that group. No member can be excluded from the benefits obtained regardless of whether he contributes to the costs of obtaining them.

As a result, the propensity to make demands on the political system is a function of group size and composition. A single individual will have a strong incentive to expend resources on political action because he will obtain all the benefits resulting from it. But, unless this "individual" is a large organizational entity (e.g. a particularly large business corporation or labour union), the demands expressed are not likely to be very effective. Even if a group is composed of numerous individuals, lobbying would take place if one of these individuals obtained such a large part of the benefit that it would be worth his while even in the absence of the other member's contributions.

In a moderately large group, whose members would benefit equally from a politically obtained good, the outcome is indeterminant. Up to a certain group size, the behaviour of each member can be fairly easily ascertained by others, and bargains can sometimes be struck to share the costs of a collectively obtained benefit.

For large groups, however, the likelihood of a spontaneous expression of political demands is remote. From the point of view of each member, his contribution will make an imperceptible contribution to obtaining a benefit which he must share with the entire group. If nobody else contributes, any individual payment is a dead loss, and even if everybody else contributes, the individual can enjoy approximately the same level of benefit if he withholds his share of the costs. Bargaining among members to agree on a sharing of costs is, itself, too costly in very large groups. In fact,
according to Olson, the only reason that large groups organize themselves at all is that the organization can provide more "selective incentives" to those who contribute.

This analysis has several important implications. The first is that the business corporation and the labour union, because they are "individuals" which enjoy potentially large benefits from political lobbying, will be particularly effective in pressing their demands; especially when a policy problem is centred around a highly concentrated industry. Conversely, those large groups which bear costs or enjoy benefits in a diluted form will not coalesce to press their demands effectively. Hence, for example, a negative externality generated by an industry will not easily be remedied through the political system if its costs are widely distributed.

A similar analysis has been used by George Stigler (1971) and other Chicago School economists to construct an "economic theory of regulation." According to this theory, government regulation (and presumably any other form of public policy) does not arise from a broadly based set of demands for the control of an industry in the public interest. Rather, it arises directly out of the economic calculus of the regulated firm. In any industry, a firm or group of firms can advance their self-interest in one of two ways. They can play by the existing rules of the market, or they can attempt to alter the rules themselves in their favour. The strategy employed will depend entirely on the associated costs and benefits. As industrial concentration increases or as some firms become particularly large relative to the others, the benefit/cost ratio associated with the political lobbying alternative improves. Public policy, then, can be understood only in terms of economic actors trying to pursue their self-interests by political means.
The effectiveness of the key constitutional antidote to such outcomes, the responsiveness of governments to the broader wishes of the population via elections, has been undermined by another public choice theorist. Politicians, asserts Anthony Downs (1957), have an overriding self-interest in seeking and holding on to office. Even if they are not as blatantly self-serving as this simple assertion implies, election or re-election are essential pre-requisites for achieving other goals.

Given a unimodel distribution of opinion along a roughly left-right political spectrum (a situation typical of most Anglo-Saxon capitalist democracies) articulation of strong collective values by politicians is unlikely. Each political party, in order to achieve electoral success, must appeal not to the bulk of its supporters, but to the marginal voter (i.e. the non-committed voter whose support is essential to provide the necessary margin of victory in the next election).

Since, empirically, the proportion of voters who shift allegiance from party to party is relatively small, the actual policy choices of a particular governing party do not really reflect the collective values of its supporters. Rather governments will find themselves having to pursue policies which confer quite concentrated and visible benefits on marginal voters while imposing highly diffused costs on infra-marginal voters.

Given the relatively high degree of uncertainty among the electorate generally, the government will attempt to portray policies in this light even if they actually have other consequences. Neither will it pay politicians to take firm stands on issues, even if these positions reflect the overwhelming sentiment of party supporters. To remove uncertainty in this way would risk alienating the uncommitted marginal voter.

Finally, the uncertainty among the electorate reinforces the dominant role of concentrated interest groups as described above. The generation
and dissemination of selective information on the consequences of government policy gives a concentrated interest group the ability to influence decisively the behaviour of the marginal voter. Hence, the pressures on government to respond to the demands of such concentrated interests is increased (Trebilcock, et. al., 1982, pp. 31-32).

In some instances, government intervention in the electric power industry appears to be consistent with the public choice and Chicago school interpretation. The support for state public utilities commissions by electric power firms in the United States is a widely observed historical fact; one which undoubtedly led Stigler to formulate his economic theory of regulation. However, the fact that the motivation for corporate demands for regulation arose as much from fear of municipal control and public ownership as it did from a desire to suppress competition, subtracts from the power of the argument. The neo-conservative approaches discussed above are even less successful in explaining the widespread political mobilization around concern for the environmental externalities of electric power generation, the incidence of which is often quite dispersed (Mitchell, 1979).

While, as we shall see shortly, there has been a fair degree of analysis of the behaviour of public corporations in the electric power industry, there has been none focusing on the rationale for nationalization. The logic of the argument, however, would suggest two reasons for such intervention. The first (following Olson, 1971 and Stigler, 1971) relates to the demand by large single interests to advance their own economic well-being by persuading the state to supply a key economic input at a price below that generated by the unregulated market. Such an explanation would be convincing (in terms of the theory) if electric power represented a significant productive input for the economic interest in question, and
if the interest was concentrated enough to make the achievement of this goal appear feasible. Second, (following Downs, 1957) public ownership could represent a means used by politicians to further their self-interest in re-election by conferring highly visible benefits (i.e. lower electricity rates) on important groups of voters.

The early experience of Ontario in pioneering the concept of public power appears consistent with both these hypotheses. Nelles' (1974) case study clearly shows the dependence of important industrial interests on energy costs and their key role in organizing support for a public presence in the emerging electric power industry. This support, combined with the attractiveness of low cost power to voters, generated the political will to undertake nationalization in opposition to powerful financial interests.

2.3 The Use of Policy Instruments

In seeking to understand the dynamics of economic policy formation in areas like electric power, the question of how the state intervenes is as important as why it does so. If, as we shall explore in the next section, there are important constraints or shortcomings associated with the use of policy instruments, the question of which instruments are adopted in particular circumstances becomes one of more than passing interest.

We have already noted that governments can seek to alter economic behaviour through allocation (the granting of public resources to private interests in return for desired activities), regulations (authoritative rules with penalties for non-compliance) and entrepreneurship (the direct public production of particular goods and services). Increasing levels of government involvement are often associated with shifts in the relative emphasis placed on each of these institutional forms.
The market failure approach, in focusing almost entirely on the economic rationale, has little to say on the subject of why particular instruments are selected to restore efficiency to the market. Given such presumptions of economic rationality and assuming that government functions as a single decision centre, one would expect both that the least cost means or policy instruments would be employed to this end; and that distributional impacts directly traceable to public policy would be either non-existent or random.

Unfortunately, none of these expectations are borne out empirically. Economists have long lamented the tendency of governments to employ inefficient means like regulation in place of market-like mechanism, and distributional consequences have been anything but neutral or random (Schultze, 1977; Dales, 1968; Kneese and Bower, 1968).

In most of the work of institutionalist theorists, the approach to the question of policy instruments is functional. Given the ideological dominance of Shultz's rebuttable presumption (see p. 15 above), "... politicians have a strong tendency to respond to policy issues by moving from the least coercive governing instruments to the most coercive" (Lowi, in Trebilcock, et. al., 1982, p. 23), and the strength of this movement will be determined by the particular characteristics of the problem they face.

The growing complexity of economic transactions, for example, makes regulation by administrative discretion an essential tool for controlling them in an effective and flexible manner. The adoption of regulation as the dominant policy instrument and the independent regulatory tribunal as the main governing institution became almost universal when the state assumed the role of social arbiter in the electric power industry.
Similarly, the perceived need by governments to alter, in a more fundamental way, the structure of an economy in the interests of particular groups or regions implies the use of entrepreneurship via the publicly owned corporation. For example, Corry, writing in the 1930s, saw in the public corporation, "...a form of organization which promises to incorporate the advantages of private and public enterprise and to eliminate the most objectionable features of both" (Tupper and Doern, 1981, p. 23).

During the same period, regional planners saw the public corporation as a means by which the state could be used to achieve public purposes previously unattainable by the more traditional means of taxation and regulation. Even the pre-war conservative economist Henry C. Simons endorsed public ownership of electric utilities as more efficient and effective than the regulation of private corporations. We have already noted that the attempts by Canadian provincial governments to use electric power as an instrument of economic growth could be more easily pursued by the public corporation than by the regulatory agency (See above, p. 37).

The neo-marxist work relating to the choice of policy instruments is also functionalist in its approach, but in a rather different sense. In a variation on the theme prominent in institutionalist writings, Clause Offe (1975) argues that the qualitative requirements of the state's accumulation function have changed. Whereas the early capitalist state could underwrite private accumulation through "allocation," its contemporary counterpart must resort extensively to "production." The former term means that the state simply allocates resources that it already possesses in the aid of private profit making. These consist mainly of the various manifestations of its authority, such as legislation, regulation, or fiscal capacity, but can also include physical resources such as land. Production, on the other hand, means that the state must fill gaps that develop in the economic
structure by actually producing various types of goods. Offe claims that the increasing importance of the latter has significant implications for the way in which the policy process functions, a theme to which we will return shortly.

In more specific terms, these functional requirements are fulfilled through the evolution of administrative structures which "...are objectively functional for capital realization," regardless of the professed intentions of administrators or politicians. These administrative structures in turn, act as "...selection rules that predetermine the consideration or suppression of problems, themes, arguments and interests" (Habermas, 1975, p. 60).

This theme is also elaborated by Poulantzas and has been applied to the study of Canadian economic policy by Rianne Mahon (1977). According to Mahon, the very structure of the administrative agencies of the state translates particular class interests (in this case the owners of finance capital) into policy via the dominance of particular agencies (particularly the finance department) in the internal decision making process. To the extent that other groups and interests representing subordinate classes attempt to participate, they are contained by the subordination of their representative agencies (e.g. the department of labour) in the government structure. The very fact that this process is organized in a structural way makes it possible for the dominant classes to portray it as much more open than it really is, hence providing an added measure of legitimation.

Writers in the neo-conservative tradition have focused more explicit attention on the theoretical explanation of the choice of policy instruments than either institutionalists or neo-marxists. In this body of writing, two distinct approaches to this problem are evident, one
concentrating on the "supply" of such instruments and the other on the "demand" for them.

The supply side approach follows a line of reasoning initially developed by Coase (and is consistent with much institutionalist thought). Coase's (1937) original article sought to explain why the private business corporation exists at all. In other words, why aren't all economic transactions between individual players co-ordinated by markets and contracting arrangements?

The reason, says Coase, is that the use of markets to co-ordinate productive activities (especially complex interdependent ones) is not costless. Extensive monitoring and enforcement activities must be undertaken, and it may be cheaper simply to purchase the right to direct the activities of the participants in a productive process. According to Coase, the boundaries of the firm lie at that point where the marginal cost of using market mechanisms equals the marginal cost of further extending a command-and-control hierarchy.

Similarly, the state will undertake the direct provision of goods and services when the incremental costs of employing the alternative instruments of regulation, subsidies or private contracting exceed the marginal benefits from avoiding the organizational rigidities of direct supply. The contracting out of complex services involves extensive opportunities for private chiseling (note, for example, the widespread problem of cost-overruns in defence contracting), while detailed specification of the desired outputs is often impossible to set out in advance. Much the same sort of difficulties are often associated with the use of subsidies (direct or through taxation) to induce the desired behaviour, while enforcement and compliance problems are endemic to regulation (Eddy, 1981). Hence, this supply-side approach formalizes in
micro-economic terms one element of the technical suitability hypothesis advanced by institutionalists.

A more prevalent approach taken by Chicago School theorists to the question of policy instruments focuses on the demand for public policy. The employment of the most efficient means to implement a particular policy choice is rarely the guiding rationale because the means themselves are not neutral in value terms. Rather, the instrument (like the policy which it implements) will be chosen on the basis of its suitability for distributing benefits to marginal voters while diffusing costs. Hence, a number of authors have argued that both regulation and public enterprise are means by which politicians can implement extensive subsidies and cross-subsidies in a relatively unobtrusive manner (Posner, 1971, 1975; Borcherding, 1979).

2.4 The Problem of Planning

The third, and final theme examined in this chapter concerns the ability of planning and policy processes, operating within the institutions of the state, to pursue effectively the role which the latter has assumed for itself in economic affairs. As the scope of government activity has expanded, this question of effectiveness has become an increasingly critical one, and at the risk of some oversimplification, three elements can be identified. The first is the problem of goal formulation. In order to pursue effectively the often vaguely-defined rationale behind the involvement of the state in altering economic outcomes, it is necessary to formulate clear guiding objectives. Only then is it possible to address the inevitable tradeoffs which must be made, to elaborate effective alternatives, and to ensure that the impacts of the resulting policy choice does in fact, bear some relationship to the intentions from which it sprang.
The second is the problem of knowledge, particularly the lack of understanding of the events which governments seek to analyze and the impossibility of projecting them into the future with any degree of reliability. The observation that such uncertainty is prevalent is by no means novel, but its presence does undermine, in a fundamental way, the capacity of governments to shape the future in the image implied by its guiding aims.

Finally, there is the problem of adapting policy and planning activities to changing external circumstances. These activities will not long be considered effective if they consistently respond to yesterday's problems, thereby becoming part of the today's problems rather than representing the means to achieve their solution. This capacity for adaptation (many policy theorists have referred to it as a cybernetic capability) involves both adopting existing policies to changing circumstances in order to maintain their relationship to overall goals, and changing overall goals themselves when the consequences are less desirable than originally foreseen (Deutsch, 1966; Dunn, 1976).

The problem of goal definition is much more important if the role of the state is viewed from an institutionalist rather than a narrower market-failure approach. For the latter, the overall rationale for government involvement is the achievement of a fairly precise goal, the achievement of overall economic efficiency. Planning from the institutional perspective, however, faces the problem of deriving an overall objective from a number of conflicting considerations. Both approaches face the problem of uncertainty in equal measure.

There is, among policy theorists from both market failure and institutionalist perspectives a general assumption that the dual problems of goal formulation and information are susceptible to amelioration, if not
an ultimate solution. One group, which can be conveniently called rationalists, see the problems as susceptible to technical solution by the application of analytical methods developed in such diverse fields as economics, sociology and ecology, and by the use of decision-making techniques like cost-benefit analysis, GAM and PERT, MBO, strategic planning, etc., to apply substantive information more effectively to policy problems (Carley, 1980).

Another group, widely known as incrementalist, asserts that overall goal formulation is both unnecessary and impossible, and emphasizes limiting analysis to reflect the inherently limited analytical capabilities of policy makers.

Lindblom (1959), in the seminal article which first defined the approach concluded that the only meaningful starting point for policy analysis is concrete alternatives combining a mix of values relevant to the problem at hand:

The value problem is...always a problem of adjustment at the margin. But there is no practicable way to state marginal objectives or values except in terms of particular policies. That one value is preferred to another in one decision situation does not mean that it is preferred in another decision situation in which it can be had only at great sacrifice of another value. Attempts to rank or order values in general and abstract terms so that they do not shift from decision to decision end up by ignoring the relevant marginal preferences.

It follows that the only analysis which is relevant to policy choice is that confined to examining the impacts of incremental changes from the status quo. This fact simplifies the task of planning and analysis considerably. On the one hand, the range of alternatives which must be examined is considerably limited and, on the other, the incremental nature
of the changes involved makes understanding and prediction of them easier to attain.

It also simplifies the problem of information synthesis and evaluation. Ultimately, these activities are not undertaken through analysis but via a process of bargaining. The principal decision makers select those pieces of information which are relevant to their favoured alternatives and the final policy selecting mechanism involves either mutual agreement or impartial arbitration.

Hence, comprehensiveness and coordination in policy making are achieved not through analysis but through group representation. Relying heavily on the bargained outcome as a satisfactory approximation of the public interest, Lindblom (1959, p. 85) notes that:

... (if) each value neglected by one policy-making agency were a major concern of at least one other agency, ... a helpful division of labour would be achieved. ... The virtue of such a hypothetical division of labor is that every interest or value has its watchdog. And these watchdogs can protect the interests in their jurisdictions in two quite different ways: first by redressing damages done by other agencies; and second by heading off injury before it occurs.

The debate between the proponents of comprehensive rationality and incrementalism (Dror, 1964) is too well known to require reiteration here, and has spawned a number of approaches aimed at combining them in an advantageous manner. Approaches like mixed scanning and strategic planning attempt to use comprehensive rationality in a selective manner to address key issues, while leaving the bulk of day to day decision-making to the processes of incrementalism (Etzioni, 1967).

The ability of decision and planning activities to adapt themselves to changing circumstances is dependent upon a continuous and productive relationship between their goal formulation and information processing
elements. The inadequacy of the latter present technical barriers to the perception of a changed policy environment and hence to the ability to adapt. However, a number of theorists see the institutional and behavioral aspects of the problem as more fundamental.

Etzioni (1968), for example, has asserted that the synthesis of information relevant to multi-valued, open-ended problems is related to the willingness (rather than the ability) of decision-making units to do so. Policy-making institutions attempt to maintain specific self-interests or views of the world, and information which presents a potential threat to these views is often collected but prevented from being brought to bear on actual decisions.

This tendency to destroy or suppress information is particularly likely to occur under conditions of relative uncertainty. Especially important in this regard is the projection of possible consequences into the future, a task at the very heart of rational planning. As Friedmann (1975, pp. 115-141) has noted, it is virtually impossible for an individual or organization to avoid colouring what it expects to happen with what it would like to see happen. There is, he concludes, an automatic tendency to over-estimate the desirable and downplay the likelihood of the unacceptable.

Unlike the mechanical systems around which the original model of cybernetics was built, human societies do not exhibit clearly fixed and unchanging objectives. If these societies are to utilize planning techniques to create preferred futures, then the extent to which social goals can be modified in light of new knowledge regarding their consequences is vital. When planning is viewed as a societal guidance system operating through the institutions of the state, the problem can be viewed in terms of the capacity of this system for self-transformation.
Such has been the approach employed by a number of social learning theorists, notably Dunn (1976) and Etzioni (1968). Dunn, using an evolutionary metaphor to explain the process of social development, sees planning as facilitating "evolutionary experimentation." This "... involves not only the testing of developmental hypotheses against the standards of established goals, but also the testing of social system goals in the light of their adequacy as planning metaphors" (Dunn, 1976, p. 170). Ideally, cumulative social perceptions of the inadequacy of existing goals set in motion a "paradigm shift" in which these goals are reordered, and the relevant aspect of the social system restructured in a fundamental way.*

For both Dunn and Etzioni, this process of societal guidance through the continuous testing, both of policy outcomes against values and of the viability of the values themselves, requires a much more intimate relationship between planning and policy making activities. According to Etzioni (1967, p. 486):

The rationalistic planner... tried to produce a master design that optimized the values presented to him by the political decision-makers. He formulated a plan which he then hoped to submit to the decision-makers for approval and to the administrative agencies for implementation. Aside from the fact that political decision-makers are unable to provide the planners with a neat set of ranked values and that even if such a scale were available, it would not allow optimization, such segregated and 'apolitical' planning is likely to be an ineffectual base for societal guidance. Its products are likely to be rejected, ignored, or radically altered by the political decision makers, and an attempt to implement plans produced in this way requires a

*This idea owes a lot to the original notion of the "paradigm shift" developed by Kuhn (1962) to characterize the process of scientific innovation.
large application of power, and thus, generates considerable resistance and alienation, because such planning is very remote from consensus-building as well as control.

A more "interwoven" approach could be achieved by planners becoming more "political" through a closer association with the perspectives of politicians, by making more of an effort to ascertain the perspectives of those affected by a plan, and by the achievement of "...a much higher level of articulation of planning and societal guidance..." by integrating planning and political units (Etzioni, 1967, p. 486).

In a similar vein, Vickers (1971, p. 116), has suggested that the essential concerns of policy are the achievement of a balance among inherently conflicting values and the regulation of an ongoing pattern of social relationships over time:

As all policy makers know from experience, policy does not consist in prescribing one goal or even one series of goals; but in regulating a system over time in such a way as to optimize the realization of many conflicting relations without wrecking the system in the process. Thus, the dominance of technology has infected policy-making with three bogus simplifications...One of these is the habit of accepting goals -- states to be attained once and for all -- rather than norms to be held through time, as the typical object of policy. The second is the further reduction of multiple objectives to a single goal, yielding a single criterion of success. The third is the acceptance of effectiveness as the sole criterion of success. The third is the acceptance of effectiveness as the sole criterion by which to choose between alternative operations which can be regarded as means to one desired end.

The conclusion arising out of these views is that "societal guidance" requires an intimate, interactive, relationship between planners, policymakers, and the social interests they serve. If planning and analysis are compartmentalized from actual goal formulation and implementation, they will become largely irrelevant to the resolution of actual policy issues,
and society will lose the analytical capability to control its own
development. If, on the other hand, a growing synthesis between policy-
making and planning activities occurs at the expense of the interaction
between what Vickers (1971) terms the "doers" and the "done by," societal
guidance will become merely authoritarian control, involving increasing
levels of coercion and alienation.

For neo-marxist policy theorists these latter outcomes are viewed as
inevitable, since the state is inherently unable to undertake rational,
goal-oriented planning within the limits imposed by the capitalist economic
order.

There is a universal tendency among neo-marxists to reinterpret the
traditional theory of the inherent contradictions of capitalism in such a
way that the policy-making processes of the state become a central element.
Different writers, however, posit alternative mechanisms through which such
contradictions develop. Some view the focus of contradiction as remaining
in the logic of the capitalist economy, but as manifesting itself wholly or
partially through the state. Hence, for example, O'Connor (1973) points to
a "fiscal crisis of the state" in which attempts by government to meet the
ever-growing demands of both accumulation and legitimation leads to public
bankruptcy. This development, in turn, simultaneously destabilizes the
economic system (since inadequate public support of private profit making
is available) and the political system (since demands for the services
categorized as "legitimation" cannot be met).

Offe (1975) suggests that, even if the state is initially successful
in stabilizing the economic sphere, it is subject to a crisis of
"rationality." As government's growing role leads it to engage less in
"allocation" and more in "production," contradictions arise between the
rationalistic and pluralistic dimensions of the policy process. In other
words, policy makers are faced with a choice of either systematically matching means to ends or of allowing "...a highly decentralized process of political conflict and consensus to determine the production process" (Offe, 1975, p. 138).

However, according to Offe, neither of these two alternatives are really compatible with the interests of private capital. Comprehensively, rational planning is hindered not only by the instability of the environment, the difficulty of formulating meaningful objectives and the pervasive presence of externalities: it is fatally undermined by the unwillingness of private economic interests to surrender their economic policy making perogatives. Hence, "...such an instrumental-rational mode of operation presupposes...a degree of control over relevant variables that is atypical for the capitalist state" (Offe, p. 143).

On the other hand, pluralistic bargaining which is truly representative tends to crystallize conflict and can "...easily become subversive of the balance between the state and the accumulation process." In addition, neither of the above approaches is really compatible with the other, so that any attempt to employ some combination results in "...the occurrence of second order contradictions" (Offe, p. 143).

Finally, Habermas (1975) regards both economic and rationality crises in advanced capitalist societies as possible, but not inevitable. For him, the most fundamental focus of contradiction is the "legitimation crisis," while the first two types of crisis occur at the interface between the political and the economic system, legitimation crises affect the relationship between the political and socio-cultural systems.

Habermas, elaborating a theme prevalent in liberal and pluralist writings, begins the analysis by identifying a critical shift from liberal to organized capitalism. In the former, economic subordination, by being
based on private property, was effectively de-politicized. The state underwrote capitalism and alleviated its most self-destructive excesses in the manner described by Polanyi, but did not (and was not expected to) assume responsibility for the ultimate economic outcomes.

However, as the accumulation function shifted to "production," and the legitimation function expanded to include more wide-ranging compensation for the outcomes of private economic activity, the state could no longer avoid such responsibility. Government authorities came to be held directly responsible for economic performance as a whole, and the nature of economic inequality came to be perceived as ultimately political in origin.

Under these conditions, both "economic" and "rationality" crises automatically become legitimation ones:

As long as motivations remain tied to norms requiring justification, the introduction of legitimate power into the reproduction (i.e. economic) process means that the 'fundamental contradiction' can break out in a questioning, rich in practical consequences, of the norms that still underlie administrative action... Because the economic crisis has been intercepted and transformed into a systematic overloading of the public budget, it has put off the mantle of a natural fate of society. If government crisis management fails, it lags behind programmatic demands that it has placed on itself. The penalty for this failure is withdrawal of legitimation. Thus, the scope for action contracts precisely at those moments in which it needs to be drastically expanded (Habermas, 1975, p. 69).

Even if government institutions are relatively successful in avoiding crisis, Habermas still perceives more fundamental legitimation problems. Because the negative side effects of goal-oriented rational action lose the "nature like" quality they once had under liberal capitalism, "the state must preserve for itself a residue of unconsciousness in order that there
accrue to it from its planning functions no responsibilities that it cannot honour without overdrawing its accounts."

The neo-conservatives also see the policy-making process as lacking in both rationality and adaptability. This inevitable failure, however, is due not to class domination but to the prevalence of individual self-interest among the key actors. Paradoxically, the assumption of individual rationality leads to the conclusion that collective rationality through government decision-making is impossible.

Even assuming the effectiveness of the analytical tools employed, both the rational and the incremental approaches to policy making are bound to fall short of their aspirations. On the one hand, the origins of the state's role in the self-interested behaviour of both the governors and the governed make the formulation of meaningful collective social objectives impossible. On the other hand, the logic of collective action ensures that incrementalist bargaining will simply translate the role of the more concentrated centres of self-interest into public policy.

Even if goal formulation were possible at the higher political levels, self-interest within the organizational structures of government is seen as inhibiting both implementation and any consequent adaptation. According to Downs (1967), the formal goals of an organization (usually specified in terms of a specific function) will never coincide with the goals of its constituent individuals. For the latter, promotion, the respect of peers, or the exercise of power over others may be key motivating factors. The biases that result from these personal interests will then:

1. Cause individuals to distort the information they pass up the hierarchy so as to "...exaggerate data that reflect favorably on themselves and to minimize those that reveal their own shortcomings."
2. Affect the attitudes of officials toward policy alternatives, these attitudes leading them to offer highly selective advice to their superiors.

3. Determine the degree to which the official actually complies with directives passed down from his superiors.

4. Affect the degree to which the official "...seeks out additional responsibilities and accepts risks in the performance of his duties" (Downs, 1967, pp. 77-78).

Hence, policy outputs are precluded from conforming to the objectives of politicians even if these objectives are initially quite clear cut. If, as the foregoing discussion suggests, they are either not very precise, or lacking altogether, then this scope for biased behaviour will be quite extensive.

Even to the extent that particular agencies of government do act as cohesive organizations, they tend to develop institutional self-interests based on both their formal function and the needs of their members. Trebilcock, et al. (1982, p. 32), suggest that, for these reasons:

The role of bureaucracies in influencing political decisions should be viewed in a manner similar to that of concentrated interest groups. In return for providing advice (information) to politicians on the impact of alternative policies on different sets of interests and perhaps on the intensity of voter preferences with respect to these interests, bureaucrats are rewarded in terms of such returns as pay, power and prestige. Bureaucrats, like other interest groups, are also providing subsidized, selective information to politicians that may, or may not, be accurate and may be influenced by their self-interest in the decisions taken with the aid of the information.

Niskanen (1971) and others have asserted that this self-interest has clearly disfunctional elements. Because public bureaucracies are not run on the basis of profit maximization, the self-interest of their managers is
expressed entirely in terms of "pay, power and prestige." These are linked primarily to the expansion of the bureaucracy and to its discretionary budget (i.e. the difference between its legislative appropriations and the cost of producing the relevant service), so that organizational inefficiency and self-promoted growth come to plague government agencies. Hence:

Bureaucrats, in advocating policies to their political overseers, will have tendency (sic) to favour policies that have a heavy bureaucratic orientation, entailing more jobs, larger fiefdoms, and more power and prestige. The virtues of non-collective, decentralized forms of resource allocation are likely to be depreciated (Trebilcock, et. al., 1982, p. 33).

Neo-conservative theorists have seen a tendency for these problems to increase as the employment of policy instruments has shifted toward regulation and public entrepreneurship. Distortions have been viewed as particularly serious in the latter case.

Although the public enterprise, unlike bureaucracy generally, sells its products in a marketplace, there are few incentives toward efficient production. Since ownership of the public firm is both dispersed and non-transferable there is no effective way that the "owners" (i.e. the general public) can exercise the supervision necessary to achieve an economically efficient use of productive inputs. The managers of the enterprise, having no claim on the capitalized value of an efficiently run enterprise, will thus tend to pursue "pay, power, and prestige" in much the same way as the bureaucrat generally. The result will be a generally high degree of x-inefficiency (i.e. a non-optimal combination of productive factors given existing levels of technology), limited innovation, and a lack of attention to marginal costs when setting prices (Borcherding, 1979, pp. 29-34).
Baldwin (1975), in his study of the Canadian airline industry, goes further, suggesting that the only organizational goal consistent with the individual interests of the public corporation’s managers is the generation of ongoing political support. This goal is best achieved by offering clearly perceivable advantages to politically important interests, thus creating a source of such support; even if it means sacrificing corporate efficiency. Through the public corporation’s production and pricing strategies, the gains can be carefully targeted, and the costs, highly dispersed. Hence, quite apart from any initial goals policy-makers may have had in resorting to regulation or public ownership, the dynamics inherent in their use ensure that they will become distributional mechanism favouring politically powerful actors.

Finally, Vining (1981, p. 180), employing this approach to interpret the recent development of Canadian electric power policy, has suggested that:

1. public managers are likely to maximize their pecuniary and non-pecuniary benefits by growth, especially if profit maximizing pressures are reduced;
2. they are likely to attempt to minimize profits (subject to loss constraints) both to maximize political support and to encourage further demand growth;
3. they are likely to attempt to cross-subsidize to large users (i.e., across consumption classes);
4. they are likely to ignore real differences in service costs within classes and opt for equal rates;
5. they are likely to utilize a too low discount rate and consequently expand capacity too quickly;
6. product variety will be smaller and customers will be grouped into broader classes for price-setting purposes; and
7. the public firm will be generally less concerned with the particular costs of servicing a customer group in determining the price for that group.
2.5 Concluding Summary

In the preceding chapter, we have looked at three substantive problems related to the role of the state in economic planning from four distinct theoretical perspectives. These three problems are the rationale for government involvement in economic life, the use of particular policy instruments, and the ability of governments to plan in a rational and adaptable manner. While all four schools of thought have emphasized the fact of increasing governmental involvement in economic life, there is a fundamental underlying disagreement concerning the reasons for this phenomenon. Both the market failure and institutionalist perspectives see increasing government activity as a response to fundamental socio-economic problems which arise in a market-based economic system and cannot be resolved by any other means. Marxists and neo-conservatives, on the other hand, view the phenomenon largely as the outcome of the pursuit of self-interest by particular social groups at the expense of others.

This initial divergency of viewpoint colours the way in which the choice of policy instruments is explained. Welfare economists and institutionalists adopt a functionalist approach to explanation, whereas neo-marxists and neo-conservatives, on the other hand, view the choice as a strategic one, based on the ability of the instruments to distribute costs and benefits in a manner favourable to the groups seeking to employ them.

Finally, the same duality of approach characterizes the treatment of the issues associated with government planning. For the market failure approach and especially for the institutionalists, the possibility of effective planning in the public sector is critical for the viability of each theoretical approach as a whole. Hence, there is an underlying assumption that, through some combination of analytical capability and
institutional structure, viable planning activity can take place within the institutions of the state.

While the public choice school uses the assumption of individually rational behaviour to question the viability of effective societal planning within the institutions of the modern state, a large part of its scholarship has been focused on the question of making these institutions more effective (Russell, 1979; Haefele, 1973; Ostrom, 1973, 1975). Given the reality of market failures in many areas of economic life, the problem has been one of designing institutions which are more effective than existing bureaucracies in translating individual preferences into collective social choices.

From this perspective the collective planning activities undertaken by the state are not aimed so much at producing a stream of specific substantive policies as at creating sets of institutional arrangements which will allow the affected individuals to make such choices for themselves. Hence, according to Ostrom (1973, p. 65):

"Bureaucratic free enterprise" need not be the vice that Tullock implied if 1) a bureaucracy is immediately accountable to the relevant community of interest for whom it is acting, 2) the costs of providing a joint good are funded by the constituents in proportion to their benefit or in accordance with some comparable rule of equity, and 3) public facilities are subject to use under terms and conditions which are considered by the relevant community to be reasonably designed to advance their common welfare. If these conditions can be met, we can then contemplate the possibility of organizing a self-governing collective enterprise. Where the organizational structure is capable of internalizing decision-making arrangements appropriate to the community of interests associated with the management of a common property or the provision of a public good.

For both neo-marxists and neo-conservatives both the origins of the state's involvement and the rationale for the selection of particular
policy instruments makes the achievement of either rationality or adaptability impossible.

However, neo-conservatives of the Chicago School draw a conclusion which is diametrically opposed to that of the neo-marxists. For the latter, the failures of the modern state point to the need for a more fundamental restructuring of the economic system. For the former, these failures point to the desirability of a relatively unregulated market economy based on private property rights.

Following the historical account of electric power planning which forms the core of this thesis, we will be particularly concerned with assessing which of the above four perspectives appears to be the most plausible explanatory framework for the role played by the provincial government. This will allow, in the concluding chapter, an assessment of the ways in which the problems created by past policy decisions can be overcome by specific changes to the policy making processes employed by government. Before proceeding to our historical narrative however, it will be useful to examine, in some detail, the economic role played by electric power in British Columbia.
2.6 References


CHAPTER 3
ECONOMIC DEVELOPMENT AND ELECTRIC POWER IN BRITISH COLUMBIA

3.1 Introduction

In the preceding chapter, we noted that a key element of the economic role of the state is defined by the nature of the regional economic structure within which it functions. One such structure is that of the "staple economy," and we have seen that the role of the state has been portrayed in terms of removing certain barriers to growth which characteristically arise in such an economy. Typically, government policies in a staple economy are concerned with increasing the attractiveness of resource extraction and processing to external investors and with providing the capital intensive and often risky infrastructure required by both these activities.

In some circumstances, policy can shift from merely underwriting or facilitating private economic activity to intervention aimed at making such activity more consistent with the perceived interests of the regional economy. As noted above, such intervention has taken place to diversify an economic structure in the face of institutional barriers and to retain economic rents generated by the extraction of the region's staples.

In this chapter we make the transition from a general theoretical perspective on the role of the state in economic planning and policy making to the specific case of electric power policy in British Columbia by looking at British Columbia as a staple economy. First, the historical evolution of the province's economic structure is described, followed by a more detailed analysis of the economic trends of the post-war period.
Then attention is focused specifically on the evolution of the electric power industry and impact of overall economic trends on the demand for electricity during the post-war period.

3.2 British Columbia as a Staple Economy: A Historical Perspective

In defending the staple approach against its detractors, Watkins (1963, p. 141) emphasized that it was not "...a general theory of economic growth, nor even a general theory about the growth of export-oriented economies..." Rather, its value lies in its ability to characterize the structure and development of a particular type of economy; the "new" region or "empty land" occupied by the European over the last four centuries.

British Columbia is a prime example of such a region, being overrun by Anglo-Saxons beginning in the early 19th century and relying overwhelmingly on the export of primary resource products ever since. Hence, it is not surprising that some variant of the staple model has constituted the core of the limited scholarship devoted to the province's political economy (Caves & Holton, 1959; Deutsch, et. al., 1959; Shearer, 1971; Denike & Leigh, 1972; Robin, 1972; McCann, 1978; Walker, 1980; Copithorne, 1979; Gunton, 1981). There is fundamental agreement that the development of British Columbia's economic structure has been intimately associated with the transformation of its resource base into several distinct commodity exports.

Canada's westernmost province, as well as constituting a distinct political entity under the terms of the British North America Act, forms a clearly delineated region, or set of regions, in geographical terms. Separated from the agricultural plains of the prairies by the Rocky Mountains, British Columbia consists largely of a series of north/south
valleys separated by successive chains of mountains. This mountainous terrain, along with B.C.'s large land area gives it a wide diversity of climate, topography and vegetation. Vancouver Island and the mainland west of the Coast Mountains is a relatively mild, damp region with heavy natural forest cover. The valleys on the leeward sides of the series of north/south mountain ranges consist of drier grasslands and more lightly forested areas, with heavier forest cover recurring on the west side of the Selkirk range. Between the Coast and Rocky Mountains, a vast, forested interior plain extends through the central region of the province in a widening band from the U.S. border to the Yukon territory.

As one moves from the southwest to the northeast, the climate becomes drier, colder and more extreme in its seasonal fluctuations. As illustrated in Figure 3.1, the mountainous terrain and heavy precipitation have combined to produce a number of major river systems, characterized by heavy flows, wide drainage areas and extreme seasonal variation. For example, the ratio of the highest recorded runoff to the lowest is 70:1 on the Fraser and 100:1 on the Skeena (Barker, 1977, p. 54; Slaymaker, 1972, pp. 32 - 68). The province's river systems have carved out a series of low-lying plains characterized by fertile soils, and distinctive micro climates.

From the earliest beginnings of European contact and settlement, the economic life of British Columbia was characterized by the search for resource-based products which could be extracted and sold for profit in more developed metropolitan centres. The subsequent growth of the province was based on a succession of such staples, whose rise and fall was determined not only by the resource base itself, but by the vagaries of external demand, the changing techniques of extraction, and, increasingly, the mobilization of the necessary capital and infrastructure. Similarly,
FIGURE 3.1
RIVER DISCHARGES IN BRITISH COLUMBIA AND YUKON TERRITORY

SOURCE: Barker, 1977, p. 43.
the nature of British Columbia's internal political and economic relationships was shaped by the character of these staples and the human resources associated with their exploitation.

The earliest economic activity, beginning in the late 18th century, was based on the fur trade, particularly the exploitation of the sea otter and the beaver, with British Columbia becoming a virtual preserve of the Hudson's Bay Company. As was the case in other regions of North America, such trade was inimical to widespread human settlement, but depletion of the fur-bearing animals and shifting patterns of demand led to the eventual decline of the industry after the mid-19th century.

The discovery of placer gold on the Fraser River after 1858, created another spurt of activity as a rapid influx of prospectors stimulated local trade and commerce. The movement of the gold mining industry northward following the depletion of the reserves of successively remote areas created a demand for an extensive road system through rugged mountainous terrain. But rapid depletion rendered both the settlements and the commercial activity created by this activity very short-lived, and the provincial economy stagnated in the decade following British Columbia's entry into Confederation in 1871.

During the late nineteenth and early twentieth century, the provincial economy grew rapidly reaching a peak just before the first world war. In fact, by 1912, an economic structure was laid down which, in many important respects, persists to the present day. The basis of this structure was the export of three staple products, fish, minerals and lumber.

The increasing industrial character of much of Europe created the demand for large quantities of imported food-stuffs, and newly developed techniques associated with canning allowed the bountiful salmon resources of the west coast to be transformed into a profitable export business.
Canning plants proliferated on the mouths of major salmon spawning rivers, and by 1881, fish canning constituted half of the province's manufacturing employment (Robin, 1972, p. 15).

Coal mining became an important extractive industry after the 1870's based largely on the industrial and transport requirements of the West Coast. During the 1880's and 1890's, another staple export industry of major proportions was created when American prospectors moved north from the "inland empire" of Montana into the East Kootenay and boundary regions of British Columbia. Extensive deposits of silver, copper, lead and zinc formed the basis of a large base metal mining industry, with the ore from B.C.'s mines feeding the smelter-refinery complex of Spokane, Washington. "It is with good reason," wrote Martin Robin, "that British Columbia became known as the mining province, producing more copper, silver and gold than the rest of the country combined, as well as providing about one-third of the national production of coke" (Robin, 1972, p. 17). Between 1881 and 1911, employment in mining increased five-fold and significant metal smelting capacity was established in south-eastern B.C..

Initially, the vast forest resources of the province were considered a hindrance to commerce, agriculture and settlement. Until the completion of the Canadian Pacific Railway in 1885, the province was simply too remote from the major demand centres of Europe and Eastern North America for lumber to become a viable export industry. However, with the completion of the CPR and the establishment of wheat as a major staple export on the Canadian prairies, the demand for wood products increased rapidly. American, Eastern Canadian and European speculators flocked to the west coast in the timber staking rush of the early 1900s, and the number of sawmills in the province increased from 27 in 1881 to 224 in 1911. During
The same period, employment in the sawmilling industry increased from just under 400 to over 15,000 (Caves & Holton, 1959, p. 220).

The shift to minerals and forest products as British Columbia's principal staple exports had a number of important implications for the province's political economy. For one thing, the bulkiness of these products relative to their value made transportation of critical importance. Without a rail network, the transformation of mineral and forest resources into commodity exports would have been severely limited. At the same time, the rugged geography of the province made the provision of transportation infrastructure a difficult and expensive undertaking. The result was the extensive involvement of governments at both the federal and provincial level, in the underwriting of railway construction.

Even after the completion of the CPR, the drive to tap new resource areas led the provincial government to involve itself in the promotion of three major railways and numerous (often abortive) smaller lines. Of particular importance to the development of B.C.'s staple economy was the developments by the CPR (with government financial support) of a major line to tap the mineral resources of the Kootenays, thereby pulling the region out of the U.S. commercial orbit.

Another result of the development of British Columbia's economy around timber and minerals was the more complex set of linkages which developed. The railways and coastal transportation networks which sprang up around these staples as a major backward linkage vastly increased the scale of the commercial and service sectors of the economy, as well as attracting significant manufacturing capacity in areas like metal fabricating and ship building. However, many of the direct inputs to transportation and resource extraction consisted of sophisticated machinery which was (and still is) imported from more industrialized regions.
The forward linkages from fishing were significant in the 1880s, but those for lumber after 1900 were even more so. A major sawmilling industry established itself in the southwest corner of the province during this period based on the coastal shipment of logs from scattered logging camps in the numerous inlets of Vancouver Island and the mainland. Metal smelting became important as well, spurred by new technology, the transportation developments described above, and financial aid from government.

The process of large scale resource development around minerals and timber resulted in a huge population influx, a seven-fold increase between 1881 and 1911 from 50,000 to 392,000. This population, and its concentration in the southwest part of the province created a demand for a wide range of consumer goods, many of which could be imported only at great expense from already-established producing regions. Hence, a limited but significant import substituting sector arose (McCann, 1978).

The reliance on forest and mineral products as staple exports led to a high degree of corporate concentration in the economic structure of British Columbia. Unlike the agrarian wheat economy of the prairies, based initially on the relatively small-scale entrepreneurship of the family farm, British Columbia became a corporate frontier at an early stage. In Martin Robin’s words, "The new extractive economy depended upon huge injections of foreign capital: British, American, Canadian. British Columbia became a company province whose output, rate of growth and social organization depended upon the rise and fall of large corporations, financial and industrial, local and foreign" (Robin, 1972, p. 18).

This trend was partly due to the technological characteristics of the two major staple export industries themselves. Base metal mining and smelting were especially capital intensive, requiring large fixed capital
investments before production could commence. Similarly, sawmilling was characterized by the need for significant levels of investment in plant and equipment.

This high degree of corporate concentration also was created by the provision of the necessary railway infrastructure. Railways were both highly capital intensive and, in the case of British Columbia, had to be built through a vast inhospitable terrain well in advance of the traffic necessary to sustain them. As mentioned above, these conditions led to the active involvement of the state in providing private capitalists with the only commodities it possessed in abundance; land and resources. Hence, the early pattern of resource alienation in both forestry and mining favoured the concentration of corporate control over the province's major resource industries. Again as noted by Robin, this fact, when combined with the social dynamics of the single-industry resource town meant that the primary social relationship in British Columbia was the wage relationship. As a consequence, unionism and class politics played a key role in the province, and the power of large private corporations was a major influence on the economic policies pursued by the state.

Finally, the early pattern of staple-led development based on forests and minerals led to a distinct metropolitan-hinterland pattern of economic and political organization within the province. As noted by McCann (1978), the Vancouver region's growth as a focus of population concentration and economic activity was related both to its favourable location for the development of sawmilling and to its role as a commercial transfer point. The region came to play a central role as a conduit through which inputs to staple production could be imported and organized and through which staple products could be exported. Hence, commercial and
managerial functions tended to locate in the Vancouver metropolitan region, and the consequent agglomeration economies led to the attraction of more diversified service and import substituting sectors (both agricultural and manufacturing). By 1914, a quarter of the province’s population, two thirds of its import trade, two thirds of all foreign-based companies, and half of all provincially-based businesses were located in the Vancouver area (McCann, 1978).

Thus, by 1914, the principal structural features of British Columbia’s economy had emerged. Its economic activity centered largely around two staple products, minerals and lumber, and the linkages which had developed around them. In terms of corporate structure, economic control was highly concentrated in the hands of a relatively small number of firms. At the same time, the reliance of economic activity on both capital intensive infrastructure and the rights to resources held by the Crown created a strong dependence by resource exploiting firms on policies pursued by the state (particularly on the provincial level). Finally, in spatial terms, the staple economy of British Columbia was organized in a metropolitan-hinterland fashion, with most of the province serving as a resource hinterland to Vancouver, an increasingly dominant metropolitan intermediary.

3.3 The Pattern of Post-War Economic Growth

Despite the occurrence of significant structural change during the post World War II period, British Columbia continued to rely heavily on the extraction of natural resources. The regional economy grew rapidly and, during the twenty years from 1961 to 1981, gross provincial product almost
TABLE 3.1
COMPARATIVE FIVE YEAR POPULATION GROWTH RATES 1951 - 1981 (Percent)

<table>
<thead>
<tr>
<th>PERIOD</th>
<th>CANADA</th>
<th>BRITISH COLUMBIA</th>
<th>PERCENT DIFFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1951-56</td>
<td>14.8</td>
<td>20.0</td>
<td>35</td>
</tr>
<tr>
<td>1956-61</td>
<td>13.4</td>
<td>16.5</td>
<td>23</td>
</tr>
<tr>
<td>1961-66</td>
<td>9.7</td>
<td>15.0</td>
<td>55</td>
</tr>
<tr>
<td>1966-71</td>
<td>7.8</td>
<td>16.6</td>
<td>113</td>
</tr>
<tr>
<td>1971-76</td>
<td>6.6</td>
<td>12.9</td>
<td>95</td>
</tr>
<tr>
<td>1976-81</td>
<td>5.9</td>
<td>11.2</td>
<td>90</td>
</tr>
</tbody>
</table>

SOURCE: Canada, Statistics Canada, Canada Year Book (Various Years).

tripled in real terms. Over this period, gdp grew at an average annual rate of 5.6 percent compared to a rate of 4.7 percent for Canada as a whole (B.C., MISBD, 1982, Table 1).

This relatively high rate of economic growth led to a large in migration of population into the province, and, as shown in Table 3.1, B.C.'s population growth rate was consistently higher than that for Canada as a whole during the three decades after 1950. As a consequence, the province's rapid economic growth led to the emergence of a larger economy relative to Canada as a whole rather than a wealthier one in per capita terms.*

*A differential per capita gdp of about 10 percent in British Columbia's favour has remained constant over the last twenty years.
However, this rapid growth did not lead to a decline in the importance of the resource-based industries in British Columbia's economic structure. Table 3.2 shows that, with the exception of agriculture, resources maintained their predominance in the goods-producing sector of the regional economy between 1960 and 1980. Non-resource based manufacturing, on the other hand, declined from 5.2 to 4.5 percent of provincial GDP.

This predominance of forestry and mining in the resource extraction and manufacturing sectors of the B.C. economy led to the persistence of a high degree of economic specialization. Table 3.3 shows

<table>
<thead>
<tr>
<th>SECTOR</th>
<th>PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>5.2</td>
</tr>
<tr>
<td>Fishing/Trapping</td>
<td>1.3</td>
</tr>
<tr>
<td>Forestry</td>
<td>14.6</td>
</tr>
<tr>
<td>Mining</td>
<td>5.6</td>
</tr>
<tr>
<td>Total Resource Sector</td>
<td>26.7</td>
</tr>
<tr>
<td>Other Manufacturing</td>
<td>5.2</td>
</tr>
<tr>
<td>Construction</td>
<td>6.0</td>
</tr>
<tr>
<td>Utilities and Transportation</td>
<td>14.7</td>
</tr>
<tr>
<td>Wholesale/Retail Trade</td>
<td>13.4</td>
</tr>
<tr>
<td>Service Sector</td>
<td>34.0</td>
</tr>
</tbody>
</table>

SOURCE: B.C., MISBD, 1982
TABLE 3.3

BRITISH COLUMBIA
GROSS DOMESTIC PRODUCT AS A PERCENTAGE
OF EXPECTED VALUE IN GOODS PRODUCING INDUSTRIES

<table>
<thead>
<tr>
<th>SECTOR</th>
<th>1971</th>
<th>1980</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>37</td>
<td>41</td>
</tr>
<tr>
<td>Forestry</td>
<td>476</td>
<td>458</td>
</tr>
<tr>
<td>Fishing</td>
<td>259</td>
<td>197</td>
</tr>
<tr>
<td>Mining</td>
<td>73</td>
<td>66</td>
</tr>
<tr>
<td>Total Manufacturing</td>
<td>75</td>
<td>83</td>
</tr>
<tr>
<td>Food and Beverages</td>
<td>75</td>
<td>64</td>
</tr>
<tr>
<td>Wood</td>
<td>469</td>
<td>406</td>
</tr>
<tr>
<td>Furniture</td>
<td>44</td>
<td>35</td>
</tr>
<tr>
<td>Paper and Allied Industries</td>
<td>177</td>
<td>184</td>
</tr>
<tr>
<td>Printing and Publishing</td>
<td>72</td>
<td>60</td>
</tr>
<tr>
<td>Primary Metals</td>
<td>58</td>
<td>78</td>
</tr>
<tr>
<td>Metal Fabricating</td>
<td>69</td>
<td>62</td>
</tr>
<tr>
<td>Machinery</td>
<td>44</td>
<td>52</td>
</tr>
<tr>
<td>Transportation Equipment</td>
<td>23</td>
<td>38</td>
</tr>
<tr>
<td>Electrical Products</td>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td>Chemicals</td>
<td>39</td>
<td>31</td>
</tr>
<tr>
<td>Construction</td>
<td>123</td>
<td>119</td>
</tr>
<tr>
<td>Education</td>
<td>83</td>
<td>85</td>
</tr>
<tr>
<td>Hospitals</td>
<td>84</td>
<td>94</td>
</tr>
<tr>
<td>Accommodation and Food</td>
<td>125</td>
<td>134</td>
</tr>
<tr>
<td>Hotels and Motels</td>
<td>158</td>
<td>158</td>
</tr>
</tbody>
</table>

that, in the goods-producing section, wood-based industries continue to be vastly overrepresented through the 1970s, and most non-resource manufacturing extremely underrepresented relative to Canada as a whole. A "regional specialization index" constructed by Gunton (1979, p. A33) on the basis of employment data, showed B.C. to be second only to the Maritimes in the narrowness of its economic base. Finally, Table 3.4 shows that the share of provincial exports represented by forest and mineral staples remained constant at about 72 percent over the decade 1968 - 78.

However, during the 1970s, significant change occurred in the nature of the contribution made by the resource sector to British Columbia's economic growth. Whereas the growth of the resource sector through the early 1970s was generated largely by changes in the physical volume of output, that occurring after the middle of the decade was largely price driven.

The 1950s and 1960s saw major expansion of the physical volume of production in the wood and pulp and paper industries. The volume of the timber harvest increased by 60 percent during the 1950s and 80 percent between 1962 and 1973, with almost all of the new incremental volume coming from previously untapped forests in the interior of the province. Pulp and paper production more than doubled in the 1950s (from around 800 to 2,000 tonnes per year) as major new capacity was added on the coast, and doubled again to around 4,500 tonnes per year by the early 1970s as the investment boom in new capacity spread into the interior (B.C., MISBD, 1980a; 1980b). Similarly, new Japanese demand for copper, iron and coal induced a major investment boom in new mining capacity in the 1960s and early '70s, and real output almost tripled between 1962 and '73.

However, after the early 1970s, the output of the principal forest and mineral staples tended to fluctuate rather than increase significantly, and
these industries maintained their share of nominal provincial GDP through higher commodity prices. These patterns are evident if the shares of provincial GDP for the sectors discussed above are calculated using the price indices for each sector. As revealed by Table 3.5, the removal of price effects reduces the share of non-agricultural resource-based activity from about 20 to 16 percent over the last twenty years.

<table>
<thead>
<tr>
<th>COMMODITY</th>
<th>PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1968</td>
</tr>
<tr>
<td>Agriculture, Fish and Food Products</td>
<td>6.6</td>
</tr>
<tr>
<td>Crude Mineral Products</td>
<td>17.3</td>
</tr>
<tr>
<td>Other Crude Materials</td>
<td>1.8</td>
</tr>
<tr>
<td>Lumber and Fabricated Wood Products</td>
<td>26.8</td>
</tr>
<tr>
<td>Pulp</td>
<td>14.9</td>
</tr>
<tr>
<td>Paper</td>
<td>12.8</td>
</tr>
<tr>
<td>Total Forest Products</td>
<td>54.5</td>
</tr>
<tr>
<td>Other Fabricated Products</td>
<td>15.5</td>
</tr>
<tr>
<td>Manufactured End Products</td>
<td>4.0</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>3.2</td>
</tr>
</tbody>
</table>


NOTE: The above percentages include only those exports considered by the Ministry of Economic Development to be principally of B.C. origin, not the total exported through B.C. ports.
Similarly, resource-based industries and manufacturing generally showed relative decline in terms of employment. Not only is employment related to output rather than price changes, but there was a steady trend toward capital intensity in both resource extraction and manufacturing. Hence, for example, employment in forestry declined markedly from 4.5 to 2.5 percent of the provincial total between 1961 and 1981, and that in manufacturing as a whole from 23 to 14 percent. On the other hand, the labour-intensive service sector grew from 24 to 33 percent of total employment.

These overall trends are supported by a number of studies. Gunton, using 1971 and 76 census data undertook a shift-share analysis of the British Columbia economy relative to that of Canada as a whole. During

| TABLE 3.5 |
| RESOURCE AND MANUFACTURING COMPONENTS OF PROVINCIAL GDP RESTATE ON AN ACTIVITY BASIS IN CONSTANT 1971 DOLLARS (Percent of Total GDP) |
| INDUSTRIAL SECTOR | PERIOD | |
| Agriculture | 4.7 | 4.1 | 3.3 | 3.0 |
| Forestry | 13.4 | 11.8 | 10.6 | 10.8 |
| Fishing/Trapping | 1.3 | 0.9 | 0.7 | 0.6 |
| Mining | 5.0 | 5.1 | 5.2 | 4.2 |
| Total Resource Sector | 24.4 | 21.9 | 19.8 | 18.6 |
| Resources Minus Agriculture | 19.7 | 17.8 | 16.5 | 15.6 |
| Other Manufacturing | 4.4 | 4.9 | 5.2 | 5.0 |

SOURCE: B.C., MISBD, 1982, Table 17.
this period, employment in B.C. grew by 56,000 relative to Canada as a whole. The largest shift of jobs to British Columbia (23,360) occurred in the service sector, and was largely the result of the province attracting a high proportion of these industries relative to Canada as a whole (Gunton, 1979, Table 3, p. A36). Overall, another study showed that 80 percent of B.C.‘s employment growth between 1961 and 1981 occurred in the service sector, and that well over half of these jobs were filled by women (two thirds in the more recent 1971-81 period) (B.C. Central Credit Union, 1983).

In conclusion, it is clear that a process of industrial maturation of the kind posited by the staple theorists has not occurred in the goods producing sector of the B.C. economy. Table 3.2 shows that non-resource processing manufacturing industries have not grown significantly in relative terms, while Table 3.3 shows that they remain highly under-represented relative to Canada as a whole.

On the other hand, the primary and secondary sectors as a whole have shown a sharp decline over the last two decades in relation to the tertiary sector. Much of this shift is due to wider North American (and indeed global) trends so that the increasing relative share of the service sector in provincial gross domestic product is exactly paralleled for Canada as a whole.*

While the above discussion demonstrates that resource staples remain far more important to British Columbia than a simple perusal of census employment data would indicate, it does raise some rather far-reaching

*The share of "community, business and personal services" in Canadian gdp grew from 14.8 to 20.6 percent between 1961 and 1980, while that for B.C. grew from 15.5 to 20.8 percent (Canada, Statistics Canada, Cat. #61-202).
questions as to future trends. If expansion of resource output in forestry and mining was a key growth determinant in the 1950s, while resource price increases were important in the 1970s, what forces will propel the economy in the 1980s and beyond? In 1976, for example, the Pearse Royal Commission on forestry noted that:

Our own strength has been almost entirely in the quality of our virgin stock, an advantage which will inexorably decline as the stock is liquidated. . . Timber production in British Columbia has hitherto been based almost entirely on the recovery of virgin "old growth" timber, and the implications of the inevitable adjustment "second growth" timber will be profound (B.C., Royal Commission, 1976, pp. 6-7).

Since the trend is unlikely to be offset by continually increasing prices over the long term, a much more pronounced shift away from resource staples appears likely.

3.4 Electric Power and Economic Activity

Because of the relatively recent origins of British Columbia's economy, hydro-electric power has always played a central role in its development. From the staple perspective elaborated above, several aspects of this role can be isolated.

First, electricity represents an important consumer good in its own right, the availability of which has revolutionized domestic life. It now provides the sole source of cheap and efficient lighting, represents an important source of energy for heating, and has allowed the development of a host of home appliances. The intensity of domestic electricity use tended to increase steadily in all western economies during the twentieth century and British Columbia was no exception.

Second, electricity has been an important element of economic development in both the commercial and light manufacturing sectors. In
the commercial sector, its applications are similar to the domestic uses just outlined. However, the gradual trend toward the diversification of trade, the commercialization of previously domestic services, and the growth of the public sector have all increased the per capita consumption of electricity in most western societies.

As noted in Chapter 2, studies of hydroelectric power development in both Quebec and Ontario (Dales, 1959; Nelles, 1974) have emphasized the revolutionary impact of electricity on the development of light secondary manufacturing. This new source of motive power made smaller, more efficient plants possible leading to the proliferation of new types of manufacturing as well as encouraging a more spatially decentralized pattern of industrial location. In Dale's words, "...the new hydroelectric technology, applied to Canada's virgin water power resources, has played a major role in deflecting Canada from its accustomed narrow path of primary production to the broader role of a more diversified economic life" (Dales, 1957, p. 3). Hence, the availability of electricity was an important element in the development of direct and consumption linkages, the growth of an import substituting sector, and the eventual diversification of an economy away from its staple base.

Third, electricity has been a key productive input to staple resource extraction itself and especially to the development of forwardly-linked primary manufacturing industries. Sawmilling, mining, pulp and paper and metal smelting are all significant users of electricity with the latter two being particularly power intensive. Innis (1933), for example, emphasized the key importance of electric power resources in allowing the transformation of a region's forest and mineral staples into the primary manufactured goods demanded by metropolitan regions.
Finally, hydro-electric power resources can be developed as staple exports in their own right, with plants being built specifically to supply the demands of other regions. The developments in long-distance transmission during the latter half of this century made such an export orientation increasingly feasible on a large scale, and Canada as a whole has become a significant net exporter of electricity. In addition, aluminum smelting, where electricity is such a major input that raw materials are imported to the power source, can be considered as a form of power export.

In the sections that follow, we will trace the pattern of hydro development in British Columbia in response to these sources of demand; briefly for the post war period and in more detail over the last twenty years.

3.5 Development of the B.C. Electric Power System: An Overview

The early patterns of electricity supply and demand in British Columbia were intimately related to the geography and overall economic development of the province. The changing pattern of electricity supply is illustrated in Table 3.6. In the metropolitan centres of Vancouver and Victoria, private generating utilities were established around the turn of the century to meet growing domestic, commercial and industrial needs of the emerging metropolis, with the eventual proliferation of small utilities in other regions. Outside the principal centres of population, however, forest and mining industries accounted for the great bulk of demand. The fact that these staple industries were generally large in scale, and spatially dispersed, led to the prevalence of industrial self-generation.
### TABLE 3.6

**PRINCIPAL PRODUCERS OF ELECTRIC POWER IN BRITISH COLUMBIA**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MW</td>
<td>%</td>
<td>MW</td>
<td>%</td>
<td>MW</td>
<td>%</td>
</tr>
<tr>
<td>B.C. Electric Co.</td>
<td>18</td>
<td>36</td>
<td>186</td>
<td>47</td>
<td>234</td>
<td>37</td>
</tr>
<tr>
<td>Other Private Utilities</td>
<td>4</td>
<td>9</td>
<td>11</td>
<td>3</td>
<td>142</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>B.C. Power Commission</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>B.C. Hydro</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Forest Companies</td>
<td>1</td>
<td>1</td>
<td>36</td>
<td>9</td>
<td>50</td>
<td>8</td>
</tr>
<tr>
<td>Mining Companies</td>
<td>1</td>
<td>3</td>
<td>36</td>
<td>9</td>
<td>39</td>
<td>6</td>
</tr>
<tr>
<td>Cominco*</td>
<td>25</td>
<td>51</td>
<td>125</td>
<td>32</td>
<td>172</td>
<td>27</td>
</tr>
<tr>
<td>Alcan</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

**SOURCES:** Taylor, 1965, Tables 2, 4, 6, 8; B.C. Energy Board 1972, Table 1.2; B.C. Ministry of the Environment, 1979.

*West Kootenay Power and Light to 1944.
In West Kootenay region, the West Kootenay Power and Light Company was incorporated, utilizing a favourable hydro site on the Kootenay River to supply the needs of the region's copper mining and smelting industries. With the development of power intensive zinc smelting techniques after 1916, the utility was acquired by its major customer, the Consolidated Mining and Smelting Company, a subsidiary of the CPR. The very large demand of the smelting operations created the scale economies of generation necessary to support an extensive transmission and distribution network throughout the West Kootenays and central Okanagan (Taylor, 1965, p. 28).

Throughout the rest of the province generating capacity grew with the mining, forestry and pulp and paper industries, and by 1930, 53 percent of the province's electric power supply was generated by industry (Taylor, 1965, p. 46). For smaller sawmills, thermal generation based on wood wastes was prevalent, while some of the larger mining and pulp and paper operations also developed local hydro plants. However, the fact that these plants were relatively small and widely scattered over mountainous terrain, prevented the quick emergence of a province-wide electricity grid.

This broad pattern of electricity supply and demand remained basically unchanged until the major government interventions of 1961-62 (described in Chapter 5) created the British Columbia Hydro and Power Authority. During the 1940s and 1950s, there was a trend toward the consolidation of electrical systems and the enlargement of the two dominant regional grids in the eastern and western sections of the province, as increasing demand created new economies of scale. Larger hydro plants and longer transmission lines were developed, so that many smaller communities began to purchase bulk power from the larger established industrial concerns. After the creation of the British Columbia Power Commission in 1945, this trend was given new impetus as government construction of major new hydro
facilities created two new integrated grids; one in the Kamloops/North Okanagan Region, and the other in north central Vancouver Island.

A marked trend toward the use of purchased electricity by the province's staple industries began to emerge during the 1950s. The privately-owned B.C. Electric Company extended its transmission lines to serve forestry, mining and pulp and paper operations in the surrounding hinterland, as the development of Bridge River system in the 1950s made available large new blocks of power. A major expansion of the pulp and paper industry on Vancouver Island was supplied by the B.C. Power Commission's new hydro plants rather than self-generation, and such bulk sales accounted for over 50 percent of the Crown utility's output.

Nevertheless, the importance of industrial self-generation was reinforced in the mid 1950s by a major hydroelectric project by the Aluminum Company of Canada. A system of dams diverted the waters of the Nechako River west to the Coast, with the energy generated being used in a world-scale aluminum plant at Kitimat.

In the 1960s, the takeover of the private B.C. Electric Company and its merger with the Power Commission created the B.C. Hydro and Power Authority. While the major Alcan and Cominco/WKLP systems remained in private hands, much of the new incremental loads in the industrial, commercial and residential sector were met by the new publicly owned utility. As is evident in Table 3.6, B. C. Hydro's generating capacity more than doubled in each of the two decades following its creation, and by 1978, it accounted for about 80 percent of total provincial generating capacity. An integrated province-wide grid was created based on large-scale hydro projects on the Peace and Columbia Rivers and extensive long distance transmission. Hence, the characteristics of the power supply system had changed in a fundamental way.
Electricity Demand Patterns in the Post War Period

The changing consumption patterns underlying the evolution of British Columbia's electric power system are summarized in Table 3.7. Between 1930 and 1980, electric power demand increased from 1201 to 38,895 GWh, representing an average annual growth rate of 7 percent. Overall electricity growth rates increased rapidly in the post-war period, peaking in the decade of the 1950s and slowing gradually through the 1960s and '70s.

The changing structure of this growth in terms of broad end-use categories clearly reflects the staple-based nature of British Columbia economic structure, particularly the importance of electricity-intensive resource processing. Industry accounted for well over 80 percent of total provincial electricity consumption in the pre-World War II period, gradually declining to under 60 percent in 1980. However, industry's share in British Columbia remained significantly higher than its 45 percent share for Canada as a whole.

During the post-war period, both residential and commercial use increased their relative shares of total electricity consumption. In the former case, this growth was the result of the rapid net immigration to the province (see Table 3.1, above), higher per capita use resulting from the proliferation of new appliances, lower power rates, and the increased availability of electricity in regional population centres. Commercial electricity use grew particularly rapidly in the 1960s (an average 16.4 percent annual growth rate) reflecting the increasing importance public and private service sectors.

Table 3.7 also illustrates the relative contribution of each of these major end-use sectors to incremental energy demands in the post-war period. Again industry was the single largest source of new demand, though its
## Table 3.7

### Changing Pattern of Growth in Electricity Consumption in British Columbia

<table>
<thead>
<tr>
<th>Growth Period</th>
<th>Avg. Annual Growth Rate (percent)</th>
<th>Percentage of Incremental Growth Attributable to:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Residential</td>
</tr>
<tr>
<td>1930-39</td>
<td>6.4</td>
<td>6</td>
</tr>
<tr>
<td>1935-44</td>
<td>4.6</td>
<td>12</td>
</tr>
<tr>
<td>1940-49</td>
<td>6.1</td>
<td>22</td>
</tr>
<tr>
<td>1945-54</td>
<td>8.7</td>
<td>27</td>
</tr>
<tr>
<td>1950-59</td>
<td>12.1</td>
<td>19</td>
</tr>
<tr>
<td>1955-64</td>
<td>9.3</td>
<td>16</td>
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<tr>
<td>1960-69</td>
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<tr>
<td>1965-74</td>
<td>8.6</td>
<td>25</td>
</tr>
<tr>
<td>1970-79</td>
<td>5.1</td>
<td>29</td>
</tr>
<tr>
<td>1974-80</td>
<td>4.0</td>
<td>38</td>
</tr>
</tbody>
</table>

Sources: Taylor, 1965; B.C. Energy Board, 1972; Canada, Statistics Canada, Cat. no. 57-202, various years.
share fell from 76 percent in the 1950s to just under 50 percent through the late 1960s and '70s. Equally important, has been the increasing reliance by industry on purchased electricity. Largely due to the Alcan Aluminum project, the bulk of new industrial demand in the 1950s was self-generated. With the rise of public power as the dominant supplier in the 1960s and the lack of any large industrial power developments, new industrial demand was increasingly met by purchases. Hence, purchased electricity doubled from 25 to 50 percent of new industrial demand from the 1950s through the 1960s, and by the late 1970s purchases accounted for almost 90 percent.

3.7 Purchased Electricity Consumption During the 1960s and '70s.

The rapid growth of electricity consumption in British Columbia continued through the 1960s. Although overall rates of growth moderated somewhat, the role of purchased (as opposed to self-generated) electricity increased. However by the mid 1970s, a marked decline in electricity growth rates occurred in British Columbia, a trend which characterized most industrialized economies during this period. In this section, the consumption patterns underlying this overall trend are examined, along with their relationship to the broader economic changes described above.

During the 1960s, total purchased electricity grew at a rapid rate of 10 percent per year. As shown in Tables 3.8 and 3.9, industrial demand was the most important component of this growth. Consumption by industry grew at the same rate as total purchased electricity use and maintained its share of this total at about 50 percent through the early 1970s.

Growth in the commercial sector was also an important source of demand, contributing just over 3,100 GWh of new consumption between 1962
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Avg. Annual Growth

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SOURCE: Statistics Canada, Cat. no. 57-202 and 57-208.
### TABLE 3.9

**ELECTRICITY END USES AS PERCENT OF TOTAL PURCHASES**

**BRITISH COLUMBIA, 1962-1980**

<table>
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**SOURCE:** Statistics Canada, Cat. no. 57-202 and 57-208.
and 1972, compared to 5,800 GWh for industry. In fact, the rate of growth of commercial consumption was significantly higher than that for industry, and the commercial sector increased its share of total purchased consumption from 18 to 23 percent during this period (See Table 3.9). Residential demand, on the other hand, grew more slowly, with its share declining from 31 to 28 percent.

Not only was the growth of purchased electricity consumption in the 1970s half that of the '60s (5 versus 10 percent), but the contribution of the principal end-use sectors to overall demand changed. Industrial use grew at under 4 percent, much more slowly than overall demand, and its share of the provincial total fell from 50 to under 45 percent. Both commercial and residential demand, on the other hand, increased more rapidly (just under 7 percent) boosting their shares to roughly 25 and 30 percent respectively.

By far the largest source of demand for purchased electricity in British Columbia's industrial sector during the 1960s originated directly from the production of forestry and mineral staples. Between 1962 and '72, 30 percent of new demand was generated by mining, 62 percent by the forest industry and only 8 percent from other manufacturing industries (See Table 3.8). While the primary metals industry remained the largest single user of electricity in the province (one fifth of total consumption), there was relatively little expansion in this sector during the 1960s and virtually all its consumption continued to be self-generated.

As illustrated by the data presented in Table 3.10, the very rapid growth of industrial purchased electricity during the 1960s was the cumulative result of three broad factors: rising real industrial output, the increasing electricity intensity of industrial production, and (as already noted) the growing reliance on purchases. A comparison of Columns
### TABLE 3.10

**INDUSTRIAL ELECTRICITY USE STATISTICS**

**BRITISH COLUMBIA, 1962-1980**

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<thead>
<tr>
<th>Year</th>
<th>Total Industrial Electricity Use, GWh</th>
<th>Percent Purchased</th>
<th>Total Purchased Electricity Use, GWh</th>
<th>Percent of Total Purchased Electricity</th>
<th>Real Industrial Output $million</th>
<th>Percent of real GPP</th>
<th>Purch kWh per Real $ Output 1971 cents</th>
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**Avg. Annual Growth**

- 1962-80: 4.7
- 1962-71: 6.8
- 1971-80: 2.6

**SOURCE:** Statistics Canada, Cat. #57-208; British Columbia, MISBD, 1982.
1, 3 and 5 in Table 3.10 show that overall electricity use increased 25 percent faster than the real industrial output, and purchased electricity use grew 50 percent faster. Similarly total electricity use per real dollar of industrial output grew by about 20 percent (from 6.16 kWh to 7.38 kWh) from 1962 to 1971 while the intensity of purchased use increased by almost 50 percent (from 3.25 kWh to just under 5.00 kWh). Hence, purchased electricity steadily increased its share of total consumption from under 40 percent in the early 1960s to 55 percent in the late 1970s (Column 2).

By the 1970s, two of these three factors had changed. As shown in Column 5 and 6 of Table 3.10, the growth of real industrial output slowed significantly, and the industrial sector's share of real GDP dropped from 22 to 20 percent. At the same time, the overall electricity intensity of production actually fell during the 1970s, so that electricity use (Column 1) grew at a much slower rate than real output (Column 5). However, the trend toward purchased electricity continued (Column 2) so that purchased electricity use per real dollar of output remained about constant over the period (Column 7).

What sort of structural shifts are evident within the industrial sector? First, Table 3.11 shows that the declining contribution of the industrial sector to overall gross provincial product was not accompanied by any significant shifts in the relative contribution of its components. The most notable exception is the decline in the contribution of "other primary industries" (largely agriculture) and a relative increase in the share of other manufacturing (mainly linked to the principal staple industries).

The patterns of purchased electricity use within the industrial sector, however, changed more noticeably. As can be seen in Tables 3.12
<table>
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<th>Year</th>
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<th>Chemicals</th>
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### TABLE 3.12

**PURCHASED ELECTRICITY INTENSITY IN THE INDUSTRIAL SECTOR**

**BRITISH COLUMBIA, 1962-1980**

kWh per Real 1971$ of Output

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<thead>
<tr>
<th>Year</th>
<th>Mining</th>
<th>Wood Industries</th>
<th>Pulp &amp; Paper</th>
<th>Chemicals</th>
<th>Backward Manufacturing Linkages</th>
<th>Other Manufacturing</th>
<th>Total Industrial Use</th>
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**Average**

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<th></th>
<th>Mining</th>
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<th>Chemicals</th>
<th>Backward Manufacturing Linkages</th>
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<td>10.74</td>
<td>21.67</td>
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<td>.86</td>
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</table>

**SOURCE:** Statistics Canada, Cat. no. 57-208; British Columbia, MISBD, 1982.
and 3.13, falling real electricity prices and the increase in the overall electrical intensity of production in the 1960s (discussed above) was noticeable in all major industrial sectors. The expansion of both pulp and paper and sawmilling into the interior of the province relied far more on purchased electricity than established plants on the coast. Similarly, the open pit mining of low grade copper and molybdenum deposits in the 1960s and '70s was much more energy intensive than previous underground operations. As real electricity prices fell sharply throughout the 1960s, and early '70s, electricity intensity in mining rose six-fold.

In the early 1970s, however, the level of purchased electricity use per unit of output in the two most intensive sectors, chemicals and pulp and paper, as well as in backwardly linked manufacturing, stopped growing. In the chemical industry electricity intensity fell by roughly half after 1970 and consumption in 1980 was only 75 percent of what it had been a decade earlier (Table 3.12, Column 4). While electricity intensity fluctuated with levels of capacity utilization in pulp and paper, there was a gradual downward trend after the peaks of the late 1960s. Hence, while Table 3.8 (Column 5) shows that the use of purchased electricity by the industry grew by just under 3 percent in the 1970s, real output increased by over 4 percent.*

In both mining and the wood industry the intensity of purchased electricity in production continued to increase through the mid 1970s. In mining, this trend is due to the fact that the process of large-scale

*Data analyzed by the Ministry of Energy Mines and Petroleum Resources indicates that this is due more to the increasing reliance on thermal self-generated electricity since the overall electrical intensity of pulp and paper production has continued to rise and the composition of industry output has not changed significantly (MEMPR., 1981, pp. 4-87 and 4-88).
### TABLE 3.13
REAL ELECTRICITY PRICES IN THE INDUSTRIAL SECTOR
BRITISH COLUMBIA, 1962-1980

1971 cents per kWh

<table>
<thead>
<tr>
<th>Year</th>
<th>Mining</th>
<th>Wood Industries</th>
<th>Pulp &amp; Paper</th>
<th>Chemicals</th>
<th>Backward Manufacturing Linkages</th>
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<th>Total Industrial Use</th>
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**SOURCE:** Statistics Canada, Cat. no. 57-208.
investment in new open-pit mines peaked somewhat later than in pulp and paper, due to the lack of any readily available sources for large scale self-generation. In the wood industries a key factor was a continuing shift in production from the coast to the interior with the latter’s share of the log harvest increasing from 55 to 60 percent between 1975 and 1980. Newer interior sawmilling operations are significantly more electricity intensive than their coastal counterparts (B.C., MEMPR, 1981, p. 4-68). However, in both the mining and wood industries, the same levelling off in electrical intensity is apparent after 1975.

Several important conclusions can be drawn from this summary of electricity use in British Columbia’s industrial sector. First, the general economic changes discussed in the earlier part of this chapter, particularly the declining contribution of real output in the staple industries to overall economic growth, have clearly reflected themselves in changing demands for electricity. However, when translated into purchased electricity demand, these economic patterns have been greatly magnified by the levelling off of growth in the electricity intensity of the major staple industries. Hence, while the growth rate of real output in the 1970s was 28 percent lower than in the 1960s, the purchased electricity growth rate was 64 percent lower.

Second, output in the mineral and forest industries which dominate the industrial sector has illustrated a distinct cyclical pattern, and the electricity intensity of these industries has again translated this pattern into large fluctuations in purchased electricity consumption rather than a pattern of steady increases. Hence, for example, purchased electricity consumption in pulp and paper peaked in 1972 at 4248 GWh, but plunged to 3319 GWh in 1975 with the recession and labour disputes of that year. Similarly, boom conditions in the mineral industry in 1973 caused a sudden
33 percent increase in electricity consumption, followed by an equally sudden decline to near previous levels in 1974.

This potential for unpredictability in the staple sector is heightened by the highly concentrated corporate structure and capital intensive character of the most energy intensive smelting, mining, pulp and paper and chemical industries. Hence, in 1980, 48 bulk electricity customers (mainly in the latter three industries) accounted for about a third of provincial power purchases (Statistics Canada, Cat. # 57-209). Decisions by relatively small numbers of corporate actors, either to expand capacity or to shut existing plants (either permanently or temporarily) can have a very large impact on the demands made on the province’s utilities, particularly B.C. Hydro.

We have already noted the tendency of British Columbia’s economy to diversify via the commercial rather than the manufacturing sector, with the former accounting for the bulk of new job creation in the province over the last decade. Between 1962 and 1980, commercial real output rose at an average annual rate of 6.1 percent versus 5.6 percent for provincial GDP as a whole. Hence, the commercial, non-manufacturing sector steadily increased its share of output from 70 to roughly 76 percent during the period.

Table 3.14 shows that, in overall terms, the commercial sector is only about one-sixth as electricity intensive as manufacturing and mining. Hence, the shift from manufacturing to services through the 1970s contributed to an overall decline in the electrical intensity of British Columbia’s economy.

Nevertheless, as in the industries discussed above, the electricity intensity of the commercial sector itself increased by about 40 percent (from roughly 0.4 to 0.7 kWh per dollar of real output) between the early
TABLE 3.14
COMMERCIAL ELECTRICITY USE STATISTICS
BRITISH COLUMBIA, 1962-1980

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<th>Year</th>
<th>Total Electricity Use, GWh</th>
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<th>Real Output Millions $1971</th>
<th>% of GDP</th>
<th>kWh per Real $ of Output</th>
<th>Real Electricity Price Cents/kWh</th>
<th>Consumption kWh per Capita</th>
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Avg. Annual Growth

<table>
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<tr>
<td>1962-80</td>
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</tr>
<tr>
<td>1971-80</td>
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1960s and mid 1970s. However, as in the industrial sector, there is evidence of a significant decline to about 0.65 kWh per dollar in the late 1970s, most likely due to the adoption of conservation measures.

While the pattern of purchased electricity consumption in the residential sector illustrated the same trend to declining growth from the 1960s to the 1970s, it was much less abrupt than in either industry or commerce. The residential growth rate of around 9 percent per annum in the 1960s trailed that for overall electricity use, while growth of just under 7 percent in the 1970s exceeded it (See Table 3.15). This electricity growth was due partly to the rapid population growth rate alluded to earlier in the chapter, which was created mainly by net in migration to the province. This in turn, was a product of rapid economic expansion and an attractive living environment. However, as noted in Table 3.15, this trend was magnified by a steady increase in electricity consuming households relative to population and a rise in the intensity of electrical use by these households.

Unlike the commercial or industrial sectors, the intensity of residential electricity use tended to increase through the late 1970s, although the rate of growth in electricity use per customer had fallen in half (from 4.4 percent to 2.2 percent per year).

Finally, unlike the other two sectors examined above, there was no consistent pattern of real price increases in the late 1970s. While nominal prices rose gradually after 1967, they were eroded by inflation. Consequently, real prices in 1980 were much lower than those prevailing through the 1960s and early '80s. Hence, it is likely that the trend to lower per customer use was the result of such things as changing residential patterns and more efficient appliance designs than to a direct price-induced curtailment of consumption.
## TABLE 3.15

**RESIDENTIAL ELECTRICITY USE STATISTICS**  
**BRITISH COLUMBIA, 1962-1980**

<table>
<thead>
<tr>
<th>Year</th>
<th>Electricity Consumption GWh</th>
<th>Percent of Total Purchased Electricity</th>
<th>Number of Residential Customers Thousands</th>
<th>Population Customer Ratio</th>
<th>Residential Use per Customer</th>
<th>Real Electricity Prices 1971 Cents/kWh</th>
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**Avg. Annual Growth**

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<th>Prices</th>
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<td>1971-80</td>
<td>6.8</td>
<td>4.5</td>
<td>2.2</td>
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</table>

**SOURCE:** Canada, Statistics Canada, Cat. #57-202.
3.8 References


________. *Consumption of Purchased Fuel and Electricity in the Forestry, Mining and Manufacturing Industries*. Cat. no. 57-208. Ottawa.


CHAPTER 4

ELECTRIC POWER DEVELOPMENT AND THE ORIGINS OF GOVERNMENT INVOLVEMENT TO 1945

4.1 Natural Monopoly and the Early Development of British Columbia's Electric Power Industry

As we have seen in the previous chapter, electric power has played a central economic role in British Columbia's staple-based economy, both as an important economic input to resource extraction and processing and as a consumer good in its own right. We have also seen, in Chapter 2, that electric power possesses a number of characteristics which, when combined with its economic importance, have led governments generally to take an active role in influencing its production. These include large fixed capital costs, indivisibilities in the output produced, declining marginal costs over significant ranges of output, and the prevalence of a series of positive and negative externalities.

The physical geography of British Columbia, with its mountainous terrain, moist climate and numerous large and small river systems had produced an abundance of suitable sites for hydro-electric power development. This reliance on hydro resources, however, meant that the series of market failures generally associated with electric power production were particularly pronounced. Since most hydro power production costs were fixed, and development required access to sizeable amounts of initial capital.

In British Columbia, this capital intensity was accentuated by the uneven flow of most river systems, making necessary the construction of large storage dams. In turn, this need for large investment in storage made it more difficult to develop new sources of power gradually in
response to market demand. Large new blocks of power had to be marketed quickly if the fixed charges associated with its production were to be recouped. Yet the sudden availability of large new blocks of electric power threatened to create a buyer's market, driving down prices and endangering the return to the private investor (See Dales, 1959).

Hence, it is not surprising that the tendency toward regional monopoly emerged right from the outset of British Columbia's electrical distribution systems in the major population centers of Victoria and the lower mainland. However, the depression of the 1890s led to the bankruptcy of most of them, and the eventual consolidation of the electrical and transportation operations of Victoria, Vancouver and New Westminster by the British Columbia Electric Railway Company in 1897 (Taylor, 1965, p. 25; Roy, 1970, pp. 1-43). New capitalization was provided by British financiers and ownership and control of the new conglomerate moved to London, England. As both population and electric power use grew in the boom years after 1900, hydro dams on surrounding rivers financed by British capital replaced the earlier steam plants as a principal power source.

Throughout the inter-war period the policies of the BCER's management were conservative in orientation, its corporate strategy being centered around the achievement of a regular flow of interest and dividends to its British bond and stock holders. Prior to World War I, the company was essentially a transportation utility, generating its own motive power and selling the remainder for lighting purposes. However, by 1914 the electrical distribution segment of the business had become the most profitable. By the 1920s, light and power earned approximately 16 percent on capital employed while the street railway system barely broke even (Roy, 1970, p. 296).
Hence, the BCER became increasingly involved in the marketing and promotion of domestic appliances to increase load growth. Like its Montreal counterpart described by Dales (1959), the utility limited its activities to the promotion of residential loads. This source of electrical demand was off-peak relative to existing urban transportation and larger industrial/commercial loads, and could thus be met at relatively low incremental costs.

Despite the fact that the BCER's generating capacity grew ten-fold between 1910 and 1930 (from 18 to 182 megawatts), the company did not actively seek out new non-residential loads. The company's management was reluctant to invest the substantial sums of capital necessary to attract large new loads in an economy so prone to cyclical ups and downs. While this attitude was galling to local business interests, it enabled the company to survive the two major depressions in the years following 1914 and 1929. By resisting the tendency toward over-expansion in the preceding boom period and maintaining large reserves, the company was able to remain solvent despite the emergence of very large surplus generating capacity.

This attitude, however, attracted competing financial interests into the power business. The BCER's established position in the attractive urban Vancouver and Victoria markets, reinforced by its success in obtaining "protective clauses" from municipalities, effectively precluded competition in power distribution at an early stage. However, two groups supported by Canadian financiers were successful in obtaining water rights on the Stave Allouette and Bridge River Systems, the two most attractive sources of large scale generating sources within economical transmission distance from the Vancouver/lower Mainland region.
While both tried to use these power sources as a basis for attracting new large scale industrial loads, neither was successful. By 1913 the BCER had negotiated a collusive agreement with Western Canada Power Corporation (WCP), the holder of the Stave River Water Rights whereby the BCER purchased its new requirements from WCP, the BCER retained its domestic markets, and WCP was given the large industrial loads. By 1921, WCP was bought out, and in 1925 the Bridge River Company, the holder of the next logical source of large scale power generation was absorbed, creating a firm regional power monopoly.

In the south-eastern part of the province, the availability of good hydro sites, combined with the large loads of the mining industry, created another large-scale power grid after the turn of the century. The West Kootenay Power and Light Company (WKPL) built a number of dams on the Kootenay river starting in the 1890s and by 1910 had utilized the newly emerging transmission technology to build a sizeable regional grid, supplying both industrial and residential needs. As in the lower mainland, the WKPL system grew rapidly, and capacity expanded from 15 to 126 MW between 1910 and 1930 (Taylor, 1965, p. 58).

As the Canadian Pacific Railway expanded its lines into the West Kootenay mining district, its mining arm, Cominco, consolidated its control over the lead/zinc industry. In order to ensure the continued availability of low cost power for its new energy intensive zinc smelting operations in Trail, Cominco bought out WKPL in 1916 (Taylor, 1965, p. 63).

Throughout the rest of the province, a proliferation of smaller electric power systems sprung up. As already noted, many were owned by mining and forestry companies for their own industrial needs, and some of these marketed small amounts of power to surrounding communities.
Elsewhere, small utilities were established, many using diesel generation when hydro sites of suitable scale were unavailable.

4.2 Water Resource Disposition and the Crown

During the early years of the electric power industry, government involvement was directed mainly toward allocating water rights to private power corporations. Unlike the prairie provinces, British Columbia retained the same ownership of land and resources granted to the original partners to Confederation in Section 109 of the British North America Act. With few exceptions, ownership of water resources was retained by the provincial Crown, and unlike the situation in the United States, water was not alienated along with the land associated with it.

The major thrust of early provincial power policy in British Columbia centered on the creation of mechanisms whereby the Crown-owned water rights could be allocated to private parties and municipalities. As early as 1859, it was recognized that the traditional English common law principle of riparian rights as an incident of land ownership was not compatible with resource development. In particular, placer mining, which formed the economic base of the province, required large scale diversion and use of water. Hence a royal proclamation, incorporated into the Land Ordinance of 1870, provided for the separate disposal of rights to use and divert water, and "...it had become firmly established in law that no rights to any water passed with the rights to the land" (Cail, 1974, pp. 111-112).

However, the process of allocating water rights remained fragmented until the 1897 Water Clauses Consolidation Act affirmed the ownership of the provincial Crown and set up a mechanism "...to provide the means whereby such water and water power may be made available to the fullest
possible extent in aid of the industrial and of the agricultural and mineral resources of the Province" (BC, 1897, c. 190, preamble, p. 2135).

Essentially, the Act defined a number of procedures through which particular classes of users (domestic, water works, industrial and power) could obtain water rights. Generally, applicants were required to post their intentions, including specified technical details of the scheme. The Chief Commissioner of Lands and Works, the Gold Commissioner, or their designated representatives were then empowered to consider the application, hear objections, and grant rights for such quantities and uses of water as they considered reasonable. Provisions were also made for the reallocation of existing rights which were not being utilized (BC, 1897, c. 190, part II, sections 9-18).

The Act, however, contained a special set of provisions for those generating power for distribution or sale. While power companies were required to post applications for water rights under Section 9, these were granted by a certificate issued by the provincial Cabinet. The right of appeal by those adversely affected was also to Cabinet, with the latter being obliged to hear such appeals (BC, 1897, sections 84-92).

The sections of the Water Clauses Consolidation Act dealing with power companies went further than simply allocating water rights. The Cabinet certificate granted a number of rights, privileges and obligations, which essentially defined their legal status as public transportation and electrical distribution utilities. Power companies were given rights to expropriate the land required for their facilities, survey and obtain rights of way, use public thoroughfares, carry freight, distribute electricity, collect fares and tariffs, and enter into agreements with municipalities and other power companies. The obligations were few, and included municipal jurisdiction over the placement of distribution lines.
and the obligation to supply customers within fifty yards of such lines (BC, 1897, sections 94 and 118).

This approach to water allocation established the framework which prevails to the present day. However, one major weakness of the 1897 Act was its lack of an adequate administrative framework. Therefore, its successor statute, the Water Act of 1909 established the office of the Chief Water Commissioner, allowed the appointment of district commissioners, and set up a Board of Investigation to untangle the confused pattern of conflicting water rights which had emerged in the province (BC, 1911, c 239, parts II and III; Cail, 1973, pp. 115-116).

In the 1912 version of the Act, water administration was further elaborated. The Commissioner was renamed the Comptroller of Water Rights and District Commissioners became Recorders. Provision was made for the appointment of district Engineers, and the Board of Investigation was constituted as an ongoing collegial decision-making body, empowered to make rules, keep records, and undertake investigations referred to it by Cabinet.

The general procedures for obtaining water rights remained essentially the same, although the types of information required of the applicant and the requirements for advertising were progressively elaborated in the 1909 and 1914 versions of the Act. Beginning in 1909, priorities for water allocation were set out,* but their actual relevance was limited by the provision that all licenses were not to be adversely prejudiced by subsequent ones (BC, 1911, Ch. 239, s.67).

As the Water Act evolved through its 1909 and 1912 versions, a single procedure for allocating water rights for all uses, including power, was established under the Water Comptroller, and uses were consolidated into three classes, A, B, and C. Class C licences, applicable to power companies and large industries were now granted by the Comptroller rather than Cabinet, but the right of Cabinet appeal remained.

Following the introduction of public utilities legislation (see below, pp. 136-37), the Water Act was substantially simplified in 1939, with its 300 or so provisions being reduced to about 80. The general allocative principals just described were retained, and their administration was vested solely with the Comptroller rather than being shared with a Board of Investigation. The activities of electrical utilities were no longer explicitly regulated under the Act, but remained subject to the Act's general provisions requiring the posting of notice, the filing of specified technical information, and the rights of intervention by affected parties. The Comptroller, at his own discretion could hold public hearings to consider these objections and attach whatever conditions to a license he considered appropriate. The right of appeal from such decisions to the provincial Cabinet remained (DeBeck, 1967, pp. 41-43).

4.3 Electric Power Monopoly and the Politics of Disposition

As noted by Dales in his Quebec case study (1959, p. 29), the exercise of such allocative powers by provincial governments "...puts a premium on the exercise of political influence." In the early years of this century, the BCER quickly recognized that government support was just as important as the natural monopoly characteristics of the power industry in maintaining its privileged position.
As has been thoroughly documented by Roy (1970), the acquisition of the initial water rights for the company's first major project on the Buntzen Lake/Coquitlam River system was steeped in political backroom dealings. The utility's manager, Robert Horne-Payne suggested that the offer of a share option to Richard McBride (then an MLA in the Dunsmuir government and later Premier) would be useful, and while there is no evidence that the bribe was offered, the BCER had no trouble obtaining a provincial licence (Roy, 1970, pp. 157-158).

The situation was complicated, however, by the federal government's decision to reassert its jurisdiction over water rights in the Railway Belt, a twenty mile wide strip of land ceded to the Dominion on either side of the CPR right of way. Despite the provincial Water Act, federal jurisdiction was affirmed in a number of court decisions culminating in the Privy Council's Burrard Power vs. the King decision of 1911 (Cail, 1973, pp. 117-121). The federal government initially opposed the BCER's dam as an obstruction to both navigation and salmon spawning, and granted water rights to the nearby municipality of Coquitlam for domestic water supply purposes. This situation prompted the BCER to undertake a strenuous lobbying campaign directed at the federal Liberal Cabinet, an effort which succeeded when the utility offered to contribute $25,000 toward the establishment of a new Liberal newspaper in Vancouver. Coquitlam's water rights were transferred to the BCER despite the grave reservations of Prime Minister Laurier himself, and the BCER received further promises of water rights in the Railway Belt. Hence, it is not surprising that the utility decided to retain a permanent lobbyist in Ottawa (Roy, 1970, pp. 177-183).

The BCER's political influence, as it evolved during the boom years prior to World War I was based on two factors. The first was its direct political connections with the provincial Conservative government, and
particularly the Premier, Richard McBride. The second was its connection with the British financial establishment, which created the belief that interference with the company's prerogatives would adversely affect the flow of British capital into the developing staple economy of B.C. While the force of the latter factor declined with the financial influence of Britain, the former persisted through the 1950s.

4.4 The Demand for Regulation I: The First Public Utilities Commission

Initially, the BCER had two key aims in its dealing with British Columbia's government, the monopolization of water rights in the lower mainland and the prevention of municipal or provincial regulation of its affairs. In the former area, it was entirely successful, and provincial acquiescence in the transfer of competitors water rights facilitated the emergence of the regional monopoly already referred to. Pressures for regulation and public ownership, however, were quick to emerge, and reached a climax with the reform fervour following the collapse of the provincial economy after 1914 (Robin, 1972, pp. 148 - 164).

In 1914, Vancouver, in the face of strenuous opposition on the part of the BCER, managed to obtain a legislative amendment enabling it to enter the public utility business itself. Thereafter, the BCER's political objectives appeared to undergo an about face. First, it offered to sell all its holdings to the city and a provincially operated power commission, an offer which Roy (1970) considers to be mainly tactical, since the post-1914 recession had damaged the financial capacity of the province and its municipalities far more than it had the BCER.

The threat of municipal interference, combined with the emerging competition posed by unregulated "jitneys" to the utility's urban transportation system had led it, by 1916, to openly support a provincial
Public Utilities Commission and to make preparations to use it to its financial advantage (Roy, 1971, p. 6). Shortly thereafter, a Royal Commission headed by the distinguished federal civil servant Adam Short recommended that such a commission be established "... as a special guardian at once of the citizens who require the services of important public utilities and of the parties who undertake heavy risks and obligations in providing them..." (Cited in Roy, 1971, p. 8).

However, as Roy has shown, the eventual legislation, as passed in 1919, was essentially drafted by the province's private utilities:

When the bill was presented to the Legislature, the leader of the Conservative opposition, W.J. Bowser, claimed it was "very much mangled" as a result of having been circulated among the government's friends. Bowser was quite correct; the companies were congratulating themselves. They had, in fact, created their own regulations (Roy, 1971, p. 10).

Specifically, the Act set up a one man commission, regulated utility rates on the basis of a reasonable rate of return on investment, set out provisions for the valuation of utility property, provided for appeal to the courts rather than Cabinet, and regulated municipal competition (Roy, 1971, p. 10).

The Commission, however, was stillborn. A year after its establishment an amendment of the federal Railway Act inadvertently brought the street railway operations of the BCER under federal control, providing the province with an excuse to rid itself of its responsibilities for utility regulation. In Roy's words "... the PUC Act gave the government insufficient control over the Commission and the clauses about a 'fair and reasonable' return worked more to the advantage of the company than to the public" (Roy, 1971, p. 13).
Despite a rather half-hearted attempt by the City of Vancouver to take over the BCER's electrical distribution operations in the early years of World War I, it was transportation rather than power distribution which generated most of the demands for regulation. While this fact is rather ironic considering the emerging tendency toward cross-subsidization of urban transportation by electricity sales, transit fares were a much more visible aspect of the day to day life of the working man. Equally important, the economies of scale brought about by hydro development allowed the BCER to progressively lower power rates from $19.50 per 200 kwh. in 1910 to $4.60, in 1928, while continuing to earn healthy profits (Taylor, 1965, p. 43).

4.5 The Demand for Regulation II: The Amendments to the Water Act

By the late 1920s, however, two events had renewed the demand for government regulation, this time aimed specifically at the province's electric power utilities. First, in 1928, the BCER was bought by a syndicate of Canadian capitalists including Nesbitt Thompson and Sir Herbert Holt, after a protracted bidding war for the stock (Roy, 1970, pp. 347-349).

The control of British Columbia's key utility monopoly by the same financial interests who had tried so hard to defeat public power in Ontario, and who were responsible for the high rates charged by the private Montreal power monopoly (Nelles, 1974; Dales, 1959), generated a great deal of apprehension among consumers. In 1928, columnist F.A. McDiarmid, writing in the Province (October 14, 1928, p. 40), observed that:

Vancouver citizens are afraid, in view of the municipality of companies, and seeing that the capital of one of the companies has suddenly
expanded by some fifty millions of dollars without any apparent increase in the physical valuation of the assets -- they are afraid that somewhere or other, moneys which they should not be compelled to pay for the necessities of life are going to swell the profits of shrewd manipulators of markets, currency and bonds; and the citizens want to know that this is not so.

The other key event was associated with the purchase of the West Kootenay Power and Light Company by Cominco in 1916, and WKPL's acquisition of two competing utilities in 1919. When WKPL was incorporated in 1897, it had apparently mobilized enough political influence to obtain an exemption from the provisions of the 1897 Water Clauses Consolidation Act requiring the extension of service to all customers within 50 years of distribution lines (see above, p. 127–128).

Subsequently, in 1928, Cominco (through WKPL) attempted to force the Granby Mining Company into a contract to smelt ore at Cominco's Trail Smelter by threatening to cut off Granby's power supply. This effort, combined with a number of other disputes over power service in the Kootenay area led to widespread public outrage and mobilized regional business interests into a concerted lobbying campaign for utility regulation through the Union of British Columbia Municipalities. At its 1929 convention in Trail, the UBCM released a hard-hitting brief on the need for utility regulation, and 67 cities and municipalities pledged $10,000 to pursue the issue with the provincial government. "Water powers and other natural resources," declared the Union's first vice-president, "belong to the people, and the government should not permit any bartering of these resources without making certain that the rights of the people therein are adequately protected" (Province, Jan. 10, 1929, p. 22).

The response of the newly-elected Conservative government of Simon Fraser Tolmie was quite rapid, and in January, 1929, a proposal was
circulated calling for the incorporation of electric utility regulation provisions into the Water Act. This approach was immediately endorsed by the UBCM, and in March the necessary amendments were introduced in the provincial legislature.

As was the case with the previous Public Utilities Act of 1919, the draft bill was circulated among the province's major utilities, and it drew immediate negative criticism. Provisions allowing the Water Board to set rates on the basis of a "fair return" on the appraised value of utility property did not attract much criticism because they clearly limited the discretion of the Board and allowed for judicial appeal. However, clauses prohibiting rate discrimination and giving the Water Board power to order extensions of service were strenuously opposed by WKPL. These anti-discrimination provisions, the company argued, would impede industrial development by ruling out preferential rates for large industrial users (Province Mar. 6, 1929, p. 1). Both the Liberal opposition and the City of Vancouver, however, dismissed the Bill as ineffectual and inadequate. Nevertheless, these regulatory provisions survived intact and were incorporated into the Water Act.

For a number of reasons the Water Act amendments proved ineffectual. The Water Board was only an appeal tribunal and had neither the resources nor the mandate to undertake the regulation of the province's utilities on its own initiative. The wide ranging rights of appeal also allowed the utilities, with much larger financial resources than municipalities, to block municipal rate setting attempts through expensive litigation. The UBCM and other groups soon became disenchanted by the Board's inactivity, and lobbying for a separate and more powerful Public Utilities Commission continued.
4.6 Regulation Achieved: The Public Utilities Act of 1939

The Liberal election platform of 1932 promised the establishment of a PUC, but despite continued agitation, the government drew back from implementing it. It was not until after the Pattullo government's re-election in 1938, that a bill was finally drafted. The original version set up a one man board assisted by a small staff, with wide ranging administrative powers to undertake those utility regulation functions which had by this time become accepted throughout the United States as well as all other Canadian provinces (The only exception was Prince Edward Island). These included the appraisal and valuation of utility property, the establishment of an allowable rate of return, the exercise of ongoing supervision over the level and structure of rates, the approval of utility plant expansions through the issuing of certificates of public convenience and necessity, and the power to settle disputes between customers and utilities.

While the desire for regulation had become so prevalent that it could no longer seriously be opposed by any significant interest group, a heated battle developed over the principles under which it was to be undertaken. The utilities, supported by other business groups and the Conservative opposition objected to the idea of a one-man board, the power of cabinet to approve or reject his regulatory decisions, and a restriction limiting the right of appeal to the courts to questions of jurisdiction. The Vancouver Province vigorously supported these protests, and a series of editorials during the latter part of 1938 emphasized the necessity of a multi-member, independent and quasi-judicial regulatory agency whose decisions could be appealed only to the courts. Utility regulation was viewed as a judicial rather than a political function, best undertaken by experts of judicial temperament. "The board should, in short, be something similar to a court,
as free from suspicion of serving political ends as a court of justice" (Vancouver Province, Aug. 17, 1938, p. 4. See also editorials of Nov. 3, 1938, p. 4, Nov. 22, 1938, p. 4, Nov. 24, 1938, p. 4, Nov. 30, 1938, p. 4, Feb. 1, 1939, p. 4).

The new Board's strong powers to both make and enforce administrative orders and to engage persons to carry them out also provoked controversy, with the Conservative opposition accusing the government of fascistic tendencies. "There should," proclaimed Herbert Anscomb during the legislative debate, "be some other system than the hiring of thugs. We don't need the sort of government they have in Germany" (Province, Dec. 6, 1938, p. 6).

This organized and vocal opposition spread into the ranks of the governing Liberal party, forcing the Cabinet to make some changes. A three-man board replaced the single commissioner, enforcement powers were softened, and the grounds of appeal to the courts were broadened somewhat. Nevertheless, Premier Pattullo's well known determination in the face of organized business opposition* meant that the Public Utilities Act survived relatively intact, particularly the powers of Cabinet to issue policy directives, to approve orders, and to hear appeals from major decisions.

4.7 The Implementation of Regulatory Control, 1939-45

The initial implementation of utility regulation during the Second World War, while following the basic lines developed in North America since

*See Martin Robin's account of the period (1973, pp. 9-62). Pattullo's vision of socialized capitalism and the crisis of the depression led him, more than any of his predecessors, to oppose the interests of British Columbia's corporate elite. In particular, he waged an ongoing battle with the oil industry over his Coal and Petroleum Products Marketing Board and his plans to develop the petroleum resources of the Peace River under public ownership.
the turn of the century, was characterized by both activism and innovation. Although Pattullo's appointment of his campaign manager, L.W. Patmore, to the PUC represented overt patronage, the other two appointments were based more on expertise than partisan considerations. A.W. Carrothers, a noted economist who had headed both the B.C. Economic Council and the Petroleum and Coal Products Marketing Board, was named Chairman. Also appointed was J.C. MacDonald who had held the post of Water Comptroller since 1926 (Province, January 31, 1939, p. 1). Subsequently, the Commission appointed S.R. Weston as chief engineer, and in August, 1939, the process of extending active regulatory control over the province's utilities commenced with a major investigation into the operations of B.C. Electric.

Initially, detailed engineering and accounting reports were prepared with the help of outside consultants. These were made public in late 1941. Then a lengthy series of public hearings covering the question of utility appraisal, rate base and rate of return were held across the province between August, 1942, and January, 1943. Despite the technical nature of the questions under consideration, they were of fundamental importance in determining the future level of power rates and utility profits and thus attracted heated debate. The principal participants were the longstanding combatants of the fight over utility regulation, the BCE itself and the province's municipalities representing the interests of power consumers.

In the words of noted UBC economist A.W. Currie, the Commission's July, 1943, report to cabinet broke "... new ground as far as rate control in Canada is concerned" (Currie, 1943, p. 380). Several of the report's key decisions favored power consumers. First it came down firmly for the establishment of a rate base on the basis of the historic costs of prudent investment, rather than on the BCE's proposal for replacement cost accounting (BC, PUC, 1943, pp 10 - 15). This meant, in effect, that
consumer's rates would reflect the historic rather than current costs of power production. Second, it also rejected the BCER's attempts to incorporate the "development costs" associated with unused capacity into the rate base (BC, PUC, 1943, p. 16).

Finally, the PUC report decided to base the BCER's rate of return on the actual weighted average cost of the various classes of debt and equity capital employed rather than on the common practice of deciding what rate of return would be sufficient to attract new capital to the industry (BC, PUC, 1943 pp. 28-29, Currie, 1943, p. 389).

On the basis of debt outstanding and a 7 1/2 percent return to common equity the British Columbia Electric Company's rate of return on its undepreciated rate base was set at 5.3 percent (5.8 percent on a depreciated base). The PUC emphasized, however, that this rate should be subject to frequent and continuous review as conditions changed.

The Public Utilities Commission's findings confirmed earlier public suspicions that excess profits were being made on the BCE's electrical operations, with subnormal returns on its urban transit and manufactured gas operations. However, at the time, all these profits were being taken by federal wartime corporate tax surcharges making it "...impossible to implement the intent of the PUC Act..." (BC, PUC, 1943, p. 34).

In a subsequent report to Cabinet issued in late 1943, the implementation of free power for certain billing periods was recommended. In this way, revenue was transferred from the federal treasury to British Columbia's Power consumers, a move which was justified by reference to the fact that customers of Ontario's publicly-owned power system did not bear the burden of these taxes (Currie, 1943, p. 389; BC, PUC, 1943, pp. 31-34).

Shortly thereafter, a similar appraisal of West Kootenay Power and Light
was undertaken, leading the company to reduce voluntarily its electrical rates by 20 percent (Taylor, 1965, p. 87).

4.8 Rural Electrification and the Origins of Public Power

As was the case throughout North America, a great deal of public agitation for an increased government role in the electric power outside the population concentrations served by the dominant private monopolies. In responding to these concerns, the newly elected Liberal-Conservative coalition government established a special Rural Electrification Committee in early 1943. Two of its three members, Dr. W.A. Carrothers and J.C. MacDonald, also sat on the PUC, and the new body was given a wide mandate to investigate the quality of service provided to rural areas and to recommend methods by which it could be improved.

The results of the Committee's work, published in two reports in 1944 and 1945,* provided extensive documentation of the fragmentation of the power supply system outside the major metropolitan centres. While in 1942, B.C. Electric accounted for 85 percent of the electric energy sold in British Columbia and WKLP for another 5 percent, the other 10 percent was marketed by thirty-one private utilities and nineteen municipalities (BC, REC, 1944, p. 82). The problem of rural electrification, the Committee emphasized, was not one which could be solved in its own right:

All rural electrification is in some degree an expansion of the established central station industry and is made possible only by the internal subsidy element operating within the utility enterprise, supplemented in some cases by government subsidies (BC, REC, 1944, p. 20).

In the case of the two large established utilities, the extension of service to rural areas was seen as susceptible to regulatory solutions. An amendment to the Public Utilities Act was suggested allowing the PUC to order "the utilities to make a survey of any rural area and to report on the capital expenditure, estimated revenues and expenses involved in supplying an area" (BC, REC, 1945, p. 29). Such extensions could then be ordered if the PUC considered that they did not adversely affect a utility's rate of return.

The problems involved in the remaining parts of the province were much more deeply rooted, and centred mainly around the ability of the fragmented and widely scattered collection of small utilities to realize economies of scale. In general terms three factors were considered essential in achieving an acceptable level of service:

- Improvement in plant, reduction in rates, increased use of service. The necessity for improved plant arises from and is financially supported by increased use of the service. Increased use of the service is promoted by improved plant and by reduced rates. Reduced rates are made possible by increased use and improved plant (BC, REC, 1944, p. 14).

The problem of rural electrification was not so much one of availability as it was of low levels of usage, inadequate plant capacity, and high rates. The only way to increase power use to the levels necessary to support larger, more efficient plants was through a "logical and scientific" rate structure in which rates per kWh declined as consumption increased (BC, REC, 1945, p. 38). However, given the small size of the utilities in question, such lower rates would erode the viability of the enterprise and make it impossible to raise the capital necessary to finance large incremental expansions of capacity.
Hence, a reorganization of the industry was recommended in which the multiplicity of small regional utilities would be "...organized into a single enterprise, as a sufficient volume of business would then be provided to support a centralized management with an efficient technical staff" (BC, REC, 1945, p. 30). This consolidation would also make it easier for the new utility to more than double its investment in the plant (from $3.6 to $8.4 million) and to achieve the level of service considered adequate by the Committee (BC, REC, 1945, p. 38).

While the Committee was careful to avoid any recommendations regarding the political question of public versus private ownership, it emphasized that:

The amalgamation of these areas under a single organization, whether the latter be a private company or a public authority, would seem to require legislative action. Even in the case of consolidation under private operation it may be necessary for the Province to participate in financing so that the lowest rate of undertaking can be maintained during a reasonable development period (BC, REC, 1945, p. 42).

For the government, the choice was clearly one between underwriting a large private corporation through subsidies and loan guarantees, or undertaking the production of power itself, with the committee emphasizing that, in the former case, consumers would have to bear the additional burden of federal income taxes.

In addition, the broader political mood of the time favoured public power development. While the Vancouver Province observed at the time of the public utility regulation debate that nationalization of the power industry had ". . .never become a question of practical politics" (Province, March 12, 1929, p. 6), there had always been considerable interest in public power. By 1942, nineteen communities had municipally-owned utilities (some with their own generating facilities), and municipal
ownership had been seriously investigated in both Vancouver and Victoria in the inter-war period.

With the general desire for social reform and a more active economic role for government which emerged out of the 1930s and the Second World War, a complete public takeover of the electric power industry gained widespread popularity. The CCF had made important electoral strides, and by the early 1940s, nationalization had become a central plank in its campaign platform (Robin, 1973, p. 73).

In addition, an all-party post-war rehabilitation council had issued a 1943 report strongly urging the establishment of a province-wide public hydro-power authority. Premier Hart, whose Liberal-Conservative coalition government had been established at least partly to keep the CCF from power, reacted cautiously. Nevertheless, in replying to demands from Conservative members R.C. MacDonald and W.A.C. Bennett for a takeover of the BCE, he proclaimed during the 1944 legislative session "that after a great deal of consideration, I firmly believe it is in the best interest of the development of this province for the people to control the entire hydro-electric power and light services now being used and which may be used for sale to the public" (Quoted in Sherman, 1966, p. 48).

The government followed this statement with a series of meetings with municipalities in the BCE's Lower Mainland and Victoria service areas, and a comprehensive study of the feasibility of nationalization was commissioned. This study, undertaken by W.C. Gilman and Company, a New York engineering firm, considered a takeover of BCE to be well within the financial capabilities of the province and set out a detailed plan. All major generation and transmission facilities would come under the control of a provincial electric power commission, while the BCE's distribution and
transportation assets would be acquired by two new municipally-based utility districts (W.C. Gilman and Company, 1945).

At the last minute, however, the Hart Cabinet, pulled back from full-scale nationalization, and the B.C. Electric Company's power monopoly survived through the 1950s. "It was assumed" commented Hugh Keenleyside in his memoirs "that the financial donations B.C. Electric provided to the government had...been responsible for the utility's long life in private hands" (Keenleyside, 1982, p. 483).

Rather, in the Electric Power Act brought down in 1945, the British Columbia Power Commission was established to take over and consolidate a number of small electric power utilities in the manner recommended by the Rural Electrification Committee. Hence, while public power finally came to the province, its restriction to the marginal, more unprofitable areas led the CCF's Arthur Turner to comment that "the mountain has laboured to bring forth a mouse -- a mouse that is hog tied and ham strung" (Sherman, 1966, p. 51).

4.9 The Electric Power Act of 1945

In the Electric Power Act, the B.C. Power Commission was given broad powers to generate and supply power, expropriate property and private utilities, raise money through the issuance of bonds, and design rate schedules "...to permit and encourage the maximum use of power" (BC, 1948, c. 108; Taylor, 1965, p. 93). As longtime Power Commission executive Garth Griffiths noted in 1961, "These terms of reference are broad and the Act has been consistently viewed by the Power Commissioners as 'enabling legislation'..." (Griffiths, 1961, p 147).

Like similar bodies in Canada, the Power Commission was exempted from public utility regulation. Griffiths (1961, p. 147), reflecting the dominant opinion of the period argued that:
Protection of the public as to rates is inherent in the Power Act. The utility can be regarded as self-regulating. There can be no 'profit;' any surpluses earned...must go into reserves which may be used to stabilize rates and thus return surpluses to the customers. Similarly, the Act does not envisage deficit...

This assumption was considered so self-evident that the Power Commission's rates did not have to be approved by Cabinet, although the latter retained ultimate right of approval over expropriations, financing, and major capital expenditures (BC, 1949, c.108).

By the end of 1945, the new Power Commission had expropriated eight utility companies and had taken on the responsibility for electric power supply in a number of widely scattered and often sparsely populated areas.

4.10 Concluding Summary: Policy Shifts in the Pre-War Period

The period prior to the Second World War showed a clear trend toward an increase in the scope of government involvement in the electric power industry. Accompanying this growing governmental role was a shift in the use of policy instruments from allocation to increased reliance on regulation and entrepreneurship.

The early rationale for provincial government involvement had two related elements. The first was the need to create market institutions for an important new economic commodity and the second was to encourage the expansion of the provincial economy. Both of these goals could be achieved by simply allocating resource rights to private corporations, and the provincial government was reluctant to enlarge the scope of its activity beyond them. Hence, the allocation process both recognized and acquiesced in the emergence of monopoly control in the power industry, and until the 1930s, no serious efforts were made to control it.
The brief foray of the provincial government into the regulatory sphere in 1919 arose primarily out of demands by the BCER itself for the regulation of competition in the urban transportation field. As such it represented a classic case of Stigler’s economic theory of regulation (see above p. 48), and was quickly abandoned when jurisdiction over the BCER’s transportation operations changed. Subsequently, it took twenty years of agitation, mainly by regional business interests through municipal governments to convince the provincial government to assume a major regulatory role as an arbiter between power producers and consumers.

The almost simultaneous entry of the provincial government into direct power production was due mainly to technical factors, i.e., it represented the easiest way to meet regional demands for greater power availability. The historical record shows clearly the reluctance of successive administrations to adopt entrepreneurship as a policy instrument, especially when it appeared to threaten the interests of the province’s larger private power producers.

In conclusion, the most striking feature of inter-war power policy in British Columbia was the extreme cautiousness of government in the face of demands for intervention in the industry. By the First World War, utility regulation had become commonplace in both the United States and other parts of Canada, but was not achieved in British Columbia until the eve of the Second World War. In Ontario, the agitation of business interests and municipalities had led to the emergence of public entrepreneurship during the earliest years of the power industry, but similar pressures in B.C. took thirty years to produce a much more limited degree of provincial involvement in power production.

Leaving aside the elements of personality and chance, the most plausible explanation for this difference lies in the different economic
structures of the two regions, structures which made the demands for government involvement weaker in B.C. and the forces opposing it stronger.

Ontario already possessed a diversified manufacturing base by the turn of the century, and this base depended largely on imported coal for its energy needs. Hence, a strong coalition formed around the public control of an energy source which promised emancipation from this dependence, and public entrepreneurship became closely associated with economic growth in the rationale for intervention.

British Columbia, by contrast, was a staple economy served by a single dominant commercial metropolis. Staple industries tended to generate their own electricity, and required only access to suitable resources. Therefore, they had little interest in either regulation or public entrepreneurship.

The extreme concentration of population and commercial activity in British Columbia resulted in the early establishment of a large private power monopoly which subsequently provided a major source of opposition to government intervention. These pressures were strengthened by the requirements of the staple economy for large capital inflows, and the consequent reluctance by the provincial government to introduce measures which could frighten investors.

Nevertheless, the limited excursions into both entrepreneurship and regulation during the inter-war period had significantly changed the character of British Columbia's electric power system. The major private monopolies, the BCER and WKPL, were now regulated, and in the more sparsely populated regions, the province had, itself, undertaken to supply electric power.
4.11 References


5.1 The Policy Setting of the Post-War Period

As British Columbia emerged from the Second World War, the question of electric power development became an issue of great economic and political importance. The war itself had given the provincial economy a sharp boost out of the depression of the 1930s which had hit B.C. with particular severity. The immediate problem was one of ensuring that the economy as a whole did not relapse into pre-war stagnation, and there was a widespread hope that the resource-based expansion so rudely interrupted by the depression and the material shortages of the war could be resumed. The province's natural resource potential appeared far from exhausted, and an annual Natural Resources Conference was established to focus the attention of businessmen, government officials, and educators on the possibilities for economic development offered by this potential (B.C. Natural Resources Conference, 1948-1962).

At the same time, we have seen that the provincial government had assumed a far more active role in the power industry. Not only did it exercise its traditional ownership and control over the water rights required for new hydro development, but it had also asserted wide-ranging regulatory authority over the activities of private power producers and had, itself, undertaken to supply electricity to the consumers outside the major metropolitan areas of the province. It remained to be seen how the government would combine these three policy instruments to influence the role played by hydro-electric power in British Columbia's post-war economic development.
5.2 The British Columbia Electric Company and the PUC: Regulation Routinized.

Once the BCE's overall rate of return had been established, rate hearings were held in Vancouver and Victoria in 1948. However, the provincial Cabinet, worried over the prospect of increasing rates for the BCE's marginal gas and urban transit operations, issued an Order in Council directing the PUC to consider all the utility's operations as one unit for rate setting purposes. This meant that the high profits of the electrical service were offset by the transit and gas losses. "As the overall return to investors from all operations was not excessive," concluded the Commission, "no general reduction in electric rates was considered" (PUC, 1948, p. 9).

The potential for regulating rates was also limited by a major refinancing by the BCE which was approved by both the PUC and Cabinet in 1946 (PUC, 1946, pp. 13-14). Much of the utility's debt was turned over, reducing interest rates on its first mortgage from 4 1/2 to 3 1/4 percent (B.C. Power Corporation Ltd, 1946). While the cost of capital was thus substantially reduced, the PUC did not lower the permitted rate of return, thereby allowing a higher effective return on the company's equity.

In 1951, claiming higher operating and taxation costs, the BCE filed three separate electrical rate increases, the combined effect of which was to increase electrical revenues by 15 percent (B.C. Power Corporation, 1951). During the same year, the BCE requested an increase in its allowable rate of return from 5.8 to 7.5 percent, and after a 12 day hearing in which strenuous opposition was voiced by municipalities, a 6.5 percent rate was granted (PUC, 1952, pp. 7-8).

A second application for a series of major rate increases in 1958 was also approved by the Public Utilities Commission. Nevertheless, the
regulatory body yielded to the public outcry over the heavy burden placed on residential users and ruled that they should bear no more than three quarters of the revenue generated. Although the BCE complied by submitting new rate schedules under which no customer would bear more than a 22 percent increase, it challenged the PUC's first excursion into the realm of rate structure in the courts.*

Supervision of the expansion plans, finances, and corporate organization of the BCE appears to have been virtually nonexistent. Of the twenty-five certificates of public convenience and necessity issued for major electrical generation and transmission projects between 1945 and 1961, only one (for construction of the Burrard thermal plant issued in 1957) was decided on the basis of a public hearing. A number of major ones, including the 64 Mw. Wahleach Dam and the 248 Mw. Bridge River #2 project were approved within twenty four hours of the application being filed (PUC, 1959, p. 12; PUC, 1956, p. 8).

Major bond issues were approved with similar speed and it is doubtful if they received even a cursory examination. In fact, the PUC, in its Annual Report for 1960, emphasized the limited nature of its regulatory role. Rate of return regulation and the appraisals on which it was based should not, according to the Commission:

"... be employed so as to conceal the basic responsibility that lies with management. ... for seeing that the expenditures... have been made prudently and with due regard to economy. To

*This appeal, eventually successful, claimed that the PUC had no legal right to restrict any specific rate increase within the company's allowable rate of return unless it allowed other rates to be raised to make up the deficiency (B.C. Power Corp., 1960, p. 7).
this important matter, the Commission can give only general supervision designed to correct gross errors of judgement. . .the reason is twofold: first, it is the essence of private enterprise that the initiative. . .should lie with management, and second, detailed supervision would duplicate the work of management and would require an extremely large staff (PUC, 1960, p. 17).

The PUC's activities were certainly limited by lack of staff. The scope of its task was extensive, including not only the electric power service of the BCE, WKPL and several smaller utilities; but also urban transit, toll highways, ferries, and (starting in the mid 1950s) cemeteries. In 1943, the Commission's expenditures were $98,537 and it employed a staff of fourteen, including two engineers and two researchers. By 1956, despite the enormous expansion of the operations it regulated (for example, assets of the BCE had more than tripled during the period), expenditures had fallen to $87,241 and staff to eleven, with no researchers employed (Stanbury, 1973, Tables 4 and 5).

The Commission was also hampered by the poor quality of some of its appointees. Percy George, a defeated Coalition candidate appointed during the dying days of the Liberal-Conservative government in 1952 with no experience in utility regulation, did a great deal to create a serious crisis of confidence in the PUC. He made major procedural errors later condemned by the courts, created general outrage by trying to settle a highly publicized dispute between the BCE and the B.C. Power Commission behind closed doors, and in the words of a fellow commissioner, "attempted to allow political pressure to bear on the Commission" (Stanbury, 1973, p. 31). While W.A.C. Bennett appointed noted UBC economist Henry F. Angus as PUC chairman in an attempt to restore its credibility, Angus was criticized for his lack of interest and initiative in the post and his failure to lobby effectively for increased resources (Stanbury, 1973, p. 33).
Hence the British Columbia Electric Company (now the principal subsidiary of an eastern Canadian based holding company, the British Columbia Power Corporation) was free to pursue its corporate objectives with relatively little interference. These were basically the same as they had been in the pre-war period; the achievement of a healthy return to the stockholders, the protection of this return by heading off the threat posed by public power, and the construction of facilities just adequate to meet the rapidly growing power demands of the period.

As shown in Table 5.1, the B.C. Power Corporation was quite successful in increasing the profitability of B.C. Electric through the 1950s. In 1950, the power corporation's return on equity was under 3.7 percent, higher than the roughly 3 1/4 percent return to the bondholders, and slightly lower than the 3.9 percent return to the BCE's preferred stockholders (B.C. Power Corporation, 1950). However, with the rate increases of 1951, this return had jumped to 5.5 percent by 1952, and to 6 percent by 1953. Thereafter, the returns to the Power Corporation's common stockholders were effectively doubled to over 10 percent by changes to the federal income tax act which allowed the accelerated write-off of new capital investments leading to the deferral of income tax.

The PUC, by opting for the normalization method of treating these deferred taxes, allowed the BCE to retain the extra income they generated, rather than distributing it to power consumers (PUC, 1957).* Hence, in addition to paying regular dividends on the Power Corporation's stock, the BCE's management was able to finance 25 percent of its $606 million net

*Under the normalization method, the utility is allowed to deduct the full amount of its tax assessment, even if much of it is not actually paid, with cumulative deferred taxes being treated as a liability on the balance sheet. However, in capital-intensive industries like power utilities, these taxes can be deferred indefinitely and become a major source of internally generated funds (See Phillips, 1965, pp. 199-205).
### TABLE 5.1

**BRITISH COLUMBIA ELECTRIC COMPANY**

**FINANCIAL PERFORMANCE, 1950-1960**

(Percent)

<table>
<thead>
<tr>
<th>YEAR</th>
<th>REGULATORY RATE OF RETURN</th>
<th>AFTER TAX RATE OF RETURN ON CAPITAL EMPLOYED</th>
<th>EFFECTIVE AFTER TAX RETURN ON POWER CORP. COMMON STOCK</th>
<th>BOOKKEEPING AFTER TAX RETURN ON COMMON STOCK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>NA</td>
<td>3.2</td>
<td>3.7</td>
<td>3.7</td>
</tr>
<tr>
<td>1951</td>
<td>NA</td>
<td>3.5</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>1952</td>
<td>5.0</td>
<td>3.8</td>
<td>5.5</td>
<td>5.5</td>
</tr>
<tr>
<td>1953</td>
<td>5.4</td>
<td>4.1</td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td>1954</td>
<td>5.6</td>
<td>5.0</td>
<td>12.3</td>
<td>6.4</td>
</tr>
<tr>
<td>1955</td>
<td>6.1</td>
<td>5.0</td>
<td>12.0</td>
<td>7.8</td>
</tr>
<tr>
<td>1956</td>
<td>5.9</td>
<td>5.5</td>
<td>11.8</td>
<td>8.4</td>
</tr>
<tr>
<td>1957</td>
<td>5.1</td>
<td>5.1</td>
<td>10.9</td>
<td>7.9</td>
</tr>
<tr>
<td>1958</td>
<td>5.0</td>
<td>5.2</td>
<td>9.3</td>
<td>6.5</td>
</tr>
<tr>
<td>1959</td>
<td>5.3</td>
<td>5.2</td>
<td>10.7</td>
<td>8.0</td>
</tr>
<tr>
<td>1960</td>
<td>NA</td>
<td>5.6</td>
<td>10.1</td>
<td>7.4</td>
</tr>
</tbody>
</table>

**SOURCES:** Column 1, B.C., Public Utilities Commission, *Annual Report* (Various Years); Columns 2-4, B.C. Power Corporation, *Annual Report* (Various Years).

**NOTE:** Column 2 is based on operating income (with deferred taxes and interest added back) divided by total assets minus current liabilities. Column 3 is based on common share earnings with deferred taxes added back divided by the sum of equity capital and accumulated deferred taxes. Column 4 is the same as Column 3, but deferred taxes are not included in either shareholder's return or equity.

However, barely surviving the threat of expropriation in 1945, the BCE moved to reinforce its position. According to Martin Robin:

An extensive camouflage propaganda campaign against public power was carried out on behalf of the government by the British Columbia Electric Railway Company, which employed for some months before the (1945) election two hundred sales representatives, directed by high salaried public relations technologists, who went on a door-to-door campaign boosting private power. Homeowners were assured that government-owned power plants were inefficient, that Ontario Hydro needed huge subsidies from the public purse, that public ownership involved regimentation and centralization similar to fascism in Italy and national socialism in Germany, and finally, that unions would be destroyed by socialist bureaucrats (Robin, 1973, p. 84).

This advertising was continued through the 1950s and, in Hugh Keenleyside's words was accompanied by "unusual efforts to improve employment policies in order to avoid strikes or other situations that might adversely affect public opinion and force the government to consider expropriation" (Keenleyside, 1982, p. 485). In addition, the fact that the coalition Premier between 1948 and 1952, Byron Johnson, had been a member of the BCE Board, must have gained the utility a sympathetic hearing. With the election of the Social Credit administration in 1952, the government's favourable treatment of the utility continued despite W.A.C. Bennett's earlier support for nationalization. Again, it is likely that the BCE's campaign contributions proved too attractive to pass up, and Sherman records that on Bennett's first official visit to Ottawa, "A.E. (Dal) Grauer of B.C. Electric Co., Ltd., obligingly arranged for a friend to show him the ropes" (Sherman, 1966, p. 141).
During most of the 1950s, Bennett was equally obliging to the private utility. Not only were repeated calls for nationalization rejected, but the British Columbia Power Commission’s advertising campaign featuring the slogan "Power at Cost" was stopped by the government when it "... infuriated the potentates of B.C. Electric..." (Keenleyside, 1982, p. 483). Similarly, the B.C. Power System was ordered by the government to sell its Sechelt operation to the BCE when the latter wanted to expand its system to service a new pulp and paper load at Powell River, heading off a public battle before the Public Utilities Commission.*


As Roy notes briefly in the Appendix to her study of the pre-war operations of the British Columbia Electric Railway company, the new British Columbia Electric Company continued the conservative approach of its predecessor into the post-war period (Roy, 1970, pp. 396-397). Rather than building ahead in the hope of attracting large new loads, it built only to meet the loads which were generated by the rapid population growth and economic expansion of the period, a pattern suggested graphically in Figure 5.1.

*Despite the Power Commission’s vigourous attempt to defend its territory, and a successful public campaign to get the PUC to hold public hearings on the issue, the latter claimed in its 1956 Annual Report that "... evidence was submitted that the B.C. Power Commission had agreed to sell its system in the Sechelt Peninsula to the British Columbia Electric Company, Ltd" (PUC, 1956, p. 156). It should be noted, however, that there appears to have been some technical justification for the move. The integration of the Sechelt System into the much larger BCE grid allowed its Clowhom Falls hydro plant to be more advantageously developed as a higher capacity system, and it is by no means clear where the B.C. Power
FIGURE 5.1
BRITISH COLUMBIA ELECTRIC COMPANY
GENERATING CAPACITY AND PEAK DEMAND
1940-1960

The private utility was able to follow such a strategy because of the favourable relationship between its load growth and the resources available to meet it. Serving by far the largest single source of demand in the province, the annual increments were sizeable enough to allow it to absorb significant blocks of hydro capacity quite quickly. On the supply side, it had, during the pre-war period gained water rights over generation sources like Bridge River, Cheakamus, and Wahleach, all of which were relatively close to load centres and could be developed sequentially in stages of a convenient size.

By the mid-1950s, however, these readily available hydro resources had been fully utilized. B.C. Electric's response on the demand side was to show greater interest in building new loads to absorb the larger blocks of additional capacity which would inevitably be produced by future projects. This new interest in load building was probably also the result of a desire to enhance its public image at a time when the province was undergoing an unprecedented industrial boom.

We have already noted in this regard the acquisition of a major new industrial load, the Powell River Pulp and Paper Company in 1955. In 1956 a major demonstration project was launched using "low-cost electric power" to irrigate "160 acres of arid sagebrush land near Lillooet...for intensive production of forage crops" (B.C. Power Corporation, 1956, p. 16), and in 1957, the company took a financial interest in Western Copper Mills, Ltd. to establish a major new industrial load (B.C. Power Corporation, 1957, p. 11). A concerted effort was also made to establish the most advantageous source of future generating capacity. A new subsidiary, Western Development and Power Ltd., was established both to undertake the load development activities described above, and to investigate future generating sites.
Initial attention was focused on the Fraser River with a theoretical capacity of around 7,000 MW,* compared to the 865 MW.** developed by the BCE between 1945 and 1960. It was relatively close to the utility's existing load centres, and was already the focus of intensive government study. In 1948, a major flood on the Fraser River System had caused serious damage in the Fraser Valley and Lower Mainland region and shortly thereafter a Dominion Provincial-Board was set up to study ways of alleviating future flood damage. This body was reconstituted as the Fraser River Board in 1955, and a major study of the basin was initiated to determine an optimal program of flood control and hydro-electric power generation (Fraser River Board, 1958, pp. 1-5).

The Fraser's advantages for the BCE were further enhanced by a proposal made in the mid 1950s by General A.L. McNaughton, Canada's representative on the International Joint Commission, to divert the Columbia into the Fraser below a major storage Dam at Mica Creek. This scheme, which would have significantly boosted the energy capability of the lower Fraser, was the subject of a major engineering study commissioned by the federal government in 1956 (B.C. Engineering Co., Ltd., 1956), and during the same year, B.C. Electric announced its intention to apply for a Water Licence to construct the Mica Dam (Financial Post, June 23, 1956, pp. 1 and 11).

*This figure is the approximate average generating capacity of three hydro development plans proposed in B.C., Fraser River Board, 1958, pp. 85-88. Theoretical energy capability of these schemes was approximately 5,000 Av. MW. (or 43,800 GWh.) annually. However, a number of the projects included in these three plans were found to be uneconomic in a later study by the B.C. Energy Board (1972, Appendix VI).

While a front page editorial in the Financial Post (June 23, 1956, p. 1), applauded this move as "a fine example of private enterprise at its public spirited best. . .," the BCE's designs for both the Fraser and the Columbia were short lived. The Fraser is British Columbia's single most productive salmon spawning river, and despite General McNaughton's belief that "...when the time comes that power is needed for the industry of the Vancouver area, everything will be swept aside" (Financial Post, June 23, 1956, p. 11), the prospect of major hydro dams raised heated and widespread opposition.

The vehemence with which such a scheme was greeted by fishermen, conservationists and many scientists arose from two important considerations. First, while the problem of passing spawning salmon over low head hydro dams had been mastered by the 1950s, a solution to the problem posed by larger dams remained elusive. "The accumulated experience on the Pacific coast" commented noted fisheries biologist Pater Larkin, "adds up to the single lesson that, as the volume of flow and the height of the dams goes up arithmetically, the problems of providing for salmon go up geometrically, and the costs go up astronomically. In an exercise designed to evaluate the possible effects of a series of ten dams on the Fraser, it was concluded that, even with an expenditure of $300,000,000 salmon could not be adequately conserved in the upper Fraser" (Larkin, 1972, p. 169; H.R. Macmillan, 1958).

Second, there was ample and indisputable historical evidence of the incompatibility of salmon migration and hydro dams. In 1913, the construction of the Canadian Northern Railway in the Fraser Canyon triggered rock slides which blocked most salmon migration. The salmon catch plunged to well under 10 percent of its previous levels and did not recover for 30 years. The lingering effects of this disaster led, in 1937,
to the formation of the International Pacific Salmon Fisheries Commission
(a joint Canada-U.S. body), and the implementation of a number of measures
to improve spawning on the Fraser (Haig Brown, 1961, pp. 145-47 and 156).
In the 1940s, the lesson was brought home again when the salmon stocks of
the Columbia river were devastated by large-scale hydro developments in the
United States.

In addition, the federal Fisheries Act gave the fisheries department
effective veto over works which interfered with salmon migration, and by
the mid-1950s, federal fisheries minister James Sinclair, pledged that no
development would be permitted unless a solution to the problem could be
found (Financial Post, Jan. 14, 1956). Although the BCE donated $50,000
to the University of British Columbia to finance research into the
fish-power problem, it unexpectedly gave up its plans for the Fraser
altogether in mid-1957. "At the present time," the utility admitted,
"there is no known dam construction which will not harm the salmon runs"
(Financial Post, May 18, 1957, p. 10).

With the BCE deciding not to battle the government and public opinion
on the Fraser issue, and the Columbia bogged down in joint Canada-U.S.
studies, the private utility eventually gave up new hydro development
altogether in favour of a thermal generation strategy. By this time the
establishment of major new export markets had allowed the construction of
the Westcoast Transmission pipeline from the gas fields of the Peace River
region, and the BCE had obtained the gas distribution franchise in the
lower Mainland. Hence, the purchase of additional increments of natural
gas for thermal power generation represented an attractive option, and in
1957 a 945 MW gas turbine plant was announced, to be constructed in
157 MW stages as demand required. While, as we shall see, the company did
not rule out new hydro development altogether, it continued to broaden its
thermal options through the acquisition of the large Hat Creek coal deposits (B.C. Power Corp., 1960, p. 9).

5.4 Public Power and Public Policy I: Rural Electrification and Resource Development

In the meantime, public power development, under the British Columbia Power Commission was playing a markedly different role. Using its ability to raise capital under the provincial government's guarantee, the Commission gradually took over most of the province's small utility companies and greatly improved their level of service. Three regional hydro-based grids were established, one in the Kamloops-North Okanagan region, another on central Vancouver Island, and a third (much smaller one) in the upper Columbia valley. The other isolated systems through the central interior and northern parts of the province relied on small-scale diesel or gas-diesel generators.

During the first decade or so of its existence, the Power Commission was successful in achieving the goals laid out in 1945 by the Rural Electrification Committee. Between 1945 and 1958, the Crown utility acquired 32,457 customers by takeovers and added 42,823 more through its expansion programs (B.C. Power Commission, 1958b). At the same time, as shown in Figure 5.2, average charges per kWh. for both residential and commercial customers fell by 50 percent, while residential use per customer more than tripled and commercial use rose 150 percent.

The other principal aspect of the Power Commission's role was not foreseen by the Rural Electrification Committee. Section 21 of the Electric Power Act had authorized the Commission, subject to Cabinet approval, to negotiate bulk power supply contracts, and in the Commission's own words:
FIGURE 5.2
BRITISH COLUMBIA POWER COMMISSION
GRAPHS SHOWING AVERAGE ANNUAL kwh CONSUMPTION AND AVERAGE CHARGE PER kwh BY FISCAL YEARS FOR THE PERIOD 1946 - 1962

One may almost say the Power Commission started with a Section 21 contract. The Commission was formed in April, 1945, and by the next month inquiries were made for the supply of 7,500 kilowatts to the proposed pulp mill of Bloedel, Stewart and Welch Ltd. at Port Alberni. A commitment was made to supply the power and the planning and construction of the John Hart development in Campbell River was put underway. (B.C. Power Commission, 1959c, p. 1).

In the decade 1946 to '56, ten more bulk power sales contracts were negotiated, seven for new pulp mill expansions, two for the Canadian Collieries coal mining operation and one to supply part of the B.C. Electric's Victoria load. Supplying these loads, the Power Commission was able to develop the Campbell River, the most attractive source of large scale power generation on Vancouver Island, and by 1957, the Commission's hydro-based Vancouver Island system accounted for over three quarters of its total electric energy output of 1,059 Gwh. (B.C. Power Commission, 1958a, p. 14). These bulk loads became a dominant element of the Vancouver Island system, increasing from 40 percent of total energy consumed in 1948 to around 75 percent after 1953 (B.C. Power Commission, 1959c, Appendix C, Table 1). As a result, over half of the Power Commission's total energy sales during the 1950s were made to five corporate buyers, B.C. Electric, MacMillan Bloedel, Elk Falls Co. Ltd., B.C. Forest Products, and Canadian Collieries.

5.5 Public Power and Public Policy II: The Planning Dilemma of the 1950s

The unique feature of the provincial government's new involvement in the direct provision of electric power from hydraulic resources was that it necessarily entailed a planning function. By contrast, the allocation of resource rights left power planning almost entirely with private cor-
porations and (as we have seen) regulation exerted minimal control over the planning activities of regulated utilities.

By the mid-1950s, the government's role in providing low-cost power to rural areas and large industrial users had forced it to confront three interrelated planning problems. These were the accurate prediction of new load growth, the rising incremental costs of supplying this growth, and the environmental controversies created by large-scale hydro development.

The promotional rates introduced by the Power Commission were, in a sense, too successful. When combined with the rapid economic growth of the 1950s, they led energy demand to grow at an extremely rapid rate of 27 percent a year between 1950 and 1960, from 153 to 1664 gwh. Growth in the first five years of the period was particularly rapid, averaging 38 percent a year. Most of this new demand occurred on the Vancouver Island System, with bulk loads accounting for almost 80 percent of the system's new demands between 1949 and 1958 (Calculated from B.C. Power Commission, 1959c).

Energy forecasting by the Power Commission, based on the extrapolation of past trends for normal power district sales and "by direct contact with the customer" for bulk sales (B.C. Power Commission, 1959b, p. 2), failed to foresee the extent of this growth. On Vancouver Island the problem was one of energy availability. While the system was generally adequate to meet peak loads, the variability of the Campbell River System's flow meant that the energy demands made on it began to exceed its dependable capability. Between 1952 and 1957, the Crown utility was in the uncomfortable situation of marketing firm power which would in fact be subject to interruption in the event of adverse water flow conditions (B.C. Power Commission, 1959c, pp. 7-8).
Therefore, in 1955 the corporate organization of the commission was streamlined, a new general manager was hired, and an accelerated development program was undertaken. This program included a new storage dam on the Campbell River system combined with major river diversions to produce additional energy, a hydro development on the Ash River, and a thermal generating station to provide standby energy in low water years (B.C. Power Commission, 1959a, p. 37).

This problem of unforeseen load growth was intimately associated with another, that of the rising incremental costs of new electrical energy supplies. This latter problem had two aspects, both of which resulted from the Commission's pursuit of its mandate to increase the availability of power. The first was that the success in extending power service in rural areas automatically lowered customer density and increased transmission and distribution costs. Customer density dropped sharply from 27 customers per mile of distribution circuit in 1948 to 16 customers per mile in 1958, while the capital investment per customer soared from $700 to $2400 during the same period. In addition, as fuel costs in the areas served by small-scale thermal generation tended to rise, the declining block rate structure failed to reflect the higher short term incremental costs of energy.

For the Vancouver Island system, the same problem arose in relation to bulk loads. The initial bulk contracts were negotiated on a relatively long-term basis, at fixed rates based on capacity rather than energy* (B.C. Power Commission, 1959c, Appendix A). The first two pulp and paper contracts were for 3 years with an option to renew for another 7. The next

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*Capacity refers to the maximum output that an electric power plant is capable of producing. Energy refers to the output which the plant is capable of producing over a given period of time. In a hydro-electric system, energy (produced by the dependable flow of a river basin) is the limiting factor.
5 were for 20 to 25 years and none had price adjustment clauses. Unfortunately the revenue from these contracts never really covered the costs of servicing them. As shown in Table 5.2, substantial losses were incurred until 1952, when average system costs were brought down to a level that allowed an operating profit. However, the profit was illusory since, as already noted, the system's energy deficiency meant that these sales were not really firm. Once the investments in new energy capability undertaken after 1955 began to reflect themselves in higher system costs, bulk sales once again showed a deficit.

Following an internal review of this situation in 1953 (B.C. Power Commission, 1955a), new bulk pulp and paper contracts were negotiated to include higher energy charges based on increasing rather than decreasing blocks as consumption increased, periodic price revisions, and provisions allowing customer self generation (B.C. Power Commission, 1959c, Appendix A). While these new contracts boosted average bulk kWh charges from about 4.1 mills in 1955 to 5 mills by 1959, to 5.6 mills by 1962, they still did not achieve a sufficient revenue to cover even the average cost of serving them (See Table 5.2).*

Overall, the rising marginal costs of supplying both bulk and rural users, when combined with the initial promotional rates structures for both groups, led to their subsidization by the power consumers of the small urban centers serviced by large scale hydro facilities. For example, in 1957, the power district sales of the Vancouver Island and Central Interior

*While system costs are not readily available after 1958, it is virtually impossible for them to have declined significantly from 6.2 mills thereafter indicating that the Power Commission's bulk revenues continued to be insufficient to cover average costs.
<table>
<thead>
<tr>
<th>YEAR</th>
<th>GENERATING COSTS</th>
<th>REVENUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1949</td>
<td>7.7</td>
<td>3.5</td>
</tr>
<tr>
<td>1950</td>
<td>7.8</td>
<td>4.2</td>
</tr>
<tr>
<td>1951</td>
<td>6.7</td>
<td>4.5</td>
</tr>
<tr>
<td>1952</td>
<td>4.3</td>
<td>4.3</td>
</tr>
<tr>
<td>1953</td>
<td>3.3</td>
<td>4.1</td>
</tr>
<tr>
<td>1954</td>
<td>2.9</td>
<td>4.1</td>
</tr>
<tr>
<td>1955</td>
<td>3.2</td>
<td>4.1</td>
</tr>
<tr>
<td>1956</td>
<td>3.4</td>
<td>4.1</td>
</tr>
<tr>
<td>1957</td>
<td>5.0</td>
<td>4.3</td>
</tr>
<tr>
<td>1958</td>
<td>6.2</td>
<td>5.4</td>
</tr>
</tbody>
</table>

SOURCE: B.C. Power Commission, 1959c, Appendix C, Table 1.
hydro systems showed a $4,294,000 surplus while bulk power sales lost $3,970,000 and smaller diesel-based power districts lost $853,000 (B.C. Power Commission, 1959c). This meant that approximately 51,000 customers in smaller regional centres were paying a significant part of the costs of both rural electrification and pulp and paper development on Vancouver Island.

Rising power costs resulted not only from general inflation and the utilization of progressively less attractive sites. They were also related to the rapid unforeseen surge in industrial power demands itself. The accelerated development program instituted by the power commission to meet these loads required the construction of large new projects with very little lead time. Not only were costs inadequately estimated, but a number of significant planning errors were made and, as shown in Table 5.3, costs exceeded original projections by about 40 percent.

The Power Commission's hydro developments of the 1950s also led to the emergence of concern over the external environmental and social costs generated by such projects. Virtually all of the hydro projects developed or proposed by the Commission in the 1950s were on medium sized rivers supporting significant salmon runs. While the potential impacts were much less dramatic than the Fraser proposals discussed above, and were amenable to mitigation measures, they immersed the public power agency in numerous controversies and threw a continuous set of obstacles in its path.

During the 1950s the legal and administrative structure governing hydro development allowed significant fish protection. The federal Fisheries Act, in effect, gave the fisheries department veto power over works detrimental to the anadromous fishery and in 1954, an amendment to the Provincial Fisheries Act gave the same power to its B.C. counterpart. Both federal and provincial ministries actively objected to many of the water
licences sought by the Power Commission, and the Crown utility was forced to take their objections into account.

In 1951, for example, a plan to develop the Quesnel River, a central interior tributary of the Fraser, as a major power source was blocked when the opposition of the International Pacific Salmon Fisheries Commission led the provincial government to appoint a special review committee. This committee recommended against development and the Power Commission was forced to rely on thermal generation (B.C. Power Commission, 1959b).

On the Vancouver Island system both the Puntledge and Ash River projects had major impacts on the salmon fishery and, although these were

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**Table 5.3**

COST OVERRUNS ON THE B.C. POWER COMMISSION'S MAJOR VANCOUVER ISLAND HYDRO PROJECTS

<table>
<thead>
<tr>
<th></th>
<th>Initial</th>
<th>Final</th>
<th>Increase</th>
<th>Overrun</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strathcona Dam</td>
<td>23,840</td>
<td>35,197</td>
<td>11,357</td>
<td>47.6</td>
</tr>
<tr>
<td>and Powerhouse</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queensam, Heber and</td>
<td>4,748</td>
<td>7,081</td>
<td>2,333</td>
<td>49.1</td>
</tr>
<tr>
<td>Salmon River Divisions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Georgia Gas Turbine Plant</td>
<td>13,300</td>
<td>15,850</td>
<td>2,550</td>
<td>19.2</td>
</tr>
<tr>
<td>Ash River G.S.</td>
<td>11,010</td>
<td>15,450</td>
<td>4,440</td>
<td>40.3</td>
</tr>
<tr>
<td>Total Vancouver Island Programs</td>
<td>52,898</td>
<td>73,578</td>
<td>20,680</td>
<td>39.1</td>
</tr>
</tbody>
</table>

constructed, the Power Commission was forced to make significant design changes to mitigate the damage they created. On the latter project, fish protection structures costing $400,000 or just under 3 percent of total costs, were incorporated at the insistence of both federal and provincial fisheries departments (B.C., Royal Commission, 1959, p. 11).

Not only did fisheries protection raise the costs of the B.C. Power Commission's major projects, thus limiting its ability to "promote the maximum use of power," but it also limited future planning options. The remaining stages of the Somas River Development that were to follow Ash River were abandoned when fisheries protection requirements proved too costly. The Homathco hydro development, on the coastal mainland within economic transmission of Vancouver Island, had by the mid 1950s emerged as the next large scale power source for the rapidly growing island system, and by 1959, $790,000 had been spent on planning surveys. However, a central feature of the scheme, the diversion of the Chilco River through the coast range raised the heated opposition of fisheries officials, thereby casting doubts on its future (B.C. Power Commission, 1959b).

Similarly, a logical new hydro power source for the integration of the Kamloops and North Okanagan and the diesel districts of the central interior was the Clearwater, another interior tributary of the Fraser watershed. The Power Commission, and the Fraser River Board undertook a number of engineering studies, but again environmental considerations made development problematic. Not only would significant salmon runs be affected but major flooding would occur in one of British Columbia's most important provincial parks, Wells Gray.

In his letter of transmittal for the Power Commission's 1956 Annual Report, General Manager H. Lee Briggs emphasized that:
Important commercial and game fisheries resources must undoubtedly be safeguarded, but it would also appear that in many locations a choice must be made either to develop that natural resource as a hydro power site...or else to go elsewhere for power at a considerably greater cost. It is surely obvious that all greater costs must be paid for by all users of power...the need for new and for compromise solutions for fish-power problems is now pressing (B.C. Power Commission, 1956a, p.7).

More specifically, the Crown utility argued that fisheries authorities were not obliged to evaluate the costs and benefits of the protective measures they required. In the Ash River case, for example, the Power Commission stated that the loss of 2,500 fish per year at $5.00 per fish amounted to only $12,500 per year whereas the annual costs of the required fish protection measures were $46,000 per year (B.C. Power Commission, 1959d, pp 6-7).

The environmental problem, however, was not confined to the fishery. The upper part of the Campbell River system lay within Vancouver Island's largest provincial park, Strathcona, and as the Power Commission's storage projects were extended into the park, a vocal public opposition emerged. In mid 1951, the utility applied to the Water Comptroller for a license to store water in Buttle Lake, and in response to public protests a hearing was held. Although a Water License was issued by the Comptroller, the local residents protesting the scheme appealed to the provincial Cabinet which confirmed the license but placed some further conditions on it (B.C., Royal Commission, 1959, p. 6).

Since the new dam was within a provincial park, its use for water storage also required Cabinet approval, and the controversy surrounding it led the new Social Credit government to establish a legislative committee. The approval which resulted from the committee's hearings required the
setting out reservoir clearing conditions. Because of the prime recreational features of the land to be flooded, these conditions were quite stringent, including the harvesting of merchantable timber, the removal of stumps to improve the appearance of the reservoir, and the construction of a new road to improve access to the area (B.C., Royal Commission, 1959, pp. 6-7).

Again the Power Commission felt that this approach overly restricted it in the performance of its mandate. Its testimony to the Shrum Royal Commission put much of the blame for the island power crisis and resulting cost overruns on the delays it encountered on its Strathcona project, although the Commission did admit that the delay allowed the redesign of the project to achieve greater cost-effectiveness (B.C., Royal Commission, 1959, p. 8). In addition, it objected to bearing the approximately $2 million extra costs associated with the clearing and access road directives, arguing that the benefits were questionable, and that, in any event, the costs should be borne by the government agency responsible for recreation (p. 12).

In summary, all of the three problems of demand estimation, rising costs and environmental impacts were interrelated. The rapid unforeseen escalation of demand associated with the unprecedented expansion of the pulp and paper industry led to a crash program of development on environmentally sensitive rivers. Subsequently, both the speed of construction and public environmental concerns over its impacts contributed to the rising costs of new power sources.

5.6 Public Power versus Public Policy: The Emergence of an Entrepreneurial Power Commission

The atmosphere of crisis surrounding the emergence of these three problems led to the emergence of an entrepreneurial spirit within the Power
Commission as the accelerated construction program led to a reorganization centered around the new post of general manager. In its early years, the operations of the Commission had been relatively informal, with management functions being divided among the three commissioners, each of whom acted as the head of a particular department (Griffiths, 1961, p. 147). However, with the overall day to day management authority being centred around the general manager, much of the decision making devolved to committees at the management staff level, with the commissioners acting as a board of directors approving major policy decisions (Griffiths, 1961; and Briggs, 1958, pp. 11-23).

The large scale construction program pursued in the latter half of the 1950s under the continual shadow of a power shortage further solidified this entrepreneurial drive by creating a collective sense of professional identity resentful of the barriers thrown up by the political process. This emerging sense of self-awareness in what Galbraith (1978) has termed the "technostructure" of the organization, when combined with the conflicting priorities of the provincial government, created a crisis of major proportions leading to the establishment of a Royal Commission into the affairs of the publicly owned utility in 1958.

Much of the tension between the provincial government and its Power Commission arose out of the environmental impacts of the Commission's projects on the one hand and the political influence of the B.C. Electric Company on the other. Throughout the 1950s, the commitment of both Coalition and Social Credit politicians to the preservation of the BCE's urban monopoly was viewed by the Power Commission's key staff as a threat to the latter organization's continued viability. In order to pursue its rural electrification and economic expansion goals as a relatively autonomous organization, the Power Commission needed access to a larger
urban market. This market would serve both as a source of revenue through which existing activities could be cross-subsidized, and as a source of demand for new, larger-scale, lower-cost hydro projects.

The provincial government, however, was ambivalent about the role of public power throughout the 1950s. The Bennett administration, following the approach set out by the Rural Electrification Committee in 1945, appeared to regard the Commission primarily as a mechanism through which the provision of power could be subsidized to non-urban areas of the province. Hence, when the Power Commission informed the Premier in May, 1958, that higher power rates were essential to its ability to continue rural-electrification, Bennett instructed the Commission to leave rates at current levels, expand rural electrification without delay at the average cost of production, and advise the government as to the subsidies required. "I am not sure," wrote H. Lee Briggs subsequently, "whether this letter phased the Commissioners the slightest little bit, but to the executive group it sounded like the death knell of the Power Commission" (Briggs, 1958, p. 75). With its next major project, Homathco, bogged down in the uncertainty surrounding its environmental costs, the position of the Power Commission's executives was undermined even further when Bennett (according to F. Lee Briggs) issued oral instructions that it undertake no further project planning since its future needs would be supplied to it (p. 72).

5.7 Private Power and Public Policy: Government Promotion of Large-Scale Hydro Development in the 1940s and '50s.

These directives and much of the general ambivalence of the provincial government toward its public power agency originated with the former's preoccupation with promoting power development via a more traditional policy instrument, that of allocation. With the recovery generated by the Second World War, the provincial government became very interested in
promoting economic expansion by utilizing the much larger water power sources which had previously been identified by federal and provincial surveys. By the late 1920s, major generation potential had been identified on several river systems, including the Fraser, Columbia, Nass and Skeena. In the 1930s, further potential was identified for the diversion of river systems in the north-west part of the province over the coastal range to produce large quantities of power, and in the mid 1950s, a large new hydro power source was identified on the Peace River.

While the magnitude of these potential generating sources held out the promise of significant new scale economies, and hence cheap power as an impetus to economic development, there were a number of difficulties. First, the incremental additions created by these developments were so large that they could not easily be incorporated into existing power systems, and their distance from load centres further increased their initial fixed capital costs.

Given its conviction that the immediate exploitation of these sites was in itself desirable, the provincial government had three options available to it. First it could simply develop the sites itself through the newly established Power Commission, hence underwriting the risks and hoping that sufficient loads could be developed to absorb the new power. Second the sites could be developed publicly in conjunction with the establishment of major new industrial loads near the generation site. In this way all, or part of the new power could be easily absorbed. In practice the only industry which was energy intensive enough for power cost and availability to exert a strong locational pull in its own right was aluminum. Finally, by granting resource rights to large industrial corporations on attractive enough terms, these corporations could be induced to undertake the development of major power sources.
From the 1940s to the early 1960s, provincial governments showed extreme reluctance to pursue either of the first two routes, while expending a great deal of effort on the third. In choosing this path, it was, of course, following the pattern which had become well established in relation to another form of capital intensive infrastructure, the railways.

Survey parties sent out by the provincial Water Rights Branch between 1929 and 1936 identified attractive diversion possibilities on both the Chilco and Nechako Rivers, and in 1947, provincial Lands Minister, E.T. Kenney invited the Aluminum Company of Canada to conduct further feasibility studies. The following year, after meetings with the provincial Cabinet, Alcan's president set these studies in motion. Initially, the company requested that the provincial government construct the Kemano diversion and generation project itself, selling the power to Alcan for a world-scale Aluminum smelter at Kitimat. However, according to the subsequent U.S. congressional testimony of Alcan's president, the provincial Cabinet decided that it was "...too great a risk" (U.S. House of Representatives, 1951, pp. 879-80).

Rather, the government passed the Industrial Development Act, in 1949, giving Cabinet the power to override the normal procedures governing the issuance of water licenses and negotiate the terms of a development agreement with Alcan. This agreement, signed in early 1951 under the authority of Order in Council #2883 (1950), subsequently became rather notorious for the extent of the resource rights granted to Alcan.

After reiterating in the preamble the government's unwillingness to undertake the risks of power development itself, Alcan was granted, in clauses 1 and 2, extensive water rights to dam and divert the Nechako River System for 50 years. In exchange, Alcan was required to develop 400,000 hp
by 1963 and at least a total of 750,000 hp by 1983. The agreement then
guaranteed Alcan a final Water License in 1999, covering the total amount
of power generated up to that time.

In clause 3, the required land for the town site and industrial plant
was sold to Alcan for $1.60 per acre, the minimum price allowed in the Land
Act, no stumpage or royalties were assessed for flooded timber, and the
company was granted rights to all minerals that its construction activities
might uncover. Clause 5 set Water License fees at 30 cents per horsepower
the minimum level allowed under the Water Act, and Clause 6 set the rental
for flooded lands at 12 cents an acre.

Clause 7, set out reservoir clearing terms. While provision was made
for timber recovery, it was explicitly stated that this recovery could not
hold up project construction and Alcan was required to undertake only
partial reservoir clearing up to a total cost of $250,000. Finally, clause
10 contained special exemptions for a range of taxes, while clause 11 was
designed to protect Alcan against any attempt by a future provincial
administration to remove or restrict the company's privileges (Kenney, in
B.C., Legislative Assembly, 1951).

There was, at the time, no serious effort devoted by the provincial
government to studying the extensive range of costs and benefits associated
with the Alcan project, and the lack of analytical effort was candidly
admitted at the time. In a major speech to the legislature defending the
project, Lands Minister, E.T. Kenney, asserted that the concessions were
justified because Alcan needed cheap power to compete with the subsidized
electricity rates enjoyed by its competitors in the United States.
Besides, "...we had a vast resource of water power going to waste in the
ocean..." and new aluminum capacity was urgently needed for national
defense. "Shall we wait until...the enemies are on our shores before we
start building an essential production plant. . .?" asked Kenney rhetorically. "...Personal and selfish interests should not be allowed to interfere with the safety and welfare of every man, woman and child on the North American continent." The spinoff benefits to British Columbia, Kenney asserted, "cannot be estimated" (Kenney in B.C., Legislative Assembly, 1951), but he regarded the subsidies given to aluminum production in the United States as evidence that they must be substantial.

Even though the costs of the extensive flooding associated with the projects 930 square kilometre reservoir were subsequently shown to be high in terms of damage to wildlife fisheries and aesthetic values, the provincial government at the time considered them scarcely worth investigating. When questioned by the opposition in the legislature on the extent to which the provincial Fish and Game Commission had been consulted during the Alcan negotiations, Kenney replied that such a step had been unnecessary. He personally visited the affected area and:

I can't see where the environment of the game is going to be affected. It simply means the water level will be raised. . .insofar as the fish are concerned they are certainly going to have more area to roam around in (Kenney, in B.C., Legislative Assembly, 1951).

This initial success by the provincial government in attracting a sizeable aluminum industry, with its creation of a new industrial town in a previously unpopulated area of the province, increased its efforts to secure deals of this sort. During the early 1950s, the Aluminum Company of America developed a proposal whereby the waters of the Taku and Yukon Rivers in Northern B.C. and the Yukon would be diverted to the coast to provide power for aluminum smelters in Skagway, Alaska. Although the newly
elected Bennett government greeted the proposal with some enthusiasm, it was rejected by the federal government as contravening the latter's policy against long-term power exports.

Due to the importance of federally controlled Yukon waters to this project and the fact that the river system crossed international boundaries, the province was obliged to accept this position, and in 1953, the Ventures/Frobisher syndicate conceived a similar scheme with a new smelter complex being located on the Taku Inlet, just inside the Canadian border which runs down the Alaska Panhandle. Again, the Bennett government enthusiastically supported the scheme, with a staged development to a total capacity of 2,099 MW, and it assisted the Frobisher syndicate in trying to attract the large American aluminum companies. However, apparently due to the U.S. tariff on aluminum and the opposition of the U.S. Government to more strategic aluminum capacity outside its territory, this effort failed.


The larger power potential of North America's fourth largest river system, the Columbia, originating in South Eastern British Columbia and flowing across the United States border to the Pacific through Idaho and Oregon, had been established well before the Second World War. During the 1930s, the Roosevelt administration had, through the U.S. Army Corps of Engineers, constructed large dams and generating plants on the lower reaches of the river and additional projects on the American side continued through the 1940s and 1950s. By the late 1950s, nearly all of the available head on the American portion of the Columbia either had been, or was
in the process of being, developed for power generation (Swainson, 1979, p. 29). On the other hand, as elaborated above, the large size of the power source and its distance from established load centres prevented similar development in Canada.

By the 1950s, however, a number of factors had increased American interest in the construction of water storage on the Canadian portion of the watershed. In physical terms, the flow of the Columbia and its tributaries was extremely variable, both seasonally and from year to year. This created the constant danger of widespread flood damage on the lower reaches of the river, the awareness of such dangers being heightened by a disastrous flood in 1948. With 30 percent of the river's average annual flow originating in the Canadian portion of the Columbia, storage there could effectively eliminate the flood threat.

The variability of the Columbia's flow also limited the firm energy capability of the American generating plants, particularly since peak flows in May and June coincided with the periods of the system's lowest power demand. This problem (a much larger version of the one affecting the B.C. Power Commission on Vancouver Island described above) was aggravated by the refusal of the Eisenhower administration to sponsor new public power projects (Krutilla, 1967). By the mid 1950s, there were a large number of American generating plants constructed by private companies and municipal utility districts without adequate water storage, and new Canadian projects appeared to be an attractive, cost effective method of increasing their firm power output by regulating the river upstream (Swainson, 1979, pp. 27-31).

As early as 1943, the U.S. government expressed its interest to the federal government in a joint development scheme, and in 1944, the matter was referred to the International Joint Commission, a body set up under the
Boundary Waters Treaty of 1911 to resolve trans-boundary water problems. The IJC was requested to determine whether joint development was "practicable and in the public interest" from the point of view of power generation, flood control and other values, and to estimate the costs and benefits accruing to both countries from such development (Swainson, 1979, p. 41).

Subsequently, the International Columbia River Engineering Board (ICREB) was created, and comprehensive joint studies were undertaken culminating in a report issued in 1959. Because power development of the Columbia was likely to be negotiated via an International Treaty, the federal government played a far more direct and active role than was the case on river systems within provincial boundaries. However, judicial interpretation of Section 132 of the BNA had established the need for provincial consent in any treaty affecting areas of provincial jurisdiction, so that both governments had to agree jointly to any development of the Columbia. Hence, as Swainson (1979) has thoroughly documented, a number of joint federal-provincial consultative bodies were established and British Columbia played a central role in the complex treaty negotiations of the early 1960s.

The lengthy investigations of ICREB, however, did not stop various American interests from proposing storage projects on the Canadian portion of the Columbia, nor did it inhibit the provincial government in its willingness to promote them actively. In 1954, a consortium of five Washington State utilities explored the possibility of building a dam at Mica Creek in the upper Columbia, thereby producing an extra 1809 Mw. of additional firm power on the American portion of the river. Upon
completion, the dam would be turned over to British Columbia which would then install generators to produce its own power at a relatively low cost (Swainson, 1979, pp. 55-56).

While this scheme did not really get off the ground, another, proposed by Kaiser Aluminum was actively promoted by the provincial government. Under a memorandum of agreement signed between Kaiser and the Bennett government in late 1954, Kaiser would build a low storage dam at the southern end of the Arrow lakes, thereby adding 331 MW. to the firm power output of American dams. In exchange, British Columbia would receive Water License fees and 20 percent of the power produced (Swainson, 1979, p. 58). Although the agreement was widely condemned as a giveaway of British Columbia's Water Resources, Lands and Forests Minister Robert Sommers defended it as giving the province "the cheapest power in the world. It would be free" (Sherman, 1966, p. 213). In addition, the province claimed that the Kaiser agreement set a precedent by establishing Canada's claim for power benefits produced downstream in the United States, and that it was financially superior to a 50 percent share of power with B.C. paying the development costs (Swainson, 1979, p. 61).

But the federal government, viewing the plan as a threat to a comprehensive Columbia agreement with the United States, effectively blocked it by passing the International Rivers Improvement Act. This legislation required a federal license for the construction of any work on a river crossing international boundaries. It does not appear, however, that the provinces's commitment to its approach to Columbia development was much affected by the legislation. Three years later, in 1958, Kaiser Aluminum testified before a U.S. Senate Committee that "While our contract with the Province of British Columbia has expired by its terms, it has been informally indicated by the province that . . . we should be able to obtain
a license to construct the project on the basis previously discussed" (Quoted in Financial Post, May 10, 1958, p. 36).

The final attempt to promote large scale hydro-electric power development through the granting of rights to a private corporation was the outcome of a larger resource development agreement. In November, 1956, representatives of the Swedish Wenner-Gren interests, who had become interested in British Columbia's northern development possibilities, travelled to the province for a series of meetings with W.A.C. Bennett. These meetings culminated, on November 16, in a memorandum of agreement under which the Swedish financier was granted exclusive resource rights over 40,000 square miles of northeastern British Columbia. In return, Wenner Gren was to initiate the construction of a rail link into the area, ". . .apply for forestry rights with the specific object of building a pulp mill or mills of an annual capacity of not less than 100,000 tons of pulp each" and ". . .survey the water sources of the proposed area of development with the object of hydro development" (Wenner-Gren, 1957; also see Swainson, 1979, pp. 82-83; Sherman, 1966, pp. 215-250; Robin, 1971, pp. 208-211).

Although the power survey was undertaken initially for the purpose of supplying energy for the proposed pulp mills and other linked industries, subsequent surveys by British engineer Ralph Chantrill on behalf of Wenner Gren identified an enormous potential for 88 million acre feet of water storage and over 3,000 Mw. of generating capacity on the Peace River (see Figure 3.1 above). At that time the BCE, the Power Commission and WKPL combined had under 3.5 million acre feet of storage and 2,048 Mw. of installed generating capacity (Chantry and Stevens, 1961, pp. 8-15).

As a result, in late 1957, a new agreement between the province and Wenner-Gren was concluded, establishing a new Peace River Power Development
Company and providing for more intensive studies leading to a concrete project proposal before the end of 1959. These prospects delighted Premier Bennett, who began his October 8, 1957 press conference by declaring that "this is the most momentous announcement I have ever made" (Quoted in Sherman, 1966, p. 220).

However, unlike the provincial government's previous attempts at large scale hydro promotion, this one had no built in source of demand for the bulk of its output. Wenner-Gren's northern pulp development scheme would not have absorbed a significant part of it, and in any event, it proved to be uneconomic. The problem was further aggravated by the ongoing studies on the Columbia which culminated with the start of formal U.S./Canadian negotiations in February, 1960. If the ability of the British Columbia market to absorb Peace River Power within a reasonable period of time was doubtful, its ability to absorb the Peace as well as the Columbia's downstream benefits was even more so.

From 1958 through 1962, the Peace River Power Development Company made a concerted effort to devise a viable marketing scheme for Peace power, and it was vigorously supported in its efforts by the Premier, who, by early 1959, had adopted a "two-rivers" policy. "Anyone who is not in favour of both," he declared in January, 1960, "is not in favour of the development of British Columbia. . .if you are not in favour of the Columbia, you are holding back development of the Kootenays. . .if you are not in favour of the Peace, you are holding back the development of central and northern British Columbia" (Quoted in Robin, 1971, p. 212). In addition, rapid development of the Peace, by decreasing British Columbia's dependence on immediate Columbia development, would enable the province to drive a better bargain with the United States.
To achieve its goals, the Peace River Power Development Company first offered significant blocks of shares to its two major prospective customers, the BCE and the Power Commission; an offer which the former, but not the latter, accepted. It then began a concerted effort to pre-empt the Columbia’s provincial markets by concluding a long-term sales contract with the B.C. Electric Company. Immediately following the second Wenner-Gren agreement in October, 1957, the new Peace River Power Development Company approached W.C. Mainwaring, head of generation planning for B.C. Electric with a power sale proposal. Mainwaring, however, indicated, that the private utility’s new thermal generation plans, as well as the subsequent possibility of cheaper power from the Columbia, precluded any involvement with the Peace (Sherman, 1966, p. 17). A year later, Mainwaring retired from the BCE and was hired as president of the Peace River Power Development Company, probably in order to improve the latter’s chances of a major power sale. Over the period to 1961, however, Mainwaring failed to persuade his former colleagues of the merits of Peace power, and the personal intervention of the Premier himself was no more successful (Sherman, 1966, pp. 222, 228-30; Swainson, 1979, pp. 157-58).

To supplement this quest for new domestic markets, the Peace River Power Development Company also tried to promote exports to the United States, and a report prepared by the company’s consultants in 1960 saw the enormous storage capacity of the Peace project as the centre of an integrated Pacific International Power Pool (Chantrill and Stevens, 1960). This approach was endorsed by B.C. Electric, which probably saw it as a means by which it could protect its investment in the Peace River company while at the same time avoiding any commitment to purchase Peace power.

An influential article prepared by the BCE’s president, Dal Grauer argued that, due to the more diversified nature of the electricity
industry, the federal government's policy against long-term power exports was obsolete. British Columbia, he asserted, should market Peace power in the United States, while reserving the cheaper power provided by the Columbia's downstream benefits for itself (Grauer, 1961, pp. 248-85).

This pro-export position was endorsed by the Vancouver Board of Trade in a widely circulated paper which argued that:

The export of surplus electric power could result in the lowering of power costs in British Columbia by making possible the development of large blocks of power. In addition, in the long term, the revenue from export sales of power could largely amortize the cost of hydro development so that when the power was returned to Canada it would be relatively inexpensive (Vancouver Board of Trade, 1960, p. 4).

5.8 Technology, Public Policy and the Power Planning Dilemma of the Late 1950s: A Summary

Hence, by the late 1950s, British Columbia's power policy had reached a watershed. Attempts to promote new hydro developments by granting concessional rights to private interests had proved unsuccessful, and despite the existence of the regulatory measures put in place during the war years, the government was unable to enlist the cooperation of the province's largest private utility. In addition, the question of private vs. public power had to be resolved. This resolution could be achieved either by creating a larger, more diversified public power agency, or (as implied by the government's actions of early 1958) by relying on private development, with the crown agency limiting its role to the subsidization of selected rural and industrial customers. Finally, while the provincial government had appeared willing to constrain both public and private power
development in the interests of other resource uses, these restrictions were controversial and no clear policy on environmental protection had emerged.

On one very important level the power question was technical. British Columbia's electric power industry had reached the point where a discontinuous jump in the scale of power production appeared inevitable. Larger increments of supply relative to existing demand and higher fixed investments seemed to require a much more careful approach to forecasting demand and accurately planning the optimal deployment of new supply. "The developments of the next decade..." the B.C. Power Commission's Garth Griffiths observed rather presciently in 1961, "will transform the character of the utility...the era of 'giant power' appears to be opening" (1961, p. 51).

This new era held out hope of a technical path around some old constraints. Significant new economies of scale achieved through the development of Peace or Columbia River power could reverse the rising marginal costs experienced throughout the 1950s by both public and private utilities. Large scale development of more remote sites would also avoid the host of environmental conflicts with fisheries and recreational interests which, as we have seen, had come to plague the power industry's smaller developments. Finally, the abundance of low cost power, it was widely believed, would give British Columbia an economic boost of major proportions by attracting new industry. "British Columbia, unlike the states of the Pacific Northwest," wrote BCE president Dal Grauer in 1961, "has never had the stimulus of really cheap power" (Grauer, 1961, p. 283).

The attractions of large-scale hydro-development, however, raised some fundamental issues. First, which particular sequence of large scale power projects was the most advantageous one given the environmental problems
associated with the Fraser for British Columbia? The developments of the 1950s had identified two attractive river systems, the Columbia and the Peace. However, the ICREB studies completed in 1959 identified 6 possible combinations of projects on the Columbia, each containing a different set of economic and environmental consequences. There were also a number of ways in which the development of the two rivers could be co-ordinated, with the attractiveness of any particular plan for Columbia development being dependent on decisions regarding the timing of the Peace.

Second, there was the issue of the approach which would be taken to the environmental and social consequences of these new hydro developments. While, as we have seen, the treatment of these problems varied during the 1950s, there appeared to be a trend toward an emerging awareness of the conflicts between power and other resources. Both the principle of rejecting power development in favour of other resource values (e.g. as in the Fraser and Quesnel decisions) and of significantly mitigating these impacts (as in the Campbell and Ash River cases) had been firmly established. Yet these precedents had thwarted the entrepreneurial drive of both public and private power developers, and there was pressure to adopt a more "realistic" attitude toward such resource losses.

Finally, there was the problem of co-ordinating power planning from an overall province-wide perspective. While the fragmentation of the power system was partly due to the geographical factors of distance and rugged terrain, advances in long distance transmission techniques meant that the institutional structure of the industry became an increasingly important constraint. By the 1950s, large parts of the BCE, Power Commission, and WKPL systems were interconnected, but a number of conflicts over power interchange and territory between the BCE and the Power Commission led to a widespread view that the public/private split was inherently inefficient.
Each utility planned projects on the basis of its own design criteria rather than those of the larger province-wide system. Such technical advantages as the balancing of diverse load-factors and the optimum use of different seasonal river flow patterns to maximize firm energy production could not be fully exploited.

With the prospect of much larger increments of energy, capacity and water storage being added to the system, a higher degree of institutional as well as technical integration became essential. Chantrill and Stevens' studies of the Peace River Power Development Company, for example, pointed out that much of the scale economies of the Peace Project derived not only from its huge energy capabilities, but from the ability of its giant storage reservoir to maximize the overall firm energy production of a province wide integrated grid (Chantrill and Stevens, 1961).

The resolution of these three issues required a greater degree of co-ordination among the policy instruments which had been deployed over the post-war period, a reassessment of their relative importance, and (either explicitly or implicitly) the elaboration of overall economic and social goals to guide the provincial government's more intimate involvement in electric power planning. This resolution, was achieved through three extremely controversial political dramas which unfolded in the five years between 1958 and 1963. These were the investigations of the Shrum Royal Commission, the negotiation of the Columbia River Treaty, and the nationalization of the BCE and Peace River Power Development Companies.

5.9 Resolution by Public Policy I: The Shrum Royal Commission

We have already noted the growing tensions between the emerging entrepreneurial self-awareness of the B.C. Power Commission and the ambivalence of a government apparently committed to the dominance of
private power development. In November, 1958, this tension came to a head when H. Lee Briggs, the Power Commission's general manager, launched a scathing public attack on the Premier. This unprecedented move was precipitated by two issues which were more symbolic than substantive. One was that the Premier had refused to endorse a rate increase considered essential by the Power Commission and had instituted an amendment to the Power Act authorizing the Comptroller General to undertake an independent audit of the Commission's books. According to Briggs (1958, p. 71):

There was no question of honesty or of adequate and proper accounting being involved. . .It was to get a report upon matters involving the judgements of the Commission, the General Manager, the professional engineers, the lawyers and accountants, the planning activities of the Commission and so on. . .To speak of this particular matter as political interference was putting it mildly.

The other issue revolved around the Social Credit government's obsession with eliminating the province's direct debt by shifting it to various Crown corporations and government agencies. To further this goal, the Premier put pressure on the Power Commission to issue its own bonds to cover $32 million in outstanding advances from government funds. Since the new bonds would carry a higher rate of interest than the old advances, Briggs (1958, p. 91) considered it another instance of unwarranted political interference, costing the Commission $260,000 a year.

Brigg's public charges included not only these specific issues but the more general one of government favouritism to private power interests. The Premier, in order to contain the potential political furor created by both the charges and the subsequent firing of Briggs, established a Royal Commission of investigation headed by Gordon Shrum, a prominent physicist and university administrator. To turn the tables somewhat, Bennett drafted the terms of reference to include not only Briggs' charges but also the
embarrassingly high cost overruns encountered by the Power Commission on its Vancouver Island hydro projects, and other "such matters...as the Commissioners deem proper." In its report on Briggs' specific charges the Shrum Commission found in favour of the government: concluding generally that the latter had acted well within its responsibilities as the ultimate source of power policy decisions, and that a number of actions taken by the BCE affecting the Power Commission were justified on economic or technical grounds.

Two elements of the Shrum Commission's report, however, were of more fundamental importance from the standpoint of the issues raised above. The first was the vigorous endorsement of the Power Commission's contention that mitigation measures taken to protect fisheries and recreational interests in the Vancouver Island Projects constituted an unnecessary burden. The Crown utility's assessment of the unfavourable economics of fish protection (see p. 173 above) was reproduced without any independent investigation, with the Royal Commission concluding that:

...there should be some independent authority rather than one directly interested group to resolve the problems of fish and power, and that this authority should take into account the economic value of the two resources concerned. We feel...that it is unwise to continue the assignment of final authority and control over the use of streams and rivers to any one agency that has a prime interest in one commercial exploitation of the waters. (B.C. Royal Commission, 1959, p. 12, emphasis original).

Similarly, the effort to protect recreational values on the Campbell River watershed was not well received by the Royal Commission:

The increase in cost to the Strathcona Development resulting from the directives which faced the Power Commission to undertake a more costly clearing and road building operation than would have otherwise been the case...probably was in excess of $2,000,000. The value of these special
treatments for achieving their objectives has not been established. There is also the question as to whether the cost should have been borne by the Power Commission or by some other government agency. It is our opinion that before directing special clearing, road building, or other requirements, their value should be carefully investigated, and if found to be necessary or desirable the costs should be assessed to electric power, to recreation, to highway improvement and to other departments and agencies (p. 12, emphasis original).

The emphasis throughout the report was clearly on the minimization of power rates to the consumer, even if this meant a less stringent approach to environmental protection and the shifting of the costs of mitigation from the power industry to the general taxpayer.

The other key question dealt with by the Shrum Inquiry was that of overall power planning. In fact, its only criticism of the Bennett government concerned the lack of clear direction by the latter regarding the Power Commission's role "...in the future development of major power sources in the Province." At the same time, however, Shrum took pains to point out that "During its short history the Power Commission has almost consistently failed to foresee the need for expansion in time to undertake the most economical development." Hence, his Royal Commission's report concluded:

It is obvious that system integration is inadequate. This requires more than a Province-wide grid. We therefore recommend that an overall authority should be established in the Province to control and direct the generation, transmission and distribution of all electric power in British Columbia, and specifically:

a) to resolve conflicts of interests in water resource development after careful consideration of all values and costs involved,
b) to establish an overall policy for the
development of the Energy resources of the
province...

c) to resolve any conflicts of interest between
utilities...

d) to study and advise on fish-power problems
and their relationship to other resource
uses... (p. 17).

The government accepted this recommendation almost as soon as it was
made, and the release of the Royal Commission's report was accompanied by
the announcement that Gordon Shrum would head up a new five-man British
Columbia Energy Board. The remainder of the Board had a technical rather
than political complexion and clearly reflected its new mandate as an
integrating body in the power field. Alongside Shrum sat James Sinclair,
former federal Fisheries Minister and then president of the B.C. Fisheries
Association; Dr. Henry Angus, Chairman of the PUC; Dr. Hugh Keenleyside,
the Power Commission's new chairman; and Arthur Paget, the Water Com-
troller (Vancouver Sun, August 19, 1959, pp. 1 & 3). In its terms of
reference, the new Board was directed to advise Cabinet on:

a) existing and estimated energy resources...

b) existing and estimated energy require-
ments...

c) the extent to which the development and
application of energy resources to provincial
requirements may or should be related to each
other; and

d) any specific matter affecting energy referred
to the Board by the Executive (B.C. Energy
Board, 1960).

These terms of reference fell well short of Shrum's vision of "...an
overall authority... to control and direct... all electric power in
British Columbia" and the new Board's importance was not enhanced by the
government's announcement that it would not be directly concerned with the
problem of Peace River power development (Vancouver Sun, Dec 16, 1959, p. 1). However, as we shall see, the Energy Board did end up playing a crucial if limited role in the Peace vs. Columbia development controversy.

5.10 Resolution by Public Policy II: The negotiation of the Columbia River Treaty

Certainly the single most important event in defining the province's approach to hydro power planning in the 1960s was the negotiation of the Columbia River Treaty. We have seen that the Province's approach to the river in the 1950s centered around the attempt to allocate water development rights to United States power interests in return for a share in the benefits which new storage dams would create downstream in the United States. We have also noted that this potential for Canadian storage dams on the upper reaches of the rivers system to create large power and flood control benefits downstream had led Canada and the United States to refer the entire development question to the International Joint Commission. As a result much of the planning initiative related to the Columbia Basin came from the federal level and the United States, and British Columbia could not continue to pursue the rather piecemeal approach it had adopted during the 1950s. Whether it wanted to or not, the Bennett government had to address itself to the questions of the comprehensive planning of hydro development on the Columbia and its relationship to the Peace.

These pressures came to a head in 1959 and '60, with the release of the ICREB engineering report and the IJC principles for the sharing of downstream power benefits, followed by the commencement of negotiations between Canada and the United States. The ICREB report advanced six alternative development schemes based on three conceptual plans as illustrated in Figure 5.3. A non-diversion plan would leave the Kootenay
FIGURE 5.3  
INTERNATIONAL COLUMBIA RIVER ENGINEERING BOARD  

PRELIMINARY PLANS OF DEVELOPMENT  

(1) NON-DIVERSION  
(2) COPPER CREEK DIVERSION  
(3) DORR DIVERSION  

Notes: The plans downstream from Murphy Creek are identical. In alternative plans Arrow Lakes project is eliminated.  

SOURCE: Swainson, 1979, p. 108, Figure 9.
and Columbia Rivers on their natural courses, the United States would build the Libby Dam with a reservoir flooding 42 miles into south-eastern B.C., and Canada would build major storages on the Arrow Lakes, Duncan Lake and Mica Creek. The second alternative was similar to the first except that Canada would divert part of the Kootenay’s flow into the Columbia to increase energy production over its part of the river. The third would provide all major storage in Canada with a major diversion of the Kootenay into the Columbia precluding the American’s Libby Dam.

The other three schemes were versions of the ones described above with a Low Arrow Dam near Murphy Creek replacing the High Arrow Dam. These latter three alternatives arose out of the fact that, of all the individual projects considered, the High Arrow Dam was the most destructive in terms of its overall environmental and social impacts. The Arrow Lakes, region although it had not experienced much economic growth since the 1920s, contained a number of long established communities and a fairly high potential for agriculture, forestry and recreation. Hence, ICREB purposely devised alternatives by which major flooding could be avoided (See the account of the briefs prepared on the Arrow Lakes resource base by local residents intervening at the 1961 Water License hearings in Waterfield, 1970, pp. 62-68, 81-86). It should also be noted that Plan 3, the Dorr Diversion involved even more extensive flooding, and while the number of people affected was less than on the Arrow Lakes, a major east-west transportation corridor would have been inundated. While the ICREB report did not recommend a preferred alternative, it did note that:

1. All schemes produced approximately equivalent flood control benefits.
2. Plan 2, then Copper Creek Diversion, maximized overall basin power production, while Plan 1 achieved maximum production in the U.S. and Plan 3, the Dorr Diversion, in Canada.
However, the cost figures presented in the report clearly indicated that, in Krutilla’s words, "...from a system standpoint, ignoring the relevance of the international boundary, neither the non-diversion scheme nor the Copper Creek diversion could be seriously entertained as economic elements (Krutilla, 1967, p. 71). Table 5.4 illustrates this point by analyzing these figures from an incremental point of view, starting with the lowest cost alternative and calculating the unit cost of additional power output. The lowest cost Dorr Diversion/Low Arrow scheme produced power at an overall cost of 2.3 mills, with the High Arrow version adding 196 average MW. of annual energy at a marginal cost of 1.54 mills. All the other combinations except Copper Creek/High Arrow produced less power at a higher cost, while the incremental costs of the latter’s additional energy was in the order of 13.7 mills per kWh.

The IJC development principles released just after the ICREB report endorsed both the idea that economic benefits should be maximized for the basin as a whole and the proposition that projects be constructed in their most economic sequence. As Krutilla has pointed out, this latter principle was critical because the marginal value of water storage for both power production and flood control downstream declined substantially as new increments were added (Krutilla, 1967, pp. 37-56). Hence, not only was it important to pick the most economically advantageous combination of projects, but it was also important to add them in the most economical sequence; i.e. from lowest to highest in terms of relative unit costs.

This consideration strengthened the economic advantages of the Dorr Diversion/High Arrow plan since the sequence associated with it -- Duncan/High Arrow, Mica, and Dorr/Bull River -- was the most economic one from a basin-wide perspective (Krutilla, 1967, pp. 77-78). It was also the sequence initially favoured by the federal government and a number of its
<table>
<thead>
<tr>
<th></th>
<th>VI Dorr Diverion</th>
<th>III Dorr Diverion</th>
<th>IV Non-Diverion Low Arrow</th>
<th>V Copper Creek Non-Diverion Low Arrow</th>
<th>I Copper Creek Non-Diverion High Arrow</th>
<th>II Copper Creek High Arrow</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ANNUAL COST, ($'000)</strong></td>
<td>162,540</td>
<td>165,190</td>
<td>174,060</td>
<td>175,730</td>
<td>176,710</td>
<td>178,380</td>
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<tr>
<td><strong>ANNUAL AVERAGE OUTPUT, KWH.</strong></td>
<td>16,577</td>
<td>16,753</td>
<td>16,563</td>
<td>16,667</td>
<td>16,733</td>
<td>16,863</td>
</tr>
<tr>
<td><strong>AVERAGE, MW.</strong></td>
<td>7,862</td>
<td>8,050</td>
<td>7,841</td>
<td>7,972</td>
<td>8,038</td>
<td>8,168</td>
</tr>
<tr>
<td><strong>CRITICAL PERIOD OUTPUT, KWH.</strong>*</td>
<td>15,649</td>
<td>15,839</td>
<td>15,616</td>
<td>15,718</td>
<td>15,807</td>
<td>15,909</td>
</tr>
<tr>
<td><strong>INCREMENTAL COST, $'000</strong></td>
<td>---</td>
<td>2,680</td>
<td>NA</td>
<td>---</td>
<td>---</td>
<td>13,190</td>
</tr>
<tr>
<td><strong>INCREMENTAL OUTPUT, KWH.</strong></td>
<td>16,557</td>
<td>196</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>110</td>
</tr>
<tr>
<td><strong>INCREMENTAL POWER COSTS:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$ millions</td>
<td>9.82</td>
<td>13.52</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>119.91</td>
</tr>
<tr>
<td>$ per AVG. MW.</td>
<td>20.67</td>
<td>13.52</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Mills per KWH.</td>
<td>2.3</td>
<td>1.54</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>13.7</td>
</tr>
</tbody>
</table>

**Source:** Canada, External Affairs, 1964

**Note:** * Output during the lowest historical sequence of recorded water flows.
advisors. Not only would it be advantageous if Canada could negotiate a favourable 50/50 downstream sharing agreement with the United States, but Canada would retain its rights under the Boundary Waters Treaty of 1909 to divert both the Kootenay and the Columbia north of the U.S. border. The other two plans, by including the Libby Dam south of the 49th parallel, automatically implied some restriction of Canada's right to divert. This restriction arose both because the U.S. could not commit itself to Libby without long-term assurances that the water necessary to make it economic would not be diverted upstream, and because the Libby reservoir would inundate the Dorr dam site.

The United States, on the other hand was not as enthusiastic. For one thing all three economical storage projects under the optimal scheme were in Canada, so that all the benefits achieved would have to be shared. The IJC principle regarding the sharing of basin-wide power and flood control gains called for each country to bear the costs of the projects in its own country, with the gross system-wide benefits being shared equally. The 50/50 split, however, would only apply if "...such sharing would result in an advantage to each country as compared with alternatives available to that country" (IJC, 1959, quoted in Krutilla, 1967, p. 65).

Much of the Canadian nationalist criticism of the subsequent treaty grew out of the assumption the United States had no economically feasible alternatives to a Columbia agreement with Canada (Higgins, 1961, 1970; Waterfield, 1970, p. 1; Robin, 1973, p. 225), but Krutilla (1967, pp. 131-141) presents evidence to suggest that the Americans could have achieved equivalent benefits from a domestic program at roughly equivalent costs. This meant that the United States demanded something better than a 50/50 split if the Dorr Diversion scheme was to be to its advantage.
Two other non-economic factors influenced the American position. One was that the U.S. Army Corps of Engineers had a long-standing commitment to the Libby Dam despite its dubious economics, and the Corps had an influential role in formulating the U.S. bargaining position. The second, suggested by some Canadian treaty critics, was that the Americans probably wanted to limit Canada's right to divert both the Kootenay and the Columbia to protect its own long term strategic interests.

The British Columbia government, in reacting to these negotiating positions affecting the disposition of its natural resources, was forced to consider its own objectives. In 1956, the province had responded to the federal government's *International Rivers Improvements Act* (See above, p. 184), by commissioning its own Columbia study from the Crippen Wright Engineering Company (Swainson, 1979, p. 71). This study, completed in early 1959, explicitly compared the benefits to the province from joint and independent development. A negotiated development agreement on the basis of a 50/50 sharing of downstream benefits was seen as capable of producing 31.2 billion kilowatt hours of power at a cost of around 2.86 mills per kWh., compared to 29.3 billion kWh. at 3.16 mills from an independent scheme (Krutilla, 1967, Table 22, p. 128).

However, both the Crippen Wright study and subsequent analyses undertaken by British Columbia's Water Resources Service indicated a problem from the province's perspective. This was that a large-scale development of storage projects in Canada, based primarily on American power requirements downstream, would involve the province in substantial capital expenditures and create large blocks of power surplus to provincial requirements. The marketing of this surplus power on a short to medium term basis in the United States created the problem of obtaining an adequate price,
especially since the Americans were demanding a block of low cost power as compensation for foregoing the Libby Dam (Swainson, 1979, pp. 137-140).

The problem for the province was compounded by the fact that Columbia downstream power benefits had exactly the wrong characteristics. They reached a maximum level very quickly upon completion of treaty storage dams, but gradually declined to half this level by 1990.* British Columbia therefore favoured construction of the American's Libby dam, a decrease in the amount of storage offered by Canada, and the postponement of capital-intensive projects like the Mica dam as long as possible.

Environmental problems were also involved since the "optimal" Dorr/High Arrow combination would cause extensive flooding in two major valleys, the Arrow Lakes and the East Kootenays. The 91,000 acres flooded (Swainson, 1979, p. 154) in the latter valley were certainly more extensive, but the social and resource impacts of Arrow flooding were probably more pronounced.

At the time of the Kaiser Dam controversy, the provincial government had defended the scheme on the grounds that the High Arrow alternative had unacceptable environmental impacts. However, by the time of the treaty negotiations in 1960, the financial advantages of High Arrow as "first added" in a joint development sequence led to a reversal of this stance. While the dam generated no power at the site, it earned very large power and flood control benefits for a relatively low capital outlay. East Kootenay storage, however, had no such financial attractions and the

* This latter characteristic resulted from the fact that, as the American power system became predominantly thermal in character, its capability for utilizing unregulated stream flows for hydro generation increased and storage became redundant (Krutilla, 1967, pp. 48-49).
provincial government took some pains to emphasize its objections on environmental grounds.

The financial analyses undertaken by the province's Water Rights Branch indicated that, although the Dorr Diversion scheme without High Arrow produced the largest average annual benefits between 1980 and 2010, it resulted in a cumulative deficit to the province of $41 million by 1980, the year all system projects would be completed. On the other hand, two of the available alternatives, one involving High Arrow and East Kootenay storage with no Mica dam, and the other involving High Arrow and Mica with no East Kootenay storage, produced roughly equivalent short term results; a $60 million surplus in 1980 (Krutilla, 1967, Table 18, p. 107).

Hence, pointing to the impacts of East Kootenay flooding, the provincial government insisted on elimination of the Dorr Diversion scheme, thus forcing the Canadian negotiating team to abandon its previous bargaining stance. The final Columbia River Treaty reflected essentially the provincial rather than the federal position and provided that:

1. The B.C. Power Commission as the "Canadian Entity," would build the three projects, Duncan, High Arrow and Mica between 1964 and 1972 to provide 15.5 million acre feet of storage.

2. Canada would receive $63.4 million for flood control services, representing the capitalized value of 50 percent of the flood control benefits achieved by its storage over the 60 year life of the Treaty. However, Canada was obliged to provide flood control in perpetuity, receiving storage operating costs and any power generation foregone as compensation.

3. Canada would receive 50 percent of the power produced by its three storages downstream in the United States. However, some high grade secondary energy was excluded, leaving British Columbia's effective
benefits at around 40 percent. Power benefits would be transmitted to the border by the United States, with Canada paying a standby east-west transmission charge.

4. "...portions of the downstream power benefits to which Canada is entitled..." could be sold in the United States.

5. The United States retained the option to build the Libby Dam within 20 years. Canada would assume the flowage costs (i.e. the reservoir clearing costs) of the Libby project in British Columbia in exchange for the downstream power benefits produced in the province.

6. To protect Libby, Canada's rights to divert the Kootenay were severely restricted. A partial diversion would be allowed after 20 years, and a full diversion between 60 and 100 years after Treaty ratification (Canada, External Affairs, 1964).

The Columbia Treaty immediately came under sustained political attack from a number of quarters after its terms were released. General Andrew McNaughton, one of Canada's representatives on the International Joint Commission, and Larratt Higgins, an economist involved in the analysis undertaken to support the Canadian negotiating position, were particularly critical (McNaughton, 1963; Higgins, 1961, 1970).

One element of this critique was that, by allowing the U.S. to construct Libby, foregoing its right to divert, and committing itself to flood control indefinitely, Canada had, in effect, ceded sovereign control over its portion of the Columbia watershed.

Second, the critics argued, British Columbia's opposition to East Kootenay storage had sabotaged the Canadian bargaining position vis a vis the United States, resulting in a far less advantageous treaty than that
which could have been achieved. In General McNaughton's widely quoted words, the United States "...walked in on a house divided against itself and skinned the occupants alive" (quoted in Higgins, 1964).

Finally, the critics charged that the High Arrow Dam, with its extensive flooding of long-settled communities, was unnecessary for the achievement of long-term power benefits, and that the costs of Arrow Lakes flooding were being incurred for only short-run advantages.

The key criticism was really the second one, since any international treaty would have compromised Canada's sovereignty and the question was really whether the benefits achieved were worth this price. Krutilla's careful analysis of the treaty terms and the economic studies on which these terms were based indicates that British Columbia did achieve a more economically advantageous scheme than could have been achieved through a purely domestic development (Krutilla, 1967, pp. 123-131).

However, Krutilla's analysis also indicates that, by forcing the Canadian negotiating team to renounce East Kootenay storage as a bargaining position, British Columbia achieved a treaty result which fell short of its initial goals. In other words, once it became clear that Canada would itself renounce East Kootenay storage without any quid pro quo, the United States turned its attention to increasing its advantages under the Duncan/High Arrow/Mica sequence now proposed by Canada. Whereas the annual operating results of British Columbia's preferred L-1 plan had been positive from 1971 on, the actual negotiated plan did not show a surplus until 1981. While the 50 year discounted net present value expected from B.C.'s preferred L-1 option was $349 million, and that obtainable from Canada's initial Arrow Lakes/East Kootenay plan was $369.4 million, the
value of the treaty as negotiated was $268.1 million (Krutilla, 1967, Tables 20 and 21, pp. 116-117).*

If the Columbia Treaty is viewed in isolation, it can be concluded that despite some analytical and negotiating errors, British Columbia obtained a development arrangement which was roughly in accord with its objectives. In the first place it obtained better results than those which could have been achieved by any purely domestic (i.e. non-Treaty) plan.

Second, it avoided the larger initial capital investments of alternative Treaty plans, thus lessening both the financial burden on the province and any consequent need for federal assistance. Swainson's (1979) comprehensive account of the federal-provincial bargaining over the treaty clearly indicates the extent to which the Bennett government wanted to avoid any federal control over Columbia development, even if the province had to finance the entire development itself.

Third, the treaty matched power production to provincial requirements more closely than the available alternatives. Downstream benefits would be created initially by Duncan and Mica storage, and when these were absorbed by increasing provincial power demands, generators could be installed at the Mica dam to meet incremental loads. In this way, the necessity of selling large blocks of power would be largely avoided.

Fourth, given the validity of the latter two goals, the Treaty minimized environmental costs by flooding only one valley, the Arrow Lakes rather than two. While it remains an open question whether the Arrow Lakes

*Krutilla notes that the actual shortfall from the expected value of both initial plans to the realized value of the outcome was less than that implied by these figures, since British Columbia's initial analysis had overstated the present value of flood control benefits by $49 million.
was the "right" valley to flood, the Dorr Diversion/Low Arrow plan pursued so vigorously by General McNaughton did not meet the province's financial and power planning objectives.

5.11 Resolution by Public Policy III: The Nationalization of B.C. Electric

However, when placed in the larger context of provincial power politics and planning, the outcome of the Columbia Treaty negotiations was more problematical. Both the above interpretation and the two accounts on which it is largely based (Krutilla, 1967; Swainson, 1979), suggest that the entire Columbia planning exercise was undertaken on the assumption that Canada's share of the power produced would be utilized in British Columbia.

We have seen, however, that Premier Bennett was, at the same time, trying to promote the private development of the Peace River. In March, 1960, just after the commencement of the Columbia negotiations, B.C.'s Water Comptroller, A.G. Paget, issued a report endorsing the engineering feasibility of the plans submitted by the Peace River Power Development Company. Although no economic analysis was undertaken, Paget pointed out the obvious when he remarked that "The energy generated under these proposals could be marketed in British Columbia within the times expressed (1968-76), provided no other resource development, either hydro or thermal, absorbs part of the market" (quoted in Swainson, 1979, p. 145). In other words, the economic viability of the Peace was threatened not only by the uncooperative stance of the B.C. Electric Company, but by the Columbia River Treaty.

Hence, during 1961, the Bennett government took a number of critical decisions. First, in December, 1960, Bennett held a key private meeting with W.C. Mainwaring of the Peace River Power Development Company in which the latter stressed the weaknesses of the Columbia Treaty and the
possibility that the sale of the Columbia's downstream benefits in the United States could make room for the Peace. He also suggested that the Premier refer the relative merits of the Peace and the Columbia to the British Columbia Energy Board for analysis (Swainson, 1979, p. 178). Bennett immediately accepted the suggestion and on December 28, 1960, the Cabinet directed the Energy Board to compare the relative costs of the two developments and to examine "...the extent to which the two projects may be related to one another if at all and, if complementary in this relationship, the legal and economic conditions under which complementary development may take place" (B.C. Energy Board, 1961, p. 7).

The Premier also launched an attack on the Columbia Treaty and the financial arrangements for its implementation proposed by the federal government, declaring in May, 1961, that "...the sound approach would be to dispose of the total amount (of downstream benefit entitlement) as firm power, for which a very favourable price could be negotiated" (quoted in Swainson, 1979, p. 193). In February, 1961, the Premier also began to question the advantages of the continued private ownership of the BCE, on the grounds that it allowed the federal government to collect substantial income tax revenues from power consumers (Swainson, 1979, p. 196).

This provincial campaign climaxed in the summer of 1961 with the simultaneous release of then Energy Board's Peace/Columbia report and the nationalization of the BCE and the Peace River Power Development Company. While the reference of the two rivers controversy to the Energy Board involved a degree of risk for the Premier, the chances of an unfavourable recommendation appeared minimal from the outset. The Energy Board's chairman, Gordon Shrum, had found in favour of the government in virtually every conclusion of his 1959 Royal Commission report, and he was already on
record as favouring accelerated hydro development and power exports.*

In any event, the Energy Board concluded that:

1. Neither the Peace nor the Columbia would produce power "...as cheap as power produced in some areas of Canada..." but that development of either project could keep power costs down for British Columbians in the long run (B.C. Energy Board, 1961, p. 20).

2. Columbia power was significantly cheaper than that from the Peace (an average of 4.4 versus 6.6 mills per kilowatt hour delivered to load centres over 18 years) but that this difference was almost entirely due to the higher direct financing and taxation costs associated with private development.

3. If both the Peace and Columbia were developed as publicly-owned projects their costs were roughly equal (4.2 and 4.03 mills per kwh. respectively for the high load growth case or 4.37 and 4.4 mills per kwh. for "basic" load growth).

4. Since there "...is no significant difference in costs of power at the load centres...any choice between the two projects must be made on the basis of other considerations" (BCEB, 1961, p. 27). While a number of considerations such as ultimate power capacity, areas served, and economic spinoffs were mentioned, no conclusion as to the preferable sequence was made.

5. "There could be benefits derived from the simultaneous construction of the two systems by reason of the joint use of transmission facilities and the operation of a larger volume of storage. This could ultimately reduce the cost of power..." However, such joint development would

*See the account of a speech given by Shrum in February, 1960, in Swainson, 1979, p. 127.
require exports, and due to lower transmission costs, "It is obvious that the first power to be sold in the United States ought to be some or all of the Columbia downstream benefits" (BCEB, 1961, p. 29).

These results reflected precisely the conclusion which the Premier had previously reached without the benefit of comprehensive analysis. It provided the justification for both the nationalization of the BCE/Peace River Power Development Company and the concerted campaign to sell the Columbia's downstream benefits before the treaty's ratification.

However, for an analysis upon which such momentous power planning decisions were taken, the Energy Board's Peace/Columbia report was remarkably deficient in rigour. For one thing, the results relating to the equivalence of Peace and Columbia power under public ownership were made on the basis of some dubious assumptions. The downstream flood control benefits of the Columbia were excluded on the basis that "... the policy of the provincial government is to put this flood-control payment in a trust fund, the earnings only to be used each year to compensate British Columbia for the loss to the provincial economy of the flooded areas" (BCEB, 1961, p. 10). However, laudable such an intention was, these payments still represented a benefit available to offset the social costs of the Columbia but not those of the Peace.

The significant downstream power benefits of the Libby Dam for both the Kootenay plants of Cominco and a prospective low-cost public power project on the same river system were also ignored. Finally, it was assumed that there would be no opportunity to export temporary surpluses from Columbia development at any price, regardless of the fact that provision for such sales had been made in the Treaty.

Equally important, the Energy Board's report simply assumed rather than demonstrated that simultaneous development would be more advantageous
to the province than sequential development in either order. All the Board
could manage in this regard was to change the observation that "there could
be benefits. . ." from the joint development in the main body of the report
to the conclusion that there "...would be benefits. . ." in the executive
summary (cf. BCEB, 1961, pp. 28 and 6, emphasis added).

Nevertheless, as is well known, the Bennett government expropriated
the BCE and the Peace River Power Development Company with the passage of
the Power Development Act during a special sitting of the legislature.
Compensation to the shareholders ranged from $111 to $180 million depending
on the extent to which they wished to dispose of their holdings, with the
government assuming all outstanding debt (Sherman, 1966, pp. 248-49).

On August 4, the day after the Bill received Royal Assent, a new board
of directors was appointed to preside over the now government-owned Peace
River/BCE conglomerate. Gordon Shrum became chairman, and other members
included Einer Gunderson, Bennett’s confidant and corporate fund raiser,
Lands and Forests Minister Ray Williston, and former BCE vice-president
William C. Mearns. Within a week preliminary engineering work on the Peace
project had commenced, and by the end of the year, the first tenders were
called (Sherman, 1966, pp. 251 and 258).

By late 1961, however, the dissatisfied BCE shareholders had launched
court actions against the government, and in 1962, two new pieces of
legislation were introduced. One tried to remove the question of compen-
sation for BCE assets from the jurisdiction of the courts. The other, of
more lasting importance, amalgamated the B.C. Electric Company, Peace River
Power Development Company, and B.C. Power Commission "...scrambling the
assets together, and providing that no action could be taken against the
new utility arising out of anything done by B.C. Electric" (Sherman, 1966,
p. 258).
The concerted campaign by British Columbia's Premier to dispose of the province's downstream power entitlement under the Columbia River Treaty was vigorously pursued after the release of the Energy Board's report. British Columbia's bargaining position with Ottawa on the issue was very strong since final ratification of the Columbia Treaty could not be effected without provincial consent, and the province's commitment to the Peace meant that the Columbia was not required to meet domestic loads. As a result, the Diefenbaker government effectively reversed the longstanding federal policy against long-term power exports by allowing British Columbia to negotiate with the United States for the sale of Columbia power and by announcing in the 1962 Speech from the Throne "...that large-scale, long term contracts for the export of power surplus to Canada's needs, present and potential, should now be encouraged in order to expedite the development of major projects...too large to be supported by domestic markets" (Quoted in Swainson, 1979, p. 232).

By the end of 1962, negotiations between British Columbia and a syndicate of United States utilities were well underway, with the Province insisting that a power sale should:

1. Be for a price of at least 5 mills,
2. Extend for the life of the Columbia Treaty with provision for reductions in quantity after twenty years,
3. Be paid in a lump sum to finance treaty project construction, this sum being discounted at the low rate used by the United States to fund its own public hydro construction (Swainson, 1979, pp. 232-233).

British Columbia's bargaining position, however, was not strong.
While the Americans had initially been quite anxious to obtain large blocks of Canadian power (see Swainson, 1979, p. 138), the energy planning in the Pacific Northwest after the negotiation of the Columbia Treaty had proceeded on the assumption that Canada's downstream power benefits would be returned to British Columbia.

The commitment of the Kennedy administration to a north-south transmission intertie linking California and the Pacific Northwest did open up a potential new market for this power, but, as Krutilla has shown, it also lessened the value of the downstream benefits themselves. This occurred because the interconnection of the hydro system of the Pacific Northwest with California's predominantly thermal system allowed previously unusable secondary energy produced by the former system to be used for fuel displacement in the latter (Krutilla, 1967, pp. 198-199).

The value of the entire treaty for the United States was also eroded by policy changes at the federal level. Much of the rationale for Canadian storage grew not out of any inherent lack of domestic alternatives, but from the reluctance of the Eisenhower administration to take an active role in public river basin development. With the accession of the Kennedy administration in 1961 after the negotiation of the Treaty, a number of hydro projects on the American portion of the Columbia were committed, thus displacing some of the benefits attributable to Canadian storage (Krutilla, 1967, p. 157). Swainson's account demonstrates the extent to which Canada's and B.C.'s technical advisors were aware of this worsening position during the power sale negotiations (Swainson, 1979, p. 245).

Nevertheless, after a delay caused by a change of administration in Ottawa, a power sale agreement was finally reached in late 1963, along with two federal-provincial agreements allowing ratification of the modified Columbia Treaty. Under the terms of the power sale, British Columbia's
downstream benefits were disposed of for 30 years in exchange for a single lump sum payment of $248 million in Canadian funds, representing a stream of annual payments discounted back to October, 1964, at 4 1/2 percent (Canada, External Affairs, 1964, pp. 118 and 173-174).

In the Canada-British Columbia agreements which paved the way for both the sale and the ratification of the treaty as a whole, British Columbia and its newly created Crown Corporation, the B.C. Hydro and Power Authority, assumed all the downstream benefits and construction obligations of Canada. After a fairly heated series of parliamentary hearings, the Columbia River Treaty, with an additional protocol elaborating the sales agreement and clarifying some technical matters, was ratified by Parliament and came into effect in early 1964.

While the provincial government and its principal policy advisors widely proclaimed the benefits of the modified Columbia arrangement, there is strong evidence that it fell well short of expectations. The downstream power sale, it was claimed, produced revenue equivalent to 5.3 mills per kWh., and would pay for the entire capital cost of the three treaty storage projects plus one half the costs of installing generators at the Mica Dam to meet future B.C. loads. This arrangement would thereby ensure that, when required to meet domestic loads, a large block of power would be available from Mica at a cost of approximately 1.5 mills (Swainson, pp. 267-268).

The quoted price of 5.3 mills did exceed the minimum figure, but this was only achieved through a load factor adjustment of 0.28 mills and, more questionably, the inclusion of the flood control benefits of 0.91 mills. In their absence the price was only a little over 4 mills per kWh., an amount which Premier Bennett had termed "good as a starter" when advanced by the Americans in early 1963 (Swainson, 1979, p. 246).
It is also interesting to note that, in an evaluation done by G.J.A. Kidd of the province’s Water Rights Branch, it was suggested that the absolute minimum B.C. should seek to obtain was a present value of $350 million from the power sale, that $250 million would represent an absolute minimum, and that, in Swainson’s words, "...a careful study of all aspects of the sale agreement would be necessary if the United States offered less than $300 million" (Swainson, 1979, p. 265).

Swainson (1979, p. 268) also records that the negotiators of the power sale faced:

...some very pointed questioning by the Premier, who ever since has remained convinced that a better bargain for Canada could have been obtained. The negotiators recall in fact that their reception was "pretty severe"...

As it turned out, inflation added 33 percent to the costs of the three treaty storage projects by the time of their 1973 completion, and the combined power and flood control benefits fell short of meeting their $548 million costs by $69.6 million (Keenleyside, 1983, p. 525). By 1978, the installation of the first four of six Mica generating units had cost an additional $405 million (B.C. Legislative Committee, 1979, p. 60). The eventual cost of Mica power translated into 1963 dollars via the Hydro construction cost index was just over 3 mills, about double the initial estimates (Calculated from Bernard, et al., 1982).

The most striking aspect of the Columbia outcome, however, was the extent to which the power sale agreement and the promotion of the Peace project undermined the economic rationale for the sequence of Columbia projects originally selected. The attractions of the High Arrow Dam, with its extensive environmental and social costs, had originally centred around its modest initial outlays and its ability to earn immediate power benefits by meeting rapidly increasing U.S. energy needs. It was also useful as a
reregulating dam which would allow Mica to be used more effectively as an at-site generating source over the longer term.

By late 1963, load growth in the United States had leveled off and new domestic sources of power had been committed to meet this growth. From British Columbia's point of view, the sale of the downstream power benefits had removed the rationale for an initial low-cost project to meet the province's own load growth (which had also leveled off following the recession of the late 1950s).

Finally, the prospects for the simultaneous connection of the Peace and Columbia to a single integrated grid with interconnection to the American system made the re-regulating role of the Arrow storage dam redundant. The enormous storage capacity of the Williston Lake Reservoir on the Peace meant that, even without Arrow, the conflict between Mica's domestic and downstream storage roles was minimal (Krutilla, 1967, pp. 159-160 and 193).*

Krutilla estimated that a renegotiation of the treaty, eliminating High Arrow, Duncan and Libby and restoring the Dorr-Bull River project on the Canadian portion of the Kootenay would have produced additional net benefits in the order of $250-300 million over the life of the treaty. Even if Dorr-Bull River were not substituted and the controversial High Arrow project was removed, a gain of about $150 million could still have been realized (Krutilla, 1967, p. 193). Assuming (perhaps optimistically)

*Less regulation was required at Mica for domestic purposes because the Peace reservoir could store water when Columbia streamflow conditions allowed high energy production, releasing it when streamflow conditions on the Columbia were less favourable. In the absence of Peace development, the Arrow reservoir, by reregulating Mica storage releases to meet the downstream power and flood-control requirements of the Columbia Treaty, would also allow Mica storage itself to be operated so as to maximize at-site firm energy production.
that British Columbia could have obtained 50 percent of these additional joint benefits from treaty renegotiation, the gain would have been equivalent to 30-35 percent of total estimated Columbia costs for the first alternative and 18 percent for the second (Calculated on project costs as stated in Canada, External Affairs, 1964, p. 179).

5.13 The Legacy of the 1950s I: Policy Content

Both the above account and the more detailed ones on which it is based (Krutilla, 1967; Swainson, 1979, Sherman, 1966; Robin, 1973, McNaughton, 1963, Waterfield, 1970; Higgins, 1961, 1964, 1970), reveal a striking difference of opinion on the outcome of the Columbia River Treaty for Canada and British Columbia. From the Canadian nationalist position taken by critics like McNaughton, Higgins, Waterfield and the New Democratic Party, the outcome represented a classic example of a resource giveaway. The Canadian negotiators were both outwitted by the more technically sophisticated Americans, and were sabotaged by the short-sighted goals of an ambitiously parochial provincial premier.

This interpretation has been challenged both by the more rigorous economic analysis of Krutilla and by Swainson's meticulous account of Columbia decision making. Because of the greater relative importance of the Columbia to Canada, and especially to British Columbia, an impressive amount of analytical effort was devoted to the issue by both the federal and provincial decision makers. Each decision taken at these levels was fully informed as to the financial consequences of the alternative which faced them (given, of course, the uncertainties inherent in such analysis).

Krutilla's (1967) analysis shows that British Columbia obtained a financial result better than that which it could have obtained independently whereas in both the original treaty and downstream benefits
sale, the United States was worse off. However, whether such an outcome would hold true given the huge increases in both power costs and rates is questionable.

At least equally important, however, are the implications of both the Columbia and Peace decisions in terms of those province-wide power planning issues which they were meant to resolve. Certainly, the provincial government had moved decisively to achieve the institutional integration necessary to make a technical breakthrough in the scale of hydro-electric power development possible. Between 1959 and '63, developments designed to triple the installed capacity of the province's utilities were committed. At the same time, the combination of policy instruments employed by the province had shifted decisively from regulation and allocation to direct entrepreneurship with the creation of B.C. Hydro.

The outcome of these developments in terms of overall power planning, however, was profoundly conditioned by the nature of their historical origins. The integration of the provincial power system under direct public ownership did not result from any inherent desire to rationalize the institutionally fragmented power system of the 1950s, but out of the failure of the allocation approach of that decade to produce the desired results. The British Columbia Power Commission was not designated as the agency responsible for Columbia development until the Kaiser Dam had been vetoed and the province's participation in a joint Canada-U.S. comprehensive power planning scheme had become inevitable. Even then, the funds made available to the Crown agency were limited.* Similarly, the

*Both Sherman (1966) and Swainson (1979) note that Lands and Forests Minister Ray Williston supported the December, 1960, B.C. Energy Board reference as a means by which the embarrassing discrepancy between the demands being made on the B.C. Power Commission and the resources available to it could be resolved.
B.C. Electric Company and Peace River Power Development Company were not nationalized until no other way to promote hydro development on the Peace could be found.

This key fact is important for a number of reasons. First, the goals associated with the earlier emphasis on allocation had relatively little to do with power planning, and a great deal to do with encouraging as much economic growth as possible with the smallest possible degree of active government involvement. The record of the provincial government in relation to the province's key forest industry in the 1950s shows a similar tendency, with extensive harvesting and management rights being allocated to large corporations (B.C., Royal Commission, 1976).

The strategy of allocation is based on the assumption that, by facilitating the supply of key goods (in this case, natural resources) barriers to the growth of economic activity in a region are removed. Since the actual production process associated with the resource in question is beyond the scope of government involvement, there is little need to devote analytical resources to the relationship between the supply of and the demand for the final product (in this case, electricity). A private developer of the public resource, be it an Alcan, a Kaiser Aluminum or a Peace River Power Development Company, would not proceed unless it had already assessed such a situation favourably. Neither is there a need for the public sector to examine the relationship between particular resource projects since each private developer would take them into account in his own planning.

In seeking to promote both Peace and Columbia developments simultaneously, however, the provincial government was forced to confront the basic issue of electricity supply and demand. But it did so grudgingly and in a piecemeal fashion. The first response was to assume that
additional supply would create its own demand. This was particularly true in relation to the Peace, where the hydro project was intimately tied up with grandiose visions of a broader northern resource development. In one of many such examples, Lands and Forests Minister, Ray Williston, in an early 1959 speech, pointed to the success of the Americans' Grand Coulee Dam, arguing that "British Columbia requires an equally strong magnet to attract people and industry to the vast unsettled regions of this province, so that the rich natural resources may be utilized" (Williston, 1959).

Hence, in the period to 1961, the provincial government both negotiated the Columbia Treaty from the perspective that the downstream benefits would be used in B.C., while at the same time aiding the Peace River Power Development Company in its efforts to pre-empt the Columbia's markets. It was not until the Columbia Treaty had been negotiated that key decisions were taken to nationalize the Peace and sell the Columbia's downstream benefits.

One result was that the province almost certainly obtained a lower return from its long term power exports than it would have received if its ultimate goals had been clearly formulated from the outset. Not only were the Americans more anxious in 1960 than they were in 1963, but British Columbia's bargaining position would have been stronger before the Columbia Treaty itself was signed.*

Another result was that the sequence of projects contained in the original treaty was, as we have seen, not well suited to the role they ended up playing in the provincial power system. In particular, the

*It could be argued that the federal policy against power exports prevented the early adoption of such a provincial position, but the fact remains that intensive provincial lobbying against the export ban did not commence until after the treaty was signed.
financial, environmental and social costs of the High Arrow Dam were needlessly incurred. However, the fact that the thrust of the provincial government's power strategy did not emerge until after the Columbia Treaty was signed and ratified by the U.S. Senate meant that renegotiation was not feasible.

While it is clear that much careful study of alternative Columbia schemes was undertaken by the provincial government and its agencies, the government's initial preoccupation with underwriting resource development meant that many of the really important power planning questions were never subjected to any analysis at all. "The announced provincial policy," recalls Keenleyside, was "...to provide cheap power at home, to stimulate balanced development of the province by strengthening the central and north-central regions, and to exploit the maximum return from the rapid economic exploitation of two rivers" (Keenleyside, 1983, p. 515). The hotly contested policy question of whether simultaneous or sequential development of the two river systems would produce such a "maximum return" or whether a power sale of the Columbia's early downstream benefits was preferable to a deferment of the Peace were not ones which were settled on the basis of analytic rationality.

Neither was the "power development brings industry" thesis implicit in the notion of "balanced development" subjected to any meaningful empirical scrutiny. Evidence available at the time, particularly Jack Davis' comprehensive energy study for the Royal Commission on Canada's Economic Prospects (Davis, 1957), shed considerable doubt on it. Even given the (ultimately accurate) assumption that much of the energy-intensive resource development of the 1960s would occur in the north-central region of the
province, there was not much attention given to the costs of meeting this load via development of the Peace rather than by power obtained from the Columbia's initial downstream benefits.

5.14 The Legacy of the 1950s II: Policy Process

The sequence of events leading to the integration of British Columbia's electric power system under public ownership had an important influence on the political decision making process surrounding power development. During the 1950s, public and private electric utilities developed their own corporate strategies, with the provincial government playing a predominantly regulatory role in relation to them. While, as we have seen, the regulation undertaken by the Public Utilities Commission was, in most respects, more symbolic than real, that which developed around the water licensing process had a more significant impact. The water licensing procedures and associated appeal processes became, in several important instances, arenas in which the claims of conflicting societal interests were resolved.

It should be emphasized that this new social and environmental consciousness arose out of several unique factors, particularly the strong veto power possessed by the federal fisheries department and the park status of Vancouver Island's Campbell River reservoirs. But, it also owed something to the tension between the government and its power agency, a factor which allowed the former to adopt, in many instances, a regulatory stance. As Lowi (1972) has pointed out, the policy dynamics associated with regulation tend to centre around group conflict and bargaining, and consequently a more decentralized type of decision-making results. This is not to say that the key power planning decisions were not made at the
Cabinet level, but that they were made on a basis of trade-offs made by a previous, relatively participatory process.

On the other hand, the policy dynamics associated with a natural resource allocation strategy pursued at the Cabinet level were quite different. Because extensive resource rights were granted on the basis of complex negotiations with a large corporate entity, the process tended to be both more centralized and more closed. The stance of the government could no longer be regulatory to the same degree, both because it operated from the explicit goal of removing barriers to economic expansion, and because agreements had to be made with the private corporation whose activities were so vital to the furtherance of this policy goal.

This tendency was strikingly evident in the policy process surrounding the Alcan project. The Cabinet, as co-promoter, made key social and environmental tradeoffs behind closed doors, in direct negotiations with the company, and the nature of the 1951 Memorandum of Agreement rendered subsequent Water License hearings literally meaningless.

Much the same sort of policy dynamic evolved out of the Peace/Columbia decision-making. Although the policy instrument employed to promote development on both rivers shifted from allocation to entrepreneurship, the influence of the early preoccupation was decisive. From the outset, development decisions on both the Peace and Columbia had been centred at the Cabinet level and the goal of removing impediments to economic expansion was paramount. Later events like the Columbia negotiations and the increasingly active role of the Premier in attempting to market power from the Peace intensified these tendencies.

In the Columbia decision-making, social and environmental considerations were not entirely ignored. Much was made of the provincial government's opposition to East Kootenay storage, but the pattern of events
suggests that its socio-environmental impacts were simply used to justify a decision which was taken largely on financial grounds. Much the same sort of aversion to Arrow Lakes flooding had been put forward to justify the low-level Kaiser Dam proposal of 1957, only to be quietly forgotten when financial factors appeared to favour the High Arrow alternative. As all the accounts of Columbia decision-making clearly show, no efforts were made even to inform those who were to be affected by the developments being considered by the provincial government, let alone to involve them in project planning (Wilson, 1973; Swainson, 1979; Waterfield, 1970).

Like the earlier Alcan project, the lack of attention given to social and environmental considerations in planning Peace and Columbia developments was striking. In the Columbia case, no studies were undertaken of fish, wildlife, agricultural or forestry losses prior to the issuance of Water Licenses, even though they were obviously quite extensive. Although a six-day Water License hearing was held in the Arrow Lakes region on the controversial High Arrow (subsequently renamed Keenleyside) Dam in late September, 1961, the Columbia Treaty had already been signed. Using the scanty information publicly available, a number of local groups organized largely around Chambers of Commerce, tried both to identify the weaknesses in the Columbia Treaty and to make a case for the agricultural, recreational and forestry resources which were being destroyed. Since the Treaty was a foregone conclusion, and the Water Comptroller ruled that arguments concerning it were not admissible, any efforts by local interests to address the question of project justification were doomed from the outset (See Waterfield, 1970; and Swainson, 1979, pp. 207-209).

As we shall see in the next chapter, the Water Licenses issued for both the Columbia and Peace projects did contain some conditions, but they were not extensive. In short, the level of social and environmental
awareness in the power planning of the Peace and Columbia projects represented a step backward from the increasing consideration given to these issues in the 1950s. This occurred partly because, as already noted, the province became firmly committed to underwriting the production of large quantities of low-cost power, a goal which was clearly incompatible with any systematic accounting of environmental and social costs.

It also occurred because, as the province became progressively drawn into a more active role in power planning, its need for information and analysis grew. To satisfy this need it turned to the Water Rights Branch, the very agency which was critical to the regulation of power development in the interests of other values. Hence, Swainson (1979, p. 301) notes that:

...the Department of Lands and Forests, a broad spectrum organization dealing with land, forests (and) water resources...was the source of the great bulk of the 'in-house' analytical effort, coordinated the bureaucratic contribution, and generated most of the recommendations on this question which went to Cabinet level. By the 'mid' fifties the Water Rights Branch of this department headed by A.F. Paget, the water comptroller, had acquired a key role here...Overall, no one public servant or department in Ottawa had quite the influence with Cabinet-level decision-makers accorded to Mr. Paget and his group in Victoria...The minister of lands and forests...worked so closely with Mr. Paget and a few senior staff members...that these men appear to have achieved a real meeting of minds...

Gordon Shrum's original recommendation for an overall authority to direct the course of power planning in the province was designed explicitly to lessen the barriers to large-scale power development posed by a number of countervailing centers of regulatory authority, thus formalizing the trend identified in the preceding quote. While the implementation of the idea did not really live up to Shrum's more ambitious conception, a body
comprising each of the institutions responsible for hydro regulation put its members in a potentially awkward position.

This became clearly evident in the only concrete issue tackled by the Energy Board in its early years, the Peace/Columbia reference. Henry Angus, the chairman of the Public Utilities Commission felt obliged to formally dissociate himself:

...from any sections of the report that indicate a preference for public power over investor-owned power in developing the Peace River project... It would be embarrassing for myself and my colleagues if I were to commit myself to a public expression of opinion on this subject... that could be quoted in cases that might come before the Commission (BCEB, 1961, p. 31).

Similarly, Arthur Paget, the Water Comptroller, felt it prudent to state that, in view of his responsibility for adjudicating Water License applications, "...the agreement I have expressed relating to the principles of project development as set out in our report is not to be taken as an agreement that a License will issue for any component part of any proposal" (BCEB, 1961, p. 32).

The Energy Board, however, soon ceased to play a significant role in power planning. With the nationalization of most of the power industry as an outcome of the Peace and Columbia controversy, the focus of provincial power planning at the governmental level shifted decisively to public entrepreneurship. Both the fact of this change in the dominant policy instrument employed, and the circumstances surrounding it, were to exert their own distinct influences on power planning and policy during the 1960s.
5.15 References


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6.1 The Policy Setting of the Early 1960s

The rather complex and fragmented pattern of power policy during the 1950s generated three key outcomes. The first was the growing involvement of the provincial government in power planning, so that by the early 1960s, the shape of the provincial power system was unambiguously one of government policy at the highest level. The second was the commitment of the province to an unprecedented expansion of hydro-electric power development, aimed more toward making available large blocks of low-cost power to attract new industry than simply to meeting emerging load growth. Finally, the form of government involvement had shifted decisively to public ownership of the key power producing utilities.

6.2 The British Columbia Hydro and Power Authority I: Legislative Framework

The British Columbia government’s new policy instrument, the B.C. Hydro and Power Authority, was legally created in a number of stages between 1961 and 1965. As noted in the previous chapter, the scope of the Power Development Act of 1961 was confined mainly to vesting ownership of the B.C. Electric Company in the provincial Crown. Although there were some new provisions governing borrowing powers and other matters, the powers of the new Crown corporation were made equivalent to those of the old BCE plus those of the Power Commission (B.C., 1961, Chapter 4).

The approach taken to spelling out the legal status of the new B.C. Hydro and Power Authority in its founding statutes of 1962 and 1964
Act.* As in the Power Act, the overall delineation of the new Authority’s operating powers was permissive, including the right to generate and supply power, develop hydro sites, and acquire the range of Water License privileges necessary to accomplish these ends. It could also buy and sell power and enter into partnerships or joint ventures with private corporations (B.C., 1964, Chapter 7, p. 14). There were also powers which enabled B.C. Hydro to continue the extensive gas distribution, rail and urban transit operations of its private predecessor.

To direct these operations, a Board of Directors with a maximum of 15 members was established along with a smaller Executive Management Committee with a maximum of 5 members. All appointments were made by Cabinet (B.C., 1964, Chapter 7, s. 3, 6, 7, 11). These legal arrangements reflected the desire by the government for more direct control over the affairs of Hydro than it had been able to exercise over its public predecessor, the B.C. Power Commission. Following the Briggs Affair in the late 1950s, the Power Commission had been enlarged to include Cabinet representation, and the position of General Manager had been replaced by a "Committee of Management." By legally constituting such a management committee at the level of the Board of Directors, the latter’s ongoing influence in the affairs of the new Crown corporation would be strengthened. In turn, the

*The two versions of the Act represented two stages in the merger of the two founding institutions, the BCE and the Power Commission. The 1962 Hydro Act, while legally "scrambling the assets" of these predecessors did not really merge them formally and reference was still made to them. The 1964 Act, following the resolution of the legal challenges to the BCE takeover, treated Hydro as one institutional entity for the first time. Actual legal merger was not accomplished until the Power Measures Act 1966 gave legal sanction to a formal amalgamation agreement concluded in Aug, 1965 (B.C., 1962, Chapter 8; 1964, Chapter 7; 1966, Chapter 38). In the discussion which follows, references are made to the final 1964 version except where significant differences occur.
powers of Cabinet to influence the policies of the B.C. Hydro Board were enhanced by making all of its powers subject to Cabinet approval.

As in the previous Power Act, the financial obligations of the new Hydro Authority were guaranteed by the province, with the Minister of Finance acting as financial agent. Sinking funds sufficient to amortize outstanding debt within 40 years were required, although payments could be deferred by the Cabinet for up to 10 years. In contrast to the Power Act, more emphasis was given to B.C. Hydro as the borrower rather than the government itself, a reflection of the tendency of the Social Credit government to incur indirect rather than direct debt.

The previous Power Commission had enjoyed two legal benefits which set it apart from privately owned utilities, wide-ranging expropriation powers and exemptions from a number of regulatory statutes. The provisions governing expropriation were taken virtually verbatim from the Power Act (cf. B.C., 1960, Chapter 293, s. 6, 68-86, and B.C., 1964, Chapter 7, s. 18, 21-44). These allowed B.C. Hydro to take real or personal property and privately-owned power facilities virtually at will, as well as to compel the sale of power from private producers. If no agreement with the affected party could be reached, the Cabinet was empowered to appoint a "valuator" to determine the appropriate level of compensation. Appeal from the valuator lay to a judge appointed by Cabinet (rather than to the regular court system) and from there to the Court of Appeal. B.C. Hydro was also granted wide-ranging powers of entry onto private land to undertake project surveys, protect power lines and provide access to its facilities. Compensation for any property damage suffered by these activities was to be settled by a single valuator with no right of appeal to the courts.
The B.C. Hydro and Power Authority, like its predecessor was explicitly exempted from a number of regulatory and taxation statutes. It was not subject to the jurisdiction of the Public Utilities Commission, to municipal control over utility plants as provided for in the Municipal Act, or to regulation under the Companies or Securities Acts (B.C., 1962, Chapter 8, s. 12). In the 1964 Hydro legislation, these detailed provisions were replaced with a blanket clause stating that "...except as otherwise provided by or under this Act, the Authority is not bound by any statute or statutory provision of the Province" (B.C., 1964, Section 53(1)).

The B.C. Power Commission had been exempt from income tax but not property taxes. However, all improvements used to produce and distribute power were exempt from both municipal and school property assessments with the Commission paying 3 percent of its sales to the municipalities in which it operated in lieu of such taxes (B.C., 1960, Chapter 293, s. 61-65). In the new Hydro Act, the exemption from income tax remained, but 75 percent of improvements used for power production and distribution were now subject to school taxation. Grants in lieu of municipal taxes were now set by the provincial cabinet (B.C., 1964, Chapter 7, s. 54).

6.3 The British Columbia Hydro and Power Authority II: Organization

The creation of a new institution from two quite different entities with a long history of mutual antagonism and distrust involved far more than simply the passing of legislation. In fact, for a number of reasons, B.C. Hydro as an organization remained an uneasy amalgamation throughout most of the 1960s. On the working level there were tensions generated by the different character of the personnel coming from the BCE and the Power Commission. The former had been a much larger, and consequently, more
hierarchical organization, with its personnel being more specialized and narrow in their orientation. The Power Commission's personnel, on the other hand, tended to be younger and possessed a greater breadth of knowledge (Nash, 1984). Hence, many of the former were wary of the threat posed to their positions by amalgamation, whereas many of the latter were frustrated by being forced to take subservient positions relative to the generally older ex-B.C. Electric managers. "Under these circumstances," observed J.W. Wilson (1973, p. 118), "it is scarcely astonishing that the integration of the two organizations left a certain amount of resentment and hostility between some members at all levels of the two original organizations, and led to the emergence of 'B.C. Electric' and 'Power Commission' cliques."

The fragmented nature of B.C. Hydro was exacerbated by Premier Bennett's appointment of two co-chairmen. Gordon Shrum was originally appointed in 1961 to take over the newly-nationalized BCE, and in 1962, the Power Commission's chairman, Hugh Keenleyside, was given an equivalent position with the new Authority. Keenleyside, while uneasy about this unusual arrangement, accepted it in order "...to see to it that the Power Commission managers should have someone in a position to protect their interests" (Keenleyside, 1962, p. 499).

Finally, the Hydro Authority was organizationally fragmented by the fact that most of its ongoing operational, construction and planning activities could be traced back to either of its two predecessors. The new system's electrical divisions followed the old territorial divisions of the B.C. Electric and Power Commission, with the gas distribution and transportation arms continuing much as they had done under private ownership.

In terms of the Authority's new generation projects, Gordon Shrum was given administrative responsibility for continuing the Peace River Power
Development Company's work on the Peace, while Keenleyside directed the Columbia project begun under the Power Commission.

6.4 B.C. Hydro and the Emergence of Organizational Objectives I: Dam Construction

As emphasized in the previous chapter, the power planning through which B.C. Hydro's new projects were related to provincial demand had been focused at a political rather than a corporate level. These previous decisions, in turn influenced the nature of the role played by the new Crown utility in British Columbia during the 1960s. Given the simultaneous construction of four large hydro-electric dams on two river systems, engineering and project management became the key tasks of the organization as a whole. Not only was the magnitude of the undertaking unprecedented, but the deadlines associated with it were extremely demanding. Under the Columbia Treaty, B.C. Hydro as the Canadian entity was subject to financial penalties if Duncan was completed after 1968, Arrow after 1969, and Mica after 1973.

In addition, the sale of the downstream benefits under the treaty meant that completion of the large Peace River dam became essential to meet the new loads of the late 1960s, and these pressures increased with the emergence of large new industrial demands in the mid-1960s (see below, pp. 244 - 245).

Despite the rigorous demands of the task and the organizational problems created by nationalization, the initial stages of the two rivers policy were successfully implemented in the decade following Hydro's creation. On the Columbia, both the Duncan and Arrow projects were completed ahead of schedule, allowing Hydro to use the downstream power benefits generated before the treaty commenced to meet provincial load
growth (B.C. Hydro, 1969, 1970). Similarly, the Mica Dam was completed on time to meet its treaty commitments in 1973.

In order to speed up construction and lower costs by $110 million, the Portage Mountain Dam on the Peace was scaled down somewhat from the plans developed by the Peace River Power Development Company. The dam’s height was reduced from 650 to 600 feet, and its storage capacity from 88 to 57 million acre feet. These changes, plus the deferment of the smaller associated Site 1 generating project downstream reduced the project’s capacity from 3145 to 2270 MW (Lemarquand, 1972, p. 78). The smaller reservoir significantly lessened the need for special works to prevent possible leakages into the Fraser River system. In its new form, the Portage Mountain (renamed W.A.C. Bennett) Dam was completed in 1967, and the first power from the project reached the lower mainland in 1968 (B.C. Hydro, 1968, 1969).

6.5 B.C. Hydro and the Emergence of Organizational Objectives II: The Promotion of Industrial Load Growth

With the Peace River coming on stream in the late 1960s, and at-site power from Mica expected to follow in the 1970s, the attention of B.C. Hydro was necessarily focused on the problem of ensuring adequate loads would exist to meet these large new increments of electrical supply. Since, as has been discussed, the capital costs of Hydro projects are largely fixed, the emergence of these new loads was essential if the financial fiasco predicted by a significant number of skeptics was to be avoided. Part of the solution was the design of rates which would reflect the lower average costs expected to result from large-scale development and the active promotion of new loads.
This situation was similar, in many respects to that encountered by the B.C. Power Commission in the late 1940s, when very large increments of capacity were added to its Vancouver Island system. However, in this earlier period, large bulk power contracts to absorb this load were negotiated prior to final project commitments being made, whereas in the early 1960s, no such advance contracts existed.

This situation had a political element as well as an economic and technical one. Through the series of events described in the last chapter, the provincial government's political credibility had become directly linked to the success or failure of hydro development. With so many public assurances that the availability of large quantities of cheap power would result in a resource development boom, the two rivers development policy had, in effect, become the central element of the province's overall economic development strategy. From a more immediate perspective, the provincial government needed to demonstrate that nationalization would produce direct, clearly perceivable benefits in terms of reduced power costs.

As in the case of the B.C. Power Commission, large-scale industrial loads were particularly important since no conceivable level of residential or commercial load growth could begin to absorb Peace River power. Hence, in 1963, a new promotional bulk power rate was introduced for large new loads.

This rate, based on the expected level of overall system costs to be achieved by Peace River development, had an energy component of only 2.2 mills/kWh and was uniform for all points along the provincial grid. A capacity charge of $1.28/KVA per month was levied on the mainland, with a higher rate of $1.80 being charged on Vancouver Island (reflecting the higher costs of transmission across the Strait of Georgia). However, in
1968, the large Vancouver Island bulk users (mainly pulp and paper mills) were granted the mainland rate of $1.28 on all capacity over 60,000 KvA (B.C. Hydro, 1982).

This rate structure meant that, at an average bulk load factor of 75 percent, energy and capacity each accounted for about 50 percent of the total effective 4.5 mills/kWh rate. With the large amounts of energy being developed on the Peace, this rate was designed both to encourage large industries to consume more electricity, and to consume it at high load factors. In other words, for a given connected capacity, industries could lower their effective kWh rate by consuming as much energy as possible. For example under the mainland rate structure, a large bulk user could reduce his effective kWh charge from 4.5 to 3.9 mills by increasing his load factor from 75 to 100 percent.

For pulp and paper mills, the system acted to discourage reliance on co-generation (i.e. the production of electricity from the steam generated by other aspects of the plant's operations). Since a high capacity connection to an interconnected grid was desirable as insurance against equipment breakdown or periodic maintenance, most of the savings from such co-generation would accrue from the displacement of very low cost energy.

This rate structure for large industrial users remained essentially unchanged until the latter 1970s, and the result was a steady decline in real industrial rates during the decade between 1964 and 1973. As shown in Figure 6.1, energy charges declined 34 percent, from 2.9 mills ($1971) in 1964 to 1.9 mills in 1973. While capacity charges were raised in 1969, they had declined 20 percent in real terms, from $1.67 KvA in 1964 to $1.35 in 1973.
**FIGURE 6.1**

**B.C. HYDRO, BULK POWER RATES**

A. Current $ 1963-1975

<table>
<thead>
<tr>
<th>Year</th>
<th>Energy Mills/kWh</th>
<th>Capacity $/KVA</th>
<th>Energy Mills/kWh</th>
<th>Capacity $/KVA</th>
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<tr>
<td>1963</td>
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<tr>
<td>1975</td>
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**Source:** B.C. HYDRO, 1982.
6.6 The Promotion of Industrial Load Growth as an Economic Development Policy

The counterpart of these activities at the governmental level was the repeated emphasis on the industrial benefits which would result from the cheap power of the two rivers policy. Lands and Forests Minister, Ray Williston, who was also a Hydro director during the 1960s, likened the Social Credit government’s power policies to a snowball rolling downhill, creating an irresistible impetus toward self-sustaining economic expansion. "B.C.," he asserted, "will be able to add incremental quantities of power and distribute this energy at a rate which will continue to attract industrial development for years to come. We're in a place by ourselves ..." (Williston, in the Province, Feb. 14, 1968, p. 11). This sentiment was echoed by the Premier, who claimed that power projects were "...the base upon which the great expansion in the province during the next decade will be built." They would, "...more than any other factor of production, be the measure of success in achieving our potential output" (Vancouver Sun, Feb. 20, 1968, p. 4).

It should be emphasized, however, that Hydro's efforts to ensure the utilization of its newly created capacity and the government's desire to emphasize the economic benefits of its previous power development decisions did not really add up to a clearly articulated economic strategy. It was recognized within Hydro itself that large quantities of low-cost power could significantly lower the costs to private entrepreneurs of new investment in the province's resource industries. This was particularly true in the case of pulp and paper, which was technically capable of meeting the bulk of its electricity requirements through self-generation. In the words of a 1968 Hydro study:
The question of whether a pulp mill would or would not generate all its own electrical energy is probably as much academic as actual. . . . (Pulp mills) can, without real difficulty be independent of central service natural gas or electric transmission systems. . . . but there is a definite bias in favour of purchased electricity . . . because they prefer not to tie up capital for purposes other than for their main purpose, and the 'nuisance factor' of maintenance and servicing of generating equipment is avoided (B.C. Hydro, 1968a, pp. 49, 72).

However, according to one ex-Hydro executive, the utility's entrepreneurial efforts in the realm of economic development were limited by the lack of any overall direction from the provincial government concerning such matters as industrial location policy and the provision of other infrastructure (Kennedy, 1984). Although B.C. Hydro did take on economic development activities which were not being performed by any government department, these activities did not evolve into a sustained and active search for new industrial loads.

Two factors probably account for the failure of such a coherent policy linking power and industrial development to energy during the 1960s. The first was that the development of such an approach was not consistent with the ideological predispositions of the Social Credit government. This government's policy approach, as we have already observed, was centred around removing specific barriers to new investment through the granting of resource rights and the subsidization of infrastructure. Forest policy was conducted mainly through granting large concessionary rights to private companies to encourage new investment (B.C., Royal Commission, 1976), mining policy was based on the ease of access to the resource and low levels of taxation (Payne, 1979), and transportation policy centered on the building of long and expensive rail lines to the north to encourage new forest and mineral investments (B.C., Royal Commission, 1978).
At least equally important was the emergence of large new mining, pulp and paper, and chemical loads in the mid-1960s, which both validated the two rivers policy and made the articulation of a conscious economic strategy appear unnecessary. As noted in Chapter 3, two sustained surges of capital investment occurred in B.C.'s resource industries beginning around the mid-1960s. One was in the pulp and paper industry, generated by growing world demand for paper products and encouraged by the provincial government's policy of granting extensive cutting rights in exchange for new manufacturing capacity. Just as the late 1940s and early '50s had seen a surge of new pulp investment on the coast and Vancouver Island regions, the 1960s saw an equally impressive increase in new mill capacity based on the extensive unutilized resource of the central interior and north-coast regions. Between 1964 and 1970, Kraft pulp production in B.C. more than doubled from 1.6 to 3.8 million metric tonnes, with two thirds of this capacity being added in the interior (Barr and Fairbairn, 1974).

Similarly, the mid 1960s saw a boom in new mining investment unprecedented since the turn of the century, with the real value of output increasing two and one half times between 1962 and 1973. This investment was fueled by rising mineral prices in general, and by the demands of the rapidly growing Japanese economy for iron, copper and coking coal (Payne, 1979). Unlike the pattern of past development, the new base-metal operations were open-pit, low grade mines, and hence quite energy intensive.

The result was a sharp jump in the quantities of electricity demanded by large industrial users. New pulp and paper and chemical loads accounted for 30 percent of all new electrical energy demands between 1962 and 1971, with mining accounting for another 9 percent (See Table 3.8, Chapter 3). The growth of these large industrial loads was particularly striking.
between 1964 and 1967, with B.C. Hydro's bulk sales increasing at an average annual rate of around 25 percent before falling to around 10 percent in the latter part of the 1960s (B.C. Hydro, 1964-72). Whereas the total average yearly increase in peak demand for B.C. Hydro's two predecessors combined averaged around 60 MW. between 1957 and 1963, the new Crown utility noted in its 1966 Annual Report that bulk power contracts totalling 88 MW. had been concluded, with negotiations underway for an additional 465 MW. (B.C., Hydro, 1967). Most of this new industrial demand occurred not in the traditional load centre of the lower mainland but in the southern and central interior regions.

In a mid-1965 feature article on this remarkable growth, a reporter for Vancouver's Province newspaper, observed that "historians will probably argue long whether the interior industrial development validated the Peace project or whether the availability of power, in fact, brought the industries." While there has, in fact, been virtually no analytical effort devoted to the question, the influence of power itself was probably limited. The only study of locational attractions of the B.C. interior for the pulp industry (Barr and Fairbairn, 1974) points to the impact of subsidized freight rates and low wood costs brought about by provincial forest policy, but does not mention electric power. Statistics Canada data do show a substantial drop in real electricity costs ($1971) to the pulp and paper industry from around 8 mills per KWh in 1962 to 5.5 mills in the early 1970s, with a corresponding 75 percent increase in electricity use per real dollar of output. However, total energy use in the pulp industry accounts for under 6 percent of total production costs compared to 30 percent for wood supply, 12 percent for labour and 18 percent for distribution (B.C. MISBD, 1980, pp. 28-29). While the availability of electricity was undoubtedly a factor in facilitating the remarkable pulp
and paper expansion of the 1960s, the existence of external demand on the one hand and an accessible wood supply on the other were of more fundamental importance.

Similarly, while low energy costs brought about by both hydro policy and the availability of inexpensive supplies of natural gas during the same period certainly gave British Columbia an edge over competitors in northern Ontario and the North-western U.S., this advantage applied to only 6 percent of total costs, and only a fraction of it could be attributed to electricity.

Similarly, the forces driving the development of large-scale open pit mines in the province had more to do with Japanese demand and the existence of economically attractive ore bodies than with the existence of electric power per se. However, as noted in Chapter 3, the emergence of open pit technology caused the overall electricity intensity of the industry to roughly triple between 1963 and 1972, indicating the growing importance of the commodity as a productive input. As in the pulp and paper industry, the real price of electricity to the mining industry fell sharply from around 8.5 mills in the early 1960s to 5.5 mills in the early 1970s ($1971).

However, it is interesting to note that in metal smelting, the only industrial sector where electricity costs are generally recognized as a significant locational factor in their own right, no new developments arose as a result of B.C. Hydro's policies. This was due partly to the role of B.C.'s new base metal mines as suppliers of concentrate to existing Japanese smelters. However, there were a number of inquiries regarding power supplies for large aluminum companies in the 1960s which were refused by Hydro. The rates sought by these prospective firms apparently were too low to cover Hydro's costs, and the provincial government was unwilling to
provide outright cash subsidies (Nash, 1984). In a 1971 address, Hydro's chairman, Gordon Shrum, stated that:

...although there has been no formal statement by B.C. Hydro it is generally agreed that power-intensive industries requiring large blocks of low-cost power are not encouraged to locate in B.C. Certainly, B.C. Hydro has taken the position that the very large capital requirements needed to serve residential commercial and smaller industrial customers precludes the possibility of providing funds to generate large blocks of low cost energy for power-intensive industries, especially those using imported raw materials and employing relatively few workers (Shrum, 1971, pp. 13-14).

6.7 B.C. Hydro and the Emergence of Organizational Objectives III:
The Promotion of Residential Load Growth

The launching of the two rivers policy was also followed by a sustained effort on the part of B.C. Hydro to promote residential loads. A program of annual rate reductions was introduced by the Premier in 1962 and continued until 1967, when rising costs forced the government to end it. The initial reductions occurred in the first blocks of consumption, affecting mainly low-volume users, while those of 1963 and 1964 reduced the tailing block from 12.5 to 10.0 mills to encourage the use of electricity in the more energy-intensive water and space heating applications (Province, March 31, 1962, p. 1; March 30, 1965, p. 1; B.C. Hydro, 1965, p. 6).

Between 1962 and 1966, B.C. Hydro's average revenue from residential users fell from 22 to 15 mills per kWh., and annual benefits to consumers had reached $19.2 million (B.C. Hydro, 1966, pp. 5 and 27). "It is believed," declared Hydro's 1965 Annual Report, "that no other Canadian utility (and possibly no utility in North America) has ever reduced rates to such an extent in so short a time" (p. 6). As shown in Table 3.15 of
Chapter 3, the impact of these policies was to lower residential real electricity prices by 24 percent between 1962 and 1970, from 25 to 19 mills ($1971).

These price reductions were accompanied by a sustained promotional campaign aimed at the residential power consumer. In the words of B.C. Hydro’s 1970 Annual Report:

Increased use of electric appliances with good load characteristics ultimately benefits electric consumers by reducing the cost per kilowatt-hour of producing energy. B.C. Hydro, in cooperation with other Canadian utilities and manufactures, participates in the promotion of electric appliances. . .During the year, electric water heaters were actively promoted, and a financing plan was made available. . .The benefits of automatic laundry dryers, automatic dishwashers, frost-free refrigerators and air conditioners were also brought to the attention of the homemaker through promotional programs (B.C. Hydro, 1970, p. 8).

Part of the rationale for this program was based on the technical assumption that falling marginal costs were being brought about by large-scale hydro development. Hence, the need to build loads which would achieve future economies of scale. When asked in 1965 if the intense promotion of residential loads was not premature, given that Peace power had yet to come onstream, Hydro’s chairman, Gordon Shrum, replied that:

This is a long-term proposition and the amount of power here is quite small. . .Besides, when the Peace comes on, we want to sell that extra power. We have to get the idea over while people have houses in the planning stage (Province, Aug. 20, 1965, p. 18).

But much of the impetus for such early and dramatic residential rate reductions was political. The nationalization of one of the province’s largest corporations by a government ideologically committed to private ownership involved heavy political risks. Nationalization was accompanied
by a storm of public criticism, much of it from interests which had previously been favourably disposed to the Social Credit government, and there was a clear need to demonstrate the benefits of public power.

6.8 "Power at Cost" I: The Use of the Crown Corporation

Whereas the thrust of the provincial government's power policy during the 1950s had centred around the promotion of large-scale power development, the concern of the 1960s was with making sure that this power would be available at the lowest possible rates. With the sale of the Columbia's downstream benefits to the United States for a fixed sum, the commitment to the promotion of resource development via the provision of low-cost electricity, and the dramatic lowering of politically visible residential rates, the policy preoccupation with power costs became central.

This goal had two elements. The first was the achievement of lower costs by utilizing the special attributes of the Crown corporation as the key supplier. The second was the development of policies which would minimize the costs borne by the Crown corporation and hence by the power consumer.

The shift from a regulated private to a virtual public power monopoly in British Columbia had a striking impact on the organization and finances of the industry. As was the case with the creation of the B.C. Power Commission, the use of the Crown corporation allowed significant reductions in power rates. This time, however, the impacts were felt on a province-wide rather than a regional level.

First, the provincial takeover of the BCE meant that under the British North America Act, its income was exempt from federal tax. This change automatically allowed a redistribution of power revenue from the federal treasury to B.C. Hydro (and hence to power consumers), but its
immediate impact was limited. The accelerated depreciation provisions incorporated into the *Income Tax Act* during the 1950s meant that the BCE's actual tax payments had been rather low, averaging under $3 million a year between 1957 and 1960 (BCE, B.C. Power Corp., 1958 and 1960). Over the longer term, however, nationalization meant that the $44.5 million in deferred taxes accumulated during the 1950s would not have to be paid by B.C. Hydro over the succeeding decade.

The most fundamental difference between private and public power, however, was that the latter allowed capital to be employed in power generation and distribution at a significantly lower rate of return. This was made possible by the provincial government's guarantee of the public utility's debt, which had two effects on the cost of capital.

First, the greater security offered bondholders by the additional fiscal resources of the state lowered the risk and hence the cost of the utility's long-term debt. Second, the government's guarantee allowed the publicly-owned utility to dispense with the higher-cost equity portion of its capitalization, regarded as essential by holders of a private utility's debt. This, in turn allowed the public utility to employ a much higher debt/equity ratio, so that the cost of capital could now approach the effective interest rate on long-term debt.

The financial results of the shift from private to public power in British Columbia are shown in Figure 6.2. The overall pre-tax rate of return on capital employed of between 6 and 7 percent earned by the BCE between 1955 and 1960 plunged sharply to under 5 percent during the 1966-70 period under public ownership. Whereas the significant proportion of equity in the BCE's overall capitalization resulted in a return which was around 1-2 percentage points higher than its debt interest charges, B.C. Hydro's return had fallen to over one percentage point below its debt
FIGURE 6.2
RETURNS TO CAPITAL EMPLOYED VS.
EFFECTIVE INTEREST RATES

interest rate by the late 1960s. This was made possible by the practice of capitalizing the interest charges on the heavy capital expenditures being undertaken on the Peace and Columbia projects.

In Table 6.1, an estimate of the approximate impact of the above changes on the distribution of hydro revenue and on resulting power rates is presented. Column A shows the difference between the actual return (net income plus debt service charges) on capital earned by B.C. Hydro, and the amount that would likely have been earned under continued private ownership. This difference rose rapidly from $2 million in 1963 to over $36 million in 1970 as B.C. Hydro's overall rate of return fell. Column B, which presents these estimates in constant 1971 dollars, shows that the total revenue transferred to consumers through this lower return to be $218 million between 1963 and 1973, or $25.5 million per year.

Columns C and D of Table 6.1 show the impact of the lower return earned by B.C. Hydro on the average price per kilowatt hour of power sold. Between 1962/3 and 1969/70, this price fell from just over 20 mills (in constant 1971 dollars) to just over 12 mills. About 30 percent of this decline was due not to economies of scale or greater productive efficiencies but to the declining rate of return earned on the capital employed in power production. By the late 1960s, power rates were almost 20 percent lower than they would have been if power development had been undertaken by private capital.

The utilization of the Crown corporation as the principal instrument of power policy also allowed the use of cross-subsidization between different classes of user. We have already seen that cross-subsidization had been viewed by the Committee on Rural Electrification in the 1940s as an essential element of the extension of improved service beyond the larger
### TABLE 6.1

**IMPACT OF REDUCED RETURN TO CAPITAL EMPLOYED**

**BY B.C. HYDRO, 1963-73**

<table>
<thead>
<tr>
<th>Year Ending</th>
<th>Difference Between Actual Return and That Required for a 6.8% Return on Capital, $'000*</th>
<th>Difference in 1971 Constant Dollars</th>
<th>Actual Revenue Per Kwh. 1971 Mills</th>
<th>Revenue Required for 6.8% Return 1971 Mills</th>
<th>C/D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1963</td>
<td>2,068</td>
<td>2,765</td>
<td>20.3</td>
<td>20.7</td>
<td>.98</td>
</tr>
<tr>
<td>1964</td>
<td>14,422</td>
<td>18,828</td>
<td>18.9</td>
<td>21.5</td>
<td>.88</td>
</tr>
<tr>
<td>1965</td>
<td>10,072</td>
<td>12,733</td>
<td>17.3</td>
<td>19.0</td>
<td>.91</td>
</tr>
<tr>
<td>1966</td>
<td>17,818</td>
<td>21,157</td>
<td>14.9</td>
<td>17.2</td>
<td>.87</td>
</tr>
<tr>
<td>1967</td>
<td>29,252</td>
<td>34,053</td>
<td>13.7</td>
<td>16.8</td>
<td>.82</td>
</tr>
<tr>
<td>1968</td>
<td>34,955</td>
<td>39,408</td>
<td>14.0</td>
<td>17.2</td>
<td>.81</td>
</tr>
<tr>
<td>1969</td>
<td>36,602</td>
<td>39,527</td>
<td>13.2</td>
<td>16.1</td>
<td>.82</td>
</tr>
<tr>
<td>1970</td>
<td>36,676</td>
<td>37,849</td>
<td>12.3</td>
<td>14.7</td>
<td>.83</td>
</tr>
<tr>
<td>1971</td>
<td>26,713</td>
<td>26,713</td>
<td>13.0</td>
<td>14.6</td>
<td>.89</td>
</tr>
<tr>
<td>1972</td>
<td>28,576</td>
<td>27,215</td>
<td>12.6</td>
<td>14.1</td>
<td>.89</td>
</tr>
<tr>
<td>1973</td>
<td>23,274</td>
<td>20,882</td>
<td>10.8</td>
<td>11.8</td>
<td>.92</td>
</tr>
</tbody>
</table>

---

**SOURCE:** B.C. Hydro, *Annual Report*, Various Years

**NOTES:**

*Return is net income plus debt interest. The 6.8% figure represents the average return earned by the BCE between 1955 and 1960, and is used as an approximate measure of the return which would have been earned by a private utility from 1963-73. An analysis of Statistics Canada data for the 1963-73 period yields an average rate of return of just under 8% for Canadian private utilities. Since the BCE's rate of return just prior to nationalization was lower than this Canadian average, we have adopted the 6.8% figure as a more conservative assumption.

**Assumes electrical assets represent an average of 90% of total B.C. Hydro assets.
population centres. In fact, this perceived need to cross-subsidize was one of the key reasons for the limited adoption of public enterprise in 1945.

The emergence of the public corporation as the dominant power supplier in 1962 removed one of the principal barriers to the further lowering of power rates to favoured groups of users. As indicated in our previous discussion of power rates, the groups favoured by political decision makers were the residential and large industrial users, and the large urban system of the BCE provided a much larger base of commercial users against which the costs of such policies could be assessed.

Table 6.2 shows the pattern of cross subsidies in terms of B.C. Hydro's own cost accounting between 1967 and 1973. Over this entire period, the general rate classes, consisting of commercial and small industrial customers, contributed an average annual excess of $16.5 million (1971 dollars) over their cost of service. The largest portion of this excess, $12.6 million, or 76 percent was used to subsidize residential consumers, and $2.7 million per year or 17 percent was applied to the reduction of bulk rates.

However, as we shall see, this average cost accounting significantly understates the benefits enjoyed by large industrial users. In B.C. Hydro's hydro-based generating system, it was the bulk class's high energy (rather than capacity) demands which were responsible for much of the new requirements for generating plant, yet bulk users were charged significantly less than the marginal cost of these projects.
## TABLE 6.2

**PATTERN OF CROSS SUBSIDIZATION AMONG B.C. HYDRO DOMESTIC SALES CLASSES**

($1971$)

<table>
<thead>
<tr>
<th>Year Ending</th>
<th>Bulk</th>
<th>Residential</th>
<th>Irrigation</th>
<th>General</th>
</tr>
</thead>
<tbody>
<tr>
<td>1967</td>
<td>(603)</td>
<td>(14,887)</td>
<td>(460)</td>
<td>16,362</td>
</tr>
<tr>
<td>1968</td>
<td>(1,414)</td>
<td>(13,366)</td>
<td>(1,064)</td>
<td>16,314</td>
</tr>
<tr>
<td>1969</td>
<td>(2,106)</td>
<td>(14,123)</td>
<td>(922)</td>
<td>17,230</td>
</tr>
<tr>
<td>1970</td>
<td>(2,382)</td>
<td>(13,137)</td>
<td>(922)</td>
<td>16,544</td>
</tr>
<tr>
<td>1971</td>
<td>(4,979)</td>
<td>(9,782)</td>
<td>(152)</td>
<td>16,500</td>
</tr>
<tr>
<td>1972</td>
<td>(4,899)</td>
<td>(10,038)</td>
<td>(632)</td>
<td>15,751</td>
</tr>
<tr>
<td>1973</td>
<td>(2,877)</td>
<td>(12,887)</td>
<td>(727)</td>
<td>16,493</td>
</tr>
</tbody>
</table>

**TOTAL**     | (19,259)| (88,220)    | (4,887)    | 115,204 |

**AVERAGE**   | (2,751) | (12,602)    | (698)      | 16,478  |

**SOURCE:**  B.C. Hydro, Cost of Service Records; Statistics Canada, GNE Price Deflator.

**NOTE:** This analysis assumes that each domestic sector would have exhibited the same ratio of earnings to revenue as B.C. Hydro's domestic electrical operations as a whole. The amount of the excess or shortfall for a year is an approximation of the cross-subsidy. Export sales are not included.
6.9 Power at Cost II: Public Policy and the Financing of Hydro Construction

The problem of achieving the lowest possible level of power rates involved more than simply utilizing the attributes of the Crown corporation. Whereas factors associated with the shift from private to public power had been largely responsible for the rate declines of the early 1960s, further reductions could only be achieved through minimizing the costs of the new capacity being constructed on the Peace and Columbia.

The capital costs of these projects and the interest charges on them were not rolled into overall system costs until completion, so that the fulfillment of the political promises of the early 1960s in the early 1970s would depend on whether the economies of scale associated with the new program of hydro development could be realized.

As is well known, the late 1960s and early '70s were marked by significant acceleration in the overall rate of inflation from around 2 1/2 percent in the first half of the 1960s, to over 4 percent in the latter 1960s, to over 7 percent in the early 1970s. Moreover, as shown in Table 6.3, the hydro-electric construction cost index rose at a significantly faster pace. Hence, in 1971, the overall price level was 38 percent higher than that of 1961, but the cost of hydro construction was 55 percent higher.

A number of elements made up these rising hydro construction costs including materials, labour, construction management practices, interest rates, taxation, and environmental/social mitigation. The costs of materials and labour were difficult to control, either by Hydro or by the provincial government. However, the launching of an unprecedented program of hydro construction at the time of rapid industrial growth in the provincial economy as a whole could not help but aggravate overall
inflationary pressures for these two inputs. For both the Columbia and the Peace, deadline pressures made the negotiation of no-strike agreements essential, and these involved the granting of "...pay increases and fringe benefits that would be equivalent to those gained by the unions in their conventional bargaining with other employers" (Keenleyside, 1982, p. 521). In 1966, rising labour costs on the Peace and Columbia led the Premier to consider the possibility of a legislated ban on over-time for the projects, though the idea was never implemented (Province, Nov. 30, 1966, p. 15).

---

**TABLE 6.3**

**HYDRO CONSTRUCTION COST INCREASES VS THE GENERAL INFLATION RATE 1961-1980**

<table>
<thead>
<tr>
<th>PERIOD</th>
<th>PERCENTAGE ANNUAL INCREASE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GNE Price Index</td>
</tr>
<tr>
<td>1961-66</td>
<td>2.65</td>
</tr>
<tr>
<td>1963-68</td>
<td>3.44</td>
</tr>
<tr>
<td>1965-70</td>
<td>4.22</td>
</tr>
<tr>
<td>1967-72</td>
<td>4.03</td>
</tr>
<tr>
<td>1969-74</td>
<td>7.29</td>
</tr>
<tr>
<td>1971-76</td>
<td>9.87</td>
</tr>
<tr>
<td>1973-78</td>
<td>9.78</td>
</tr>
<tr>
<td>1975-80</td>
<td>8.87</td>
</tr>
</tbody>
</table>

The unprecedented scale of B.C.'s hydro expansion program, which would involve a more than two-fold increase in the fixed assets of B.C. Hydro from $922 to $2662 million during the decade 1962 to 1972, made both the availability and cost of capital a key policy issue. While the advance sale of the Columbia's downstream benefits produced a large, lump sum payment of some $274 million, an additional $118 million was required to complete the BCE takeover and another $600 million for the Peace River project. All this was in addition to the normal requirements for electricity and gas distribution (B.C. Hydro, 1962-1972).

While, as we have seen, the shift from private to public ownership allowed the cost of capital to the utility to be lowered significantly, the provincial government was determined to lower it further by employing a range of additional policy measures. One of the earliest devices used by the Social Credit government was the Parity Development Bond. This financial instrument, promoted in the investment community by both Premier Bennett and the Hydro co-chairmen, was similar to the Canada Savings Bond at the federal level. Parity Development Bonds were sold in maximum lots of $10,000 to small investors, were guaranteed by the provincial government, and could be redeemed at any time. Hence, they could be marketed at interest rates significantly below those of fixed term bonds traditionally issued by the province.

Between 1963 and 1965, four series of these bonds, totalling $202 million, were issued at an interest rate of 5 percent, accounting for just over half of the $356 million in long-term debt issued for hydro development purposes during this period (B.C. Hydro, 1963-1965). Subsequently, these instruments were rolled over, with interest rates being roughly 1/2 percent lower than Hydro's overall average cost of capital.
In 1965, another major source of funds replaced Parity Bonds as a means of hydro project financing. The newly enacted Canada Pension Plan provided that all the compulsory pension contributions collected within a province be made available to provincial governments at rates well below those prevailing in capital markets. Virtually all of British Columbia's Canada Pension Plan allotment was used by B.C. Hydro, and between 1966 and 1971, the fund provided $408.3 million, or 42 percent of the utility's total long term debt incurred during the period (B.C. Hydro, 1966-71).

The growth of provincial government employment and the improvement of pension coverage also made significant funds available to B.C. Hydro at attractive interest rates. After 1962, virtually all of the contributions to such plans as the Teachers' Pension Fund, the Municipal Superannuation Fund, and the Civil Service Superannuation Fund were allocated to the Crown corporation (Vancouver Sun, Feb. 7, 1967, p. 1; Jan. 23, 1970, p. 11), and by 1971, $301 million of the total $506 million held by these funds were Hydro bonds (Vancouver Sun, Jan. 27, 1971, p. 20).

These special funds were increased still further by the Social Credit government's practice of underestimating revenue. According to Liberal opposition critic Pat McGeer:

The revenues in any budget year were estimated to be equal to the revenues of the year previous. Expenditures were held to that low level. Therefore, the growth each year usually found its way, directly or indirectly, into the hands of B.C. Hydro or the Pacific Great Eastern Railway . . . (McGeer, 1972, p. 55).

This heavy reliance by B.C. Hydro on internal provincial funds created a heated political controversy in the late 1960s. Both opposition politicians and editorialists repeatedly denounced the favourable access to such funds accorded to Hydro relative to the province's other capital requirements. "What," asked a Vancouver Sun editorial of 1967, "will be
left on the open market for such vital needs as education, hospitals or municipal financing" (Feb. 2, 1967, p. 4). A year later, the paper's editorialists answered this rhetorical question by asserting that "Hydro's insatiable demands for money have...been felt on social services. Part of the price for the two rivers policy is the starving of schools and hospitals" (Vancouver Sun, Feb. 20, 1968, p. 4; See also Aug. 3, 1968, p. 4).

Opposition MLAs provided a number of examples of such discrimination in favour of Hydro. In late 1968, for example, Liberal Pat McGeer compared the 5.84 percent interest rate on a $96.6 million Hydro bond issue with the 7.86 percent which the Municipality of North Vancouver was forced to pay for money on the open market, and the following year the president of the Union of B.C. Municipalities pointed to the difficulties of selling municipal bonds at market yields of 8.75 to 9 percent (Vancouver Sun, Dec. 7, 1968, p. 2; and June 2, 1969, p. 12). "How," asked the Province's editorialists, "can this situation occur when the economy is at its peak and governments at all levels are setting new spending records" (Province, Feb. 1, 1967, p. 4)?

Outside borrowing on the open market was thereby limited, and it was only during the peak construction years of 1967 and 1968 that major public bond issues were required. In those years, the Premier personally traveled to New York to float $150 million in long-term bonds for Hydro, and despite the opposition of the conservative Barron's financial newspaper, the effort proved successful. However, it was not until 1974 that B.C. Hydro was once again forced to resort to open market borrowings.

In Table 6.4, an approximation of the benefits enjoyed by B.C. Hydro through its access to special funds is presented. Using the difference between Hydro's cost of capital and the average yield on provincial
government bonds as a rough measure of this benefit, the savings to Hydro between 1965 and 1972 totalled $32 million (\$1971 constant). This amount represented about 13 percent of the total savings on the cost of its capital requirements for this period (presented in Table 6.1). In other words, of the total difference of \$238 million (\$1971 constant) between Hydro's actual cost of capital and the cost which would have been paid under private ownership, 87 percent was due to the impact of the government's guarantee, and 13 percent to the Crown utility's access to special funds.

TABLE 6.4
APPROXIMATE EFFECT OF UTILIZING GOVERNMENT FUNDS ON B.C. HYDRO'S COST OF CAPITAL 1965-1972

<table>
<thead>
<tr>
<th>Year Ending</th>
<th>Average Interest Rate on B.C. Hydro Issues</th>
<th>Average Yield on Provincial Government Bonds</th>
<th>Rate Difference for Year</th>
<th>Saving to B.C. Hydro $'000</th>
<th>Current</th>
<th>$1971</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>5.3</td>
<td>5.5</td>
<td>.2</td>
<td>80</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td>1966</td>
<td>5.5</td>
<td>5.7</td>
<td>.2</td>
<td>168</td>
<td>203</td>
<td></td>
</tr>
<tr>
<td>1967</td>
<td>5.8</td>
<td>6.3</td>
<td>.5</td>
<td>1,585</td>
<td>1,845</td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td>6.2</td>
<td>6.9</td>
<td>.7</td>
<td>3,234</td>
<td>3,646</td>
<td></td>
</tr>
<tr>
<td>1969</td>
<td>7.0</td>
<td>7.7</td>
<td>.7</td>
<td>4,154</td>
<td>4,486</td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>7.7</td>
<td>8.6</td>
<td>.9</td>
<td>5,589</td>
<td>5,768</td>
<td></td>
</tr>
<tr>
<td>1971</td>
<td>7.6</td>
<td>8.7</td>
<td>1.1</td>
<td>7,446</td>
<td>7,446</td>
<td></td>
</tr>
<tr>
<td>1972</td>
<td>7.1</td>
<td>8.0</td>
<td>.9</td>
<td>8,942</td>
<td>8,516</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>32,011</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Another element of Hydro costs was taxation. Nationalization, as we have seen, meant that the new Crown corporation would be exempt from income tax. However, the accelerated depreciation provisions of the Income Tax Act meant that the BCE's actual tax payments were rather low, averaging under $3 million a year between 1957 and 1960 (BCE, 1957-1960). Under public ownership, we have seen that the amalgamated company was assessed for water license fees and school taxes, but paid grants in lieu of municipal assessments. While there was some grumbling from municipalities over the fairness of a complex grant formula developed by the government in 1965 (Vancouver Sun, April 28, 1965, p. 2; Province, May 4, 1965, p. 4), the aggregate of all the above taxes did rise from an average of around 5 percent of total revenue for B.C. Hydro's two predecessor companies in the late 1950s to around 6.5 percent for Hydro in the 1960s (B.C. Power Commission, 1955-60; B.C. Power Corp., 1955-60; B.C. Hydro, 1963-70).

Nevertheless, in 1968, a major step was taken to lower the taxation costs associated with the Peace and Columbia developments. The Hydro and Power Authority Act was changed to allow the Cabinet to exempt specific Hydro properties from school taxation, and shortly thereafter, an Order in Council made such an exemption for all land and improvements related to the Peace and Columbia (B.C., 1968, Ch. 53, s. 2; B.C. Regulation 93/68, April 10, 1968; Province, April 5, 1968, p. 30). This sudden move appears to have taken both Hydro and the affected communities by surprise since written agreements had been concluded setting out assessments for the school districts adjacent to the Columbia River projects. The chairman of the Creston-Kaslo school district insisted that:

We were promised the assessment and we thought it was all arranged. We have a letter from Provincial Secretary Wesley Black stating the
Similarly, the Castlegar school board had held a series of meetings with B.C. Hydro concerning the increased burden placed on the local school system by dam construction, and a $26 million property tax assessment realizing $585,000 annually had been the key element of the solution reached. Commented a school district spokesman, "The board considers that under these circumstances they and the taxpayers...were misled and have consequently subsidized B.C. Hydro" (Vancouver Sun, April 11, 1968, p. 27).

The Premier, however, was quick to assure local residents that "The provincial government and British Columbia taxpayers as a whole will make up the difference. And this is as it should be because the dams benefit all the people in the province, not just people in the area" (Vancouver Sun, June 14, 1968, p. 17).

6.10 "Power at Cost" III: Public Policy and the Burden of Socio-Environmental Impacts

As we have observed at several points so far, hydro-electric power projects have a wide range of undesirable environmental and social impacts, and the extent to which they are taken into account in project planning has an impact on the rates eventually charged for electricity. In broader terms, society can pay for these external costs directly through higher energy prices or indirectly through taxation. Alternatively, the state can simply let those who are unlucky enough to reside in the vicinity of major power projects live with the impacts created.

We have also seen that, although the Peace and Columbia's impacts were extensive relative to previous hydro developments, environmental and social considerations had no significant role to play in the decision to develop
both rivers simultaneously. Consequently, minimal effort was devoted to
determining what these impacts would be.

The magnitude of the two rivers policy's physical impacts on the
environment is illustrated in Table 6.5. Whereas all the large scale hydro
developments (excluding Alcan's Kemano project) of the 1950s more than
doubled the land area flooded by hydro dams from 13.6 to 34.7 thousand
hectares, the initial Peace and Columbia development increased it almost
tenfold to 324 thousand hectares. As noted in Table 6.6, almost three
quarters of the total area affected by Peace and Columbia flooding had
either forestry or agricultural potential.

We have already seen that the Water License granted for the Peace
River development contained few mitigative measures. Clearing of the
reservoir was confined to an area within 12 miles of the dam site, and the
problem of debris severely limited subsequent recreational use. The most
severe problem, however, seems to have been completely unanticipated, and
occurred downstream in Alberta's Peace/Athabaska Delta region. As shown in
Figure 6.3, this 4,000 square kilometre area is located where the Peace and
Athabaska Rivers flow into Lake Athabaska, and represents one of the
largest freshwater deltas in the world.

In December, 1967, the filling of the reservoir behind the
W.A.C. Bennett dam commenced. Shortly thereafter, responding to pressures
to make power available from the project as soon as possible, B.C. Hydro
applied for a modification of its Water License, lowering the minimum
discharge at the dam site from 10,000 to 1,000 cubic feet per second

This application was granted, and in early 1969, a federal government
study identified serious disruption in the water flow regime of the Delta
(Canada, Energy Mines and Resources, 1969). Although the report
recommended that "...flows from the reservoir during 1969 and later should not be as restricted as in 1968" (p. 9), the problem became worse. By 1970, more than 50,000 hectares of the delta had been exposed by lack of seasonal flooding. The livelihood of 1,300 native people dependent on the Delta's ecosystem was threatened and the Alberta provincial government was eventually forced to rectify the problem by undertaking studies and corrective measures costing some $3 million (Sniatynski, 1979, p. 28; Townsend, 1975, pp. 171-76; Alberta, Environment and Conservation Authority, 1974).

FIGURE 6.3

SOURCE: Sniatynski, 1979, p. 28.
In the case of the three Columbia developments, the areas impacted by the three treaty storage dams had long contained significant populations. This fact meant that the environmental problems created by flooding were more keenly felt, and that a wide range of social concerns had to be addressed. As we have seen, the provincial government’s approach toward the obvious social and environmental implications of Columbia development was rather opportunistic, with these impacts being stressed or downplayed at various points to enhance the provincial bargaining position vis a vis Ottawa. The result was that, when development finally occurred, its impacts had to be faced with very little pre-planning, and that the population affected had become suspicious of the government’s good faith.

<table>
<thead>
<tr>
<th>PERIOD</th>
<th>HECTARES</th>
<th>PERCENT OF TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Flooded Surface Area</td>
<td>Cumulative Flooded Area</td>
</tr>
<tr>
<td>Pre-1945</td>
<td>13,618</td>
<td>13,618</td>
</tr>
<tr>
<td>1945-1960</td>
<td>21,094</td>
<td>34,712</td>
</tr>
<tr>
<td>1960-1975</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Columbia</td>
<td>111,134</td>
<td></td>
</tr>
<tr>
<td>Peace</td>
<td>178,200</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>289,334</td>
<td>324,046</td>
</tr>
<tr>
<td>1975-1980</td>
<td>12,009</td>
<td>336,055</td>
</tr>
</tbody>
</table>

Systematic studies of the environmental impacts of the Columbia development projects did not commence until 1964, when B.C. Hydro provided funding to the Provincial Fish and Wildlife Branch to undertake limited investigations of the three treaty projects. For the Arrow Dam, the Branch concluded that "Fish populations in the reservoir will suffer loss in growth rates through water level fluctuations and will decline in numbers through loss of spawning grounds," and that "...a moderate number of game animals, waterfowl, and fur bearers will be lost as a result of flooding of

TABLE 6.6

FORESTRY AND AGRICULTURAL LAND
FLOODED BY B.C. HYDRO'S PEACE AND COLUMBIA RESERVOIRS

<table>
<thead>
<tr>
<th>Reservoir</th>
<th>Hectares Flooded</th>
<th>Percent Suitable For Forestry or Agriculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peace River</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Williston Reservoir</td>
<td>178,200</td>
<td>82</td>
</tr>
<tr>
<td>Columbia River</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duncan</td>
<td>8,100</td>
<td>35</td>
</tr>
<tr>
<td>Arrow Lakes</td>
<td>53,279</td>
<td>51</td>
</tr>
<tr>
<td>Mica</td>
<td>42,525</td>
<td>67</td>
</tr>
<tr>
<td>7-Mile</td>
<td>364</td>
<td>25</td>
</tr>
<tr>
<td>Revelstoke</td>
<td>11,645</td>
<td>75</td>
</tr>
<tr>
<td>Total Columbia</td>
<td>123,143</td>
<td>59</td>
</tr>
<tr>
<td>Grand Total</td>
<td>301,343</td>
<td>73</td>
</tr>
</tbody>
</table>

SOURCE: Association of B.C. Professional Foresters, 1983, Table 1, p. 9.
habitat" (B.C., Fish and Wildlife Branch, 1965a, p. 30). However, the Branch noted, both the fishery and the wildlife resource of the region were lightly exploited.

Much the same conclusions were drawn regarding the impacts of the Duncan Lake dam, although the loss of valuable fish spawning grounds at the dam site was seen as more pronounced (B.C., Fish and Wildlife Branch, 1965b, p. 69). The much larger Mica reservoir, while located in the more remote and sparsely populated reaches of the Columbia watershed was found to involve more severe impacts on wildlife populations:

Most of the high quality habitat in the valley systems of the reservoir area will be flooded, removing a significant part of the big game population. . .In most reservoir areas, beaver and muskrat populations will be destroyed and otter and mink will probably be completely displaced. . .There is little chance of replacement of wetland habitat in the region and upland areas are not suitable for mammals and birds. Few land areas adjacent to the reservoir are likely to supply alternative big game winter ranges. . ." (B.C., Fish and Wildlife Branch, 1965c, p. 25).

All of these studies emphasized the cursory and incomplete nature of the investigations undertaken, with the Mica report noting that "The approximately 69,120 acres of forest habitat to be flooded could not be included in the Mica basin studies" (1965c, p. 27). Neither the forestry nor wildlife losses resulting from the Columbia project were subject to any systematic scrutiny by the government agencies responsible until the Mica reservoir study was undertaken almost a decade later.

Nevertheless, a small degree of environmental mitigation was undertaken by B.C. Hydro. To replace the spawning grounds destroyed by the Duncan Dam an artificial fish spawning channel was constructed at a cost of some $500,000, another $300,000 was spent on wildlife protection, and recreation facilities costing $137,000 were installed. All in all, these
measures represented about 3 percent of total project costs (based on figures provided to the B.C. Legislature by W.A.C. Bennett, *Vancouver Sun*, March 22, 1972).

In the case of the Arrow Lakes project, much of the controversy over environmental mitigation centered around the question of reservoir clearing standards. The original Water License issued for the project allowed B.C. Hydro five years to complete the clearing of the Arrow Lakes, and a number of Hydro's executives wished to stretch out clearing activity to save money. However, forestry experts pointed to the increased costs which such a proposal would generate, and after "...hesitations in Victoria and battles in the Hydro building" complete clearing was undertaken prior to flooding (Wilson, 1974, p. 99). This clearing, which represented the only significant environmental mitigation measure undertaken on the Arrow Lakes cost just over $13 million, just under 8 percent of direct project costs.

For Mica, clearing also represented the only environmental mitigation of any significance, but it was less comprehensive. Eventually, clearing and debris removal for the large reservoir totalled $11.3 million, 100 percent over initial estimates. However, in terms of their relationship to total direct project costs, Mica's clearing expenditures were only half of those for the Arrow Lakes, just over 4 percent for the former compared to around 8 percent for the latter (B.C., Legislative Committee on Crown Corporations, p. 59).*

The clearing program for Mica involved the removal of trees along a strip of land between the high and low water marks of the proposed

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*Mica's total costs (before capitalized interest and corporate overhead) of $257.7 million are exclusive of the costs of installing generators (an additional $317 m). This represents a fair comparison with Arrow since the latter did not contain any generating facilities.
reservoir, and despite its limited scope, the size of the area made this effort "...the most ambitious yet attempted for a reservoir in British Columbia" (B.C., ELUCS, 1974). Yet, unlike either the Arrow Lakes or the vast area behind the Peace River Dam, B.C. Hydro refused to pay contractors for removing waste debris, the plan being to have it removed gradually by the forest service over a number of years. Hence, much of the eventual cost of complete clearing was externalized onto the Forest Service, but since this agency "...had been hampered by having no funds budgeted for debris collection..." (B.C., ELUCS, 1974), these costs were ultimately borne by the population of the region. The reservoir could not be safely used for either recreational boating or log transport until debris was removed, and although such removal continued through the 1970s, the problem remains to the present day.

The lack of mitigative measures undertaken at Mica undoubtedly resulted from their high cost and the relatively sparse population in the immediately affected area. Nevertheless, a subsequent study sponsored by the province's Environment and Land Use Committee Secretariat in 1974 clearly showed that the costs of hydro development borne by the residents of the upper Columbia were significant.

The area affected by Mica development depended primarily on forestry to support the populations of two major communities, Valemount and Golden. The region also possessed major wildlife and scenic qualities, being located between the Rocky and Selkirk mountains in an area adjacent to some of Canada's most magnificent national parks. In fact, in 1941, the entire Mica reservoir area had been designated a Class A provincial park (Hamber), but relatively low use and pressure from forestry interests had led to its downgrading and eventual elimination in 1961 (B.C. ELUCS, 1974, pp. 6.62-6.63).
Even prior to the flooding of the Mica reservoir, the pressures on the resource base of the upper Columbia had become evident, particularly in the extensive commitment of most of the forested land base to industrial use, a significant excess of sawmilling capacity relative to the forestry resource, and the reliance by the industry on sites of dubious regenerative potential for 20 to 30 percent of the annual allowable cut. Mica flooding exacerbated these problems in a number of ways. Most immediately, flooding eliminated the prime forestry production sites on the valley bottom, leading to a loss of about 5 percent of the gross value of production in the region's two large public sustained yield units (B.C. ELUCS, 1973, Table 6.1).

Access to the resource that remained was also blocked by the flooding of much of the access road network and by the impediments posed by debris to the use of the reservoir for log transportation. Much of the flooded road access was not compensated by Hydro. Instead, the normal provincial system of providing new forest access was followed, with forestry operators providing their own access and being reimbursed by deductions from stumpage payments due to the provincial government. Hence, the ultimate burden of road replacement fell on general provincial revenues.

As partially foreseen by the 1965 Fish and Wildlife Branch study, the impact of the Mica project proved to be severe. Wildlife losses in the diverse and relatively undisturbed habitat area of the upper Columbia amounted to over 50 percent for big game species such as moose and black bear (B.C., ELUCS, 1973, Vol. 2, Table 5, pp. A4 - A20.) While the recreational use of the reservoir area was limited largely to local residents prior to flooding, the ELUCS study team regarded the tourist potential foregone by hydro development as significant.
Over the longer term, the large scale flooding of the most economically valuable land on the upper Columbia intensified the level of conflict over the region's remaining resources. The loss of favourable valley bottom land by a forest industry already suffering from excess processing capacity increased the pressures exerted by logging on less desirable and more ecologically sensitive sites. Similarly, the loss of so much wildlife habitat made the remaining flat lands in the vicinity of Valemount and Golden much more important for the survival of many species. Unfortunately, these remaining lands were also the most suitable for sustained yield forestry, agriculture, and the expansion of human settlement.

The most immediate social impact of Columbia development was the displacement of 2,000 people through the flooding of 1,300 properties along the Arrow Lakes, creating the need to relocate a number of communities and transportation links. Despite the unprecedented scale of this relocation, the issues of expropriation were resolved, not by any overall policy elaborated at the governmental level, but by B.C. Hydro employing conventional property assessment methods. Property owners were offered compensation based on the fair market value of their holdings, but, as Wilson (1973) has documented, this approach created a host of problems.

The extensive erosion of the land base of the Arrow Lakes lowered property values throughout the valley, forcing assessors to resort to comparisons with other, more or less similar regions. In addition, the high degree of self-sufficiency and mutual co-operation prevalent among many of the area’s residents meant that conventional property valuation often fell well short of compensating residents for their true losses. The resulting "...lack of any announced yardstick in figuring property values..." the "...scores of inconsistencies in settlements..." and
the refusal of B.C. Hydro "...to disclose the basis on which they made offers" all led to considerable dissatisfaction among those displaced (Hazlitt, 1966, in Wilson, 1973, pp. 51-52).

In refuting the widespread perception that the problem was essentially one of an arrogant and unaccountable Crown corporation, Wilson (1973) stresses the limitations faced by B.C. Hydro in resolving the range of concerns raised by Arrow Lake flooding. In addressing the specific issues associated with compensation and relocation, the remoteness of Hydro's central organization from the site of the Columbia project, the difficulties in finding trained staff, and a lack of internal communication resulting from "...the Power Commission-B.C. Electric schism..." all limited the effectiveness of Hydro's programs (Wilson, 1974, pp. 41, 120, 121).

More fundamentally, however:

...little effective preparation seems to have been made in the early planning process for broader ameliorative action. When such possibilities did emerge in due course it was realized that Hydro had neither legal mandate nor assigned funds to implement them directly...Nor could Hydro, a semi-independent agency outside the departmental structure of the British Columbia government, overlook the fact that most of the extra-curricular actions it might wish to undertake (the building of access highways or the development of lakeside parks, for example) would fall within the jurisdiction of one or other of the established provincial departments. In short, the Authority was by no means a free agent in relation to the broader challenges of the Columbia River project (Wilson, 1973, p. 26).

Shortly after the start of construction on the High Arrow Dam, Hugh Keenleyside persuaded the Premier to establish a Columbia Minister's Committee composed of the Ministers of Highways, Lands and Forests, Municipal Affairs, Agriculture, and Recreation and Conservation, chaired by the Hydro chairman. A comprehensive regional development program was
approved and a special five-year capital budget of $20 million tentatively allocated to it. This program included new highway and bridge construction to link together areas remaining above the floodline, recreational developments to increase the region's tourist potential, and three new planned communities to replace those lost by flooding.

These plans were widely publicized in a brochure prepared by Hydro entitled, *The New Outlook for the Arrow Lakes*, which was mailed to all residents in the affected area in mid-1965 (Wilson, pp. 56-65). However, the following year, both the Committee and its program were scrapped by the provincial government, despite the fact that "...Hydro had in good faith announced the agreed plans for parks, highways, and the bridge, none of which materialized." (Wilson, 1973, p. 68).

This unsympathetic attitude by the provincial government left Hydro itself with the bulk of the planning and financial responsibility for the level of social mitigation and compensation that remained. Expenditures on land acquisition for the Arrow storage project jumped 90 percent over initial estimates from $10.4 to $19.7 million, while road relocation jumped 36 percent from $15.1 to $20.7 million. Although items related to project mitigation and compensation represented under a third of the initial Arrow cost estimate, these expenditures accounted for about half of the project's total cost overrun of $36 million (B.C., Legislative Committee on Crown Corporations, 1979, p. 37).

This situation led Hydro to urge the Provincial government to honour its earlier commitment and assume a share of these expenditures, and an internal committee was formed to separate out costs which the utility felt related to broader regional development objectives. When these activities were uncovered by the NDP government in 1973, they led to charges that B.C. Hydro had secretly contrived to externalize significant costs associated
with Columbia development. Keenleyside (1982), in his memoirs, vehemently rejects the negative connotations placed on this activity, but does not really deny that it took place. In any case, the provincial government was not persuaded to assume the costs that it had renounced in 1966.

The main instance of Columbia costs being externalized by the provincial government occurred in the flooding of the Libby Reservoir. This large storage reservoir associated with the U.S. Libby Dam was, as we have seen, included in the Columbia River Treaty, and B.C. assumed responsibility for land acquisition and clearing on its side of the border. In 1969, a special statute was passed by the legislature allowing Cabinet to designate the Crown agency responsible for land acquisition in the forty-mile long Libby reservoir area, and a subsequent regulation named the Department of Highways as the responsible agency (B.C., 1968, Chapter 24; B.C., Regulation 173/68). This action ensured that Libby's costs would be paid out of general revenue rather than by power consumers.

6.11 Power Planning in the Public Sector I: The Problem Defined

While the power costs achieved by the two-rivers policy depended on government and utility decisions regarding the various aspects of project construction discussed above, those which would prevail in the more distant future depended on the longer term planning of new power supply. This planning activity involved both the accurate estimate of future demand growth and the provision of facilities to meet this growth at the lowest possible cost.

Both elements are particularly important in a hydro system, in which costs are largely fixed and supply has to be developed in relatively large increments. The most attractive large-scale power source may end up being
much more costly than projected if sufficient demand for its output does not materialize within the time period projected.

In order to ensure that power costs are actually minimized over the longer term, planning on the demand side must address itself to a number of issues. The first is the geographical scope of the market which is to be served. Is it to be purely domestic, or is electric power to be viewed as a potential staple export in its own right? The federal government's ban on long term firm power exports meant that the private power planners of the 1950s did not really have to face the issue, but by the mid-1960s, the future role of power exports had become an open question.

Second, who would bear the inevitable risks associated with forecasting future demand levels? Would they be allocated to particular export or domestic consumers through contractual arrangements negotiated in advance, or would the utility itself assume these risks; thereby passing them on to all customers through the costs of excess capacity? By the 1960s, nationalization and the decision to proceed with large-scale power development had led B.C. Hydro to assume most of these risks.

A third issue involved the degree of effort devoted to power forecasting and to taking account of the range of factors affecting future levels of electricity demand. The assumption of much of the risk of overbuilding by the Crown utility, B.C. Hydro, had given this problem added importance by the mid-1960s.

On the supply side, the planning process adopted to guide the activities of an electric utility will determine whether a given level of demand is supplied at the lowest possible cost. Apart from the purely technical aspects of comparing the costs of alternative sources of supply, a number of issues are involved. The first is the range of supply alternatives considered by the planning agency. The integration of the
electric power system which had occurred by the early 1960s, as well as its rapid growth during the post-war period, had increased the range of large-scale alternatives available and made many smaller-scale ones seem less attractive.

The second supply-side issue involves the range of costs considered by the planning agency in determining the most attractive new addition to electricity supply. Now that power planning had been brought firmly within the public domain, the opportunity existed to go beyond the traditional criterion of minimizing the utility's direct costs. The experience of the 1950s and early 1960s had clearly shown the importance of both social and environmental costs generated by power development in a province with a limited habitable land base. It had also illustrated that such costs could be effectively taken into account only if foreseen.

Underlying all these power planning issues was the question of where they would be resolved within the overall governmental structure. In response to the fragmented state of the power industry during the 1950s, the provincial government had created the British Columbia Energy Board as a central planning agency. Shortly thereafter, the Premier, his Cabinet, and a small number of advisors had taken over the resolution of all the issues just outlined to achieve the simultaneous development of the Peace and the Columbia. However, the government had also created a large, integrated power utility which would be in a position to play a dominant planning role.

6.12 Power Planning in the Public Sector II: The Question of Exports

As we have seen, the export of power to the United States was a key element of the W.A.C. Bennett's two rivers development policy. In fact, British Columbia's insistence on the simultaneous development of both the
Peace and Columbia led the federal government to reverse its long standing ban on firm power exports and to remove its power export tax.

However, while the export question was central to the emergence of power planning as a political rather than a purely technical process, exports never really formed the primary focus of hydro-development policy. Rather, they represented a means by which large scale development could proceed in the face of limited domestic demand, a form of insurance against future domestic forecasting errors, and a means by which domestic power costs could be lowered through the economies of scale arising from joint storage facilities.*

The fact that hydro represented a staple product whose favourable cost position could generate significant economic rents to the province in future years was not readily appreciated. Rather, the dominant perception at the time was that the widespread adoption of nuclear power in the U.S. market would drive down power costs, thus making it more difficult to market electricity produced by hydro sources. The provincial government, by selling the Columbia's downstream benefits for a fixed, capitalized sum, insured itself against any decline in electricity prices brought about by such a decline in power costs. At the same time, it incurred all the risks of future construction cost escalation and precluded the possibility of collecting future rents. In fact, because of rising construction costs,

*As we have seen in the previous chapter, this last consideration formed a key rationale for the Columbia Treaty. The Mica storage dam was viewed as representing an inexpensive source of future domestic energy since part of its costs were financed by the Treaty.
the net present value of the Columbia's direct revenue stream during the 1964-73 period was negative by some $40 million ($1971).*

With a discrete block of B.C.'s energy and capacity allocated to the United States via the Columbia Treaty, B.C. Hydro's power planning efforts focused entirely on the domestic market. Prior to 1970, virtually no power was exported from the B.C. Hydro system, since all the system's available resources were required to supply the rapidly growing provincial load. Between 1965 and 1969 extensive use was made of the 750 MW Burrard Thermal plant (originally commissioned by the B.C. Electric Company) to meet this load, but with the Peace River development coming onstream in the late 1960s and early 1970s, the plant became largely redundant as a domestic energy source.

The Peace project also made B.C. Hydro's power system as a whole much more dependent on hydro sources. Whereas 64 percent of Hydro's generating capacity came from hydraulic sources in 1965, hydro capacity accounted for 76 percent of the total in 1972 (B.C. Hydro, 1973). In terms of energy generated, the predominance became even more pronounced, with the Peace River project accounting for 50 percent of total generation in 1972, other hydro sources for 40 percent, and thermal sources for only 4 percent.

As B.C. Hydro's generating system came to rely more heavily on hydraulic sources, its output became more dependent on streamflow conditions. Because the supply of water from year to year is uncertain, the dependable capability of a hydro system is determined by its energy

*Using a real discount rate of 7 1/2 percent to reflect the social opportunity cost of capital (Bernard, et. al, 1982) and adjusting all expenditures and receipts as presented by B.C. Hydro (1973) by the BNE price deflator.
output over the lowest recorded sequence of water flows. Since generation planning for domestic demand is based on dependable capability, there will be varying degrees of surplus energy available when water conditions are not critical. When there is a significant thermal component to the generation system (as in the 1964-69 period) much of this surplus energy can be firmed up by increased thermal output during low water years, but this ability declines as hydro becomes more predominant.

This tendency of B.C. Hydro's system to produce more surplus energy was exacerbated by a change in the technical planning criteria used by Hydro's management:

During the later 1960s and early 1970s, a more conservative approach was used by B.C. Hydro to establish the firm load-carrying capability of the hydro-electric system. The critical hydro-electric system capability was calculated by totalling the lowest annual capability of each hydroelectric plant over a historic streamflow period, even if the lowest plant capabilities did not occur during the same streamflow year (B.C. Hydro, 1984, p. A-2).

Hence, both the changing nature of B.C. Hydro's generating system and the premium placed by its management on virtually 100 percent reliability created a significant exportable surplus. In 1968 and 1969, B.C. Hydro sought approval from the federal National Energy Board (which had assumed regulatory authority over power exports in 1959) for increased interruptible exports. In late 1968, Hydro applied to increase maximum interruptible exports from 1500 to 4000 GWh. per year, including 1700 GWh. of off-peak Burrard Thermal power to be sold to the U.S. Bureau of Reclamation's Central Valley Authority in California (Vancouver Sun, Dec. 10, 1968, p. 31; Dec. 11, 1968, p. 30). These licenses were granted after hearings in late 1969, at which the NEB imposed a 3.5 mill/kWh floor
on exports from Burrard, to ensure that variable fuel costs were covered (Province, Oct. 9, 1969, p. 26; Oct. 10, 1969, p. 26).

As shown in Table 6.7, exports showed an increasing but fluctuating trend in the early 1970s, peaking at 9.2 percent of Hydro's kWh sales in 1973/74. The prices obtained for these sales tended to fluctuate around the prices to bulk users, with the larger sales of 1973 and 1974 generating

<table>
<thead>
<tr>
<th>Year</th>
<th>GWh</th>
<th>Percent of Total kWh Sold</th>
<th>Revenue $'000</th>
<th>Mills/ kWh</th>
<th>Bulk Mills/ kWh</th>
</tr>
</thead>
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significantly lower returns. Both the interruptible nature of export sales and the low returns from them prior to 1977 illustrate the residual role played by this market.

This approach to power exports was confirmed as policy by Hydro's chairman, Gordon Shrum, when he declared in 1971 that, "...it should be made clear that we have not exported, and do not plan to export, firm power from our hydroelectric plants" (Shrum, 1972). Hence, post-Columbia power planning was focused almost entirely on the domestic market.

6.13 Power Planning in the Public Sector III: Load Forecasting

At the time of the creation of B.C. Hydro, the ultimate responsibility for determining the province's future electricity needs was unclear. Both of the new Crown utility's predecessor organizations had engaged in their own forecasting, and this capability was now transferred to B.C. Hydro. At the same time, the British Columbia Energy Board had been created in 1959 to bring a province-wide perspective to power planning, and one of its tasks was to advise the provincial Cabinet on "existing and estimated energy requirements..." (See above, p. 195).

In the period of organizational turmoil which existed between the Shrum Royal Commission of 1959, and the nationalization of the BCE in 1961, the Energy Board, under Gordon Shrum's leadership, moved quickly to establish a central role in provincial power forecasting. In early 1960, the Board organized a major load-forecasting meeting to which the forecasting officers of all major provincial power producers and the U.S. Bonneville Power Administration were invited, along with representatives from several government departments and the University of British Columbia.
This meeting was interesting in terms of the range of viewpoints represented; many of which would provide the basis for a growing controversy over energy forecasting through the next two decades. C.C. Purves, of the B.C. Power Commission presented his agency’s approach to demand forecasting. During the 1950s, the Power Commission had prepared annual load forecasts covering each of its service areas for a five year period, with more tentative projections covering an additional five. The previous load growth experience of these districts was extrapolated into the future with local district managers providing separate estimates of future economic conditions and large new industrial loads. A load forecasting committee then compiled these separate projections and applied its own judgement to the likelihood of large new industrial loads (B.C. Power Commission, 1960a).

Purves recommended to the Energy Board that a province-wide forecast be based on these practices, as well as some consideration of "industrial use per head of population, labour force and energy use per man hour employment" and general economic indicators (B.C. Power Commission, 1960a). He did not, however, indicate how these macro-economic trends should be integrated into the aggregated, extrapolation-based techniques used by the Commission.

J.A. Gruetter of the Bonneville Power Administration outlined a similar, but rather more sophisticated methodology based on a systematic analysis of electricity in specific end-uses such as irrigation, home appliances and space heating. The emphasis, however, was still on "...an extrapolation of trends based on historical information" with present utilization patterns being generally treated as constant (U.S., Dept. of the Interior, ND).
The possible impact of other energy sources was raised by John Davis of the B.C. Electric Company who noted that "...petroleum fuels are 'bending' electrical load projections as consumers now have a multiple choice of energy for some purposes" (BCEB, 1960). The competition from newly available supplies of cheap natural gas was seen as particularly important, although Davis noted that this fuel could actually raise electricity demand by attracting large new industries.

Dr. Matuszewski, a geographer from the University of B.C., was rather critical of the dominant, extrapolation-oriented approach taken by the utility representatives, noting that "...subjective evaluations appear to form a very strong influence on the determining of load growth curves and that trend extrapolations influence these subjective evaluations. ..." (BCEB, 1960). Furthermore, the relationship of electrical consumption to both economic output and population was itself subject to change, making these two indicators unsatisfactory for predictive purposes.

One important topic, however, seems to have been entirely absent from the discussion, that of providing for large bulk loads. For the BCE, the problem had not been particularly pronounced since it had not actively sought such loads, and in any event, they had been a relatively small part of its overall system. This was certainly not the case for the Power Commission's Vancouver Island system, but its earlier generating components had been commissioned only after major bulk power contracts had been signed. While, as we have seen, the unexpected growth of large industrial demands on Vancouver Island had created problems for the power commission through the late 1950s, these involved excess rather than insufficient demand. By the time the B.C. Hydro and Power Authority was created, the responsibility of the public power agency for supplying the needs of large new industrial loads had become firmly established, yet there seemed to be
little appreciation of the risks and uncertainties inherent in this role.

In any case, neither this problem, nor the methodological concerns expressed by Dr. Davis and Dr. Matuszewski had an appreciable effect on the procedures eventually employed to produce the Energy Board's first forecast. The dominant opinion of the March, 1960, load forecasting meeting was that the problem was not so much one of methodology as of a consistent, province-wide data base. Shortly after the load forecasting meeting, another committee was formed (Committee A) to compile this data, thus removing any discrepancies.

This data was then referred to "Committee B" composed entirely of the load forecasting officers of the major utilities. According to the Board's official record:

Each officer brought his company's forecast (for its representative area) and outlined its contents for review and consideration by other committee members. Each of the power areas not covered by the forecasts made by the utilities was discussed by the group and a decision reached as to its most probable growth rate. The results were then tabulated to arrive at a basic forecast for the province as a whole (BCEB, 1961).

To this total was added an allowance for new industrial growth, which was arbitrarily assigned to three equal increments of five billion kilowatt hours each from 1979 to 1986. The Board's completed forecast, covering the period 1961-1985, was presented as a series of tables covering each of the eighteen electric service areas delineated by "Committee A." Both energy (kilowatt hours) and peak demand (kilowatts) were presented, with the former projected as a constant annual rate of growth, and the latter estimated on the basis of a given load factor (88 percent in 1960 dropping to 85 percent in 1985). Energy use was projected to increase at an annual rate of 5.3 percent in Northern B.C. and 6.8 percent in the south (BCEB, 1961).
While, according to the B.C. Energy Board's 1961 Annual Report, the load forecast "facilitated greatly," the Board's examination of the relative merits of the Peace and Columbia projects, the outcome of this latter exercise had the effect of substantially diminishing the Board's subsequent role as an energy forecasting agency. With the creation of the B.C. Hydro and Power Authority as the province's dominant, publicly controlled utility, the perceived need for the Board as a central coordinating body was greatly diminished. The fact that the Board's chairman, Gordon Shrum, was also made chairman of B.C. Hydro and that the Board's offices were moved to the B.C. Hydro building in Vancouver, certainly did nothing to maintain its independent role in the area of electric power planning.

Hence, it was basically the Power Commission's approach as adopted by B.C. Hydro, which would, in fact, guide the planning of British Columbia's electric power development through the 1960s and 1970s. At the risk of repetition, the similarity between the approach used by the B.C. Power Commission in the 1950s, and that used by the B.C. Hydro in the 1960s and '70s, is evident in the following summary contained in the latter's 1975 Task-Force Report:

...the procedure employed by B.C. Hydro may be summarized as follows:

1) Historical trends and consumption data are derived and extrapolated for each of the several classes of customers served.

2) Historical trends...on a regional basis...are derived and extrapolated.

3) Separate short-term (24 months) estimates of demands are prepared by regional staff for their respective regions.

4) Separate short-term estimates are prepared of probable new large industrial loads and changes in production levels of existing large industrial
customers, based on discussions with existing and prospective new customers and a general review of economic and business conditions.

5) A five-year forecast of the total system demand is prepared based on a rationalization of the foregoing estimates and trends...

6) By extrapolation of the five year forecast referred to above, a less detailed forecast for the following five to ten years is prepared for use for longer range planning studies (B.C. Hydro, 1975, pp. 30-31).

Initially, B.C. Hydro produced two forecasts; a probable and a maximum one. The former was used for shorter term annual budgeting, whereas the latter, which included provision for more doubtful loads formed the basis of long-term generation planning (Vancouver Province, Nov. 16, 1966, p. 15). Since the "probable" forecast was relevant mainly for the short term (1 - 5 years) and the maximum one to the longer term (5 - 10 years), they were eventually combined into a single load forecast for planning purposes in 1970 (B.C. Hydro 1983, p. 145; B.C. Hydro 1984, pp. A2 - A3).

Hence, throughout the 1960s and '70s, B.C. Hydro developed an approach to forecasting which committed the utility to meet the maximum load which could be foreseen. In large part, this approach grew naturally out of the unmistakable political emphasis being placed on power availability as the central element of the provincial government's strategy. Adequate supplies of power had to be provided to ensure the continuance of the boom in resource manufacturing, even if the Crown utility had to assume all the financial risks associated with overplanning. In any case, it was underplanning rather than overplanning which had apparently been the key failing of B.C. Hydro's predecessor, a point made forcefully by the Hydro's chairman, Gordon Shrum, in his 1959 Royal Commission Report (see above, p. 194).
In the heady days of the mid 1960s, the danger of failing to provide adequate power to supply the province’s rapidly growing resource manufacturing base seemed even more real than it had a decade earlier, despite the unprecedented scale of the hydro developments already underway. Whereas, annual growth rates measured on a month by month basis fluctuated around an average of 8 percent during 1962 and 7 percent during 1963, they increased rapidly thereafter, peaking at just over 20 percent in June, 1965. The 16 percent load growth experienced between November, 1964 and November, 1965, led Gordon Shrum to remark that "...in four and a half years we have to build as much capacity as B.C. Electric and B.C. Hydro built in their whole history to date" (Province, Jan. 7, 1966, p. 15).

B.C. Hydro’s early forecasting efforts, however, were no more successful in foreseeing this rapid load growth than those of the Power Commission had been a decade earlier. Table 6.8 compares the annual forecasts made between 1963 and 1975 with the actual demand over each forecast period. The projections of the 1963 - 1965 period were quickly proved to be too low, with the 1963 forecast being off by 11 percent for 1966, 17 percent for 1967, 20 percent for 1968 and 25 percent for 1969. B.C. Hydro’s response was to raise its eleven year growth projections significantly, to around 9.3 percent in 1966, and just under 10 percent in 1968. Thereafter, it remained in the 9 to 9.5 percent range through the mid 1970s.

This tendency to raise the long term load growth projections in response to the unexpected surge on electricity demand was reflected in a revised province-wide power forecast issued by the B.C. Energy Board in 1967 (BCEB, 1967). As in the 1961 Report, the Board simply aggregated the
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<th>4</th>
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<td>-22.8</td>
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<td>5.0</td>
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<td>26.1</td>
<td>32.6</td>
<td>49.1</td>
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forecasts of provincial power utilities. Figure 6.4 shows both the growing impact of increasing the projected growth in the utility component of energy demand from 7 to 9 percent, and the fact that this latter growth rate proved to be a fairly accurate projection of B.C. Hydro's actual load growth through the early 1970s.

6.14 Power Planning in the Public Sector IV: The Choice of a System Plan

As discussed above, the two rivers policy of the W.A.C. Bennett government represented a large scale system planning decision taken at the highest level. However, this dramatic assertion of government control over the power planning function raised the question of how it would be exercised in the future. Clearly, the intimate involvement of the Premier and his Cabinet had been a result of the specific circumstances described above, and could not be expected to form the basis for an ongoing planning process.

With the creation of B.C. Hydro and the subsequent decline in the profile of the B.C. Energy Board, the Crown utility seemed to be the natural focus for future system planning. However, the organization of B.C. Hydro had been developed to implement the two rivers policy, and was thus focused on project construction rather than planning. As shown in Figure 6.5, Hydro's organization consisted of eleven divisions, all reporting to the Executive Management Committee. Overall coordination was minimal, and as noted above, the organization was plagued with internal schisms arising out of the original merger. Formally, system planning was one of a range of functions performed by the engineering division, but the activities of this division were focused on ongoing construction, and in any case, it could play no overall coordinating role for Hydro as a whole.
FIGURE 6.4
B.C. ENERGY BOARD 1961 AND 1967 FORECASTS
VS. ACTUAL LOAD GROWTH OF B.C. HYDRO

Index
1964=1.0

B.C. Hydro
Actual
Consumption

1961
BCEB
Forecast

1967
BCEB
Forecast

SOURCE:
Initially, this institutional deficiency had not appeared to present a real problem since the Energy Board's 1961 Peace/Columbia report had projected that the Peace project would be sufficient to meet provincial utility demands through the mid-1980s. However, the emergence of the unexpected load growth of the mid-1960s raised both the spectre of a power shortage during the period prior to the completion of the Peace project and the need to consider new generation projects for the longer term. As early as mid 1965, Hydro's chairman, Gordon Shrum, warned of possible power shortages.

FIGURE 6.5

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY ORGANIZATION

BOARD of DIRECTORS

CHAIRMAN

EXECUTIVE MANAGEMENT COMMITTEE
(comprised of Chairman and Executive Directors)

CHIEF ENGINEER

ENGINEERING DIVISION

CONSTRUCTION DIVISION

PRODUCTION DIVISION

GAS DIVISION

TRANSPORTATION DIVISION

DISTRIBUTION DIVISION

FINANCIAL DIVISION

COMPUTER & MGT. SYSTEMS DIVISION

FINANCIAL DIVISION

COORDINATOR OF ADMINISTRATION

ADMINISTRATION DIVISION

CORPORATE SERVICES DIVISION

LEGAL DIVISION

SOURCE: BCEB, 1972, Figure 11.3.
shortages in 1967 and 1968 if work on the Peace was not accelerated. Furthermore, both rapid load growth and the earlier decision to scale down the initial Peace project meant that B.C. Hydro would require the completion of a major new generation source by 1973 (Vancouver Sun, June 10, 1965, p. 10). Complicating the situation, the rapid load growth on Vancouver Island (due mainly to the expansion of the pulp and paper industry) threatened to exceed the combined capacity of the Island's own power services and the underwater transmission cables from the mainland.

The options available to meet projected power demands of the mid-1970s centred on construction of additional dams on the Peace and Columbia. On the Peace, the Site I dam deleted from the original development offered an attractive possibility, while on the Columbia, the key options were the installation of generators at Mica and a run of the river plant on the Kootenay. All of these projects represented relatively inexpensive additions to the system, utilizing the water storage capabilities which were being put in place by the initial phases of the Peace and Columbia. For Vancouver Island, the choices were additional thermal capacity on the Island itself and a high voltage, above-ground transmission line from the mainland.

Straightforward as these choices seemed, their resolution quickly became bogged down in internal squabbling within Hydro as well as open disagreement between Hydro and government officials. Hydro's chairman, Gordon Shrum, quickly adopted a preference for the Site I dam, but this was opposed by many of those involved with the Columbia. According to a former Hydro executive, lines of communication were so bad that economic and technical information on the Peace was purposely kept from those working on Columbia projects (Kennedy, 1964). Similarly, the question of Vancouver Island power supply became bogged down in political controversy when Gordon
Shrum publicly stated his preference for a nuclear plant on the Island and the Premier announced the government’s opposition to nuclear power.

As the decade drew to a close, none of these planning questions had been resolved, and the confusion was heightened rather than lessened when the Premier announced during his annual meeting with investment dealers in August, 1969, that he had decided on a new system plan for Hydro. After the installation of ten generating units totalling 230 MW on the Peace, 2000 MW would be installed at Mica, followed by construction of Peace Site I and the Kootenay Canal project. Shrum, who was attending the same meeting seemed taken aback by the announcement, commenting that, "if that’s the Premier’s program, that will be it." But, added the Hydro chairman, "economics might change his mind" (Province, Aug. 12, 1969, p. 14).

Underlying the seeming inability to produce a medium term expansion plan, lay some larger unanswered questions. One was the longer term choice of an expansion strategy. Alternatives included the utilization of Alcan’s substantial unused water rights on the Nechako, the development of the Fraser (which, as we have seen, was halted during the 1950s by fisheries concerns), and the utilization of the Hat Creek thermal coal reserves acquired by the B.C. Electric Company just prior to nationalization. The provincial government had already held discussions with Alcan and interest in the Fraser among businessmen and engineers remained strong. The Premier had taken a firm public position on his preference for Hydro over thermal development, although he remained opposed to a dam on the main stem of the Fraser.

The question of the extent to which environmental considerations would be taken account of in future project planning had also been raised with increasing frequency during the late 1960s. This growing public expression of such concerns was due both to the heightened level of environmental
awareness in North America generally, and the well publicized impacts of Hydro's Peace and Columbia construction in particular (see above, pp. 264 - 275). Far from avoiding the environmental problems of the 1950s, the large scale developments of the 1960s had heightened them and raised new fears concerning the impact of future power projects.

Finally, the events of the 1960s had created a generalized distrust of the government's new policy instrument, B.C. Hydro. This pervasive negative attitude had two elements which, at first glance, appeared contradictory. The first was that B.C Hydro's activities were steeped in political interference, making it an inherently inefficient organization. The second was that Hydro was arrogant and unaccountable to the citizens it was supposed to be serving.

The reason for the simultaneous expression of these two criticisms during the latter 1960s can be traced both to the pattern of provincial power policy generally, and more specifically, to the behavior of the Premier. Not only was there a widespread questioning of the economic wisdom of the two rivers policy, but the government's overt subsidization of Hydro's capital requirements, as well as the Premier's direct involvement in rate reductions and future system planning, gave rise to additional criticism. Hence, for example, the Vancouver Province called editorially for the reconstitution of Hydro as "...a body free of political meddling ... (that) stands on its own feet in the money market like other major utilities" (Province, February 17, 1971, p. 4).

On the other hand, in a number of more politically sensitive areas, the Premier and his government were careful not to intervene in Hydro's affairs. We have already seen its unwillingness to become involved on the side of local residents during Columbia development (see above pp. 309 -
and it had proved unresponsive to the demand that Hydro's wide ranging expropriation powers be curtailed (Province, June 3, 1969, p. 10).

Similarly, the responsibility for residential rate hikes in 1967 and 1970 was attributed solely to Hydro. W.A.C. Bennett responded to legislative questioning of the first increase by stating "...very clearly that the Premier is not in charge of Hydro" (Province, Feb. 28, 1968, p. 36), while the government claimed in 1970 that neither a legislative review nor a Public Utilities Commission hearing into Hydro's rates would serve any useful purpose (Province, Jan. 13, 1970, p. 21).


The Premier's response to B.C. Hydro's lack of system planning capability and to the general controversy which continued to surround provincial hydro policy was to establish an independent inquiry. A Cabinet Minute issued on June 8, 1970, ordered the B.C. Energy Board:

...to determine by assembly of known data and by independent inquiry the best use of public and private energy resources to meet the electric load growth in the province up to the year 1985, together with realistic five-year interim goals until that period (BCEB, 1972, Preface p. xxii).

The Premier's resort to the Energy Board (which as we have seen, had not played an active role in power planning for a decade) was widely interpreted as a rebuke to B.C. Hydro (Province, Feb. 19, 1971, p. 4). Nevertheless, the fact remained that Gordon Shrum was chairman of both bodies, and the Board had neither significant organizational nor analytical capability. The rest of its original members, Hugh Keenleyside, A.F. Paget, Henry Angus and James Sinclair remained, despite the fact that some were rather elderly, and all had retired from the positions which had justified their initial appointments (see above, p. 195).
The terms of reference given to the Energy Board were, in some respects, not very clearly defined. Initially, the original Order in Council had asked for recommendations concerning new transmission lines, new hydro plants, potential hydro plants, potential thermal plants, inter-utility exchanges, and "the form of organization required to ensure the operation of the electrical plants and transmission facilities on a coordinated basis to provide maximum benefits for the people of British Columbia" (BCEB, 1972, p. xxviii). However, in announcing these terms, Premier Bennett made it clear that the Board should confine its considerations to an all-hydro program to 1985, and that no consideration be given to nuclear power (Vancouver Sun, June 12, 1970, p. 1; and Dec. 10, 1970, p. 34). Shrum's response was to add nuclear power to the Board's mandate regardless, to give full consideration to a thermal option, and to extend its planning horizon from 1985 to 1990.

More fundamental, however, were the items neglected in the terms of reference. No mention was made of the economic and social objectives of power policy, either by way of guidelines or in terms of a specific request for recommendations. Conspicuous by its absence was any mention of environment concerns, an omission which was widely noted by interest groups, the press and the opposition parties (Province, Feb. 17, 1971, p. 4; and January 25, 1972, p. 5). These criticisms prompted Shrum to announce subsequently that the Board's examination would be more comprehensive than first expected, including wildlife, pollution and environmental concerns in addition to traditional engineering and economic ones (Province, Dec. 8, 1971).

The Board's first task in defining the scope and emphasis of its efforts was to establish a working structure. In November, 1970, a contract was signed with J.K. Sexton, a Vice-President of Montreal
Engineering Company, under which Sexton would put together an engineering study team utilizing staff from B.C. Hydro, the International Power and Engineering Company (Hydro's engineering subsidiary), and his own firm. This group, The Vancouver Study Group, operating out of B.C. Hydro's headquarters, was supplemented by the Head Office Group, composed largely of B.C. Hydro and IPEC staff, whose task would be to co-ordinate the study and prepare the final report.

Three advisory committees were also constituted. One, headed by the Energy Board's executive officer, J.J. Southworth, and chief Hydro load forecaster, C.C. Purves, was to study future power requirements. The other two reflected a decision by the Board to focus much of its broader consideration of socio-economic and environmental questions on the Fraser River. Board members, Hugh Keenleyside and James Sinclair, headed up an Advisory Committee on the Fishery, while Arthur Paget presided over a similar Committee on Flood Control.

While it had received no guidelines advising it how to proceed with its inquiry, the Board decided on a combination of in-house investigation and reliance on outside consultants. The use of public hearings or consultations with affected groups was explicitly rejected because, in Shrum's words:

"...it was felt nothing would come out of a public hearing. ...and I don't think you would get much factual information. ...It is far better to employ people who are knowledgeable and get them to give you a report." (Shrum, 1972, p. 30).

The shorter-term problem of Hydro's five-year plan, which had prompted the inquiry in the first place, was settled in favor of Mica generation before the Energy Board's work really got underway, and in response, five years were added to the end of its study period, shifting it from 1985 to 1990 (BCEB, 1972, p. xxvi).
Logically, the foundation for such a long term study was the estimation of future load growth in the province. Since the costs of future large scale power developments were likely to be even greater than those already encountered, an accurate projection of future demand growth (necessarily involving assumptions about the economic activity underlying it) was essential to the subsequent identification of the most optimal system plan. However, relative to the attention given to identifying and evaluating the province's potential energy sources, demand growth was examined in a cursory manner, and represented a weak link in the subsequent report.

Essentially, both the procedures and methodology used to produce the Board's 1961 and 1967 forecasting reports were used again in 1971. The internal forecasts used by B.C. Hydro and the other major power producers were taken as a basis:

subject only to an overall check against provincial population forecasts, and substantial allowances were made for industrial loads in individual ESAs over and above those already included in the B.C. Hydro, Alcan and Cominco projections (BCEB, 1971, pp. 9-11).

Major assumptions were that: (1) population would continue to increase at slightly lower than historic rates; (2) the mineral and forest industries would continue to grow at historic rates; (3) pollution controls would have no net effect on the growth rates of these sectors; (4) per capita energy requirements would follow previous patterns and double between 1970 and 1985; (5) that residential and commercial load growth would relate to population growth by varying ratios depending on more specific demographic variables; and (6) that residential consumption would be affected by such new technological innovations as the electric automobile, electric heating
and air conditioning. However, it is not clear from the Board's report exactly how these last two assumptions were built into the forecast.

The 1971 forecast showed provincial power requirements rising immediately to the level predicted in its earlier 1967 report, and increasing at a rate roughly similar to that envisioned by this previous forecast. A twenty year average annual growth rate of 7.6 percent was predicted, resulting in power consumption rising from 25,842 GWh in 1970, to 55,792 GWh in 1980, to 112,128 GWh in 1990. Excluding industrial self-generation, energy growth rates (served primarily by B.C. Hydro) were projected at a higher average annual rate of 8.7 percent. The conclusions of the forecasting exercise, as summarized in Table 6.9 were that an energy deficit of almost 4000 Av MW (35,000 GWh) would exist by 1985, increasing to 7,500 Av MW (66,000 GWh) by 1990.

The next step was to identify feasible alternatives available to meet these projected requirements. First, a comprehensive inventory of all hydro and thermal resources was compiled from a number of federal and

| TABLE 6.9 |
| B.C. ENERGY BOARD: PROJECTIONS OF FUTURE POWER REQUIREMENTS |

<table>
<thead>
<tr>
<th>1985</th>
<th>1990</th>
</tr>
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<tbody>
<tr>
<td><strong>Energy</strong></td>
<td><strong>Capacity</strong></td>
</tr>
<tr>
<td>Av. MW</td>
<td>Mw</td>
</tr>
<tr>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Forecast Loads</td>
<td>8829</td>
</tr>
<tr>
<td>System Capability after Hydro five year plan</td>
<td>4832</td>
</tr>
<tr>
<td>Deficit</td>
<td>3997</td>
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</tbody>
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SOURCE: BCEB, 1972, Table 3, p. 4.
provincial sources. This list included over one hundred individual hydro projects covering ten major river basins and totalling almost 24,000 Av MW (210,240 GWh) of energy potential.

This larger list was then reduced to fifty (including the thermal coal reserves of Hat Creek and Vancouver Island) by excluding those which were obviously too expensive, had a potential of less than 50 Av MW or had unacceptable environmental cost. "The most desirable projects," commented the Board, "will be those that achieve an optimum balance between economy of power production on the one hand and protection of the environment on the other," but "...a conscious effort should be made to keep environmental considerations in a proper perspective by employing...sound judgement divorced from emotional exaggeration" (BCEB, 1971, pp. 3.1-3.4). This initial environmental screening process appears to have been cursory and was, in any event, highly judgmental, since most of the projects selected for further economic evaluation would prove to be highly controversial over the next decade from an environmental point of view.

The Board's engineering study team then proceeded to evaluate comparative costs of each of the fifty alternatives in 1970 dollars, using discounted cash flow techniques. A nominal discount rate of 10 percent was used, and 3.8 percent inflation assumed, producing a real rate of 6 percent. This was considered equivalent to hydro's real cost of capital. Labour costs were discounted at a lower 4 percent rate to approximate an expected real escalation in wage rates. Although its report claimed that these costs were based on designs which minimized environmental damage, the actual environmental impacts of all these projects had received virtually no study, so that they were, in fact, based on the more narrowly defined costs to the utility.*
A computer model (called Shrumo) was then created to simulate the impact of alternative programs of expansion on the primary energy capability of the interconnected provincial power system (BCEB, 1972, pp. 6.13 - 6.15). In performing these simulations, B.C. Hydro's conservative assumption of energy capability based on the "lowest streamflows on record" was adopted (BCEB, 1972, p. 3-35; cf. above p. 280) along with a 15 percent gross peak reserve requirement. Fifteen trial sequences were then costed using the capital estimates of the component generation projects and associated transmission facilities, with a smaller number of sequences prepared for the 1977-85 and 1985-90 period.

For the first period, two system development alternatives were elaborated, an all hydro program and a combined hydro-thermal one. In the first, Site I on the Peace, the Low Revelstoke and Seven Mile sites on the Columbia would be brought on stream during the 1979-82 period. Peace Site C would follow in 1982/83 with the Kemano II and Homathco River basins being developed to meet loads through 1985. In the mixed hydro-thermal version, Hat Creek would displace development of these latter two basins. Comparative unit costs were 5.76 mills/kWh for the all-hydro program vs. 5.6 mills/kWh for the mixed hydro-thermal version. Perhaps in deference to the Premier's wishes, the somewhat more expensive all-hydro option was recommended; the higher costs being justified on the rather dubious grounds that hydro power was available in perpetuity, and

*The report admitted that, due to time pressures, it had relied primarily on cost data provided by the province's utilities. One exception was the exclusion of all taxes and water rentals, since these represented a transfer payment from the utility to general revenue rather than a real social cost (BCEB, 1972, p. 3-5).
...it provides intangible benefits to British Columbia because it facilitates a wider geographic distribution of provincial development through the legacy of access roads, communications and local power supply that remains after construction (BCEB, 1972, p. 21).

The problem of how the Kemano II project could be built to meet the province's overall need when Alcan held the water rights was not really addressed. The Board was content merely to suggest that it:

...will be available for provincial power supply because the evolution that has recently taken place in the aluminum industry indicates that Alcan is unlikely to expand its smelter at Kemano in the foreseeable future (BCEB, 1972, pp. 7-20).

For the period 1985 to 1990, three options were outlined; a primarily thermal program based on Hat Creek, and two hydro sequences, one focusing on the Fraser and the other on the Liard in the far north of the province. As shown in Table 6.10, the Liard was shown to be significantly more expensive, with the costs of Hat Creek and the Fraser being virtually identical.

The focus of the Board's work then shifted to a consideration of the wider social costs and benefits associated with the development of the Fraser River. In its 1963 report, the federal/provincial Fraser River Board had rejected large scale development at the Moran site on the River's upper main stem for environmental reasons, opting instead for a series of storage dams on a number of the river's tributaries. This plan (which had not been implemented in the federal/provincial flood control agreement of 1968) was rejected by the Energy Board on the grounds that it produced "...a conflict with the environment, while providing only modest flood control benefits." Hence, attention was focused exclusively on "...the
large main stem developments where power and flood control benefits would be at a maximum" since environmental controversy would be "...unavoidable in any case" (BCEB, 1972, p. 4.22).

Some twenty-five reports were commissioned on the consequences of a major storage and generation facility at Moran on the upper Fraser. The areas examined included impacts on flood control, bank stability, sedimentation, transportation, agriculture, forestry, mining, Indian lands, wildlife and fisheries. The Advisory Committee on Flood Control concluded that a Moran Dam would significantly improve flood protection for the metropolitan lower mainland region, thereby producing a capitalized benefit of some $149 million (BCEB, 1972, p. 9.21).

Most of the other impacts, however, were shown to be decidedly negative. A huge reservoir extending 170 miles upstream from the dam site would be created leading to a "prolonged period of bank erosion before stability could be achieved" (BCEB, 1972, p. 4.23). The Quesnel region

### TABLE 6.10

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<tr>
<td>Thermal Hat Creek</td>
<td>1004</td>
<td>184</td>
<td>5.63</td>
</tr>
<tr>
<td>Hydro Fraser River</td>
<td>983</td>
<td>180</td>
<td>5.64</td>
</tr>
<tr>
<td>Hydro Liard River</td>
<td>1355</td>
<td>183</td>
<td>6.45</td>
</tr>
</tbody>
</table>

SOURCE: BCEB, 1972, Table 7, p. 25.
would lose 4,000 acres of important agricultural and grazing land, with a further 4,500 acres being threatened by bank erosion (p. 9.38). Indian bands would lose twenty-seven parcels of land totalling 4,450 acres along with their traditional fishing sites, and large losses of Bighorn sheep and other wildlife species were predicted (pp. 9.40-9.46).

By far the most dramatic impacts were identified by the Board's Advisory Committee on Fisheries. The Committee had been instructed by the Energy Board to answer the following questions:

1. Is passage of anadromous fish by a high dam at Moran Canyon feasible?
2. What measures could be taken to mitigate or compensate losses?
3. What were the economic implications of 1 and 2 (BCEB, 1972, p. xxv)?

The answers were unambiguous. Fish could not migrate past the dam so that if it were built, it would put an end to about one half of the Fraser River's Salmon producing capability. Nothing could be done to effectively mitigate this loss, and as shown in Table 6.11, the costs would range from $4 to $48 million.

The Board's final report, rather than attempting a systematic comparison of the costs and benefits of Moran, tended to downplay the significance of the social and environment costs, concluding that "... these would be outweighed by the advantages of multipurpose development" (p. 27). The Board devoted considerable effort to criticizing the work of its own fisheries advisory committee, concluding among other things that its estimates of fisheries losses were "...of doubtful application to the Provincial Power Study." (p. 9.2).

Nevertheless, the Energy Board ended up concluding that "the contention arising out of the project is such that it is not feasible to
include it in a specific schedule of power development..." (p. 30), and Hat Creek was selected as the preferred power source for the 1985-90 period.

Specific responsibility for examining the question of a suitable institutional framework for future power development was given to the Montreal Engineering Company, and its analysis and recommendations centred largely on engineering considerations. After describing the key institutions involved in electric power development, the Board's report sought, with reference to various written statements, to analyze their different objectives.

However, this analysis did not really go beyond rather vague generalities on the one hand and a list of specific functions on the other.

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**TABLE 6.11**

B.C. ENERGY BOARD ADVISORY COMMITTEE ON FISHERIES' ESTIMATE OF FISHERIES LOSSES FROM THE MORAN DAM

($ millions)

<table>
<thead>
<tr>
<th></th>
<th>Commercial Fishery</th>
<th>Indian Food Fishery</th>
<th>Sport Fishery</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present Yields and Harvesting Arrangements</td>
<td>.2</td>
<td>.3</td>
<td>3.6</td>
<td>4.2</td>
</tr>
<tr>
<td>Potential Yields Based on Rationalized Harvesting and Current Prices</td>
<td>20.9</td>
<td>.7</td>
<td>5.2</td>
<td>26.9</td>
</tr>
<tr>
<td>Potential Yields Based on Rationalized Harvesting and a 2 percent Real Price Increase</td>
<td>37.6</td>
<td>1.2</td>
<td>4.4</td>
<td>48.2</td>
</tr>
</tbody>
</table>

The objectives of the provincial government, among other things, were "to coordinate in an economic manner the development of the basic energy resources of the province." to install Mica generators as soon as possible, and to ensure that the preservation and maintenance of the natural environment are considered in the administration of land use and resource development (BCEB, 1972, pp. 11.13 - 11.14). Beyond a rather lengthy list of B.C. Hydro's specific legislative powers, its objectives were listed as "to generate power and supply electric service to the greatest number of consumers at the lowest cost consistent with sound management" and to construct facilities "without adversely affecting the natural environment of the province" (BCEB, 1972, p. 11.16). Despite the obvious scope for conflicts between economic, engineering and environmental objectives (amply demonstrated by the events of the 1950s and '60s), the Board concluded that "...it is evident that most of them are in harmony, and it is assumed that in these cases, no additional means for resolution of differences are required" (p. 11.9).

Environmental considerations, however, did deserve more attention because "...there is a growing tendency for the public to question such effects regardless of their true significance" so that "...future power developments may be delayed to the serious detriment of the power industry, and of the province as a whole" (p. 11.20). This goal was seen as best accomplished by a strengthening of the capabilities of the Water Resources Service as well as the inclusion of "...representatives of the power industry in future deliberations leading to the resolution of environmental problems within the industry."

With regard to the relationship between government and its Crown utility, the Board stressed that:
The fact that the government has representatives on B.C. Hydro's Board of Directors and is thus able to communicate government policy directly, should make it possible to resolve potential divergences of objectives equitably before they harden into conflicts of interest (p. 11.23).

However, the Board was less sanguine on the question of Hydro's internal organization, noting that "remnants" of the organizational schism described above "have been observed in the course of this study" and "may well have given rise to indecision and procrastination in the preparations of plans for future developments" (p. 11.24). Moreover, the direct relationship between the board of directors with its executive management committee and the eleven divisions at the operational level had led to division of loyalties, confusion of objectives and low morale. Hence, the board recommended, the executive management committee should be abolished, with the relations between the Board of Directors and the operational divisions being buffered by a general manager and a number of assistant general managers. Ironically, this structure was very similar to the one which had been adopted by the Power Commission in the mid 1950s, only to be done away with when its independent-minded General Manager, H. Lee Briggs had clashed openly with the Premier. Finally, the Energy Board recommended shifting the system planning function from the Engineering Division to a new Corporate Planning Group combining both engineering and economic expertise.

In conclusion, the British Columbia Energy Board's 1972 report represented a major attempt to substitute analytical rationality for ad hoc political considerations in planning the future of the province's electric power system. However, after almost two years of study and the publication of seven thick volumes of analysis and recommendations, its immediate impact was rather limited. First, the release of the report coincided with
the replacement of W.A.C. Bennett's Social Credit administration by an NDP government whose approach and priorities were quite different. For both the new government and a significant segment of the public at large, the Board's approach to rational planning was hopelessly narrow. The power demand assumptions of the 1960s were reiterated rather than examined, and the range of costs and benefits considered were restricted largely to direct utility outlays. Furthermore, despite the comprehensive and enlightening studies conducted on the Fraser development questions, the report's main authors gave the distinct impression that they considered the growing concern for the environment as both a nuisance and hopefully a passing fad.

This narrowness of view arose from the fact that the Energy Board's inquiry was not really an independent one. The reality was that the Board had long since ceased to exist as a meaningful entity and that the driving forces behind its work were Hydro's chairman, Gordon Shrum, the Engineering consultant, J.K. Sexton, and B.C. Hydro's own engineering staff. The report's real legacy consisted of a power planning framework, a methodology and a well-developed inventory of potential projects which was quite amenable to absorption by B.C. Hydro. It also created a sense of common purpose around this approach and agenda, capable of overcoming the organizational schisms which had plagued Hydro since its creation. As we shall see, these outcomes would exert a decisive influence on power planning and policy through the mid-1970s.

6.16 Concluding Summary: Power Planning and the Public Corporation in the 1960s

In Chapter 5, we saw that the creation of a dominant Crown-owned electric power utility in British Columbia arose out of a desire to promote large-scale hydro development. Nationalization was not a primary policy
goal, but a route which was adopted only after existing policy instruments proved unsuccessful. In turn, the desire to promote hydro development arose, at least partly, from an acceptance of a link between hydro projects and broader regional economic development. As we have noted at several points so far, this association owed as much to myth and a number of well-publicized examples as it did to serious economic analysis.

Once the provincial government had taken upon itself the task of supplying the key commodity of electricity, the focus of policy shifted toward supplying it in a way which would encourage the maximum exploitation of other provincial resources, particularly forestry and mining. This role, particularly when combined with the political necessity of demonstrating to residential users the benefits of the government's policies, meant supplying power at the lowest possible direct cost to consumers. Not only was the Crown corporation employed to lower this cost, but a range of other policy initiatives, particularly in the areas of financing, taxation, and environmental regulation, were adopted to lower it again. Hence, the externalities generated by the large-scale hydro projects of the 1960s were not so much unintended or overlooked impacts as they were a conscious attempt to redistribute the costs of these projects from the power consumer to the taxpayer at large.

In Chapter 5, we also emphasized the shift of power planning responsibility from individual Crown and private power producing organizations to the highest levels of the provincial government. However, the scale of the decisions which resulted from these planning efforts (i.e. the simultaneous construction of the Peace and Columbia projects) virtually eliminated the immediate need for future long-term planning. Rather, the key requirements centred around the construction of new generating projects and the promotion of electricity consumption to ensure a market for their output.
When an unanticipated surge in power demands increased the apparent urgency of the power planning problem, there existed no institutional capacity through which it could be addressed. At the governmental level, the original planning team for the Columbia had been dispersed and the B.C. Energy Board was largely dormant. The new Crown corporation, B.C. Hydro, had been created out of two quite different organizations to implement a hydro expansion plan handed to it by the provincial government; these circumstances rendering it unable to provide a clear and immediate sense of direction.

Nevertheless, B.C. Hydro, by the late 1960s, represented the dominant source of professional expertise and organizational capability in the electric power field, and it is hardly surprising that an organization actively engaged in the largest single engineering effort of twentieth century British Columbia should develop a strong sense of institutional self-identity.

Hence, when the power planning issue again became a pressing one in the early 1970s, it was B.C. Hydro which provided the basic planning assumptions underlying its proposed resolution. This institutional bias was clearly evident in the 1972 Energy Board report, both in the degree of attention given to the different aspects of the electric power problem and in the recommendations which it produced.

Basically, both the economic trends and policy directions of the 1960s were extrapolated through the 1970s and '80s with no critical examination of either. Through the engineering accomplishments of B.C. Hydro and the planning framework of the 1972 Energy Board report, the government's hydro policy directions of the 1960s had been transformed into B.C. Hydro's corporate goals for the 1970s.
6.17 References


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The Province. Various Dates. Vancouver, B.C.


Vancouver Sun. Various Dates. Vancouver, B.C.

7.1 The Policy Setting of the Early 1970s

The New Democratic Party took power in British Columbia in September, 1972 with policy goals which represented a clear departure from those pursued during the twenty year reign of W.A.C. Bennett's Social Credit government. The NDP had consistently criticized the previous government's preoccupation with resource-led growth and its extensive concessions to large corporations. In fact, the Columbia River Treaty and two rivers policy were frequently held to be a prime instance of the Bennett government's failings, and the NDP had committed itself to a major diversification of the provincial economy away from its reliance on resource industries (Payne, 1979).

The NDP was also committed to a much more active government role in the protection of environmental quality, with the party platform calling for "...the creation of a department of environmental quality and planning that would have power to rule over all other departments" (Province, Nov. 4, 1975, p. 5).

In seeking to apply this approach to the specific area of hydro power policy, the NDP was faced with a number of key issues. The broadest related to the role of electric power within the economy as a whole. For the previous government, we have seen that the provision of cheap power to industry had been the central element of its economic development strategy, and low residential rates a key aspect of its populist political strategy. During the last years of the Social Credit government, however, these policies had come under increased criticism. As we have seen, the preferential access given by Hydro to the province's capital resources was widely
responsible for the lack of capital spending on other social priorities, and a deterioration in Hydro's financial performance had led to rate increases directed largely at residential rather than industrial users.

A closely related issue was that of power planning. As we have seen, B.C. Hydro's planners had reacted to the unforeseen spurt in economic and electricity growth during the 1960s by raising their longer term load projections to around 9.5 percent, an assumption which implied another decade of large scale power development. How would the new government react to Hydro's long term expansion goals as embodied in the 1972 Energy Board Report, and what consideration would they give to the environmental consequences of these goals?

Finally, there was the question of the institutional structure which would govern future power planning activities. We have seen that in the 1960s, B.C. Hydro's activities had raised major concerns that the Crown corporation exercised too much unchecked power and was unaccountable to the citizens it was supposed to serve. On the other hand, the Social Credit government's creation and use of B.C. Hydro as an instrument of its own goals had led a number of critics, both inside and outside Hydro, to condemn the excessive political interference in its management and planning activities. How would the new government reconcile these two concerns, and what sort of mechanisms would be created to ensure that the public corporation's activities were carried on in the broader public interest?

7.2 The New Democratic Party Agenda

On assuming office, the NDP Government's pronouncements indicated that the Hydro policies of the 1970s would be markedly different than those of the 1960s. Hydro's chairman, Gordon Shrum, and seven of the eight members of the Board of Directors, were replaced. David Cass Beggs was recruited
from Manitoba Hydro as the new chairman, and two new NDP Cabinet Ministers, Robert Williams and James Lorimar were appointed to the board. Williams, who was designated the Minister responsible for Hydro, was also Minister of the large Department of Lands, Forests and Water Resources, and would be the central figure in provincial resource policy during the NDPs three years in power. Williams also recruited James Wilson, a prominent regional planner who had been closely involved in the mitigation/compensation activities on the Columbia and had written a book somewhat critical of Hydro's approach (Wilson, 1973). Wilson's role, Williams indicated, would be to "humanize" Hydro and to make the organization more sensitive to the social and environmental impacts of its activities (Vancouver Sun, Nov. 2, 1972, p. 1).

Immediately following the election, the new Premier, Dave Barrett stated his government's commitment to conservation rather than promotion, and indicated his firm opposition to nuclear power for British Columbia. Williams followed up this general indication of the government's direction with a number of more specific policy announcements.

First, he indicated that Hydro's board of directors would be instructed to end all promotional advertising in favor of efforts to promote energy conservation and that Hydro would be expected to examine closely the relationship between demand growth and the rate structure.

Second, Williams indicated that the previous government's indirect subsidization of Hydro rates would end. This meant eliminating Hydro's preferential access to pension funds:

Pension funds are now provided to the Authority at a rate which is at least one percent below market rates and that means that the savings of our citizens in the province are being used to subsidize the Authority and indirectly to subsidize the major industries throughout the province. Forty percent of the demand for power is from industrial users and
are being transferred to some extent to these major industrial users of power. We are convinced there is no justification for that (Vancouver Sun, Oct. 11, 1972, p. 12).

In addition, Hydro would be expected to incorporate the costs of past and future resource losses created by its activities into its rates so that the cost of power would be "...an honest cost which it hasn't been so far" (Vancouver Sun, Oct. 11, 1972, p. 12).

Finally, despite the new government's generally cool reaction to the B.C. Energy Board's 1972 power study, it announced its intention to make basically the same organizational changes that the Board had recommended. Hydro's organization would be centred around a general manager and a number of assistant managers, with the executive management committee being abolished. A corporate planning group would be established and the government would take a less direct role in the day to day affairs of the Crown corporation.

7.3 Power Planning and the NDP I: The Environment

One area in which the NDP was quick to translate its general goals into specific programs was that of the environment. The new government's policy involved both internal changes within Hydro and changes to the general governmental planning structure within which the utility operated. Within a year after the change in government, social and environmental impact statements became a regular feature of the feasibility studies undertaken on new hydro projects.

In the words of the utility's 1974 Annual Report:

...B.C. Hydro has embarked on several new programs which emphasize protection of the environment... During the year environmental studies were substantially completed on proposed projects on the Peace (Site 1) and Pend-d'Oreille (7 mile) Rivers; these studies considered the effects on fish, wildlife, recreation, forestry,
agriculture and mining. The findings of all these studies were presented to the public in a series of public meetings at various centres throughout the province. B.C. Hydro has also established a new environmental studies department (and), has undertaken a thorough review of its operations from the environmental point of view. (B.C. Hydro, 1974, p. 18).

In order to fulfill its commitment to establish an overall environmental watchdog in the province, the NDP government created the Environment and Land Use Committee Secretariat in 1973. The Environment and Land Use Committee of Cabinet had originally been established by the Social Credit government in 1969 as a forum for the resolution of environmental and land use conflicts at the highest level, with the Committee being given formal legal standing in 1971. By adding a permanent secretariat, the NDP's major resource policy maker, Bob Williams, had created an agency capable of subsuming the activities of both line departments and Crown corporations under a broad environmental planning framework. According to Jeremy Wilson:

Public service commission constraints on staffing were swept aside by Williams and his powerful subordinates, and ELUCS commenced operations in 1973 with two divisions - Regional (later changed to Resource) Planning and Special Projects - and an establishment staff of 23 positions. While there was substantial overlap in the type of project assigned to the two divisions, the official line was that the Special Projects Unit concentrated on "developing techniques to resolve classes of resource use conflict such as benefit-cost analysis and environmental impact assessment" while the Resource Planning Unit applied "these techniques on a broad regional scale to evaluate and propose integrated resource use plans" (Wilson, 1983, p. 4).

The work, undertaken by the Special Projects Unit of ELUCS, had two principal aspects. The first was the creation of a more formalized referral process under which B.C. Hydro's socio-environmental impact
studies were circulated to other government agencies for review and criticism, with Hydro being expected to remedy major deficiencies with further work.

The second was the development of formalized guidelines governing impact assessment, transmission line routing, cost benefit analysis and mitigation/compensation. While some of these guidelines were put in place fairly quickly, those governing cost-benefit analysis were not completed until 1977, and those for mitigation/compensation until 1980.

In addition, resource conservation branches of government, like Fish and Wildlife, were given much more freedom to challenge openly B.C. Hydro’s activities than they had possessed in the past.

The first application of all these changes occurred when Water License hearings were held on B.C. Hydro’s proposed 7 Mile Dam on the Pen d’Oreille River. This project, a relatively small one developed to take advantage of the extensive storage already created by the Columbia River Treaty, involved a number of adverse environmental consequences. The new dam would destroy a fairly scenic free flowing river, flood approximately 500 acres of river bottom, and lead to losses of both fish and wildlife. These issues were aired during a four day Water License hearing in July, 1974, with strong concerns being expressed by the Fish and Wildlife Branch, environmental interest groups, and local residents. (Province, July 24, 1974, p. 14; July 25, 1974, pp. 10, 17; July 26, 1974; O’Riordan, 1975).

Although the Water Comptroller’s decision, issued in August, 1974, approved Hydro’s plans, it imposed conditions on the use of access roads and ordered several fish and wildlife mitigation measures to be undertaken in cooperation with the Fish and Wildlife Branch (Province, Aug. 20, 1974, p. 12, O’Riordan, 1975).
This outcome, while representing a clear improvement over the approach of the W.A.C. Bennett years, was not entirely satisfactory to either environmental or local interests. Complaints were raised concerning the superficial nature of Hydro's impact assessment work, the limited nature of its public consultations, and its unwillingness to compromise on the location of a disruptive access road. More fundamental, however, were the concerns expressed on the overall scope of the consideration given to environmental questions. Hydro's presentation to the Water License hearings had stressed both the urgency of the need for new generating capability and the lack of any other alternative means of providing it (Province, July 24, 1974, p. 14; July 25, 1974, p. 17).

While the public intervenors were unprepared to deal with this argument, they resented the lack of attention given to environmental questions in Hydro's larger generation planning process, and the Water Comptroller's decision had emphasized that the policy issues raised by this broader perspective were outside his jurisdiction and competence (Province, August 20, 1974, p. 12). Graham Kenyan, Vice-president of the B.C. Wildlife Federation was a particularly vocal critic of the lack of attention being given to these broader issues. Even before the hearings had commenced, Kenyan argued that:

> When the commitments have already been made, then public involvement can be little more than academic argument between a defensive B.C. Hydro and a frustrated even hostile public. . . . The basic decisions have already been made. The public is left with the options of attempting to salvage from whatever losses may result or else opposing the project until proper environmental and social studies can be concluded. (Vancouver Sun, July 20, 1973, p. 31).

Subsequently, he emphasized that:

> We attempted to break out of the piecemeal approach to power projects: the fallacy of
environmental impact studies of individual dams, when no one is looking at the enormous long-term environmental and social impact of maintaining the energy growth forecast...

We see no move by the provincial government toward a policy or objectives that would modify...a rate of power growth which clearly cannot be sustained indefinitely without severe effects on the environment and high costs in terms of resource losses (Vancouver Sun, January 23, 1975, quoted in Wilson, 1983, p. 13).

7.4 Power Planning and the NDP II: Electricity Supply and Demand

The issues which Kenyan had raised in his objections to the planning process surrounding 7-Mile were related to the key questions of electricity supply and demand. First, were the load growth projections on which Hydro's system planning was based realistic ones, and if so, could the factors underlying them be altered to achieve a more manageable power generation program? Second, to what extent could or should B.C. Hydro's overall generation planning be adjusted to take account of the growing appreciation of the costs of hydro developments, both direct and indirect?

The NDP administration found it much harder to come to grips with these more fundamental problems than it had with the issue of project-specific environmental impact. As we have seen, the government had expressed initial concerns that this growth rate had been due as much to the policies of both Hydro and the previous government as it had to inexorable economic trends. However, Hydro's load forecasts of both late 1972 and late 1973 had continued to project demand growth of around 9.5 percent, and a statement issued by the utility in early 1973 emphasized that:

Some look at this forecast as a "target" but the utility uses it as a method of measuring what society needs. It is our most realistic estimate of what is going to happen; it's not an objective. If society doesn't like it then it
will have to take steps to stop it (Province, Jan. 17, 1973, p. 11).

Bob Williams, the Minister responsible for B.C. Hydro, did not seem so sure, emphasizing in the early 1974 that:

I'm not the least convinced that these demand projections have to be the way they are...I've been on Hydro's tail in recent months to start doing some more research work on the demand end...I'm convinced that we can modify demand at least, because I believe that price affects demand and the question mark is really in changes in the rate structure. I suspect that hydro-electricity because it is relatively cheap compared with other energy sources now is relatively easy to waste (Vancouver Sun, Jan. 17, 1974, p. 6).

William's concerns, however, were not shared by the NDP's new Hydro chairman, David Cass-Beggs. The latter's views were identical to those of his staff, emphasizing that a steady shift in energy consumption patterns from fossil fuels to electricity would keep demand growth at between 8 - 10 percent for at least 30 years, and that this trend should not be discouraged by a revision to the rate structure (Province, May 9, 1973, p. 13; B.C. Hydro, 1975a, Introductory Letter, p. 8). Hence, Hydro's current forecast approach, according to Cass-Beggs, constituted a "...rational basis for specific short-range planning and for general long-term planning" (Province, December 21, 1973, p. 22).

When it came to the development of a strategy to meet this growth, B.C. Hydro's management had based its 1973 system plan on the 1972 Energy Board report, despite the cool reception that the report had received from the new NDP government. This plan called for the immediate start of construction on two projects, the 700 MW. Site 1 dam on the Peace and the 500 MW. 7-Mile installation on the Pen-d'Oreille. These were to be closely followed by the development of two new projects on the Columbia near Revelstoke. The plan called for the Kemano II project to be brought on
stream in the early 1980s, followed by Peace Sites C and E in the mid 1980s and Hat Creek for the end of the decade (B.C. Hydro, 1975a).

Although, again this approach had been publicly endorsed by chairman Cass-Beggs, the possible development of Kemano II and other large scale hydro projects began to attract concern. In addition, the trend toward higher inflation and interest rates evident during the late 1960s and early 1970s led some to question whether an all-hydro policy through 1985 still made economic sense. Bob Williams, in particular, thought that renewed consideration should be given to advancing the Hat Creek coal project.

The NDP government, as had its Social Credit predecessor, decided to submit these basic questions of electricity demand and supply to comprehensive rational analysis. This time, however, the process selected was completely internal to Hydro, with David Cass-Beggs formally constituting a Task Force on Future Generation and Transmission Requirements. This Task Force’s general terms of reference instructed it.

To prepare alternative plans to meet B.C. Hydro load requirements to 1990, taking into account probable interest rates, changing fuel costs, and escalation. Approaches will include minimizing capital expenditures, minimizing the impact of transmission system extensions, conservation of energy, reduction in load forecast and assessment of reliability of energy supply and dependence on future fuel and labour costs (B.C. Hydro, 1975a, p. 1).

In approaching a re-examination of the load growth forecasts underlying its planning activities, the more detailed terms of reference had asked the Task Force to "develop one load forecast based on existing criteria and practice and one using restrictive policies" (p. 1). However, this instruction was ignored and the Task Force devoted the bulk of its attention in the forecasting area to validating its existing approach.
A United States consulting economist, John W. Wilson, was hired to examine the relationship between electricity growth rates on the one hand and economic growth and power rates on the other. Wilson, using price and consumption data for British Columbia over the previous ten years, estimated that residential demand elasticity was relatively low, ranging between -0.16 in the short to -0.35 in the long term. On the other hand, the elasticity of non-residential demand was estimated to be quite high, around -1.2 (Osler, 1977, pp. 74-75).

Combining these estimates with the observed historical relationship between economic activity and electricity use and a number of other variables, Wilson derived two electricity forecasting equations (B.C.Hydro, 1975a, Exhibit 3-10, p. 50). However, neither the price elasticities nor the forecasting equations derived from them were used by the Task Force. Rather, it developed a so-called "econometric forecast" based solely on the observed historical relationship between electricity use and the growth of real provincial gdp. Applying this overall electricity coefficient to a projected real gdp growth of 5.9 percent produced a load growth forecast of 8.6 percent, and since, according to the utility, this estimate was identical to that derived by B.C. Hydro's conventional techniques, this growth rate was adopted for purposes of generation planning.

The above forecasting effort really represented an attempt to validate the fairly detailed extrapolation technique of Hydro's utility forecast with reference to a much more simplistic extrapolation method based on a static relationship with gdp. The presentation of the exercise was also misleading. For one thing, a calculation of the demand projection numbers adopted reveals a 9.3 percent growth rate, calculated on a 1974 base, not an 8.6 percent rate (identical to hydro's previous forecast). Second, by its extensive discussion of econometric techniques, the report conveyed to
all but the most careful reader the false impression that they had actually been used to validate hydro's traditional forecasting methods.

The approach adopted by the Task Force to supply the demands projected by its forecasting efforts essentially followed that used by the Energy Board in its 1972 report. Cost estimates for the inventory of potential projects originally compiled in the earlier study were updated, and the comparative costs of different project sequences were projected using computer modeling and discounted cash flow techniques. While the conservative energy capability assumptions used by the Energy Board report were retained, project economics were calculated on a nominal, rather than a real basis and transfer payments like water taxes and municipal grants included.

The outcome of this evaluation exercise was a new generation plan which relied overwhelmingly on thermal rather than hydro sources. After the completion of the Revelstoke hydro development (now designed as one large project rather than two smaller ones), Hat Creek would be brought into production in several stages, replacing both Kemano II and Sites C and E on the Peace. In addition, a thermal plant previously proposed for Vancouver Island would be replaced by a 500 kv. overhead line and transmission standards would be revised to achieve additional economies.

Apart from the fact that the B.C. Hydro Task Force Study included both taxes and inflation in their capital cost estimates, there appears to have been no real change in the relative ranking of major generation alternatives from the previous Energy Board study. Cass-Beggs, in his summary of the Task Force's work, justified the change in system plan on the basis of a $1 billion cash saving between 1975 and 1995, and on the grounds that "the combination of inflated capital costs and high interest rates thus led
to a favourable position for coal in the analysis, compared with hydro...

"(B.C. Hydro, 1975a, Covering Letter, p. 6).

However, the $1 billion saving was highly misleading because most of it was generated by the substitution of thermal plants for more capital intensive hydro projects, and would be offset by higher operating costs after 1990. In addition, both higher inflation and rising nominal interest rates were irrelevant to the relative ranking of hydro and thermal plants. As illustrated graphically in Figure 7.1, the key consideration was the level of real-interest rates (adjusted for inflation) or more precisely, the real opportunity cost of capital as reflected in the choice of an overall project discount rate.

The major departure of the Task Force's economic analysis from that of the Energy Boards was, in fact, the use of a higher real discount rate of 9.5 percent (15 percent including inflation) compared to the Energy Board's 6 percent (or 9.5 percent under comparable inflation assumptions). As illustrated by Figure 7.1, analysis using the lower rate shows Hat Creek to be significantly more expensive than Revelstoke and Kemano II, and only slightly cheaper than Site C, whereas that using the higher rate shows Hat Creek to be comparable to Revelstoke and Kemano II, and significantly cheaper than Site C. Hence, given both the environmental controversy which would be generated by Kemano II and the complications raised by Alcan's water licenses, Hat Creek now seemed more attractive.

Despite assurances that "...allowances for the direct costs of mitigation or compensation of... (environmental) effects will be taken into account in project evaluations," the economic analysis on which the new system plan had been produced used the same minimal information base as the previous Energy Board effort. Subsequent environmental studies had been confined to the projects under immediate consideration (7-Mile and
FIGURE 7.1
COMPARATIVE ENERGY COSTS OF FUTURE PROJECTS IN BRITISH COLUMBIA
Based on 1974 Capital Costs adjusted to a Capacity Factor of 60%, including Transmission Costs and effects of a 5% Annual Inflation.

*Projects in this range listed in order of lowest energy costs

Site 1) and there really existed no basis on which to calculate the impacts of projects like Revelstoke, Site C, Kemano II or the Liard. Not only were sufficient coal reserves for the development of 4800 MW of capacity at Hat Creek not yet established, but the report itself admitted that investigations were still "...in progress as to methods of obtaining cooling water and meeting pollution control requirements both for the first stage of development and the ultimate full scale development of 4800 MW...as presently contemplated" (B.C. Hydro, 1975a, p. 109).

In summary, B.C. Hydro's 1975 Task Force Report was problematical, not so much because of the questionable nature of some specific technical assumptions employed. Rather, its key problem lay in its overall conception of the power planning problem. A continuation of the rapid energy growth of the 1960s was viewed as inevitable, leaving energy policy makers with two choices. One was that they could approve and support Hydro's efforts to meet this growth, imposing the level of mitigation and compensation they deemed appropriate. The other was that they could intervene to limit energy growth, thereby raising the possibility of rationing and resulting shortages. Not only would society pay for this latter course in terms of lower economic growth, but rationing "...could impose considerable personal and economic hardship and is not recommended except as an extreme emergency measure" (B.C. Hydro, 1975a, p. 114).

This version of the power planning problem really gave policy makers little choice but to acquiesce in Hydro's agenda. However, it glossed over the reality that the electricity demand and supply situation was becoming increasingly unstable. In the first place, if as the Task Force had asserted, the real opportunity cost of capital was 9 1/2 percent, how could
Hydro continue to earn a nominal return on capital of only 4–5 percent (which, given the inflation rates prevailing at the time, represented a negative real return)?

Even the achievement of a real return of half the level suggested by the Task Force would have a substantial impact on rates, and this impact would be compounded by the rising real costs of new energy sources illustrated in Figure 7.1. According to the elasticity estimates presented by Hydro's own consultant, such rate increases would be expected to have at least a proportionate effect on the growth of the non-residential loads which accounted for about 70 percent of the utility's total demand.

These factors were compounded by changes in the province's economic performance and structure. The rapid economic growth characteristic of the 1960s had become much more uncertain by the mid 1970s, and as shown in Table 7.1, these changes had interrupted the steady pattern of B.C. Hydro's load growth. Changes in non-residential load growth rates after 1973 were particularly pronounced, and were actually negative for the bulk category.

The analysis of Chapter III showed that a pronounced shift away from both rapid expansion in the staple sector and the trend toward electricity-intensity were already becoming evident. Although these trends are more striking in hindsight than they were at the time, it was evident even then that the vast expansion of forestry had brought the province closer to the limits of its resource base, and that the mining investment boom of the 1960s had largely run its course. Hydro's Task Force Report had admitted these changes in passing, only to ignore their impact and to assert, without presenting evidence, that they would be counteracted by a more general trend toward electricity intensity (B.C. Hydro, 1975a, p. 40).

If the above perspective was correct, then it was Hydro's under-pricing of its product, its exaggerated load forecasts and its overly
<table>
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<tr>
<th>Fiscal Year End</th>
<th>Residential (000 gwh)</th>
<th>Percent Increase</th>
<th>General (000 gwh)</th>
<th>Percent Increase</th>
<th>Bulk (000 gwh)</th>
<th>Percent Increase</th>
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<td>9.2</td>
<td>6.848</td>
<td>12.0</td>
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<td>10.0</td>
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<td>10.1</td>
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<td>5.6</td>
<td>6.808</td>
<td>-11.7</td>
<td>23.538</td>
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SOURCE: B.C. Hydro, ANNUAL REPORT, Various Years.
ambitious system planning which threatened the province with both environmental and economic hardship. While the NDP government's policies did result in the emergence of an ongoing challenge to Hydro's load forecasting assumptions, they were either unable or unwilling to come to grips with the electricity pricing issue.

7.5 Power Planning and the NDP III: The Move Toward a More Reliable Energy Forecasting Capability

The NDP's formal abolition of the B.C. Energy Board in late 1972 was followed, in the spring of 1973, by the passage of the Energy Act, creating a new B.C. Energy Commission. The Commission took over both the regulatory functions of the old Public Utilities Commission and the advisory functions of the old Energy Board. Thus it was delegated fairly wide powers to license all private utilities within provincial jurisdiction, conduct investigations into the petroleum products industry (with the right to hold hearings and examine company books), set prices for all petroleum products, and represent the province before the National Energy Board. Its advisory mandate was equally broad, and included areas such as (1) the nature, quality and extent of known energy resources; (2) the promotion of discovery, conservation and prudent use of energy (with regard to present and future requirements and the protection of the future environment); (3) the export of energy resources from the province; and (4) the revenues accruing to the government from energy resources (Vancouver Province, Mar. 22, 1973, pp. 1-22).

In general terms, the new Commission represented an attempt by the more activist NDP government to strengthen both its policy making and regulatory presence in the energy field. The major focus of attention in this regard, however, was the petroleum industry, in which the private
producing and pipeline companies, along with the National Energy Board, had always played the predominant role. The Commission's mandate in the electric power area was much less certain since the Energy Act had followed the previous patterns and exempted the B.C. Hydro and Power Authority from external regulatory control. The new government seemed far more anxious to establish its control over private as opposed to public corporations, and in any event, the government did exercise direct control over Hydro through Cabinet representation on the Board of Directors.

The role of the British Columbia Energy Commission in electric power forecasting arose directly out of its responsibility (under section 19 of the Energy Act) for preparing province-wide energy forecasts at Cabinet direction. In November, 1973, a Cabinet Order in Council was issued authorizing such a study, and it was released in early 1975. In both methodology and results, the possession of a wide-range of independent expertise combined with the "total energy" mandate of the commission resulted in a radical departure from the conventional utility approach followed by both B.C. Hydro and the old Energy Board. For the first time, it became possible to examine, in some detail, the relationship between energy as a whole, and the economic and social life of the province.

The Commission's approach began with the adoption of four end-use categories; residential, commercial, industrial, and transportation. Thus energy was explicitly viewed as a derivative of trends in specific areas of economic activity. Each end-use category was examined in some detail and future sectoral demand was calculated by "...estimating the total energy requirements, and then the breakout into future requirements by energy type" (BCEC, 1974, p. 71.

The Commission was careful to emphasize that the results of any energy forecast depended on the assumptions made, and thus developed several
alternate sets of such assumptions. Three different population growth rates were utilized along with two industrial growth rates based on medium and high pulp and paper production forecasts. In addition, two price assumptions concerning the relative prices of oil and natural gas were made, one assuming gas prices 10-15 percent lower than oil (Assumption A) and the other assuming full price parity (Assumption B). The "best guess" forecast assumed medium population growth, medium pulp and paper production, and price Assumption A.

Other assumptions were that (1) electricity would remain substantially more expensive than petroleum products, (2) no new government measures to curtail energy demand would be introduced, (3) no gas pipeline would be built to Vancouver Island, and (4) all energy prices would continue to rise in real terms (BCEC, 1974, pp 72-74).

The methodology employed in estimating residential demands included projecting population growth under the three assumptions outlined above, calculating the growth of new households, and using historical records to calculate a total per household energy co-efficient. This co-efficient was based on three more specific uses, space heating, water heating and appliances, and took into account factors such as the relative ratio of apartments to single family dwellings. The Commission estimated that this residential co-efficient had risen steadily from 122.8 million Btu's per household in 1966 to 142.3 in 1971, but had leveled off during the early 1970s. By estimating the changes in the underlying trends, the future value of this co-efficient was projected to vary between 143.5 and 144.5 Btu's per household between 1974 and 1991, and rise to 150.5 by 2006. By multiplying this value by the three household projections derived from the population growth assumptions, total energy increase of 2.0, 2.8, and 3.4
percent a year were estimated. Between 1973 and 1986, these rates were 1.9, 3.0, and 3.9 percent (BCEC, 1974, pp. 99-115).

The demand for the major fuels was then determined by deriving fuel share assumptions based on each of the three specific residential end uses, space heating, water heating and new appliances. Historical shares were modified by changing trends in new residential construction (excluding new insulation standards) and appliance use. It was estimated that between 1973 and 2006, the share of refined petroleum products would drop from 45 to 23 percent, natural gas would rise from 34 to 46 percent and electricity would rise from 18 to 28 percent (under price assumption A). Thus, electricity demands under the best guess estimate were forecast to rise at an average annual rate of 4.8 percent between 1973 and 1986, substantially higher than the 2.8 and 3 percent rates for residential energy growth as a whole (BCEC, 1974, Table 4.11b, p. 117).

Because the commercial category is largely a residual one with very few "typical" attributes, the initial forecasting methodology employed by the Energy Commission in this area was much less elaborate. A simple relationship between commercial requirements, and population and household growth was developed, and a "per household" consumption figure calculated. Historical data indicated that this figure had risen from 91.5 million BTUs in 1966 to 107.2 in 1971. Commercial energy use per household was predicted to continue to rise (at a somewhat lower rate due to higher energy prices) to 124.4 in 1975, 142.4 in 1986, and 172.4 in 2006 (BCEC, Table 4.13, p. 124).

On this basis, the medium population estimate produced an overall energy growth rate of 3.8 percent per annum to 2006 and 4.4 percent to 1986. Natural gas was expected to increase its share of the commercial market from 34 to 46 percent, petroleum to decline from 45 to 23 percent.
(under price assumption A), and electricity to increase from 18 to 28 percent. Thus, commercial electricity consumption was expected to increase at a slightly higher rate of 3.9 percent to 2006 and 4.6 percent to 1986.

Both the importance of the industrial sector for total provincial energy demands and the relative predominance of a number of large industries led the commission to examine in some detail the relationship between production and energy consumption. In broad terms, the sector as a whole was broken into its component industries, the level of future production was projected, and an estimate of energy requirements per unit of output was made. These were then summed to produce a forecast for the industrial sector as a whole. Because of its relative importance, the Energy Commission spent a great deal of time and effort calculating the future energy requirement of the pulp and paper industry. Briefly, the method employed began by estimating the future availability of raw materials (roundwood, chips and hog fuel), future market trends and expansion plans, and the resulting production levels. Medium (best guess) and high production estimates were considered based largely on future raw material availability (BCEC, 1974, pp. 146-178).

The best guess forecast saw production increasing at rates substantially lower than historic trends due to the approaching limits of forest utilization. Energy estimates of 15 million BTUs per ton of pulp and 10 million BTUs per ton of paper were estimated, and total energy growth of 1.3 percent (medium growth) to 1.4 percent (high growth) calculated. Assuming the increased use of hog fuel, both natural gas and petroleum consumption were seen as actually falling during the forecast period, with a shift toward paper production approximately doubling electricity requirements from 15.6 trillion BTUs in 1973 to 32.7 in 2006 (BCEC, 1974, Table 5.19, p. 177).
In regard to both metal refining and mining, the large scale of production typical of these industries necessitated several specific assumptions concerning new growth. In the former sector it was assumed that Alcan would not proceed with its new Kemano II Dam, that two major copper smelter refinery complexes and a direct reduction steel mill would commence production in 1978, and that a larger blast furnace type steel mill would begin production in 1991. In mining, extremely large increases in coal production (7.6 to 216. short tons by 2006) were assumed along with a doubling of copper output by 1986. Thus, total energy requirements for primary metals were projected to more than double during the forecast period from 39 to 93 trillion BTUs, while mining requirements were estimated to grow from 23.5 to 124.5 trillion BTUs. In primary metals, self-generated electricity was forecast to increase marginally (26.8 - 29.2 trillion BTUs) while purchased electricity would triple from 6 to 18.4 trillion BTUs. At a constant share of 39 percent, electrical consumption in mining was predicted to grow from 9.2 to 48.6 million BTUs by 2006 (BCEC, 1974, Table 5.35, p. 189). Much the same procedures were employed for the other major industrial sectors, although for diverse categories like food and beverages, and other manufacturing, the estimates were rather rough ones. This approach to forecasting, while crude in some respects, was far more sophisticated than that employed by B.C. Hydro, and was progressively refined in its subsequent 1976 and 1978 versions (BCEC, 1976 and 1978).

Despite the fact that the Energy Commission’s industrial growth assumptions were rather optimistic and it did not systematically consider the impact of rising electrical prices, it produced electricity demand forecasts which were dramatically lower than those previously advanced by both Hydro and the old Energy Board. Whereas the 1971 Energy Board Report
had seen province-wide demand for electricity increasing at a rate 7.6 percent to 1990, the Commission projected a 4.1 percent growth rate to 1986, and 3.6 percent thereafter. As illustrated in Figure 7.2, this difference in projected growth rates represented an enormous discrepancy in energy requirements; 31 billion kWh by 1986 and about 48 billions kWh by 1990. By comparison, total provincial generation in 1973 was about 32 billion kWh (BCEC, 1974; and BCEB, 1972). The Energy Commission’s second report, issued in early 1976, estimated load growth for B.C. Hydro’s service area at approximately 5 percent, compared to Hydro’s own estimate of around 9.5 percent, producing a difference of about 30 billion kWh by 1990 (BCEC, 1976, Volume I, Figure VII, p. 25).

With the release of the Energy Board’s first report in 1975, its chairman, Dr. Andrew Thompson, did not hesitate to draw the attention of both the provincial Cabinet and the public to these differences:

We are simply questioning the growth rates contained in the 1972 Energy Board report. We think it overstates the requirements in a number of industrial areas... the difference between these forecasts is of the greatest significance in view of the reported $7.6 billion 10-year B.C. Hydro capital expenditure program (Province, Jan. 31, 1975, p. 1; Feb. 1, 1975, p. 1).

7.6 Power Planning and the NDP IV: The Price of Electricity

When the NDP government came to power in late 1972, it was faced with a growing financial problem at B.C. Hydro. It will be recalled that the B.C. Energy Board’s original 1961 report on the Columbia and Peace projects had warned that the development of neither river system would result in dramatically lower power costs. Rather, it would simply prevent power costs from rising dramatically in response to the growing scarcity of other suitable generating sources. This was not, however, the political message of the W.A.C. Bennett government, and as we have seen, that government
FIGURE 7.2


FORECASTS COMPARED

combined low industrial power rates with a well-publicized residential rate reduction program.

As illustrated by Figures 6.1, and 6.2 of the previous chapter, the results were a sharp decline in real power rates and an equally sharp deterioration in Hydro's financial performance. While the belated across-the-board rate hikes introduced toward the end of the Social Credit administration had temporarily reversed this trend, even larger increases were needed if further financial deterioration was to be avoided. As shown in Table 7.2, Hydro's cost increases between 1973 and '76 were substantial, averaging 15 percent in 1973/74, 17 percent in 1974/75, and 24 percent in 1975/76.

Despite both this situation and the seeming appreciation by Bob Williams, the Minister responsible for Hydro, of the link between energy growth and price, the NDP government was extremely reluctant to deal with the rate problem. It was not until mid 1974, a year and a half after taking office that the NDP introduced a rate increase. Residential rates were boosted by about 20 percent and bulk industrial rates by about

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<td>1976</td>
<td>24.3</td>
<td>33.2</td>
<td>37.1</td>
<td>25.1</td>
<td>10.7</td>
</tr>
</tbody>
</table>

70 percent. However, while the hike for domestic consumers was immediate, that for intermediate bulk users required one year's notice and that for large bulk users, two years (B.C. Hydro, 1982; Province, July 20, 1974, p. 1). A year later, in September 1975, residential rates were boosted a further 12 percent, with no increase in industrial rates.

The impact of this procrastination on B.C. Hydro's finances is shown in Tables 7.3 and 7.4. As shown in Table 7.3, the traditional pattern of cross subsidization discussed above (see pp. 252-253), was not altered significantly during the NDP years, even when the substantial boost in both residential and bulk rates took effect in the 1976/77 fiscal year. As shown in Table 7.4, B.C. Hydro's declining financial performance, after being halted by the rate hikes of 1971, deteriorated again between 1972 and 1976. Return on capital employed sunk to an all time low of 4.3 percent in 1975, and 1976 revenues were barely adequate to cover the Authority's cost of debt. The utility's lack of revenue growth, when combined with a doubling of capital expenditures between 1973 and 1975, led the percentage of these expenditures financed from operations to plunge from over 40 percent between 1970 and 1973 to a low of 12 percent in 1976.

The result was a doubling of Hydro's borrowing requirements and an increasing reliance on the funds raised in outside capital markets. Despite the NDP government's announced intentions, Hydro's $238 million borrowing requirements for fiscal 1973/74, were met entirely through the use of Canada Pension Plan and provincial funds. However, the $308 million in borrowing requirements for 1974/75 forced "...B.C. Hydro's entry into the open market for financing for the first time since 1967," with 74 percent of its borrowing coming from external market sources. While the reliance on external financing for 1975/76 was lessened by the decision of the newly-elected Social Credit administration to allocate $215 million of its
### TABLE 7.3

**B.C. HYDRO**

**CROSS SUBSIDIES ON DOMESTIC SALES**

1972/73 - 1976/77

$1971

<table>
<thead>
<tr>
<th>Year Ending</th>
<th>Bulk</th>
<th>General</th>
<th>Residential</th>
<th>Irrigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1973</td>
<td>(2877)</td>
<td>16,491</td>
<td>(12,085)</td>
<td>(727)</td>
</tr>
<tr>
<td>1974</td>
<td>(1773)</td>
<td>12,521</td>
<td>(10,307)</td>
<td>(707)</td>
</tr>
<tr>
<td>1975</td>
<td>(2780)</td>
<td>12,425</td>
<td>(8,892)</td>
<td>(454)</td>
</tr>
<tr>
<td>1976*</td>
<td>(7031)</td>
<td>15,773</td>
<td>(8,842)</td>
<td>(253)</td>
</tr>
<tr>
<td>1977</td>
<td>(2195)</td>
<td>12,739</td>
<td>(10,027)</td>
<td>(825)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>(16,656)</td>
<td>69,949</td>
<td>(50,953)</td>
<td>(2966)</td>
</tr>
<tr>
<td><strong>Avg.</strong></td>
<td>(3,331)</td>
<td>13,990</td>
<td>(10,191)</td>
<td>(593)</td>
</tr>
</tbody>
</table>

**NOTE:** See Table 6.2

**SOURCE:** B.C. Hydro, Cost of Service Records; Stats Canada, GNE Price Deflation.
<table>
<thead>
<tr>
<th>Year Ending</th>
<th>Operating Margin %</th>
<th>Return on Capital %</th>
<th>Interest Coverage %</th>
<th>Funds Raised by Operations %</th>
<th>Capital Expenditures $ Millions</th>
<th>Net Increase of Long Term Debt $ Million</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>-0.2</td>
<td>4.7</td>
<td>0.99</td>
<td>33</td>
<td>138</td>
<td>139</td>
</tr>
<tr>
<td>1971</td>
<td>5.8</td>
<td>5.4</td>
<td>1.15</td>
<td>41</td>
<td>164</td>
<td>147</td>
</tr>
<tr>
<td>1972</td>
<td>5.5</td>
<td>5.4</td>
<td>1.14</td>
<td>45</td>
<td>157</td>
<td>142</td>
</tr>
<tr>
<td>1973</td>
<td>6.3</td>
<td>5.8</td>
<td>1.17</td>
<td>43</td>
<td>182</td>
<td>115</td>
</tr>
<tr>
<td>1974</td>
<td>3.8</td>
<td>5.2</td>
<td>1.11</td>
<td>23</td>
<td>332</td>
<td>167</td>
</tr>
<tr>
<td>1975</td>
<td>0.8</td>
<td>4.3</td>
<td>1.02</td>
<td>15</td>
<td>464</td>
<td>420</td>
</tr>
<tr>
<td>1976</td>
<td>0.3</td>
<td>4.3</td>
<td>1.01</td>
<td>12</td>
<td>590</td>
<td>447</td>
</tr>
<tr>
<td>1977</td>
<td>6.2</td>
<td>5.6</td>
<td>1.15</td>
<td>23</td>
<td>548</td>
<td>640</td>
</tr>
</tbody>
</table>

SOURCE: B.C. Hydro, ANNUAL REPORT, Various Years.
own provincial funds to Hydro, market borrowing still accounted for 44 percent of the total $541 million requirement. Although the immediate financial impact of these changes was masked by Hydro's capitalization of interest on new construction, this growing reliance on higher cost external funds, plus the general trend toward higher interest rates, made future rate hikes inevitable.

Apart from its focus on the industrial sector in its rate increases, the NDP seemed equally reluctant to alter the existing structure of power rates. As we have seen, bulk rates in particular were heavily slanted toward capacity charges, with a relatively inexpensive energy component of 2.5 mills per kWh (see above p. 239 - 240). Similarly, the second block of the two-tier residential structure had a kWh charge of only one third that of the first block. This structure had originally been put in place during construction of the Peace and was well suited to the economic circumstances of the period. The costs of the energy which was being provided by this development were almost entirely fixed, and there was a need to ensure that this energy could be absorbed by the market within a reasonable time.

The NDP's rate hikes of 1974 preserved and even accentuated this structure. For large bulk users, the capacity charge was hiked by 130 percent from $1.74 to $3.95/KVA, whereas the energy component was raised by only 20 percent from 2.5 to 3.0 mills/KWh. In the residential area a single percentage increase applied to both blocks.

Retention of the existing structure, particularly in the industrial area was preferred by B.C. Hydro's management because it produced a greater degree of revenue stability. From an accounting point of view the costs of providing energy via hydro sources were still largely fixed, so that any downward fluctuations in bulk energy demands could result in significant losses to the utility. For example, as shown in Table 7.3, a prolonged
pulp and paper strike in 1975 led accounting losses for the bulk sector to approximately double.

From a broader economic perspective, however, this rate structure had serious defects. In a predominantly hydro-based system most of the costs of a new plant are associated with the energy rather than capacity aspects of demand. Whereas increased capacity can be met fairly easily by adding new generators at existing storage facilities, increased energy must be provided through the construction of completely new storage and generating plants. Especially when new energy must be provided from more distant hydro sites, much of the cost of transmission is also attributable to the energy component of demand.

Hence, under the prevailing capacity-dominated system, power consumers were being charged a rate well below that required to meet the costs of the plants which would have to be constructed to fulfil their demands. This marginal-cost pricing argument strengthened the view that projected load growth was being based on unrealistically low price assumptions, and that a more economically sound rate structure would significantly lower this growth. While this argument was not really addressed by the NDP government, it would become an increasingly important element of the electric power controversy in British Columbia.

7.7 The NDP Government vs. B.C. Hydro: The Emergence of an Entrepreneurial Crown Corporation

In our review of the general literature on political economy and public policy, we have observed the importance given to the tendency of institutions to develop their own organizational objectives; objectives which may inhibit the ability of those using such institutions to adapt their activities to changing circumstances. Hence, for example, Galbraith
saw the emergence of bureaucracy within the large corporation as significantly undermining key assumptions about the market economy, while many public choice theorists have questioned the traditional assumption that governmental institutions are merely instruments of broader public policy goals.

In his study of economic policy in New Brunswick, Robert Young (1982), has stressed the emergence of a sense of entrepreneurial self-identity within the New Brunswick Power Authority as a key element in the economic directions taken by the province. We have already seen that this same sense of organizational self-awareness developed within the British Columbia Power Commission as a result of the efforts required to meet the very rapid load growth of the 1950s. This emergence of a strong, entrepreneurial Crown corporation, however, was halted when it came up against the conflicting political objectives of a strong Premier and subsequently, by the merger of the Commission with its private arch rival. However, despite the persistence of this organizational schism through the 1960s, the impressive engineering accomplishments of B.C. Hydro during the period laid the groundwork for its re-emergence as a cohesive organizational entity with a corresponding sense of institutional purpose. As we saw at the end of the last chapter, the B.C. Energy Board’s system planning exercise of 1970-72 had given this growing self-awareness a concrete focus in terms of both an approach to planning and a long term development agenda.

It is perhaps ironic that the culmination of these tendencies should occur under an NDP government which had stressed its clear intention to impose its own priorities on B.C. Hydro’s activities. Nevertheless, a number of policy decisions of the NDP had precisely this effect.
One such decision was the choice of David Cass-Beggs as Hydro chairman. His credentials centred on his experience as chief power executive under the NDP governments of Saskatchewan and Manitoba, but this experience had made him much more sympathetic to the viewpoint of B.C. Hydro's staff than to that of his new political masters. While Gordon Shrum had occasionally criticized Premier W.A.C. Bennett's decisions in public, Cass-Beggs expressed his opposition to virtually all of the NDP's policy ideas. Not only was rapid load growth inevitable, he asserted, but this growth should not be discouraged through the rate structure. He was also a strong proponent of Hydro's independence from external control, arguing that:

"Given intelligent government in British Columbia, I don't see any reason for having a multiplicity of boards and regulatory bodies with overlapping jurisdictions which work against each other. . . I expect we will have a straight-through sort of system in which approvals are logical and reasonably obtained provided we have a sound project to present. . . If Hydro manages its affairs properly, the relationship with government will be quite loose and relaxed. . ." (Province, May 10, 1973, p. 23).

In Cass-Beggs' view, B.C. Hydro's problems revolved not so much around its fundamental role and independence as around its internal management structure (Province, May 9, 1973, p. 13). Hence, in June, 1973, a corporate re-organization along the lines recommended by the Energy Board Report was approved by Hydro's Board of Directors. As illustrated in Figure 7.3, relations between the chairman and the Crown corporation's operating divisions were mediated by a general manager and a number of assistant general managers with managerial authority for particular functional areas. In the words of Hydro's 1974 Annual Report, "the aim of the new structure is to provide a clear line of responsible management,"
FIGURE 7.3
B.C. Hydro Organization, 1973

Board of Directors

Chairman

Transportation Management Committee
Legal Division

General Manager

Assistant General Manager
Electrical Operations

Assistant General Manager
Engineering

Assistant General Manager
Administration & Finance

Assistant General Manager
Gas

functionally organized, decentralized and permitting maximum delegation of authority" (B.C. Hydro, 1974, p. 10). As Cass-Beggs elaborated:

I don’t think every decision should be channeled to the top for a yes or no and then back down again. I think that is an old fashioned management method. You have to set up a structure to enable decisions to be made by the people who know most about them. We may run the risk of making some wrong decisions at the right level but that’s better than restricting decisions at different levels for fear of making a wrong one (Vancouver Sun, June 14, 1973, p. 20).

Hydro’s reorganization, however, differed from the recommendation of the Energy Board in two important ways. First, the load forecasting and system planning functions were not brought under a corporate planning group reporting directly to the chairman despite previous indications from Cass-Beggs. Rather they came under the direction of the Assistant General Manager for Engineering.

Second, Hydro’s engineering subsidiary, International Power and Engineering Consultants, Ltd., was merged into Hydro itself, thus greatly enlarging the latter’s permanent systems engineering staff. The IPEC subsidiary had originally been created by B.C. Electric as a means of ensuring its access to qualified engineering expertise, while at the same time maintaining a degree of flexibility in its operations. Engineering staff could be more easily expanded and contracted as the demands of system expansion changed, and the consulting subsidiary could seek additional business through other contracts.

The merger, when combined with the other organizational changes implemented under Cass-Beggs’s guidance, had the impact of greatly increasing the dominance of the Crown corporation and its staff in overall system planning. The system planning function was well removed from the direct oversight of the chairman, with his links to the politically
accountable board of directors. Rather, it came under the direct influence of the Crown corporation's enlarged engineering staff with its inherent organizational self-interest in the continuous construction of new generation projects. Finally, the new emphasis on initiative at the middle management level meant that the engineering staff would now exercise a higher degree of autonomy in its activities.

The increasing role of Hydro's middle level management in system planning was further strengthened through the work of the Task Force on Future Generation and Transmission Requirements. While, as we have seen, the Task Force's recommendations accommodated the government's preference for thermal rather than hydro generation, it represented the first comprehensive long-term planning exercise actually undertaken within B.C. Hydro itself. The particular system plan contained in the Task Force's report could be easily changed, but both the assumptions and the planning approach which underlay it were to be more durable.

Despite the role of the NDP government's policies in creating a more cohesive Crown corporation and limiting the degree of systematic public scrutiny given to its activities, Hydro's management and staff remained wary of the NDP's intentions. This tension further encouraged emergence of a stronger sense of institutional self-identity at Hydro. The increased emphasis given to environmental protection, with its added demands on the organization and its challenge to the dominance of a straightforward engineering approach certainly contributed to the tension. In addition, Bob William's strong position in favor of a thermal strategy was not received with enthusiasm by a staff composed largely of hydro engineers.

Williams' often rather blunt style also raised hackles, and bad feelings were intensified by his attempts to uncover Hydro's previous allocation of costs for the Columbia River Treaty. Director, James
Wilson's efforts to "humanize" hydro's activities led to perceptions that he was interfering in the smooth functioning of Hydro's newly implemented corporate hierarchy, and there were criticisms of the NDP's vacillation on the rate hike question (Nash, 1984).

For its part, the NDP government and its responsible minister, Bob Williams, became increasingly frustrated over the difficulty of controlling its Crown corporation, and Williams reportedly spent increasing amounts of time at B.C. Hydro attempting both to understand its internal workings and to attain a larger measure of control over its activities.

7.8 B.C. Hydro's Policy Predominance; The Revelstoke Dam Decision

It is impossible to say whether the tension between Hydro and the NDP Government would have resulted in a more tightly controlled Crown Corporation, a period of renewed organizational turmoil, or the government's acquiescence in Hydro's predominant role in power planning. In December, 1975, the Social Credit Party led by W.R. Bennett unseated the NDP after only three years in office, and this event had an important impact on the course of power planning in British Columbia.

While the new administration did not come to office with any stated policy on electric power development the direction of its initial efforts was decisively influenced by the appointment of Robert Bonner as Hydro's new chairman. Bonner, who as Attorney General in the previous W.A.C. Bennett administration, had engineered the nationalization of B.C. Electric and the creation of B.C. Hydro, moved quickly and aggressively to secure the hegemony of the Crown utility in power planning.

The new approach to energy forecasting being pioneered by the B.C. Energy Commission was perceived as a particularly serious threat, and Bonner wasted little time in trying to discredit it publicly. The Commis-
sion, he claimed, was seriously misleading a public who simply did not understand the technical complexities of energy forecasting:

Epithetical criticism of Hydro can not dismiss the solid arithmetic indicating the correctness of our course to 1986, or the solid arithmetic which indicates the impossibility of financial misadventure in the same space of time (Province, July 28, 1976, p. 13).

The vehemence of Bonner’s criticism was probably increased by the fact that B.C. Hydro’s load growth had fallen sharply from 13.5 percent in 1973, to 4.8 percent in 1975, to virtually zero in 1976 (See Table 7.1). Hydro’s stubborn insistence on the indefinite continuation of a 9 percent plus growth rate began to appear increasingly implausible, leading Bonner and Hydro’s staff to emphasize the dangers of under-building versus the ease of adopting to inadequate demand. Not only, according to Bonner, was Hydro’s forecast “highly reliable and highly conservative,” but there was no financial risk in over-building in any case, since construction programs could always be slowed down and surplus power exported on a short term basis (Province, July 28, 1976, p. 13).

Bonner was equally unsympathetic to environmental interests, stating that:

It’s a question of moose or men. Our purpose is to meet power demands. Unless those demands drop we will produce new projects (Vancouver Sun, April 7, 1976, p. 55).

In order to meet these demands, the Crown utility’s generation strategy quickly shifted from thermal back to hydro. After Revelstoke, Sites C and E on the Peace would be developed, the McGregor would be diverted into the Peace to increase the latter’s energy production, and dams on both the Homathco and the Stikine River systems would follow. Hat Creek thermal power, Bonner asserted, was not really economic because
the full opportunity cost of the coal being burned was closer to the $25 - $50 per ton paid by eastern utilities than it was to the $5 per ton cost of mining it. Hence, "...if the full economic rent of the resource on a continental basis is factored into the Hat Creek equation, the apparent economics of the project change very quickly and would appear to tip the scale in favour of early hydro development" (Vancouver Sun, April 1, 1976, p. 53).

With the change of government, B.C. Hydro moved quickly to seek approval for its next hydro development, the 2700 MW Revelstoke Dam, downstream from Mica on the Columbia. This alternative had been developed on a conceptual level by the Hydro Task Force, and in late 1976, engineering and environmental studies were begun.

While Hydro made the case for an early start on Revelstoke on purely technical grounds, several political and institutional factors were important. First the previous government had given consideration to the introduction of a much broader assessment and public hearing process for Revelstoke (Wilson, 1983, p. 13), and it is possible that Hydro wished to seek approval before the new government had a chance to adopt the idea. Second, as noted above, the case for the 9 percent plus growth rate required to justify a start in Revelstoke was rapidly becoming weaker.

Hence, in mid 1976, B.C. Hydro applied for a Water License for Revelstoke, claiming that "Projects already committed to construction will meet incremental needs up to the year 1980/81, but for the period beginning in the fall of 1981, additional sources of firm energy will be necessary to meet the energy demand economically (B.C. Hydro, 1976a, p. 2.7). Since the earliest Revelstoke could be completed was September 1982, even an early start on the project would mean relying on expensive gas thermal generation for the one year interim period."
As in the previous case of the 7-Mile dam, testimony at the hearings on B.C. Hydro's Water License focused on the issues of project justification and environmental impact. This time both questions received considerably more attention than previously. In addressing the environmental question, B.C. Hydro was required by the ELUCS to prepare both a comprehensive impact statement and a social cost-benefit analysis.

While Hydro's impact assessment did not view the fisheries, wildlife, and forestry losses from the flooding of an additional 80 miles of the Columbia's main stem as sufficient to outweigh the power production benefits, it did indicate its willingness to undertake a limited degree of mitigation and compensation (B.C. Hydro, 1976a). In its accompanying cost-benefit analysis the power benefits of Revelstoke were considered to be equivalent to the costs associated with providing an equivalent amount of power from a hypothetical Hat Creek thermal plant, estimated at $751.2 million ($1975) discounted at 10 percent. Direct operating costs were estimated to be $517.7 million on the same basis, and forestry and recreation losses generated an additional cost of only $5.4 million, producing an overall benefit/cost ratio of 1.44:1.00.

Several alternative designs involving a scaled down dam with less flooding were outlined in Hydro's report, only to be rejected on the grounds that the approximately $4 million in resource losses avoided did not come close to the increased costs of approximately $170 - $250 million.

Shortly after the commencement of its social and environmental impact studies, B.C. Hydro set up a series of committees on local impacts, forestry, highway relocation and environment to anticipate problems prior to the public Water License hearings. However, differences quickly emerged
concerning Hydro’s approach to mitigation/compensation questions and the expectations of both local residents and other government agencies (Bankes and Thompson, 1980, p. 24).

Hydro’s initial efforts did not prevent the emergence of serious concerns, and 30 groups and organizations filed interventions at the Water License hearings held in September, 1976. These included four government agencies, ten recreation and environmental groups, ten local organizations and four forestry companies (B.C. Min. of Environment, 1976d).

The provincial Fish and Wildlife Branch was particularly forceful in focusing the environmental concerns associated with Revelstoke, emphasizing in its submission that:

Over the past 15 years a massive program of power development and water control...on the Columbia system...and agreements allowing the United States to flood B.C. lands have led to the inundation of about 360 lineal miles of major valley bottom land. All this has occurred in the Kootenay region and the people of the region have sustained a major social and environmental cost for power development...The Fish and Wildlife Branch...as the government agency responsible for the protection and management of fish and wildlife resources, feels that the project as proposed would result in severe adverse effects on these resources...We are seriously concerned with the rushed nature of this project and the consequent inadequate lead time that was made available for studies related to fish and wildlife concerns (B.C., Fish and Wildlife Branch, 1976).

Specifically, the Branch opposed B.C. Hydro’s application because:

1) Big game populations will be adversely affected...
2) River and tributary stream sport fisheries will be destroyed by inundation.
3) The Arrow Lakes sport fishery will be adversely affected...
4) The applicant has not completed a thorough socio-economic and environmental impact assessments...
5) Until the applicant has completed thorough...assessment, the Comptroller is not in a firm position to properly consider the application in question" (B.C. Fish and Wildlife Branch, 1976).

These points were echoed by other intervenors, and the final one was at least partly accepted by the Water Comptroller in his final decision. The conditions placed on Hydro's Water License were more numerous and extensive than any which had been imposed previously. The Comptroller reserved the right to control reservoir clearing, water levels, water releases, the location of construction facilities, the provision of new recreation facilities, mitigation and compensation for fish and wildlife losses, and mitigation of adverse effects on the local community. In addition, Hydro was ordered to employ both a fisheries and a wildlife biologist to assist in the drafting of environmental guidelines (B.C. Ministry of Environment, 1976a).

The Water Comptroller, however, lacked the resources necessary to carry out such a comprehensive program, and as the result of an appeal of Hydro's Revelstoke license to Cabinet, two monitoring committees were established. One, the Revelstoke Project Co-ordinating Committee was composed of representatives from various provincial agencies and was responsible for the mitigation and compensation of resource losses. The other Community Impact Committee was composed of representatives from social service agencies and was responsible for overseeing the mitigation of adverse community impacts. Hydro was required by the Cabinet to pay for the costs of both Committees. As a result of Hydro's promises at the Water License hearing, a separate local impact monitoring committee was also financed by the Utility (Bankes and Thompson, pp. 27-33).
While a number of criticisms of the functioning of these arrangements were subsequently made (Wood, ND; Bankes and Thompson, Pp. 33-34), they represented a significant step forward relative to past practice.

However, despite the efforts of several intervenors, the Revelstoke decision failed to come to grips with the key issue of project justification. As noted previously, Hydro's initial case for the facility was based on its judgement that it was essential to meet a projected 9.3 percent load growth, and that "no other project is sufficiently advanced that it could be brought into service by 1982, i.e., there are no real alternative resources to Revelstoke in 1982" (B.C. Hydro, 1976a, p. 3.2).

The approach used to develop the forecast underlying Hydro's justification was identical to that laid out in its 1975 Task Force Report (see above pp. 286-287), with the utility claiming that "forecasts prepared in the above manner have proved to be a sound premise for planning the development of the system historically and have allowed us to just meet the actual requirements of Hydro's customers" (B.C. Hydro, 1976a, p. 2.6).

However, the B.C. Energy Commission's second provincial energy demand forecast, issued in April 1976, had projected a growth rate of between 5.6 and 6.1 percent for the 1976 - 1986 period. As in 1975, the Energy Commission attempted to bring the differences between itself and Hydro to the attention of provincial policy makers, emphasizing that "While it is not surprising that two independent forecasts differ, the size of the difference is remarkable" (BCEC, 1976, p. 24). The Commission went on to recommend a fundamental re-examination of hydro policy in British Columbia:

...generation capability has been planned and constructed well in advance of demand, and prices charged for electricity supply have encouraged consumption and industrial development. In an era of decreasing average costs of supply as
generation capability increased, and of abundant new sources of electrical energy, these attitudes were perhaps supportable and the planning strategies they spawned may have been beneficial. Today these traditionally accepted precepts have lost their validity, and continuing use of planning strategies which ignore this fact can only place unnecessarily burdensome costs on all electricity consumers. . . (who are) also agitated about the irreversible damage to social and natural environments associated with major generation projects (BCEC, 1976, p. 23).

However, the Energy Commission's representations at the Revelstoke hearings were much more subdued. The Commission's high load forecast of 6.1 percent rather than its lower, "best guess" estimate was presented and "following discussions with B.C. Hydro" (B.C. Hydro, 1976, p. 2.7), some adjustments were introduced to raise it to 7.1 percent* (BCEC, 1976, p. 3).

In addition, shortly before the hearings commenced, the government had referred both the Hydro and BCEC forecasts to the Ministry of Economic Development for a third opinion. This agency also endorsed a 7 percent growth rate for the 1974/75 to 1985/86 period, adding that "for planning purposes, some additional allowance might be required to reflect the uncertainty in the forecasts and the trade off between the expected costs of under and over planning" (B.C. Hydro, 1976a, p. 2-10).

While the forecast of Hydro's competitor had been raised somewhat relative to its own, the fact remained that the utility's projections were still 25 percent higher. Given this apparent uncertainty, the emphasis of B.C. Hydro's case shifted to the relative costs of over versus under building new generating facilities:

*This was achieved by adding a projected deficiency for the WKPL system and restating the forecast on a 1974/75 base.
there are a number of strong arguments to support the view that where there is doubt concerning the future level of energy consumption, it is more prudent to plan to meet a higher forecast than a lower one. If projects are begun too soon, it is a relatively simple matter to delay completion. . .If, on the other hand, the utility discovers that the load will be higher than anticipated, there is no assurance that construction and manufacturing schedules can be sufficiently accelerated, and it is certain that any such move will result in a considerable increase in costs. . .At worst, if no replacement power is available the utility faces an energy deficit with the necessity of load shedding and the prospect of brownouts (B.C. Hydro, 1976a, p. 2.10 - 2.11).

While this argument had an appealing, self-evident quality from an engineering perspective, it was more problematic on economic grounds. It might be relatively simple to suspend construction on an unfinished hydro dam, but it could be extremely costly if the project was already well advanced. The outgoing chairman of the B.C. Energy Commission, Andrew Thompson had argued in early 1976, that the increasing economic and social costs of new hydro projects made it more prudent to risk under, rather than over building (Vancouver Sun, June 30, 1976). In any case, only a detailed economic analysis could shed light on the question, and this was not undertaken by B.C. Hydro as part of its justification for Revelstoke.

In its testimony to the Water License hearings, the B.C. Energy Commission did present a very limited economic analysis of the costs and benefits of delaying Revelstoke. The question which the Commission posed was whether the fuel savings from displacing energy from the Burrard Thermal Plant would exceed the costs of maintaining Hydro's inservice date for Revelstoke despite the lower 7 percent forecast. The results were not clear cut. Given a 10 percent real discount rate, savings would be realized by delaying Revelstoke for one year, but the reverse was true at
an 8 percent discount rate. These results led the Energy Commission to the rather ambiguous conclusion that:

We are not convinced that delay of one or two years in the on-stream date of this project would impose undue additional costs on Hydro nor do we believe that such a delay would necessarily lead to electricity shortages. On the other hand, there are not particular adverse financial consequences from proceeding on the schedule proposed by Hydro (B.C. Energy Commission, 1976a, p. 2).

The second half of this conclusion, however, only held true if demand growth did not fall below the Commission’s upper bound estimate of 7 percent. The Commission did not emphasize this aspect of its conclusion, nor did it present any calculations of costs and benefits at lower load growth rates.

The B.C. Energy Commission’s rather subdued performance at the Revelstoke hearings attracted considerable criticism from public interest intervenors, who suggested that this stance had resulted from government pressure (Vancouver Sun, Sept. 16, 1976, p. 29). In any event, one of these groups, the Scientific Pollution and Environmental Control Society (SPEC), aided by a number of professors from the University of B.C.’s Department of Economics, attempted to mount a more vigorous attack on B.C. Hydro’s justification for Revelstoke. The key arguments presented by this group were that:

1) Hydro had ignored the magnitude of the costs associated with underbuilding while downplaying the costs of overbuilding.

2) Conservation and smaller scale energy projects represented viable alternatives to Revelstoke which had been ignored by B.C. Hydro.

3) Hydro’s pricing policies discouraged efficient use of electricity and a move to marginal cost pricing would eliminate much of the demand growth justifying Revelstoke (SPEC, 1976).
The central argument was the third, and it was supported by some fairly detailed research undertaken by Sanford L. Osler, then a graduate student in economics at the University of B.C. (Osler, 1977). Osler's study began by arguing that both efficient energy use and overall economic efficiency required a utility to price electricity at its marginal cost of production. Only under such a pricing structure would consumers be faced with the actual social costs associated with the production required to meet their needs and thus be in a position to make a rational choice among alternative sources of supply.

The pricing structure of most utilities, including that of B.C. Hydro, was based on the historic average cost of production. When marginal costs were higher than average costs, this approach to pricing led to rates which were artificially low. Consumers would then demand more electricity than they would be willing to pay for if the rate regime truly reflected the costs of providing it. The magnitude of this impact on consumption growth rates would depend on the price elasticity of demand for electricity.

Osler constructed a mathematical model of B.C. Hydro's system which allowed the calculation of the incremental generation and transmission costs associated with varying levels of demand. His results indicated that the costs of supplying the incremental loads of large and small consumers was 22.6 and 24.9 mills respectively, well above the average system cost of 18.1 mills (1976) (Osler, 1977, pp. 48, 50, 56). "The real marginal price," concluded Osler, "for both residential and general customers is in the order of 50 percent (relative to prevailing rates) whereas it exceeds 100 percent for the bulk customers" (Osler, 1977, p. 76). If electricity rates were restructured to reflect these costs, consumers would demand less power, and the load growth rate would fall. Osler estimated this fall in
load growth rates at between 13 and 37 percent depending upon the demand elasticity assumptions used (Osler, 1977, p. 78).

SPEC's representatives argued at the Water License hearings that, if electricity rates approximated the true costs of providing new power from the Revelstoke project, alternative sources of supply would become more economically attractive. These sources included not only the "soft" energy options like wind and solar power, but also conservation as a response to higher prices and industrial co-generation (Revelstoke Proceedings, Volumes 2, 3, 4, and 17). For these reasons the environmental group submitted, "the energy from the Revelstoke Dam is not needed at this time, will not be needed by the proposed in-service date and may not be needed for some time thereafter" (SPEC, 1974, point 4.1).

Hydro's response to these arguments was that the research on which their conclusions was based was inadequate to support a deferral of Revelstoke, that marginal cost pricing was impractical, and that alternative energy sources "...including wind, solar and biomass power have not been shown to be feasible alternatives." (B.C. Hydro, 1976b, p. 2).

In the words of one of Hydro's submissions to the Cabinet Appeal Committee on Revelstoke:

The brief presented by Professor Berndt is based entirely on "marginal costs" derived during the preparation of a thesis for an M.A. by Sanford L. Osler. Does he seriously suggest that the delicate balances which make up a developed economy such as British Columbia should be subjected to the shock of marginal electrical costs radically different from those presently prevailing on the strength of one individual's efforts, however competent or thorough they may be? ...to seriously propose these costs as an immediate alternative to the present method of calculating rates without considering the effects
on the B.C. economy is incomprehensible. To further propose that on this basis the Revelstoke Project should be delayed is even more astonishing (B.C. Hydro, 1977a, pp. 4, 7).

In his decision, the Water Comptroller accepted B.C. Hydro's case, and granted a Water License for the Revelstoke Project. In a covering letter to one of the intervenors, Comptroller Howard DeBeck stated that: "I believe the evidence is convincing that the Revelstoke Project is required and is economically attractive for B.C. Hydro and the Province with the proposed in-service date" (B.C., Dept. of Environment, 1976b). However, as in his previous decision on the Pen-d'Oreille project, he emphasized that the Water Act did not give him the jurisdiction to rule on the issue of project justification:

My decision...does not require acceptance of the forecast of B.C. Hydro because I believe that ideally authorization by water license for a project should be sought and obtained well in advance of the intended date for the commencement of construction. The license issued permits the dam to be constructed when proposed but it does not require adherence to the original schedule (B.C., Dept. of Environment, 1976b).

A number of intervenors, particularly SPEC were particularly dissatisfied with this aspect of the Water Comptroller's decision, and using the provisions of the Water Act, it was appealed to the provincial Cabinet. The questions elaborated above were again argued before a Committee of Cabinet in early 1977, and although the Cabinet decision upheld Hydro's case, the intervenors' efforts did have an impact. Jeremy Wilson records rumours "...that a committee sentiment in favour of forcing Hydro to delay its plans was reversed only after an intervention by Hydro Chairman Bonner" (1983, p. 14), and the Cabinet's decision was unambiguously critical of existing policy making capability in the area of Hydro planning:
The processing of the application by Hydro for this and similar licenses under the Water Act involves the consideration of issues which... call for decisions far removed from the ambit of that statute... In particular, the existence of a method by which the estimating of energy demand would be made by a competent organization functioning independently of Hydro would have reduced the arguments, both before the comptroller and the committee... The comptroller is seriously limited in the staff which he can make available in policing many of the conditions which he feels compelled to devise... The committee would suggest that the Minister of Environment, in particular, and the other ministries who are members of ELUC should undertake an examination of existing legislation... and consider whether or not revisions or new legislation is indicated (B.C. Cabinet Appeal Committee, 1977, quoted in Wilson, 1983, p. 15).

Hence, in the face of vocal opposition from a wide range of interests and serious misgivings within the government itself, B.C. Hydro was permitted to proceed with the Revelstoke Dam. Not only would it prove to be the Crown utility’s last major generation project to date, but the criticisms and misgivings surrounding its authorization would be fully borne out by events.

7.9 Concluding Summary

The election of the NDP government in late 1972 marked an important turning point for power policy in British Columbia. On the one hand, new government was clearly committed to a fundamental re-examination of both the policy assumptions of the 1960s and the planning assumptions developed by B.C. Hydro via the 1972 Energy Board report. On the other, the new government was faced with the institutionalization of previous Social Credit policies in the form of an enlarged Crown utility whose size and scope of operations rivalled those of the largest government agencies and Crown corporations in British Columbia. It was also a Crown corporation
with a long history of conflict involving its own sense of institutional autonomy and the policy constraints imposed by the provincial government.

The outcome of these two opposing forces under the NDP was a strengthening of Hydro's policy predominance, but the end of its previous monopoly on the information and analysis surrounding hydro planning issues. These two outcomes, in turn created a tension which would characterize hydro policy for the next decade.

The failure of the NDP to come to grips with the institutional aspects of Hydro's accountability to the political process as a whole combined with the organizational changes within Hydro itself, led to a strengthening of the Crown utility's dominance in the electric power planning process. This unwillingness of the government to adopt external regulatory mechanisms was based on two assumptions, both of which were held by the previous Social Credit Administration. One was that the traditional chain of political accountability with Ministers of the Crown directly represented on Hydro's Board of Directors, would ensure an adequate degree of control.

The second was that other modes of external regulatory supervision, while appropriate for private monopolies, would dilute or interfere with the policy direction of the duly elected government of the day. Shortly after the NDP government began to realize the limitations of such direct control in the face of a large organization with a virtual monopoly over expertise and information in key areas, it had lost power to a renewed Social Credit Party.

However, the analytical resources mobilized by the NDP government in the areas of socio/environmental impact assessment and energy demand forecasting meant that Hydro's narrow conception of the power planning problem came under increasing challenge. Not only were government agencies now openly critical of much of Hydro's analysis, but public interest
intervenors were given a solid analytical and informational base to support their opposition. Hydro engineers were no longer able to convincingly characterize the concern over the environmental impacts of their projects as mere emotionalism, and the inevitability of constant exponential growth in power consumption was no longer an unquestioned assumption. While Hydro's new organizational cohesiveness, combined with the policy vacuum created by a transition of government allowed Hydro to prevail in the Revelstoke decision, this victory represented only the opening round of a battle which would increase in intensity through the rest of the 1970s.
References


1977a. In the Matter of an Appeal Under Section 38 of the Water Act R.S.B.C. 1960 Chapter 405; and In the Matter of Conditional Water License No. 47215 Issued to British Columbia Hydro and Power Authority; and In the Matter of the Canadian Scientific Pollution and Environmental Control Society. Rebuttal Evidence to be Presented Before the Cabinet Appeal Committee. Vancouver.


8.1 The Policy Setting of the Late 1970s

In the last chapter we noted that the events of the 1960s and early 1970s had produced two important outcomes in the area of electric power policy. The first was the emergence of B.C. Hydro as the dominant force in the electric power policy field; the result of its enormous expansion, its growing organizational cohesiveness, and the development of a stronger internal planning capability. This dominance was strengthened by the election of a Social Credit administration in late 1975. Unlike the previous NDP government, the new administration's initial predisposition was (despite some misgivings) to accede to Hydro's plans and priorities.

The second important development was the end of Hydro's monopoly on the information and analysis central to the power planning process. This development, in turn, was the result of two factors: the first was the emergence of the environmental movement as a more organized political force and its growing ability to utilize the expertise available in academia; the second was the NDP's creation of alternative sources of policy advice and analysis within the government itself, particularly ELUCS and the Energy Commission.

These opposing forces played themselves out in British Columbia's political stage throughout the late 1970s. B.C. Hydro continued to stress the need for new large-scale generation projects if a disruptive power shortage were to be avoided in the late 1980s. To meet this need, increasing effort was devoted by the utility to the longer term planning of projects whose size and costs greatly exceeded those of the 1960s and '70s.
The opposition to these plans was articulated on both economic and environmental grounds, although the latter aspect commanded far more public attention. Questioning of Hydro's load growth assumptions increased rather than abated, along with criticism of the role of the rate structure in encouraging over-use of electricity. During the late 1970s every major project proposed by Hydro generated opposition from at least one public interest group predicting serious ecological or social damage.

This controversy over the direction of future hydro policy in British Columbia during the late 1970s occurred in an economic environment which had become increasingly uncertain. The recession of 1974-1976 had ended a prolonged period of steady economic growth in British Columbia. However, by 1979 a gradual economic recovery combined with the second oil price shock created a major boom in commodity prices. British Columbia experienced a sharp increase in economic activity accompanied by a period of intense speculative interest in its resource industries. However, these inflated expectations were quickly dashed by a recession unprecedented in length and severity since the great depression of the 1930s.

8.2 Electric Power Forecasting and Planning: The Crystallization of Conflicting Perspectives

Despite the intense critical scrutiny of B.C. Hydro's load forecasting procedures beginning at the Revelstoke hearings and continuing over succeeding years, the utility continued to employ them through the early 1980s. The forecasting method outlined in B.C. Hydro's 1981 system planning document (B.C. Hydro, 1980g, pp. 5.11 - 5.14) was identical to the one contained in the 1975 Task Force report, which was, in turn, largely unchanged from that employed in the early 1960s (See above pp. 282 - 287). Briefly, residential and general demand estimates were aggregated from the extrapolations made by each of the utility's 56 districts, while bulk
demand projections were based on consultations with existing customers and judgments based on "enquiries by prospective new customers" (B.C. Hydro, 1980g, p. 5.14).

Table 8.1 presents the results of successive B.C. Hydro forecasts made between 1976 and 1983. Between 1975 (the forecast used to justify Revelstoke) and 1976, a change in planning approach was adopted whereby a "probable" rather than "high" forecast was used for the final half of the 11 year forecast period. This change lowered the projected load growth rate from 9.5 to 8.8 percent, and the projected total 1991 requirements from 90 to 74 thousand GWh. However, the revisions made in the following year as a belated response to the recession were even more dramatic. The overall 11 year load growth projection was cut from 8.8 to 7.5 percent and 1991 requirements declined to 62 thousand GWh.

Thereafter, load growth projections declined steadily through the early 1980s, reaching 4 percent by 1983. Overall, between 1976 and 1982, projected 1991 probable requirements dropped by almost 50 percent and the magnitude of the drop, almost 47 thousand GWh greatly exceeded hydro's installed 1980 capability of 39 thousand GWh. In less than ten years the perceived need to more than double B.C. Hydro's generating capacity had vanished. By 1984, when the Revelstoke Dam finally came on-stream its annual energy production of just under 7 thousand GWh was entirely surplus to provincial requirements.

The breakdown of B.C. Hydro's excessive load growth projections by customer class is as interesting as the overall forecast results. Projections for both the residential and general (largely commercial use) categories were lowered steadily through the period as the impacts of
<table>
<thead>
<tr>
<th>Year of Forecast</th>
<th>10 year Growth</th>
<th>1990/91 Total</th>
<th>10 Year Growth</th>
<th>1990/91 Total</th>
<th>10 Year Growth</th>
<th>1990/91 Total</th>
<th>10 Year Growth</th>
<th>1990/91 Total</th>
<th>10 Year Growth</th>
<th>1990/91 Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>9.5</td>
<td>90,050</td>
<td>9.2</td>
<td>23,243</td>
<td>9.8</td>
<td>32,045</td>
<td>8.8</td>
<td>29,740</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1976</td>
<td>8.8</td>
<td>74,070</td>
<td>8.4</td>
<td>20,983</td>
<td>8.4</td>
<td>25,463</td>
<td>8.7</td>
<td>23,794</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1977</td>
<td>7.5</td>
<td>62,300</td>
<td>6.9</td>
<td>16,765</td>
<td>8.7</td>
<td>25,405</td>
<td>3.6</td>
<td>13,250</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1978</td>
<td>6.7</td>
<td>60,300</td>
<td>6.4</td>
<td>15,749</td>
<td>8.5</td>
<td>24,640</td>
<td>3.8</td>
<td>13,290</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1979</td>
<td>5.8</td>
<td>57,700</td>
<td>5.6</td>
<td>14,376</td>
<td>7.6</td>
<td>22,213</td>
<td>4.2</td>
<td>14,820</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>6.1</td>
<td>57,280</td>
<td>4.3</td>
<td>12,347</td>
<td>6.5</td>
<td>19,192</td>
<td>7.1</td>
<td>19,675</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>5.7</td>
<td>54,505</td>
<td>3.9</td>
<td>11,842</td>
<td>5.9</td>
<td>17,822</td>
<td>6.8</td>
<td>19,050</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1982</td>
<td>4.8</td>
<td>50,365</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>1983</td>
<td>3.9</td>
<td>43,200</td>
<td>2.5</td>
<td>10,972</td>
<td>2.8</td>
<td>12,940</td>
<td>4.7</td>
<td>13,250</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

rising electricity rates, slower economic growth, the availability of competing natural gas, and more stringent energy conservation methods all became evident.

The projection of bulk demands changed much more erratically. Between 1975 and 1977 both the overall growth rate and estimated 1991 requirements were cut in half (See Table 8.1). The 1991 estimate contained in the 1977 load forecast was down by over 10 thousand GWh, greater than the output of the entire Revelstoke project. However, between 1979 and 1980 the bulk load projection was raised sharply from a 4 to a 7 percent annual growth rate, a revision which offset the declines in the other sales categories.

These large fluctuations were the result of limitations inherent in the procedures used to estimate the large industrial loads associated with British Columbia's resource-based economy. If there is one universal generalization in the literature of staple based economic development, it is the consistent tendency toward optimism among commodity producers. Short-lived boom periods generate excessive expectations among these producers, often leading to severe over capacity (Gunton and Richards, 1987).

Because Hydro's bulk load forecasting approach was based directly on producers' expectations, it too tended to overreact to the peak of the price cycle. Hence, the 1977 bulk load growth revisions represented a rather delayed reaction to the sharp economic downturn of 1974/75. The sharp upward revision of 1980 represented a reaction to the second OPEC oil price rise of 1979 accompanied by a sharp increase in commodity prices for most mineral and forest products. In particular, a great deal of interest was expressed by various investors in energy-based megaprojects and, as a result, B.C. Hydro experienced a large volume of enquiries from new potential customers.
The drawbacks of such an approach to forecasting, however, are illustrated by the fact that B.C. Hydro's bulk load forecasting record for the 1970s and early '80s was the worst of its three categories. Between 1973 and 1978 for example, B.C. Hydro's projection for the fifth year of its forecast period was off by an average of 10 percent for the residential category, 15 percent for the general category and 24 percent for the bulk category. The upward revision of the bulk forecast in 1980 proved to be too high by 44 percent only three years after it was made (Calculated from B.C. Hydro, 1980c and 1983b).

Despite the steady overall decline in B.C. Hydro's growth projections, they continued to be higher than those of the B.C. Energy Commission. As shown in Table 8.2, the Commission's 1978 forecast for B.C. Hydro's service area was only 3.6 percent compared with Hydro's 6.4 percent over a comparable period. By 1987 the discrepancy between the two forecasts was over 9 thousand GWh, greater than the entire output of Revelstoke.

These differences persisted after the forecasting unit of the Energy Commission was transferred to the Ministry of Energy Mines and Petroleum Resources in 1979. The Ministry's 1979 forecast was up to 4.3 percent for the eight years compared to 6.2 percent for Hydro, and the 1986/87 discrepancy had declined somewhat to 6.5 thousand GWh. Because the Ministry's forecasts began to include increasing allowances for speculative bulk loads, the biggest discrepancy between the two forecasts was now in the commercial sector, where the Ministry's forecast contained much more sophisticated analysis of end use patterns (Margolick and Charles, 1980).

The overall approach adopted by B.C. Hydro toward the planning of new generation and transmission projects remained basically the same throughout the late 1970s with some modifications. Following the policy which had
emerged during the late 1960s, system planning was geared toward meeting expected demand in the domestic economy with firm, long-term exports to the United States being explicitly ruled out. The export market continued to be regarded as a convenient outlet for both the large quantities of surplus, interruptible energy produced by Hydro's conservative planning approach (See above, pp. 278 - 282), and the temporary surpluses resulting from any completion of new projects ahead of demand.

![Table 8.2](image)

**TABLE 8.2**

**B.C. HYDRO VS. B.C. ENERGY COMMISSION**

**ALTERNATIVE LOAD GROWTH FORECASTS, SEPTEMBER 1978**

**(GWh)**

<table>
<thead>
<tr>
<th>Year*</th>
<th>B.C. Energy Commission**</th>
<th>B.C. Hydro</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>30,309</td>
<td>28,950</td>
<td>1,359</td>
</tr>
<tr>
<td>1979</td>
<td>30,975</td>
<td>30,560</td>
<td>415</td>
</tr>
<tr>
<td>1980</td>
<td>31,508</td>
<td>32,040</td>
<td>&lt;532</td>
</tr>
<tr>
<td>1981</td>
<td>32,695</td>
<td>34,060</td>
<td>&lt;1,365</td>
</tr>
<tr>
<td>1982</td>
<td>34,892</td>
<td>36,770</td>
<td>&lt;1,878</td>
</tr>
<tr>
<td>1987</td>
<td>41,869</td>
<td>51,240</td>
<td>&lt;9,371</td>
</tr>
</tbody>
</table>

* For B.C. Hydro, Fiscal Year beginning April 1.
** Converted from Joules

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**Average Annual Growth, 1978 - 1987**

| Year* | 3.65 | 6.4 |

**SOURCES:** B.C. Hydro, 1978b, Table FE-2; B.C. Energy Commission, 1978, Table 12.3.
This policy was reaffirmed by both B.C. Hydro and the provincial government in early 1980 when the utility applied for renewal of its existing export licenses to the National Energy Board. A sizeable increase in the ceilings sought under these new license to 3000 GWh per year firm and 7000 GWh per year interruptible generated a number of protests as intervenors claimed that B.C. Hydro was surreptitiously overbuilding facilities to obtain sales in the United States market (Farstad, 1979; SPEC, 1980). The allegation was strenuously denied by both the utility and the government at the export hearing, and the then Energy Minister, James Hewitt stated unequivocally that:

It is Hydro's mandate to ensure there is adequate generating capacity in B.C. to meet our present and future needs. Hydro does not build generating plants to meet export demand. . .If we are to have enough water (energy) in low water years we are bound to have surpluses in good water years. The government believes it is in the best interest of British Columbians to export any surpluses at the best possible price (Vancouver Sun, Nov. 16, 1979, p. 5).

The policy was reflected in Hydro's 1981 System Plan (the first such document to be made public), which asserted that "Hydroelectric sites in the province will continue to be developed to meet British Columbia's own present and future needs. . ." and "Electricity which is surplus to British Columbia's needs, due to the completion of a dam or above-average flows, will continue to be available for export" (B.C. Hydro, 1980g, p. 3.1).

As in the early 1970s, generation projects were planned to ensure that the energy available during "...the lowest streamflow period for the B.C. Hydro system as a whole recorded between 1940 and 1975. . ." would be "...equal to or greater than the probable forecast of electrical energy demand. . ." (B.C. Hydro, 1980g, pp. 8.3-8.4). As already noted, the approach was extremely conservative in that it did not include any
allowance for energy available under either noncritical water conditions or transactions with other utilities, even though these latter sources could be relied on with a relatively high degree of probability.

Starting in 1977, the reliance on thermal energy from the Burrard Thermal Plant was reduced sharply from 5125 GWh/a to around 3000 GWh/a due to the rising price of natural gas and the emission control problems associated with the burning of alternative fuels (B.C. Hydro, 1984b, pp. A.5-A.6 and Table A.1). The impact of this change was to offset to some extent, the reduction in load forecast projections, thereby justifying continued work on the Revelstoke project.

Although the presentation of the load forecast was changed in 1976, Hydro initially continued to plan around its "high" forecast (or maximum expectation of future demands). Starting with the 1977/78 system plan, generation projects were first advanced to meet the "probable" demand forecast but if the high forecast showed that a "...decision to advance and commit new projects to licensing and/or construction would have to be made during the initial year of the current System Plan" such an advancement was made (B.C. Hydro, 1984b, p. A.5). Subsequently, as the magnitude of the difference between the "high" and the "probable" forecasts increased, this latter criterion was gradually phased out in the subsequent system plans, and planning became based solely on the latter projection.

Despite the gradual lowering of Hydro's load forecast throughout the latter part of the 1970s, it still implied very sizeable increases in the utility's generating capability. Even the 1977 probable forecast projected the need for just over 26 thousand GWh/a of new generating capability within ten years, a figure only slightly below the total of all pre-Revelstoke developments on the Peace and Columbia. Despite the gradual
lowering of projected growth rates, this ten year figure remained in the vicinity of 25 thousand GWh/a.

Hence, the efforts devoted to the investigation and scheduling of large new generation projects actually accelerated rather than decreased after the Revelstoke decision. In fact, the emerging concern with the environmental impacts of new generation projects lengthened B.C. Hydro’s perception of the length of time necessary to bring them onstream. As shown in Figure 8.1, Hydro began to provide for a pre-construction planning phase of seven to eight years, with up to five years for assessment studies and two for licensing.

By 1975, intensive engineering and environmental studies were underway on the 2000 MW Hat Creek thermal project, and by 1976/77 studies had been launched on the Site C, McGregor Diversion and Kootenay Diversion projects. By 1978/79, studies were underway on the much larger and more distant hydro projects on the Stikine/Iskut and Liard Rivers, and by early 1982 work on the former had progressed to the point where Hydro felt prepared to seek regulatory approval (B.C. Hydro, 1976a - 1982a). As shown in Table 8.3, Hydro spent over $142 million on investigations for major new generation projects during the late 1970s and early ’80s.

However, after Revelstoke, only one major project was actually constructed, the 500 kV. Cheekye-Dunsmuir transmission line from the mainland to Vancouver Island. This project, which had been part of Hydro’s system plan since the 1975 Task Force Report, raised the same two issues of project justification and environmental impact which had surrounded the Revelstoke decision. Not only was there a great deal of opposition to the negative aesthetic impact of the line on the scenic Sechelt peninsula and Gulf Islands regions, but the need for the line was dubious.
FIGURE 8.1

B.C. HYDRO

HYDROELECTRIC PROJECTS

GENERALIZED PLANNING FLOW CHART

PLANNING PHASE
(84-96 MONTHS)

ASSESSMENT
(48-60 MONTHS)

ENVIRONMENTAL OVERVIEW STUDIES (12 MONTHS)

PRELIMINARY ENVIRONMENTAL STUDIES (18-24 MONTHS)

DETAILED ENVIRONMENTAL STUDIES (18-24 MONTHS)

LICENSING*
(24 MONTHS)

PREPARE E.I.S. & B/C ANALYSIS

ENGINEERING STUDIES

PREFEASIBILITY STUDY (12 MONTHS)

FEASIBILITY STUDY (18-24 MONTHS)

PRELIMINARY DESIGN (18-24 MONTHS)

FINAL DESIGN

PROJECT APPROVALS

PRELIMINARY ASSESSMENT REPORT

DIRECTORS' ASSESSMENT REPORT

PUBLIC REVIEW OF E.I.S. AND B/C ANALYSIS (6 MOS.)

PROJECT APPROVED FOR CONSTRUCTION

APPLY FOR PERMITS, APPROVALS AND LICENSES

ISSUE TENDERS

CONTRACT DOC'S & AWARDS (6 MOS) (42-70 MOS)

SOURCE: B.C. Hydro, 1979b, Figure 2.
Power supply to Vancouver Island had always represented a distinct planning problem for B.C. Hydro. As we saw in Chapter 5, virtually all the attractive hydro sites on the island had been developed in the mid 1950s mainly to supply the rapidly expanding needs of the pulp and paper industry. During the 1960s, additional power requirements were supplied by underwater transmission cables, but this solution was viewed as inadequate for the needs of the 1970s and '80s. The most immediate problem facing power planners was the lack of peak capacity available via the underground cable network, a situation which threatened to produce brownouts during periods of high demand.

**TABLE 8.3**

**B.C. HYDRO:**

**MAJOR GENERATION PROJECT PLANNING EXPENDITURES TO MARCH, 1982**

<table>
<thead>
<tr>
<th>Project</th>
<th>Annual Energy Output (GWh/a)*</th>
<th>Expenditures ($'000s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peace Site C</td>
<td>4,660</td>
<td>36,522</td>
</tr>
<tr>
<td>Keenleyside/Murphy Creek</td>
<td>1,780</td>
<td>4,976</td>
</tr>
<tr>
<td>Hat Creek Thermal</td>
<td>13,140</td>
<td>51,695</td>
</tr>
<tr>
<td>Stikine/Iskut</td>
<td>13,020</td>
<td>27,412</td>
</tr>
<tr>
<td>Liard</td>
<td>23,900</td>
<td>17,821</td>
</tr>
<tr>
<td>Kootenay Diversion</td>
<td>810</td>
<td>3,139</td>
</tr>
<tr>
<td>Homathco</td>
<td>6,790</td>
<td>555</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>64,100</strong></td>
<td><strong>142,120</strong></td>
</tr>
</tbody>
</table>

*Under critical water conditions

**SOURCE:** B.C. Hydro, 1981c, Table 4; 1980g, Table 7.2.
One of the more controversial solutions pushed by Gordon Shrum as part of the Energy Board’s planning exercise of 1972 had been the construction of a nuclear plant. The intense opposition to this proposal, combined with the unfavourable economics of a major coal-fired thermal plant, led to the decision to construct a major 500 kV. overhead transmission line from the mainland (BCEB, 1972, B.C. Hydro, 1975b).

When the proposal to commence construction of the line was considered in 1978/79, however, a debate concerning its economic justification arose within the government and B.C. Hydro. The controversy was sparked by a consulting report prepared for the government by Marvin Shaffer, an economist from the University of British Columbia. Referring to the differences in the electric power forecasts of B.C. Hydro and the Energy Commission, the report concluded that the former was overstated. New capacity for Vancouver Island would be required in 1985/86 rather than 1983, and new energy capability would be needed in 1989/90 rather than 1985. If this was the case, then the 500 kV. Cheekye Dunsmuir line, whose cost had almost doubled from $315 to just over $580 million, represented a costly and inefficient means of solving the immediate problem of insufficient peak capacity. Gas turbine generators, a smaller 230 kV. line, or a combination of both were all significantly less costly. In 1984, after events had proved his analysis correct, Shaffer (1984, p. 13) estimated that the loss to the British Columbia economy of the Cheekye-Dunsmuir decision at around $290 million:

One might argue that it is easy, with the benefit of hindsight, to see how things could have been done differently. But in the case of Cheekye-Dunsmuir the government was clearly warned. It only had to listen to its own energy agency to recognize that the project should not proceed as planned. Even if the government was not convinced by the Energy Commission forecasts, it could have at least used the installation of
gas turbines as an interim measure to give itself time to see whether the lower BCEC forecasts were correct. Had it exercised caution - prudent restraint, the $290 million waste associated with Cheekye-Dunsmuir would have been avoided.

One reason for the government's decision to proceed appears to have been the encouragement of a new newsprint mill proposed by Crown Zellerbach Canada Ltd. for its operations near Campbell River. However, the fact that the new project would only use a small fraction of the new line's capacity, led Hydro's building programs manager to write a sharply critical internal memorandum to his colleagues. Not only was Hydro intentionally concealing the project's true cost from the public, it was also "providing hidden subsidies in the form of transmission crossings" to the Island's pulp and paper industry (As quoted in Vancouver Sun, Jan. 14, 1980, p. A8).

Shortly after this memo was leaked to the press, Hydro's vice-president, Charles Nash, termed its criticisms a "political judgment" and emphasized that "It is Hydro's responsibility to supply power requested by customers until told otherwise by the provincial government" (Vancouver Sun, Jan. 14, 1980, p. A8). Unfortunately, the provincial government's refusal to release Shaffer's economic analysis, meant that most of the informed debate over the justification for Cheekye-Dunsmuir took place behind closed doors (Vancouver Sun, July 17, 1979, p. A7).

The same was not the case for the subsequent controversy over the environmental impacts of the line, the intangible costs of which were not included in Shaffer's analysis. A number of confrontations occurred between Hydro construction crews, injunctions filed by both Hydro and protestors were fought out in the courts, and in 1982 a radical environmental group destroyed a key project substation with explosives.

In terms of Hydro's overall generation planning strategy, the first major change of the mid 1970s was the substitution of the Peace Site C dam
for the Hat Creek Thermal project. A combination of political and technical factors led to this postponement of the move into thermal generation. As already noted, Hat Creek had been a major policy initiative of the previous NDP government, whereas the capabilities and orientation of B.C. Hydro were centered around hydro projects.

A related technical factor was the adoption of a much lower real discount rate in post-Task Force system plans, a change which increased the apparent economic attractiveness of hydro relative to thermal projects. In the 1982 system plan (B.C. Hydro, 1980g), a real cost of capital of 2.8 percent was used, far below the roughly 8 percent average real return in the economy as a whole, or the 10 percent discount rate suggested by ELUCS Benefit/Cost Guidelines.

Finally, the capital cost of Hat Creek escalated very rapidly following the initial estimates of the 1972 Energy Board study and the 1974 Task Force Report. This escalation was due largely to pollution control requirements (which had previously received only cursory attention), and by 1984 Hat Creek was significantly more costly than most major hydro alternatives even at higher discount rates (B.C. Hydro, 1984c).

Despite both the deferral of Hat Creek as the next major generating source and its rising costs, intensive engineering and environmental studies continued. By 1980 it had again regained a key role in Hydro's future generation strategy.

During the latter 1970s considerable support emerged for a more expansionist approach to provincial power development. Hydro's chairman, Robert Bonner, continued to be a strong advocate of accelerated project construction, arguing that the U.S. market could easily absorb any resulting surplus on advantageous terms. On numerous occasions, Bonner stated that, in his opinion, load growth would be significantly higher than
that foreseen by Hydro's own forecasters. In 1980, he remarked that
"...our problem is to overcome a reluctance to develop energy sources
surplus to our immediate needs. I think we should be more vigorous...the
sooner the better" (Vancouver Sun, July 18, 1980, p. C1).

This sentiment was echoed within the Ministry of Energy Mines and
Petroleum Resources by Harry Swain, an Assistant Deputy Minister, recruited
from the federal civil service to help formulate a provincial energy
policy. Despite his strong criticisms of Hydro's pricing policies and
corporate organization, he argued that:

The economic cost of timidity is high...this
year there has been an unprecedented surge of new
industries that have come knocking on Hydro's
door, chequebooks in hand, asking for delivery
guarantees for the middle '80s. But the cupboard
is bare...To avoid such an embarrassing gap
...in the future, we should start now, judi-
ciously, to overbuild for 1990 and beyond. If
demand overshoots, great; that means a higher
than expected level of economic activity. If it
undershoots, great; we sell the surplus to the
Americans at prices that lower our cost
...(Swain, 1980, p. 5).

As is evident in the above quote, the large number of inquiries from
new industries gave impetus to the case for accelerated development. In a
sentiment reminiscent of the 1960s, William Best, Hydro's vice-president of
operations, remarked in 1980 that "with the potential for industrial
growth, you could almost pick a figure and make it happen. Industries all
over the world are looking for a secure supply of energy and if we tell
them it's here they'll knock the door down" (quoted in Vancouver Sun, July

These pressures for a more expansionist approach led, in Hydro's 1981
system plan, to the articulation of an "Industrial Development Strategy."
This approach, approved by the utility's board of directors in December,
1980, despite some internal opposition (Overstall, 1981), called for the
early completion of the 2000 MW. Hat Creek plant to provide "...a block of energy for possible new energy-intensive industrial loads by 1990 with the option of selling that energy to the United States until it is required" (B.C. Hydro, 1981g, p. 9.5).

This strategy was adopted despite the fact that Hat Creek no longer represented a relatively low cost addition to B.C. Hydro's system. In fact, with full emission controls, Hat Creek's costs were 150 percent greater than those of Revelstoke, 66 percent greater than Site C and Stikine/Iskut, and 100 percent greater than those of the Liard (B.C. Hydro, 1981c, Figure 8.3). The decision to retain Hat Creek as next added in the generation sequence after Site C was due entirely to the perceived impossibility of bringing the Stikine/Iskut project on stream by the latter 1980s. Given the unavailability of Stikine/Iskut power until late 1991, 1000 MW. of capacity was viewed as necessary to meet the demands of the "probable" load projection, and Hat Creek was considered the one source capable of supplying it. Since the partial output of Hat Creek would be required anyway, the immediate, full-scale development of the project to its ultimate capacity of 2000 MW. was viewed as a convenient way to implement the "Industrial Development Strategy" of building in advance of identified probable new loads.

The release of Hydro's 1981 system plan made it clear that the utility would seek early approval for a number of controversial new hydro and thermal projects. In late 1979, B.C. Hydro had already announced its intention to seek regulatory approval for its Site C project on the Peace for a 1987 inservice date (B.C. Hydro, 1980a, p. 11), and in late 1980 it announced that an application to build Hat Creek would be forthcoming within a year (Vancouver Sun, Nov. 26, 1980, p. A19).
In the System Plan, B.C. Hydro projected that approval for these projects would be followed almost immediately by four more. Licensing for the smaller Murphy Creek project would commence in early 1982, with simultaneous approval for the huge Stikine and Liard projects being sought between mid 1982 and 1985. Finally, an application to build a new coal thermal plant in the East Kootenay Region would commence in 1983 (B.C. Hydro, 1980g, Figure 8.2).

This intense level of planning activity on the part of B.C. Hydro was perceived as an immediate threat to a range of interest groups. First, there were locally based groups which coalesced around the possibility of development of a particular power resource and the threat which it posed to local residents. Hydro’s interest in Site C prompted the formulation of the Peace River Valley Environmental Association in 1979 to prevent the losses of fertile and scenic valley bottom land which would be lost by the project’s flooding (See below, p. 423). The 1980 decision to proceed with Hat Creek thermal plant prompted the activation of two protest groups, the Hat Creek Coalition and the Hat Creek Alliance. According to the former group’s initial newsletter:

The Hat Creek Coalition is a society formed to attempt to prevent environmental damage from the proposed Hat Creek Power Project by means of educating the public to the hazards of this project through the dissemination of information and promotion of discussion. We have concrete evidence that emissions from the project will cause a decline in the forest productivity, agriculture, and fish populations, as well as expose residents to toxic heavy metals, radioactive metals and gaseous pollutants associated with lung disease (Hat Creek Coalition, N.D.).

The long delay by B.C. Hydro in releasing the results of a massive Environmental Impact Statement for the project led the Vancouver Sun to remark editorially that:
The fact that Hydro needs six months to 'boil down' results of a study showing the plant would have a 'negligible impact on the environment' makes us wonder whether the study is not also being cooked up. (Vancouver Sun, Nov. 28, 1980, p. A4).

When the Environmental Impact Assessment was finally released in May 1981, it did indeed conclude that there would be few detrimental effects on the environment. However, this conclusion was greeted with some skepticism:

Hydro says emissions of contaminants from the plant would be within the range of objectives established by the Pollution Control Board as safe and acceptable. But the estimates show sulphur and nitrogen emissions at the high end of that range, and the board is not known for its stringency in setting pollution standards. . . . only 52% of the sulphur dioxide would be removed by the scrubber Hydro proposes to install. (Vancouver Sun, May 21, 1981, p. A4).

Similarly, Hydro's plans to bring on large-scale hydro capacity in the Stikine/Iskut basin following Hat Creek led to the organization of a "Stikine Workshop" in early 1980, followed by the creation of Friends of the Stikine. At the initial workshop, a wide range of groups and individuals were brought together including existing environmental, native groups, local residents and interested academics. An extensive set of background papers was presented, bringing together existing information on the river basin and making a case for its preservation as a free flowing river.

The case against hydro development on the Stikine/Iskut centered on the uniqueness of the resource and the rights of the area's residents to preserve their traditional way of life:

A fundamental assumption that has motivated the organization of the workshop is that, in addition to the costs and returns from resource use
measured strictly in monetary terms, there are other considerations of major importance that must be weighed. These include:
- the effects of damming the Stikine upon the way of life of those who live in the northern British Columbia and, in particular, upon the native people who have occupied the area for centuries.
- the loss through inundation of an awe-inspiring natural phenomenon of tremendous proportions. . .the Grand Canyon of the Stikine is a unique geological formation.
- the impact of the dams upon an important fishery which people have relied upon for many centuries and which can help to feed people indefinitely into the future.
- the impact. . .upon the wildlife. . .and upon the wilderness which sustains the wildlife (Sierra Club, 1980a).

This emerging opposition to the Stikine project raised the broader question of the future of the entire northern third of British Columbia. Although a number of ambitious resource development schemes for power, forestry and mining had been planned in the post war period, almost none of these had materialized by the late 1970s. However, the imminent development of the Stikine, followed by the development of the larger, more northerly, Liard basin carried with it the prospect of large-scale changes. Northern B.C. represented one of the last remaining wilderness areas in North America, and many environmentalists and local residents feared the longer term impact of the infrastructure associated with Hydro development. For example, more access roads would lead to both a disruption of wildlife migration patterns and increased hunting pressures, with the subsequent decline in wildlife populations undermining the existing economy of the region. Hence, the Stikine Workshop concluded by going beyond mere opposition to hydro development to advocate heritage status for the river along with the implementation of a management plan to preserve the region's resource base (Sierra Club, 1980b). Subsequently, the groups opposing
Stikine's development had some success in blocking B.C. Hydro's application to the Lands Branch for a major access road into the Stikine area (Power Generation, 1982, p. 7).

While the opposition to the above projects was unsuccessful in influencing B.C. Hydro's generation plans during the late 1970s and early '80s, environmental considerations were successful in eliminating one project from Hydro's agenda. The McGregor Diversion project, advanced as part of the full development of the Peace River involved diverting the McGregor, a tributary of the Fraser into the Parsnip, a tributary of the Peace, thereby increasing the energy production at all existing and proposed Peace generating sites. However, the plan involved connecting two huge drainage systems; one emptying into the Pacific and one into the Arctic, and when environmental studies found five dangerous fish parasites in the Pacific Basin but not in the Arctic, serious fears of cross contamination were raised (B.C. Hydro, 1978a, p. 30). Following representations from both the fishing industry and the federal Fisheries Ministry, all engineering work on the McGregor Diversion was suspended in 1978 (Wilson, 1983, p. 17; B.C. Hydro, 1978a, p. 30).

With the exception of the McGregor Diversion, the widespread environmental opposition to Hydro's major new generation projects lacked an effective institutional outlet. As in the 1950s, the wide-ranging jurisdiction of the federal government over fisheries provided an effective governmental advocate for fisheries-related environmental concerns (See above pp. 170 - 173). As noted above, the Revelstoke hearing had revealed the serious weaknesses of existing energy project approval mechanisms and these weaknesses had been publicly recognized by the government itself. Although environmental groups like SPEC increasingly tried to emphasize the broader environmental choices involved in Hydro's overall sequence of
projects, the utility's dubious forecasting procedures, the merits of conservation, and the relationship of demand growth to electricity pricing, there existed no public forum in which they could be debated.

It was this state of affairs which generated an unprecedented level of intervenor interest in the National Energy Board power export hearings of early 1980. While B.C. Hydro's export licenses for firm and interruptible exports had produced little public interest in either 1969 or 1974, the 1979 application was actively opposed by a number of groups, including SPEC, the Sierra Club, the United Fishermen and Allied Workers Union, the B.C. Wildlife Federation and the Union of B.C. Indian Chiefs. SPEC's argument to the NEB was that by systematically overestimating demand, B.C. Hydro was (in direct contravention of its mandate) surreptitiously building for the export market. Therefore, the entire capital costs of Hydro's surplus capacity should be charged to the export customer rather than the very low operating costs associated with producing surplus electricity for the interruptible export market.

The high level of intervenor interest in the 1980 export hearings went well beyond the immediate issues associated with the size, length and pricing aspects of Hydro's export licenses. The hearings represented the first public opportunity in over three years (since the Revelstoke hearings) to question key Hydro executives regarding the utility's forecasting assumptions and overall generation planning intentions. Therefore, to the irritation of the NEB hearing panel, much of the testimony and cross examination which occurred was not directly relevant to the issue of power exports (This observation is based on the author's attendance at these hearings). Rather, it indicated a clear demand for an appropriate public forum at the provincial level and the lack of any institutional mechanism which could accommodate it.
The power policy problems which emerged during the late 1970s went beyond the deficiencies of the existing project-specific public hearing process and the lack of any institutional mechanism for public input into the larger questions of system planning. There was also a lack of overall policy direction at the governmental level. New electrical generation was being planned by B.C. Hydro to meet domestic demands which appeared increasingly uncertain. Particularly in the industrial sector, load growth would depend on government's overall economic strategy. To what extent would the government actively seek out large new energy-intensive industries? Would the government, through B.C. Hydro, continue to underwrite the risks associated with developing new electricity supplies for questionable new loads, or would new large customers be asked to assume a portion of these risks through advance financial commitments? To what extent would hydro rates be raised to reflect the increased marginal costs of new generating facilities and how would new rates affect demand growth in industrial and other sectors? These unanswered questions led Hydro executives to assert privately that there was really no firm basis on which to estimate either future load growth or a generation sequence to meet it.

8.3 B.C. Hydro Rates and Finances: Toward an Appropriate Price for Electricity

The economists' critique of hydro planning during the mid 1970s (a critique which also formed a central element of the environmentalists' position) stressed the relationship between electricity rates and future power demands. If the demand for electricity was not completely inelastic, then the quantity demanded by consumers would vary inversely according to its price. To the extent that the marginal costs of new power supply were rising and these costs were not reflected in rates, demand for power would be inflated relative to consumers' actual willingness to pay. If marginal
costs were increasing, and the utility failed to price on a marginal cost basis, rates would still have to rise, albeit more slowly, as the average cost of the system as a whole was pushed up. Finally, if forecasters failed to take into account these rising power rates, their estimates of future demand would be inflated.

The reverse held true if marginal costs were falling. If the utility priced its output at average cost, consumers would demand less electricity than they would be willing to pay for, and lowering rates would increase economic efficiency. In this situation a government subsidy to offset the losses suffered by the utility in pricing at the lower marginal cost level would be justified on economic grounds.

Although B.C.'s Crown power utility did not explicitly adopt a marginal cost approach to power pricing during the 1950s and '60s, their behaviour did tend to follow its logic. First, as we have seen at several points above, policy makers proceeded from the assumption that the marginal costs of power were falling. In this environment, the "scientific" approach to pricing was to lower rates as far and as quickly as possible, and to adopt declining block rate structures in order to increase power consumption. We have also seen that a number of measures were introduced (particularly in the 1960s) to subsidize power production costs.

Figure 8.2 shows that the assumption of falling marginal costs was a valid one. Constant dollar costs (deflated by the Hydro construction cost index) fell from around 18 mills ($1972) for pre 1945 sites, to 15 mills for those developed during the 1940s and 1950s, to 10 1/2 mills for the much larger developments after 1960. In other words, despite significant escalations of the inputs required for hydro project construction, the exploitation of larger scale generating sites did produce economies of scale which largely offset these inflationary trends.
FIGURE 8.2
UNIT COSTS OF HYDRO SITES DEVELOPED BY ELECTRIC POWER UTILITIES IN BRITISH COLUMBIA
(1979 Mills/kWh of Firm Energy)

Pre-1945 Sites

Sites Developed Between 1945 and 1960

Sites Developed Between 1960 and 1975

GWh. per year

With the commissioning of Revelstoke in the mid 1970s, however, this trend appears to have reversed itself. As illustrated in Figure 8.3, Hydro's constant dollar costs of new generation and transmission projects were projected to rise steeply during the 1980s and '90s. Revelstoke's costs were estimated to be almost 40 percent higher than 1979 average system costs, Site C's, 94 percent higher, and those of the Stikine Iskut, more than double. The Hat Creek thermal plant, which was to follow Site C because of perceived scheduling problems with the latter hydro projects, was estimated to cost one and a third times that of the installed 1979 system.

However, even during the period when the relatively inexpensive generating projects on the Peace and Columbia were being brought onstream, general inflationary pressures led to increases in power production costs. Hence, as we have seen, B.C. Hydro was forced to end its annual residential rate reduction program in 1967. We have also seen that the utility's reluctance to raise rates to cover inflationary cost increases led to a steady deterioration of B.C. Hydro's financial performance during the first half of the 1970s (Table 7.4 above).

Shortly after the Social Credit Party returned to power in late 1975, B.C. Hydro introduced a number of measures designed to reverse this situation:

B.C. Hydro has initiated a financial and management program to reverse the unfavourable earnings trend it has experienced in recent years, so as to improve its general performance and to enhance the Authority's credit as a major borrower... Rates to electric and gas customers were increased during the year. In conjunction with raising rates, steps have been taken to reduce operating expenses and to delay, where possible, capital expenditures (B.C. Hydro, 1976a, Introductory Letter).
8 percent for new projects.

Discount rates used are 7.44 percent for average system costs and

Note: Average cost of power escalated from 1979 to 1983 using hydro construction cost

Source: B.C. Hydro (1984c); Bernard Bridges and Scott (1982), Table 4, p. 35.

Supply Source

Liard
Hat Creek Thermal
Stikine/Iskut
Keenleyside/Murphy
Peace Site C
Revelstoke

Pre-Revelstoke
Average

Transmission and Generation Only

In British Columbia

Rising Marginal Costs of Electricity

Figure B.3
Thereafter, power rates were increased steadily through the early 1980s. Residential power rates were raised substantially, by an average of about 7 percent per annum for small and 11 percent for large consumers between 1975 and 1981. These increases were virtually the same as the overall cost of living, so that by 1981 residential electricity rates were about the same as they had been in 1975.

In terms of rate structure the two block rate was maintained, but a fixed service charge was introduced in 1977. While this change impacted small users more than large ones, the general trend after 1977 was to raise additional revenue almost entirely from the second block so that overall rates for large users rose somewhat relative to those for small ones.

For large industrial users changes in both the level and structure of rates were more pronounced. As already outlined, the NDP administration approved a 70 percent increase for bulk customers, effective in 1977. A number of smaller increases were implemented thereafter, focusing largely on the energy component of demand. Then, in early 1980, a major modification in rate structure for bulk customers was introduced, effective in 1982. The monthly capacity charge was actually lowered, from $4.60 to $3.34 per kVA, while the energy charge was almost doubled from 8 to 15 mills/kWh. As already noted, such a change had long been advocated by critics on the grounds that most of the future costs of the hydro-based system were related to demands for additional energy rather than capacity. While B.C. Hydro did not move to marginal cost pricing, the change in the industrial rate structure did move the utility's pricing approach closer to the actual costs of supplying the future demands of large bulk loads (see Figure 8.4).

Overall, the data presented in Tables 3.13, 3.14 and 3.15 show that even before the major restructuring of bulk rates in 1980, most of the real
FIGURE 8.4
B.C. HYDRO, BULK POWER RATES
1975-1982

Mills/kWh $/KVA. Mills/kWh $/KVA

- 2.00
- 1.50
- 1.00

1975 1980 1984

SOURCE: B.C. Hydro, 1982b.
rate increases occurred in the industrial sector. Whereas both residential and commercial rates increased only slightly more than inflation between 1975 and 1980, industrial rates rose 30 percent in real terms during the same period.

Table 8.4 and Figure 6.2 (see above p. 250) illustrate the impact of these rate increases on B.C. Hydro's financial performance during the late 1970s. In 1975 and 1976 Hydro's revenue was barely adequate to cover the interest charges on its long term debt and its overall return on capital was 30 percent below its cost of debt. By 1977/78 the return on capital had been boosted to a level equal to the cost of debt and was retained at this level until 1981/82. Thereafter, rising interest rates, the addition of surplus plant capacity, and delays encountered in seeking regulatory approval for rate increases all combined to lower Hydro's overall return well below its cost of debt capital.

The upward pressure on electricity rates during the late 1970s and early '80s was maintained by the rapid escalation of capital spending during the period, combined with rising interest rates. Whereas Hydro's capital expenditures for the eight years between 1966 and 1974 totalled just under $1.7 billion, those for the 1975 - 1983 period were almost $6.7 billion. Roughly the same proportion of these expenditures were financed from operations in both periods (29 percent of the total) resulting in a large increase in debt requirements to finance the balance. Whereas net borrowing for the 1966 - 1974 period totalled about $1.3 billion, it increased almost fourfold to $4.7 billion in the 1975 -1983 period. At the same time the effective average interest rate on Hydro's debt climbed steadily from around 5 percent in the mid 1960s to 6 percent in the early 1970s to 10 percent by the early 1980s. As a result, annual interest
### TABLE 8.4

**B.C. HYDRO, FINANCIAL INDICATORS, 1975-83**

<table>
<thead>
<tr>
<th>Fiscal Year Ending March 31</th>
<th>Net Income/Revenue (%)</th>
<th>Return on Capital Employed (%)</th>
<th>Effective Interest Rate (%)</th>
<th>Interest Coverage Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>.8</td>
<td>4.3</td>
<td>6.2</td>
<td>1.02</td>
</tr>
<tr>
<td>1976</td>
<td>.3</td>
<td>4.3</td>
<td>6.6</td>
<td>1.01</td>
</tr>
<tr>
<td>1977</td>
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<td>1978</td>
<td>11.1</td>
<td>7.4</td>
<td>7.1</td>
<td>1.20</td>
</tr>
<tr>
<td>1979</td>
<td>12.1</td>
<td>7.6</td>
<td>7.4</td>
<td>1.31</td>
</tr>
<tr>
<td>1980</td>
<td>10.5</td>
<td>7.2</td>
<td>7.7</td>
<td>1.24</td>
</tr>
<tr>
<td>1981</td>
<td>10.3</td>
<td>8.8</td>
<td>8.8</td>
<td>1.24</td>
</tr>
<tr>
<td>1982</td>
<td>8.1</td>
<td>8.4</td>
<td>8.4</td>
<td>1.38</td>
</tr>
<tr>
<td>1983</td>
<td>5.0</td>
<td>7.2</td>
<td>10.1</td>
<td>1.11</td>
</tr>
</tbody>
</table>

**SOURCE:** B.C. Hydro, 1975a - 1983a
charges increased fivefold during the latter 1970s from $134 million in 1974 (of which $23 million was capitalized) to $696 million in 1983 (of which $217 million was capitalized).

We have seen that the policy of the pre-1972 Social Credit Government was to rely heavily on less costly government-controlled pension funds to finance the bulk of B.C. Hydro's capital requirements. The NDP administration did not end the use of government-controlled funds but supplemented them with major borrowings in the United States and Canadian capital markets (see above p. 341).

After the election of a Social Credit administration in late 1975, renewed emphasis was placed on provincially controlled pension funds. In fiscal 1978, $521 million was borrowed from these funds, representing two thirds of Hydro's total borrowing requirements for the year. For 1979 and 1980, all of Hydro's $1 billion borrowings were from government pension funds.

This practice, however, came to an abrupt end in 1980, when fears concerning the viability of provincial pension funds led to a government decision to confine their future use to short term investments (B.C. Utilities Commission, 1983a, p. 52). In fiscal 1982 and 1983, $1.7 billion was borrowed on world capital markets and, as shown in Table 8.4, Hydro's average interest rate on outstanding debt jumped sharply to 10 percent.

8.4 The Provincial Energy Policy Statement of 1980

With the re-election of a Social Credit administration in late 1975, hydro policy in British Columbia returned to the assumptions of the 1960s. Hydro again became the predominant policy actor with the government's approach still being oriented toward keeping the cost of power to the
consumer as low as possible. In the period prior to 1980, most rates were raised just enough to cover inflation, and provincial pension funds were again used to lower the cost of capital to the utility.

However, the policy environment of the 1970s was markedly different from that of the 1960s, and this rather laissez-faire approach by the government to its Crown hydro utility came under increasing criticism. The demands for greater direct involvement by government had two key elements. The first was the perception that the Crown-owned hydro utility was no longer acting in the public interest, and that its activities should be brought under more effective public scrutiny and regulatory control. The Revelstoke hearings had produced a high degree of public skepticism regarding B.C. Hydro's forecasting and planning capabilities, a skepticism which was even shared by some members of the governing party.

Hydro's critics viewed the existing hearing process under the Water Act as an inadequate forum for the consideration of either general system planning questions or the environmental impacts of new generation projects. This demand for a new, more open regulatory mechanism was heightened by the continuous rate increases of the 1970s, all of which were implemented by Hydro with no external public review.

The second element of the demand for greater governmental involvement was the need for more overall policy guidance. Through the late 1970s, the system planning policies pursued by Hydro had raised questions concerning the role of government-sponsored hydro electric power development in the overall economic life of British Columbia. While Hydro had continued to operate under the assumption that inexorable economic trends would lead to a continuation of exponential load growth, the rate of such growth really
depended on government policy in a number of areas. Most important were the approach to electric power pricing and the elaboration of an explicit economic development strategy.

We saw in Chapter 3 that a trend toward slower economic growth (particularly in the province's traditional resource industries) and a decline in the electricity intensity of many industrial sectors had become clearly evident by the late 1970s. However, the rapid escalation of oil and gas prices during the same period also created the possibility that these trends could be reversed. The very large increases in the cost of electricity generated by fossil fuels directly threatened the viability of electricity-intensive metal processing facilities located in the industrialized regions of Asia, Europe and the United States. Therefore, despite the rising costs of new hydro electric power capacity in British Columbia, the potential locational advantages of such energy intensive industries increased. In addition, the rising costs of thermal power in the United States opened up possible opportunities for profitable long-term power exports.

Both the rising marginal costs of hydro power in British Columbia and the global trend toward the escalating costs of thermal power raised broader policy questions associated with the concept of economic rent. Clearly, these escalating costs created sizeable rents on existing hydro power production in B.C., as well as potential rents for new power developments. This trend is evident in the data on B.C. electricity export revenues presented in Table 6.7. Two studies using the year 1979 (Bernard, et. al., 1982; Zucker and Jenkins, 1984) estimated rents on existing Hydro facilities in B.C. based on the cost of supplying an equivalent amount of electricity from conventional thermal sources. While the methodologies employed by these two studies were somewhat different,
the rent estimates were fairly close; $819 million per year for Zucker and Jenkins and just over $1 billion per year for Bernard, et. al. (Bernard and Payne, 1987).

The hydro pricing policies developed in the 1960s and followed through the '70s distributed all of these rents to consumers roughly in proportion to their power consumption. The data presented in Tables 6.2 and 7.3 show that residential and bulk users got a somewhat larger percentage of these rents, and general users, a somewhat smaller share. However, the failure of B.C. Hydro to curtail its expansion plans in the face of declining demand also led to the dissipation of potential rents through over capacity. As shown graphically in Figure 8.5 the gap between installed capacity and peak system demand widened significantly in the late 1970s, even before Revelstoke was brought onstream. Whereas, capacity was 27 percent higher than peak demand in 1970, it was 60 percent higher in 1980.

Beginning in the late 1970s, the Social Credit administration began the process of developing an energy planning framework capable of addressing the above issues. In late 1978 the policy advisory and forecasting functions of the B.C. Energy Commission were relocated in a reorganized Ministry of Energy Mines and Petroleum Resources. The following year a well known energy economist, Harry Swain was recruited from the federal government to head up the new Energy Policy Division of the Department.

However, the subsequent drafting of a comprehensive energy policy statement proved both difficult and time consuming. Attempts to come to grips with the key regulatory, pricing and economic issues generated intense conflict within the provincial bureaucracy, leading eventually to the dismissal of Harry Swain in early 1980. After the production of an
SOURCE: B.C. Hydro, Annual Report, various years.
initial version in the summer of 1979, the energy policy document reportedly underwent nine revisions before being released in final form in February, 1980.

While, not surprisingly, the policy document titled *An Energy Secure British Columbia: The Challenge and the Opportunity* was vague in many key areas, its tone was decidedly interventionist and proactive:

> While the government's policy is that the private sector should continue to play a major role in the development of British Columbia's energy resources, it is also the government's responsibility to exercise authority and direction over this development. In its stewardship role, the government must ensure that the province's energy resources, both public and private are developed wisely, and to the advantage of present and future generations...
>
> (B.C., 1980a, p. 9).

Following the more general preoccupation of this period, the policy document placed a great deal of emphasis on energy self-sufficiency.*

"...we must," it declared, "reduce our dependence on imported energy supplies and increase our use of those abundant energy sources which we possess" (p. 10).

Both the security and cost of provincial energy supplies, particularly in the form of electricity were portrayed in the energy policy document as "...major stimulants to the continuing growth of our economy through the 1980s" (p. 9). More industrialized regions of the Pacific Rim were viewed as being:

> ...highly vulnerable to disruptions in world energy supplies and will thus view favourably trade with and investment in British Columbia. The government intends to capitalize on this opportunity.

*See, for example Ottawa's National Energy Program, released the same year (Canada, EMR, 1980).*
The province's hydro-electric potential is perhaps the strongest attraction for firms considering where to locate or expand. As well as economic benefits, hydro-electric projects can also have significant social and environmental consequences. Therefore, the government must take the leading role in guiding future hydro-electric development...

To accomplish these aims, the government will require that all future hydro-electric developments be carried out by the province's public utility - the British Columbia Hydro and Power Authority - and that these developments be in accordance with policy directions set by the government (p. 10).

Despite the recognition that hydro power represented an important economic resource and that the government intended to take a more active role in guiding its development, no clear industrial development policy was articulated. During this period, a number of studies were commissioned by the Ministry of Industry and Small Business Development on the economic feasibility of locating various electricity intensive metal processing facilities in British Columbia (Halvorsen Consultants and Wright Engineering, 1979; Chase Econometrics, 1981). While these studies were followed up by consultations between B.C. government officials and potential investors, no such developments occurred during the first half of the 1980s. Much of this failure must be attributed to the deep recession after 1983, which led to an unprecedented fall in the price of most metals. However, one close observer of the process has criticized the government's energy intensive development efforts of the 1980-81 as being rather half-hearted (Halvorsen, 1986). In particular, the government was reluctant to guarantee either the availability or the price of new power for a specific project. Apparently, the flood of enquiries concerning the availability of electricity which occurred during this period (see above, p. 385) led provincial policy makers to conclude that the problem was
really one of ensuring future power supply rather than the demand for this power. As in the 1960s, power development itself was viewed as the crucial element of a provincial economic development policy. As noted above (pp. 385 - 386), this approach was translated into B.C. Hydro's planning goals with the articulation of the "economic development strategy" in the 1981 system plan.

The 1980 energy policy document also re-affirmed the approach to electricity exports which had emerged during the 1960s:

Hydro-electric sites in the province will continue to be developed to meet British Columbia's own present and future needs; ensuring that sufficient capacity is available to cover low water years. Electricity which is surplus to British Columbia's needs...will continue to be available for export (B.C., 1980a, p. 10).

In the area of energy pricing, the provincial policy paper again promised a more active government role while defining only in the most general terms what its approach would be:

The government recognizes that there is a trade-off between the conservation and supply benefits from increased energy prices and the effects of higher prices on consumers, both private and industrial. In establishing energy prices the government must balance these often conflicting interests. ...electricity rates, until now, have been set by British Columbia Hydro. The government has set up a special task force to develop specific energy pricing systems...The price of energy commodities must continue to be adjusted to reflect long-term replacement costs and the value of the resource (B.C. MEMPR, 1980a, p. 14).

Although these pronouncements were not followed by a comprehensive government electricity pricing strategy, a number of actions were taken to bring rates closer to marginal cost concepts. As noted above, a major restructuring of industrial rates had taken place in early 1980,
emphasizing the energy rather than capacity components of demand, and shortly thereafter a number of marginal cost studies were undertaken by B.C. Hydro (B.C. Hydro, 1980e; 1982c; 1982d).

The most significant electricity pricing initiative following the energy policy statement came in late 1981 when the water rental rates charged by the provincial government were approximately tripled. This increase not only resulted in an immediate across-the-board rate hike of about 10 percent for B.C. Hydro's customers. It also affected industries which generated their own electricity from hydro sources. As shown in Table 8.5, provincial revenues from water rentals climbed from $20 million in fiscal 1980/81 to $65 million in 1981/82 to $187 million in 1982/83. By 1982/83 water rentals were the largest single natural resource revenue source, accounting for about 3 percent of total provincial revenue.

These unprecedented increases represented a major departure from the previous policy of distributing hydro rents entirely to power consumers. While the approach used by the provincial government did not attempt to measure the economic rent generated by each hydro site in the province, it did, for the first time, appropriate some of it for the public as a whole.

In its 1982 budget, the provincial government related its new water rental policy directly to the problem of ensuring that correct market signals were sent to the consumers of electricity:

Although British Columbia Hydro has been able to fulfil its broad goal of providing low-priced electric power, the disadvantages of such a policy have become more apparent in recent years. Low prices provide consumers with less incentive to moderate their demand for electricity and the subsequent growth in demand forces British Columbia to add to its generating facilities. . . . Unless electricity is sold at its true cost, production of full-priced and tax-paying private goods is sacrificed to produce subsidized
electricity. . . The most practical means of reducing demand, and therefore the risk of over-investment is to raise the price of electricity. A move in this direction has been achieved with the recent increase in rental fees for water used in electricity generation. . . (B.C., Ministry of Finance, 1982).

Another, more compelling, reason for the steep increase in water rentals was the need for additional revenue to offset plunging receipts from other natural resources. For example, declining markets led forest revenues to plunge from a peak of over $600 million in 1979/80 to $300 million in 1980/81 to $100 million in 1981/82. While sustained protests

<table>
<thead>
<tr>
<th>Fiscal Year Ending</th>
<th>Water Rentals (Millions)</th>
<th>Percent of Total Provincial Revenue</th>
</tr>
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<tbody>
<tr>
<td>1977</td>
<td>12.8</td>
<td>.3</td>
</tr>
<tr>
<td>1978</td>
<td>14.7</td>
<td>.3</td>
</tr>
<tr>
<td>1979</td>
<td>15.3</td>
<td>.3</td>
</tr>
<tr>
<td>1980</td>
<td>22.4</td>
<td>.4</td>
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<tr>
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<td>.3</td>
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<tr>
<td>1983</td>
<td>187.4</td>
<td>2.9</td>
</tr>
<tr>
<td>1984</td>
<td>172.0</td>
<td>2.5</td>
</tr>
</tbody>
</table>

SOURCE: B.C., Ministry of Finance, Various Years.
from large industrial power users led the government to moderate its plans for even larger water rental increases, its need for extra revenue prevented it from backing away from its initial actions.

The clearest commitments of the 1980 provincial energy policy related to the introduction of new policy and regulatory mechanisms. First, a more comprehensive, two-stage energy project review process was outlined:

This process will streamline, not shortcut, the review process now in place. This streamlining will ensure that socially and economically desirable projects will be evaluated with a minimum of delay, while also ensuring that all appropriate safeguards will be taken. Full opportunity will be provided for public input.

The first phase will examine the broad justification for the project. Projects found justifiable in the first phase would go to a second phase of detailed study to examine specific environmental concerns, mitigation measures and other detailed factors (B.C. MEMPR, 1980a, p. 13).

In addition, a new British Columbia Utilities Commission with full jurisdiction over the rates and other activities of B.C. Hydro was proposed. Clearly, the proposal to reform the province’s energy regulatory mechanisms represented the policy statement’s sharpest departure from previous policy. It was also the first to be implemented through the passage of a comprehensive new Utilities Commission Act in late 1980 (B.C., Legislative Assembly, 1980). The Act established a new Utilities Commission, and B.C. Hydro was brought under two distinct regulatory regimes.

The first, under part III of the Act, represented the reintroduction of traditional utility rate regulation. In essence, the powers of the new Utilities Commission were similar to those wielded by the old Public Utilities Commission during the 1950s (see above, p. 136), including:
1. the approval of all rate changes, with hearings held at the discretion of the Commission
2. the prohibition of unjust or discriminatory pricing practices, with the Commission having wide discretion in defining the operational meaning of this term
3. the issuing of certificates of public convenience and necessity for new utility facilities with hearings held at the Commission's discretion
4. the approval of all long term borrowing and major corporate reorganizations (B.C., Legislative Assembly, 1980, part III, sections 26-70).

The second regulatory regime governed both the approval of major new energy projects and the removal of energy from the province, in effect overriding the procedures governing certificates of public convenience and necessity. The proponents of such regulated projects (including B.C. Hydro) were required to apply to the Energy Minister for an "Energy Project Certificate" (or "Energy Removal Certificate"). The Energy Minister, with the concurrence of the Minister of the Environment, could then either:
1. refer the application to a Utilities Commission panel for a "review"
2. order it dealt with as a certificate of public convenience and necessity as outlined above
3. exempt it from review and grant the certificate.

Under the first of these options, a Utilities Commission panel would hold public hearings according to terms of reference supplied by the Ministers of Energy and the Environment and submit its report and recommendations to Cabinet. The Cabinet could then deny the application, or approve it subject to any conditions it deemed appropriate. The terms of reference for this process could also include the granting of permits.
under the *Pollution Control Act* and the *Water Act*, and, if this was the case, the Cabinet could grant approvals in lieu of those regulatory bodies. Finally, the government was empowered to appoint any number of "temporary commissioners" to preside over these proceedings (B.C., Legislative Assembly, 1980, part II, sections 16-25, and 2(6)).

The procedures under part II of the *Utilities Commission Act* attracted a fair degree of criticism, especially from public interest groups. While the Energy Minister asserted that "This legislation marks the beginning of a new era...in which we are providing the tools with which the people of this province can participate in the management of our energy future" (B.C., MEMPR, 1980b), it allowed the government wide scope to limit this participation. There were no legislative guidelines governing what had to be included in an energy project application, public hearings were not obligatory, and no legislative guidance was given concerning either terms of reference or the qualifications of temporary commissioners. Once a report produced by a Utilities Commission hearing panel reached Cabinet, there was no assurance that it would be made public or that its recommendations would be followed; leaving the Cabinet very wide discretion to make its own decisions on a wide range of complex technical issues.

### 8.5 B.C. Hydro Under Scrutiny I: The Utilities Commission Rate Hearings of 1982

The external review of B.C. Hydro’s rates began in June, 1981, when the Crown utility filed an application for two rate increases. These increases were in addition to those brought about by the boost in water rental fees described above. The latter were automatically passed on to customers by the Utilities Commission in late 1981, and were confirmed during 1982 despite the strenuous objections of bulk electricity customers.
The first B.C. Hydro rate increase, totalling 11.5 percent for non-bulk customers, was to be effective August 1, 1981. The second, totalling 11.66 percent for all customers was to be effective April 1, 1982 (B.C. Hydro, 1982a, pp. 16-17). The application containing these two increases was rejected by the Commission in August 1981 on the grounds that B.C. Hydro had not included export revenues in its revenue requirement calculations.

A new application, requesting a single increase of just under 18 percent was submitted in late November, and public hearings on this application commenced in January, 1982. In May, 1982, before these hearings had concluded, B.C. Hydro applied for two more rate increases, a further 7.7 percent effective April 1, 1982 and an additional 15.7 percent effective April 1, 1983.

The Utilities Commission's decision, handed down after 82 days of hearings extending almost a year, was important more for its searching scrutiny of B.C. Hydro's operations than for the development of a consistent approach to the regulation of a Crown utility. The latter task was something of a novelty in Canada, and in developing its own approach, the Commission was constrained by a major policy shift at the governmental level. In March 1981, the Cabinet issued "Special Direction, B.C. Hydro No. 1" which ordered that, for regulatory purposes, "the Authority should achieve by the 1983/84 fiscal year an interest coverage ratio of 1.3:1 and should maintain that ratio thereafter so as to achieve and ultimately maintain a debt/equity ratio of 80:20" (BCUC, 1983a, p. 17).

The justification for this standard was the need to maintain B.C. Hydro's credit rating (BCUC, 1983a, p. 22). However, this rationale was a rather dubious one since the provincial government's guarantee of the utility's debt tied its credit rating to perceptions of the economic strength of the province as a whole. A more indirect impact of the
directive was to ensure that, at the debt/equity ratio specified, the return on B.C. Hydro's equity capital would be 20 percent higher than its cost of debt. In other words, it implicitly recognized that, despite public ownership, the equity capital employed by the utility had an opportunity cost, and that this cost should be recovered from rates.

In the end, however, the application of this directive was undermined first by a severe economic downturn and subsequently by a change in government policy. In confirming an 11.5 percent increase for fiscal 1982/83, the Utilities Commission noted that it would produce:

In its decision on the application for a 1983/84 rate increase of almost 16 percent, the Utilities Commission was faced not only with achieving the 1.30:1 interest coverage ratio, but with a newly enacted government regulation restricting all Crown corporation rate increases to 6 percent as part of an overall "restraint" program:

Those who approach the task of public utility rate regulation must make a fundamental choice regarding the degree of scrutiny given the operations of the regulated corporation. Given regulatory criteria such as
those just discussed (or the more conventional rate of return tests), the regulator can either apply them in a mechanical fashion to the cost data supplied by the regulated utility or it can seek to evaluate the validity of the underlying costs themselves. As noted above (pp. 151 - 156) the regulation of British Columbia's private electric utilities during the 1950s soon settled into the former, less activist approach.

The regulators of the early 1980s however, were determined from the outset to pursue a more vigorous style of regulation:

It is the Commission's view that in the exercise of its regulatory responsibility under the Utilities Commission Act and notwithstanding the requirements of Special Direction No. 1, it is obliged to inquire into any aspects of B.C. Hydro's operations and practices where it believes information bearing on the efficiency of such operations may be found and to make such decisions, findings and recommendations as in its judgment will result in rates charged by the authority being just and reasonable in all of the circumstances (BCUC, 1983a, p. 17).

This approach was almost certainly due to almost two decades of criticism directed at B.C. Hydro, and to a widespread feeling that the previous lack of public scrutiny had led to serious inefficiencies in its operation and management. The Utilities Commission's 1982 hearings and subsequent report confirmed these suspicions. There emerged from the Commission's work a picture of a Crown Corporation which was not only inefficiently managed, but more concerned with its own expansion than the provision of service at the lowest possible cost.

One of the key problems identified by the Commission was related to B.C. Hydro's overall corporate goals. Noting the "...Authority's apparent preoccupation with growth, expansion, and finance..." the Commission's report suggested that:
B.C. Hydro should be equally concerned with minimizing the rate of growth of its revenue requirements as it is with ensuring expansion of the system. . . There are no clearly stated objectives which focus on minimizing the current costs of providing services to customers (BCUC, 1983, pp. 22-23).

One manifestation of this orientation was a lack of overall operating efficiency. A consultant's report prepared for the Utilities Commission concluded that B.C. Hydro's 1981 wages and salaries were $47 million, or 14 percent higher than "market average compensation." While the utility challenged this study, it did admit to salaries which were about 10 percent above normal levels (BCUC, 1983a, p. 70). Day to day financial management was also criticized for its lack of centralized control:

The Commission is not convinced that the planning and budgeting procedures ensure that operations are or will be conducted in an efficient manner. The danger is that internally generated individual objectives tend to emphasize the status quo and dominate the conclusion (BCUC, 1983a, p. 32).

This lack of operating efficiency was viewed as being aggravated by another tendency arising out of B.C. Hydro's growth orientation, the practice of capitalizing a large proportion of operating costs as part of major projects. In fiscal 1982, 35 percent of the utility's $802 million operating and administrative budget was capitalized, including 37 percent of all corporate administration and planning expenditures (BCUC, 1983a, pp. 35, 156):

The commission is of the view that B.C. Hydro has taken the application of the approach beyond the limits of reasonableness. . . It is also apparent that a greater measure of management discipline is imposed on expenditure decisions when expenditures must be fully justified for recovery in the current period. . . Extensive overhead capitalization also exacerbates the increase in customer rates when new facilities come into service (BCUC, 1983a, p. 37).
Finally, the Utilities Commission criticized the rapid growth of activities which had more to do with promoting B.C. Hydro's own corporate image than with providing improved service to its customers. Pointing to a projected doubling of the Corporate Division's budget between 1981 and 1984, its report concluded that:

Taken at face value, the Corporate Division cost data shows little evidence of expenditure restraint. . . The Commission is satisfied that B.C. Hydro requires a public affairs department . . . It is not satisfied that customers should be expected to fund efforts at building a positive image for the Authority. . . The Authority is a service industry; its primary responsibility is the actual needs of its customers (BCUC, 1983a, p. 158).

In order to force the utility to improve its operating efficiency, the Utilities Commission made its granting of the interim 1982 rate increase contingent on "...a 5 percent decrease from budgetary controllable expenses for 1982/83 while at the same time maintaining its level of service to its customers" (BCUC, 1983a, p. 10). It also ordered Hydro to re-examine its policy regarding the capitalization of operating overhead.

As emphasized at several points in the foregoing narrative, the provision of low cost service by a capital intensive hydro-based utility is largely dependent on successful long range planning. Excess system capacity can lead to a rapid escalation of fixed capital costs over which the utility has no control in the short term.

Data provided to the Utilities Commission during its 1982 hearings showed that of a total projected cost increase of $346 million projected by B.C. Hydro between 1982 and 1984, 48 percent was attributable to taxes and water rentals, 38 percent to capital costs and only 13 percent to operating
costs (BCUC, 1983a, p. 140). For 1982, 62 cents out of every dollar of total electric system costs were attributable to debt service and depreciation (BCUC, 1983a, p. 43).

The Commission's report attributed much of the cost increase being borne by Hydro's customers to the excess plant capacity arising out of the utility's poor planning record:

Large rate increases will be necessary in the near future due to Cheekye-Dunsmuir and Revelstoke coming into service when increased sales volumes are unlikely to be adequate to cover the incremental costs. If domestic demand does not increase to a level anticipated when Revelstoke was committed, and prospects for export sales do not improve, the inevitable result will be that the domestic customer will pay (BCUC, 1983a p. 126, emphasis original).

This planning failure was attributed to a combination of inadequate forecasting and inappropriate system expansion criteria. In the area of forecasting, the poor bulk forecasting record described above (pp. 371 - 374) was singled out for particular criticism:

Testimony was submitted by a panel of industrial executives (which). . . suggested a need for caution in anticipating significant capital investment in new facilities by such customers . . . B.C. Hydro's load growth projections do not provide any explicit indication that this potential constraint on expansion of bulk demand was factored into the forecasting process (BCUC, 1983a, p. 88).

To improve the situation a number of recommendations were made, including:

1. An improvement by Hydro of "the strategic planning linkage between the load forecast, the capital budgets, borrowing requirement and tariffs."

2. The explicit incorporation of price into load forecasts.

3. The assumption of a greater degree of responsibility by bulk users in providing accurate information to B.C. Hydro and;
4. The consideration of "...some form of precontracting..." to ensure that potential large bulk loads are indeed firm.

In terms of committing new projects to meet projected loads, the Utilities Commission noted that:

The authority’s approach appears so heavily focused on large projects and a 'large hydro first' form of self-sufficiency emphasis, that it is difficult to obtain adequate assurance that other supply options receive adequate consideration (BCUC, 1983a, p. 97).

More specifically, the Commission concluded that the conservative bias of the 44 month critical period used by Hydro (see above, pp. 377 - 378) for generation planning purposes had not been justified, and that alternative approaches had not been considered.

In addition, the separation of the load forecasting and generation planning components prevented the development of strategies "...to accommodate or minimize risks from uncertain future demand" (BCUC, 1983a, p. 91). For example, the failure to give adequate consideration to energy purchases or co-generation by industrial users, had led Hydro to avoid the risk of underbuilding thereby increasing that of overbuilding.

Finally, the Commission questioned B.C. Hydro's approach to the export market. In its original rate submission and subsequent testimony, B.C. Hydro argued that export revenues should be kept distinct from domestic revenues for regulatory purposes. Not only was it "...government policy to build generating capacity to meet domestic demand only..." but revenues from the (largely interruptible) export market were too irregular to allow for adequate financial forecasting. Besides, the utility argued, domestic customers would benefit eventually in any case because extra export revenues could be used to replace borrowed funds.
This position was rejected by the Utilities Commission right from the outset when it denied Hydro's initial rate application and ordered the utility to include export revenues in its revised submission. Subsequently, in its March 1982 interim decision, the Commission ordered Hydro to establish a "Rate Stabilization" account from its export revenues and to transfer $60 million from this fund each year to its general income (BCUC, 1983, p. 8). In this way customers would benefit directly in terms of rates, while the impact of fluctuations in export revenues would be smoothed out.

In its final report, the Utilities Commission observed that Hydro had designed its system to enable it to sell into the export market in average water years, that revenues from these exports could be adequately forecasted, and that other Canadian public utilities treated exports as part of their normal operating revenues (BCUC, 1983a, pp. 103-104).

Finally, while not challenging the provincial policy against building for export, the Utilities Commission urged a more aggressive approach to short term exports in order to alleviate the burden that excess capacity had placed on domestic consumers (BCUC, 1983a, p. 239).

8.6 B.C. Hydro Under Scrutiny II: The Site C Hearings

In October, 1979, B.C. Hydro announced its intention to seek regulatory approval for its next major generating project, the Site C facility on the Peace River. Site C was one of a number of generating sites downstream from the original W.A.C. Bennett dam and, from an engineering standpoint, represented a logical step in the complete utilization of the Peace for power development purposes. The huge storage capacity of the W.A.C. Bennett Dam (see above p. 185) gave additional facilities downstream a high level of energy capability with a relatively
low storage requirement, and another downstream site (Site 1) had already been developed during the late 1970s.

However, Hydro's request to proceed was stalled by the government's overall review of energy policy and its development of a new regulatory framework (see above pp.401 - 413). In July 1980, before this framework was fully in place, Hydro released its key background document, the Site C Project Environmental Impact Statement (B.C. Hydro, 1980b). This was followed in September 1980, by an Application for an Energy Project Certificate under the new Utilities Commission Act, containing much the same information in abbreviated form but with no section on project justification (B.C. Hydro, 1980d).

Hydro approached the task of presenting a justification for Site C in much the same way as it had with Revelstoke four years earlier. In Hydro's impact statement, the need for a new generating facility was portrayed as an urgent one, with this urgency essentially limiting the choice of options to the project proposed:

The September 1979 forecast indicates a probable average annual growth rate of 5.9% . . . the Peace Site C hydro project is proposed by B.C. Hydro to meet load growth deficits beginning in 1987. . . . Although there are many potential future hydro and thermal power projects in British Columbia, the studies for most of these alternatives are not sufficiently advanced so that they could become feasible alternatives to the Site C project for a 1987 in-service date (B.C. Hydro, 1980b, pp. 2.1 and 2.24).

The most significant departure from the Revelstoke application was the extent of study given by Hydro to the environmental and social impacts of Site C. Between 1976 and 1980, thirteen major reports on these impacts were produced, and while many of their conclusions would eventually be criticized, it cannot be said that B.C. Hydro tried to ignore the environmental consequences of its project. Approximately 4,600 hectares
(11,500 acres) of land would be flooded by the Site C reservoir, with another 840 ha. (2100 acres) being rendered unavailable due to bank instability (B.C. Hydro, 1980b, Part 2).

The most significant (and most widely protested) consequence of this flooding was the loss of approximately 2520 ha. of high quality (CLI class 1 and 2) agricultural land. While only equivalent to about 2 percent of such land in the entire Peace River region, it represented a more significant 17 percent of high quality farmland in the lower Peace Valley and 32 percent of land suitable for vegetable crops (B.C. Hydro, 1980b, p. 7.3). Both the climate and fertility of the valley bottom lands were superior to the higher surrounding plains.

The Peace Valley also represented an area with significant recreational potential. In Hydro's words, the "...attractiveness for recreation is due to varied patterns of islands, channels and vegetation in the floodplain," making "the scenic qualities of the Peace River valley... of provincial significance" (B.C. Hydro, 1980b, p. 8.3). Much of this scenic appeal would be destroyed by flooding as a natural wild river setting was transformed into an extensive regulated reservoir (pp. 8.4-8.5).

In addition, some forest production would be lost, wildlife would be displaced due to a reduction of habitat, the character of the fishery would change and "...64 known heritage sites, 16 of which are historic in origin..." would be inundated (B.C. Hydro, 1980b, p. 13.4).

As was the case with Revelstoke, a social cost/benefit analysis was prepared to demonstrate that the overall social benefit from Site C (not just its benefit to B.C. Hydro) exceeded both direct and indirect costs (B.C. Hydro, 1980f; summarized in B.C. Hydro, 1980b, section 3.0). Again following the approach developed for Revelstoke, the social benefits of
Site C were considered equivalent to the costs of supplying projected load requirements by the next most expensive means. Since according to Hydro, only the Hat Creek plant was capable of being built by 1987, its estimated costs of $2.9 - 3.4 billion (at the medium 6 percent discount rate used) were scaled down to Site C's energy capability to produce a benefit of $1.2 to $1.3 billion.

As shown in Table 8.6, the benefits of Site C relative to Hat Creek were estimated at between $62 and $368 million at a 10 and 6 percent discount rate respectively, and resource losses lowered this figure to between $45 and $318 million. While, according to B.C. Hydro's initial analysis, resource losses from Site C were significant, they were greatly exceeded by its benefits. Using a "cost of funds" approach in which 43 percent of the project's costs were assumed to be raised through government trusted funds, a discount rate of 6 percent was advanced as the appropriate one, producing a $318 million net benefit for Site C.

While Hydro stated that the net benefits of Site C justified its construction, it proposed a number of mitigation and compensation measures. These measures were based on the two principles. One was that "... mitigation measures should bring about at least as valuable a reduction in resource losses as the cost of the measures themselves." The second was that compensation should be based on considerations of equity for those unduly affected by the project, not on the broader grounds of internalizing all the economic externalities generated by it:

It is desirable that those who stand to lose the most from a development project receive some of the benefits directly in terms of either reduced impact via mitigation measures or compensation for impacts. ... However, based on efficiency arguments, if paid by B.C. Hydro, would simply result in a transfer payment from electricity consumers to general revenue. That type of compensation would in effect be a form of general
TABLE 8.6
B.C. HYDRO: COST/BENEFIT ANALYSIS OF SITE C

($ Millions)

<table>
<thead>
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<th>Energy Benefits (i.e. Hat Creek Costs with 50% FGD)</th>
<th>6%</th>
<th>10%</th>
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<td>Discount Rate of:</td>
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<td>Capital and Operating Costs</td>
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<td>Benefit to Utility</td>
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<td>Forestry</td>
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<td>Total Resource Costs</td>
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<tr>
<td>Benefit/Cost Ratio</td>
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SOURCE: B.C. Hydro, 1980f, Table 5.16; and 1980b, Table 3.8.
taxation since virtually the whole population of the province will be served by B.C. Hydro’s additional generating stations (B.C. Hydro, 1980b, pp. 16.12 and 16.11).

The most significant mitigation measure proposed by Hydro was a $7.7 million reservoir clearing and clean-up program which was estimated to lower resource losses by $33 million. For the remaining $49.6 million in resource losses (at Hydro’s 6 percent discount rate) the utility proposed compensation of between $18 and $19 million, with $17 million of this total going to recreation facilities (B.C. Hydro, 1980b, p. 18.4). No agricultural compensation was proposed on the grounds that Hydro’s private purchase of farmland fully reflected the value of the lost agricultural potential.

B.C. Hydro’s announcement of its intention to proceed with Site C was followed by a mobilization of those local and province-wide interest groups opposed to the project. The Peace Valley Environmental Association and the Save the Valley Committee circulated a pamphlet summarizing the case against the project:

The undeniable truth of this basic limit to hydro power means that no matter what, we will have to turn to alternative power sources anyway. Why, then should the local economy of the Peace area suffer permanent environmental destruction to fill a short term demand? . . . The Peace Valley, because of its special atypical soil and shelter is a unique northern agricultural area . . . It is too valuable a northern resource to be lost forever. (PVEA, N.D., p. 1).

There was, however, some evidence that the provincial government had already made up its mind to proceed with the project, and that any review under the new Utilities Commission Act would deal only with mitigation and compensation issues. For one thing, the Act allowed the government unlimited leeway in this regard, and the earlier Energy Policy Statement’s promise of a two-stage review process focusing initially on project
justification had not been included. For another, the appearance of the "economic development strategy" in Hydro's System Plan (see above pp. 384 - 386) and the government's vocal support for a number of energy intensive "mega projects" seemed to indicate that policy makers viewed the future level of domestic electricity demand as less important than the creation of new supply to encourage economic growth. These suspicions were given added credibility when a leaked government document indicated that a decision had already been taken to supply the North East Coal project from the Site C project. According to a *Vancouver Sun* editorial, the decision to construct Site C had already been made:

...the government has short-circuited the public approval process for the proposed Site C dam ... (and) has deceived and betrayed the people who were promised... full and open public hearings (*Vancouver Sun*, Feb. 13, 1981, p. 1.4).

Finally, conversations with officials in those provincial ministries concerned with Site C issues revealed that they had been instructed to confine their work to questions of mitigation and compensation, not to the issue of whether or not it should be built (*Vancouver Sun*, Oct. 10, 1980, p. A.7; Runka, 1980).

Nevertheless, when the Site C application was referred to the Utilities Commission for public review under Section 19(1a), Part 2 of the Utilities Commission Act, the terms of reference were quite broad; including project justification as well as socio-environmental impacts, design, licensing, and "...any other issues deemed to be relevant by the Commission..." (*BCUC, 1983b, Appendix 4*).

The government's selection of a hearing panel did, however, meet with some criticism from those who hoped to use the public review to stop Site C. Only one panel member, Don Kilpatrick, was a regular member of the
Utilities Commission. The panel chairman, Keith Henry was an engineer with previous Hydro construction experience, and the remaining three members had either engineering or business backgrounds (Vancouver Sun, April 24, 1981, p. A2; Barz, 1983, pp. 161-162).

Nevertheless, despite a degree of tension between the panel chairman and some environmental intervenors (Barz, 1983, pp. 161-162), the fears of a superficial hearing biased by the pro-development backgrounds of the panel proved to be unfounded. In a review process lasting two years, from the selection of the panel in April, 1981, to the completion of the final report in May, 1983, B.C. Hydro's Site C application was given exhaustive and unprecedented scrutiny. Interventions were filed by 115 groups and individuals, over 70 panels of witnesses made presentations, and over 17,000 pages of transcripts were generated by almost a year of public hearings (BCUC, 1983b, pp. 1 and 44).

In sharp contrast to previous Water License Hearings, the Site C Hearing Panel took an active rather than passive approach to their task. At a pre-hearing conference and in a series of decisions made between June and October, 1981, the Panel commissioned several studies evaluating the validity of Hydro's submissions, ordered B.C. Hydro to reveal the sources for its industrial load forecast, required all government ministries to submit "blue papers" on matters within their jurisdictions, and set out the ground rules for the subsequent public hearing (BCUC, 1983b, pp. 44-46; Vancouver Sun, Oct. 16, 1981, p. E.6).

This hearing was broken down into six phases; demand, supply, cost and design, socio-environmental issues, financial impacts, and final argument. The right to participate was extended to any interested party, and funding was provided for intervenors. While the decision to award costs only after the end of each hearing phase according to the Panel's judgment of
"...the degree to which the intervention contributes to the understanding of the issues..." (BCUC, 1983b, p. 45) drew protests from some intervenors, it did provide them with significant support.

During the hearing itself, counsel for the Utilities Commission took an active role, generating as much cross-examination of Hydro's testimony as the intervenors themselves. The Hearing Panel also confronted the government over the latter's continuing efforts to limit the role played by its own public servants. The release of a number of Ministry Blue Papers was followed by accusations from their authors that they had been heavily edited after a review by the Ministry of Industry. For example, an official from the Ministry of Lands, Parks and Housing told the press that "I'm just getting over my initial shock...there's not much left of the original, 38 pages have been reduced to 3" and other public servants feared that they would not be allowed to testify openly at the hearing (Vancouver Sun, Nov. 12, 1981, p. A.2). The Hearing Panel responded by asserting that the preparation of Blue Papers "...makes the Ministry an intervenor" and after a "long struggle" between Panel Chairman, Keith Henry and the government, the latter announced that all civil servants who had worked on these papers would be available for testimony and cross examination (Vancouver Sun, Jan. 24, 1982, p. A10).

The most fundamental issue facing the Utilities Commission's Site C Panel (and the one which had never been faced head on in previous hearings on Hydro's projects), was that of project justification. The Panel's hearings on this issue extended from November, 1981, to February 1982, and the question was reheard in October, 1982 in response to a new B.C. Hydro demand forecast.

The project justification issue encompassed three separate but related questions: 1) was B.C. Hydro's forecast justified? 2) was running the
the risk of overbuilding a less costly planning approach to forecasting uncertainties than running the risk of insufficient capacity? and 3) given a need for new generating capacity, was Site C the most economic alternative?

While B.C. Hydro's initial presentation to the Site C panel followed closely the case presented in its Environmental Impact Statement, the utility appeared to be on the defensive right from the outset. W.A. Best, the utility's vice-president for Corporate Affairs, admitted in his initial presentation that Hydro's forecasting record had "deteriorated during the energy troubled 1970s" and that it had been "somewhat slow to adopt new methods" (Vancouver Sun, Nov. 25, 1981, p. A1).

Specifically, Best stated that in future forecasts, Hydro would establish a more explicit link between its electricity forecasts and long-term economic outlook, prepare its forecasts within a total energy context, give more explicit consideration to the effect of electricity prices, and establish a permanent load forecasting committee (BCUC, 1983b, p. 59 and Ex. 29). However, the utility's vice-president concluded that Hydro's past forecasting record, "while not perfect is not too bad" and that its 1981 forecast could still serve as a justification for Site C (Vancouver Sun, Nov. 25, 1981, p. A1; BCUC, 1983b, Ex. 29).

Although the 1981 Hydro forecast growth rate of 5.7 percent was virtually the same as that presented in its initial Environmental Impact Statement, the projected energy requirements were substantially lower. As shown in Table 8.7, the failure of demand to grow at the expected rate between 1979 and '81 meant that 1991 requirements were now 3330 GWh/a lower and 1993 requirements, 5000 GWh/a lower. Furthermore, the Ministry of Energy (which Hydro itself now admitted had a better forecasting record),
foresaw a 1991 demand which was almost 10,000 GWh/a lower than Hydro’s initial 1979 forecast. Since the firm energy output of Site C was just under 5000 GWh, Hydro’s contention that it was urgently needed was rendered questionable right from the outset.

The subsequent testimony and cross examination not only confirmed the dubious assumptions and technical deficiencies of Hydro’s forecast; it also revealed a number of upward biases in the one presented by the Ministry of Energy. One area which came under particular scrutiny from environmental intervenors was the role of price. In the words of a brief presented by SPEC:

> What will the effect of projected rates be on demand? This must be answered if one is to be confident that the load growth projected as a justification for future projects will in fact materialize at rates consistent with putting those projects in place...The B.C. Hydro fore-

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<tr>
<td>1981</td>
<td>32,080</td>
<td>31,114</td>
<td>30,558</td>
<td>31,158</td>
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<td>1986</td>
<td>45,310</td>
<td>43,690</td>
<td>41,114</td>
<td>38,060</td>
</tr>
<tr>
<td>1991</td>
<td>58,100</td>
<td>54,770</td>
<td>48,337</td>
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<td>1993</td>
<td>64,700</td>
<td>59,700</td>
<td>49,645*</td>
<td>51,150</td>
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</tbody>
</table>

NOTE: *Interpolated from 1990 and 1995 data

SOURCE: B.C. Hydro (1980b), Table 2.2; BCUC (1983b), Table 4.
cast has not explicitly measured price effects and has not been shown to account for them in any other way either (Quoted in Wilson, 1983, p. 21).

Hydro's initial response was to contend that it had taken account of price effects in its allowance for conservation, and that, in any event, electricity prices were not expected to increase faster than the rate of inflation. While the latter point was endorsed by the Ministry of Energy in its testimony, it broke down under cross-examination. For one thing, the assumption directly contradicted evidence presented by Hydro at the Utilities Commission rate hearings projecting significant real increases. For another, it assumed that existing "average cost" pricing policies would continue indefinitely despite the announced intention of the provincial government in its energy policy statement to move toward replacement cost pricing for all energy commodities.

Two econometric analyses submitted by economists on behalf of environmental intervenors argued that even Hydro's own projected rate increases would dampen demand enough to allow a postponement of Site C (BCUCb, 1983, Ex. 85A and Ex. 400). The analysis presented by Lord (Ex. 400) went as far as to suggest that "the 2.9 percent annual real rate increase anticipated by Hydro for the balance of the decade would choke off virtually all demand growth, to the extent that neither Site C nor Revelstoke would be needed (Ex. 400, p. 2).

In an attempt to clarify the government's approach to the question of its pricing intentions, the Utilities Commission requested testimony from the Minister of Energy Mines and Petroleum Resources. Although the Minister did appear, he shed virtually no light on the issue, saying only that the government would move toward replacement cost pricing, but that no timetable had been determined (Jacard, 1983, p. 77).
The Utilities Commissions's final conclusion from all this evidence was that "... real electricity prices can be expected to increase over the next decade. ..." that Hydro had not adequately taken the influence of price into account in its demand forecasting, and that price impacts could be even more pronounced if pricing policy changed at the provincial level (BCUC, 1983b, pp. 68-71 and 78).

The second key demand issue examined during the Site C hearing involved the relationship between the projected energy requirements of various sectors and the underlying economic trends in those sectors. In the commercial sector Hydro's approach of simply projecting electricity demand as a function of GDP came under serious criticism, especially in light of the much more sophisticated end-use analysis developed by the Energy Commission and the Energy Ministry during the 1970s.

It was, however, the industrial bulk sector which generated the most critical scrutiny. Not only was Hydro's forecasting record for this sector the worst of any (BCUC, 1983, ex. 12; and above pp. 374 - 375), it was also the area where both Hydro and the energy ministry had significantly increased their projections during the early 1980s.

Cross-examination of both forecasting agencies, however, revealed that bulk sector demand estimates, especially for prospective new energy intensive industries, were based on little more than guesswork. While each agency assumed the emergence of significant demand from these sources, their lists of new projects were almost completely different (Vancouver Sun, Nov. 28, 1981, p. A16). The Energy Ministry's forecast in the area tended to be more optimistic than Hydro's, thereby offsetting the former's more conservative end-use approach to existing industries like pulp and paper. It also became apparent during the hearing that neither bulk
forecast, with their assumptions of rapid growth in the energy-intensive resource industries, was compatible with their more conservative projections of overall provincial GDP (BCUC, 1983b, p. 74).

The confusion and uncertainty generated by this detailed probing of the two load forecasts proved disturbing to the Utilities Commission as illustrated by the following outburst directed at the Energy Ministry Panel by Commissioner Kilpatrick:

> After listening to last week’s Hydro panel, their economists and now you, gentlemen, I am troubled by the bottom line. You are all economists whose training should qualify you to be competent in forecasting, which I admit is as much art as science, but as late as this fall, you all had access to the same data, you know of the recession and yet the Energy Ministry has increased its load forecast upward while B.C. Hydro has revised its forecast downward. . .What is this Commission supposed to do now? Add our own judgment? We have been required to provide reasoned advice on a $2.64 billion project and your testimony has made it very difficult for us (Vancouver Sun, Dec. 10, 1981, p. A.18).

Both the continued impact of the recession and the strong criticism of Hydro’s 1981 load forecast, led the utility to submit a revised forecast to the hearing in late 1982. While not really alleviating all of the methodological problems identified by the hearing panel, it did move toward both a more explicit end-use analysis and a more explicit consideration of price (BCUC, 1983b, p. 60 and Ex. 429). However, based mainly on its perceptions of the impact of technical change on the pulp and paper industry, Hydro continued to argue that rising real electricity prices would have no impact on future industrial electricity demand (BCUC, 1983b, p. 72). As shown in Table 8.7, the results of Hydro’s 1982 forecast were virtually identical to that submitted by the Ministry of Energy in 1981.
However, even with this sharp downward revision, the Utilities Commission Panel concluded that:

As a result of any of the following factors — lower GDP growth than Hydro has projected; the effect of rising real electricity prices; less rapid shifts into electric-intensive processes; more conservation or alternative energy substitution for electricity; greater realization of self-generation potential — a lower rate of growth than shown in Hydro’s September 1982 10-year probable load forecast could very easily result. The Commission therefore concludes that Hydro’s “probable” load forecast should be considered optimistic... (BCUC, 1983b, p. 85).

As we have seen, the growing uncertainties associated with provincial load forecasting led Hydro to place increasing emphasis on the role of exports in creating a residual market for any surplus created by the construction of excess generating capacity. At the Site C hearings, Hydro went beyond its previous approach of simply asserting that the availability of export markets made overbuilding less costly than underbuilding and submitted a consultant’s report concerning the longer term export potential in the Western United States market (BCUC, 1983b, pp. 82-84).

Hydro’s case, however, was undermined in two ways during subsequent cross-examination. First, the wisdom of relying on the interruptible export market had been directly questioned by Hydro’s own submission at the Utilities Commission’s rate hearings. In a letter to the Commission, arguing its case that export sales should not be included in determining overall revenue requirements, the utility had argued that:

B.C. Hydro used the market for export surplus revenues as one which could vanish, as the buyer is not contractually bound. It is B.C. Hydro’s view that a reliance on the revenues of export sales would therefore result in unwarranted financial risk... the volatile energy market in the western United States and its current uncertainties dictate that B.C. Hydro’s
While the word "forecasting" in the above quote referred to financial rather than load growth considerations, the Utilities Commissioners naturally wondered why Hydro would place any more reliance on such an uncertain market when making critical system planning commitments.

The instability of the export market was also confirmed by a consulting study commissioned by the Utilities Commission itself. The essence of its analysis was that the only reliable export opportunity was the sale of firm power under longer term contracts into the California market (BCUC, 1983b, pp. 83-84 and ex. 13). However, since the testimony of the Energy Minister had confirmed that the policy of exporting only interruptible energy remained in place (p. 82), the Utilities Commission Panel was led to the conclusion that the "...export demand for surplus energy at attractive rates is not likely for the balance of the decade" (p. 85).

This conclusion, in turn, seriously undermined Hydro's more general contention concerning the relative costs of over versus under building, leading the Utilities Commission to conclude that:

...undersupply can impose serious consequences and therefore should be avoided if possible. But...under current circumstances overbuilding can entail the significant economic costs to the province associated with a mistimed investment...over building can result in the commitment of a large amount of capital yielding a relatively low rate of return. This return might be sufficient to cover Hydro's borrowing costs (i.e. 3 percent) but it would not be sufficient to cover the social opportunity cost of capital (i.e. 8 percent to 10 percent) (BCUC, 1983b, pp. 99-100).

The conclusions emerging from the Utilities Commission's proceedings on the subjects of demand growth and export opportunities seriously...
undermined by Hydro's contentions that Site C represented the most economical source of new supply and that its benefits outweighed its social costs. As we have seen, Hydro argued initially that Site C and Hat Creek were the only projects capable of meeting the projected load growth within the time required and that since Site C was less costly than Hat Creek, it was justified on social benefit/cost grounds.

When Hydro itself was forced to admit, on the basis of its September, 1982 load forecast, that Site C would be required in late 1990 rather than 1987, it continued to argue "...that the granting of the certificate and start-up of construction should not be delayed because, while Site C could be constructed over a six year period, economies might be realized by extending the construction period" (BCUC, 1983b, p. 88).

However, given the lower load growth outlook and the consequent relaxation of the original time constraints, a much wider range of electricity supply opportunities became possible, leading the Utilities Commission to conclude that "the position which Hydro presented on alternatives based on its September, 1981 forecast is no longer relevant" (BCUC, 1983b, p. 103).

A more general planning issue raised at the Site C hearing related to the evaluation criteria used to rank alternative sources of supply. While Hydro did present a social cost benefit analysis of its favoured project, its overall consideration of alternatives was conducted according to the narrower criterion of their relative cost to B.C. Hydro. Hence, there was no assurance that projects rejected by Hydro as sub-economic from a corporate viewpoint might not be optimal from a social viewpoint.

Probably the largest discrepancy between Hydro's perspective and that of the province as a whole concerned the discount rate applied to costs and benefits. Hydro's own system planning used a 3 percent real rate, much
lower than the 8 - 10 percent generally accepted as reflecting the social opportunity cost of capital. When Hydro's relative costs were adjusted to take account of this difference, alternatives like conservation, forest industry co-generation and increased use of the Burrard Thermal plant appeared relatively more attractive than more capital-intense hydro projects like Site C.

In its final decision the Utilities Commission clearly highlighted this problem and argued for a more consistent approach:

...to avoid a basic inconsistency between the criteria Hydro uses to select and evaluate projects and the social benefit-cost which the government has indicated as appropriate for this review, either Hydro's evaluation policies or the government's criteria must be changed. The Commission recommends that the government resolve this important matter and advise Hydro of the policy to be followed for future planning and facility applications (BCUC, 1983b, p. 108).

Finally, the Utilities Commission proceedings discredited the social benefit/cost analysis submitted by Hydro in justification of Site C. Apart from the question of the discount rate already alluded to, the most fundamental criticism directed at Hydro's analysis was that it contained no valid estimate of Site C's benefits. Hydro, as we have seen, had used a method of benefit estimation widely used to evaluate public sector projects where a demand was assumed to exist but its direct benefits are difficult to measure. In these circumstances the benefits of a project are assumed to be equal to the next best means of supplying the equivalent output.

However, as numerous intervenors pointed out during the Site C hearing, this approach was really a cost-effectiveness rather than a cost-benefit one, and it rested on the already discredited assumption that the output would be required. As one intervenor graphically put it, "A conclusion based on such a demonstration is comparable in logic to proving
that since severing my hand will be less debilitating to me than severing my arm, then amputating my hand is in my best interest even though there may be no need to do so" (Fox, 1981, in Jacard, 1983, p. 81). Hydro's approach was further undermined when its "next best alternative," the Hat Creek thermal plant was dropped from its system plan altogether in 1982, with the utility's expenditures being completely written off. While the Utilities Commission did not directly condemn Hydro's approach to benefit/cost analysis it did conclude that the no positive net benefits for Site C had been demonstrated (BCUC, 1983b, pp. 112-113).

In summary, the Utilities Panel concluded that a valid case for the Site C project had not been made. Not only was their no convincing evidence that future load growth would require it, but "it has not been demonstrated that Site C is the best possible project from a provincial point of view" (BCUC, 1983b, p. 113). While the majority of Commissioners did not reject B.C. Hydro's application outright, they did recommend that Hydro be required to present a more convincing case for Site C before being permitted to proceed.*

Although it soon became clear that Hydro's case for Site C rested on very dubious foundations, the Commission's terms of reference still required a comprehensive examination of its socio/environmental impact as well as appropriate levels of mitigation and compensation. In fact, this aspect of the hearing proved to be the most lengthy one; consuming 62 of the 116 hearing days and generating over half of the 17,000 or so pages of

*Commissioner Don Kilpatrick dissented from this rather equivocal stance, emphasizing that "...rejection of an Application is the only appropriate result where crucial evidence is missing" (BCUC, 1983b, p. 308).
transcript (Barz, 1983, pp. 173 and 184). According to Jacard (1983), much of this delay was due to the government's failure to provide proper co-ordination:

Specifically, while the government was developing the new review process it was also well aware of the B.C. Hydro's proposal (SIC), and yet it refused to provide any significant guidance or feedback to the Crown Corporation. . . As a consequence, B.C. Hydro had no opportunity in the pre-hearing stage, to respond to the discrepancies between their work and the work of government ministries. While some of these discrepancies could have been resolved in the pre-hearing stage, they were instead debated at length during the hearing (Jacard, 1983, p. 71).

The key issues raised by intervenors during this phase were the extent to which the range of adverse environmental impacts associated with Site C could be quantified, the validity of the monetary estimates developed by Hydro and various government ministries, and the basis for mitigation and compensation. Despite a wide range of testimony to the effect that no dollar figure could adequately reflect the loss of such resources as prime agricultural land and the scenic beauty of the Peace Valley, the Commission concluded that there was no other rational basis for mitigation or compensation decisions (BCUC, 1983b, p. 145).

However, in attempting to assess the conflicting estimates of resource valuation presented to it, the Commission was forced to answer three contentious questions. First, should valuation be based on what particular resources would be worth under a "realistic" assessment of future conditions, or on what they could be worth given the realization of their maximum potential? The Utilities Commission opted for the former perspective.

Second, should foregone resource values be evaluated on the basis of the willingness of users to accept compensation for their loss, or
according to the willingness of those users to pay for them. The question was one which had long troubled cost-benefit analysts since the valuations according to the latter but not the former criterion were limited by the income of users. A number of economists, particularly Mishan (1975) had argued that the status quo should be the determining factor; i.e. those seeking to obtain the use of a resource should be required to compensate those giving it up.

The Utilities Commission, however, rejected this position and concluded that:

The willingness-to-be compensated approach is based on the premise that one class of users have special rights to the resource. . .unless prior rights have been established through contractual or treaty arrangements, the willingness-to-pay approach for valuing public or Crown-owned resources is appropriate (BCUC, 1983b, p. 148).

Finally, the Commission was faced with the question of determining an appropriate discount rate for the estimation of resource values foregone. While Hydro had used the same rate it applied to its own capital expenditures, a number of intervenors argued that society had a different lower social time preference rate when it came to evaluating future resource losses. The Commission accepted this latter contention and adopted a "hybrid" discount rate of 8 percent for Hydro's capital expenditures and 3 percent for resource losses.

Table 8.8 shows the comparative resource loss estimates presented by Hydro and the relevant government ministry as well as the final decision on valuation by the Utilities Commission. With the exception of recreation, the resource loss estimates of the government ministries were significantly higher than those submitted by B.C. Hydro. Generally, the Utilities Commission determined values which were higher than those of the utility, but in the case of fisheries losses, it decided that there was insufficient
research to allow a reliable estimate to be made. All in all (excluding the fishery), the Utilities Commission estimated resource losses totalling approximately $70.5 million, somewhat greater than Hydro’s maximum estimate of $67 million.

Hydro’s contention that it should pay compensation for these losses only on equity grounds (see above p. 424) was contested by a number of intervenors and ultimately rejected by the Commission. Although it was accepted that compensation payments should be channeled into regional improvement programs "...the (provincial compensation and mitigation) guidelines clearly indicate that the provincial government wants compensation to serve as an efficient control and payment for any resource loss or incremental social cost" (BCUC, 1983b, p. 153). From this

TABLE 8.8
ALTERNATIVE ESTIMATES OF SITE C RESOURCE LOSSES
($ Millions)

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<th>B.C. Government Ministries</th>
<th>B.C. Utilities Commission</th>
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<tbody>
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<td>Agriculture</td>
<td>8.0 - 52.0</td>
<td>17.5 - 94.5</td>
<td>59.8</td>
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<td>Forestry</td>
<td>.356 - 1.024</td>
<td>.414 - 1.072</td>
<td>1.0</td>
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<tr>
<td>Hunting/Wildlife</td>
<td>.181 - .518</td>
<td>2.0 - 3.7</td>
<td>2.8</td>
</tr>
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<td>General Recreation</td>
<td>4.0 - 13.8</td>
<td>1.8 - 3.7</td>
<td>6.9</td>
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<tr>
<td>Subtotal</td>
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<td>21.7 - 102.97</td>
<td>70.5</td>
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<tr>
<td>Fishery</td>
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<td>2.0 - 4.2</td>
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perspective the Utilities Commission ordered a compensation package of some $30 million (plus an amount for fisheries to be subsequently determined). The only difference between the Commission's total resource loss estimate and its total compensation package was the value of private agricultural land which was presumed to be compensated by Hydro's transactions with the land owners.

Finally, the Utilities Commission's Site C decision attempted to build on the experience of Revelstoke by recommending a comprehensive impact monitoring program. This program would have two overall objectives. First, it would deal with any project-related mitigation or compensation matters which had not been resolved by the initial hearing. Such issues included the estimation of fisheries losses and the identification of most mitigation and compensation for community socio-economic impacts (BCUC, 1983b, p. 251). Second, the monitoring program would "...verify compliance with conditions specified in the Energy Project Certificate" (p. 249).

These tasks would be undertaken by a single individual based in Fort St. John and acting under the authority of the Utilities Commission with a small staff. The monitoring commissioner's function would be "...adjudicative rather than analytical..." with consultants being provided to deal with any unresolved technical issue. Finally, Hydro was required to fund the monitoring program until the completion of production.

8.7 Aftermath

The impact of the post 1982 economic recession on power consumption in B.C. left the government little choice but to concur with the Utilities Commission's recommendations that Site C should not proceed. In fact, the Energy Minister, in late 1983, went as far as to state that Site C would be
shelved for "...at least another ten years: and that "...it may be preferable to build smaller projects instead." (B.C., 1983, p. 2).

The ensuing years were not happy ones for B.C. Hydro, as the emphasis shifted abruptly from the planning and construction of new hydro projects to coping with the consequences of serious over-capacity. As a result of efforts to cut costs in the face of growing fixed interest costs and stagnant revenues, approximately 4,000 jobs were eliminated, equivalent to one third of the Crown utility's entire staff.

At the governmental level as well, policy after 1983 became preoccupied with the over-capacity problem. The first manifestation of this concern was a shift in the province's power export policy. In late 1983, Energy Minister Stephen Rogers formally announced that British Columbia "...will permit firm, long-term exports of surplus electricity to the United States" (B.C., MEMPR, 1983, p. 1).

Apart from the important symbolic value of this announcement, it represented a gradual rather than an abrupt change from past policy. The province simply discovered that in order to market its very large quantities of surplus energy, it had to seek out new customers and longer contract terms. Both the rationale and the pricing criteria for these new, longer term sales were stated in terms of their very low, short-run marginal costs:

We can either spill the water over the dams, or we can generate the power and attempt to find new markets for it. The choice is: spill it or sell it. Selling it makes a lot more sense. Every dollar Hydro earns in exports is a dollar it doesn't have to add on to its domestic rates (MEMPR, 1983, p. 1).

The first sale negotiated under this policy substantiated the fears expressed by the Site C Panel concerning the costs of over-building. A three year agreement was tentatively reached with a Los Angeles utility to
take the equivalent of about half of the annual output of Revelstoke. While the approximately 24 mill price for the sale was more advantageous than spilling the water, it did not cover the approximately 35 mills of financing costs associated with Revelstoke (MEMPR, 1983; B.C. NDP, 1984, pp. 13-14).

The years following the Site C decision also saw a number of special incentive rates for industrial customers. One scheme, the block recovery rate, contained a special incentive rate of 18.5 mills for all incremental electricity consumption by large users (MEMPR, 1984, p. 1). Another used concessional power rates as the principal ingredient in a package of measures developed to re-open mining operations which had shut down in the wake of plunging metal prices.

Like the renewed emphasis on exports these measures made economic sense in the environment of excess capacity. Since almost the entire costs of installed hydro generating plants like Revelstoke would have to be paid regardless of the level of electricity demand, short term reductions in power rates became a relatively costless form of aid to stricken resource industries. Production and employment were created which wouldn't otherwise exist and B.C. Hydro earned some revenue to ease its burden of fixed costs.

As the middle of the decade approached, however, there were indications of a more fundamental shift in B.C.'s power policy. The premier, William Bennett, began to express interest in using hydro development as an economic stimulus to counteract the prolonged downturn in the province's other major resource industries. Increasingly, the premier advanced the idea of building the Site C dam as part of a long-term export contract to the California market. While extensive discussions were held with California utilities, and a new $400 million intertie between
California and the Pacific northwest held out the promise of improved market access, this idea has yet to come to fruition.

This development, however, raised a number of old questions concerning both the risks of adding yet more capacity to the B.C. Hydro system and the willingness of British Columbians to sacrifice the environmental resources of the Peace for export revenues. For those with knowledge of the developments of the last decade, however, the approach being taken by B.C. Hydro's new chairman, Chester Johnson, was disturbing. When asked whether the construction of the Site C dam for the export market involved risks, he replied that: "Business is a chance. Hydro is no different than anything else. We have to take chances" (Quoted in Mulgrew, 1986, p. 40).

8.8 Concluding Summary

In under a decade, the B.C. Hydro and Power Authority had lost its predominant role in determining the direction of the province's electric power policy. After vigorously pursuing its conception of the power planning problem, with its need for a continuous expansion of capacity, the Crown Utility had largely been discredited. However, as a result of its failure to control B.C. Hydro's activity at an earlier stage, the province found itself, for the first time since the great depression, with a serious problem of overcapacity.

While they came too late to prevent this latter problem, the power policy initiatives of the late 1970s were at least partially successful in bringing the activities of B.C. Hydro under a broader planning framework. Not only was significant progress made in internalizing the socio-environmental costs of hydro development, but Hydro's planning process had finally been subjected to external scrutiny and found wanting.
The roots of these developments could be traced back to the changes implemented by the New Democratic Government between 1972 and 1975. During this period, new analytical techniques, particularly in the areas of impact assessment, welfare economics, and demand forecasting were introduced. However, the reintroduction of regulatory decision making in 1980 was the crucial development which allowed these new techniques to be utilized effectively. Prior to this change, these new approaches to electric power planning questions had been strenuously resisted by B.C Hydro and often viewed with suspicion by politicians of the governing party. Both groups showed a tendency to attempt to maintain their traditional conceptions of power planning in the face of conflicting evidence.

The organized, open exchange of conflicting ideas brought about by the institutional changes of 1980, finally allowed the key power planning issues to be addressed in the public domain. Despite the often tedious and redundant quality of much of the lengthy hearings into Site C and Hydro's rate increase, these exercises produced a relatively sophisticated level of debate and analysis.

The late 1970s and early 1980s also showed an interesting symbiosis between the concerns over the environmental impact of hydro projects and the broader issues of electricity supply and demand. It can be argued that the highly visible nature of the adverse impacts of hydro projects (both past and future) led the environmental movement to devote increasing analytical effort and public attention to the issues of project justification. If the environmental impacts of hydro development in British Columbia had been less pronounced, it is unlikely that supply and demand issues would have received the degree of attention they did. This outcome was important
because the social costs of excess plant capacity can be high or higher than those associated only with environmental impacts. 

Finally, a note of caution should be introduced concerning the progress in power planning made during the early 1980s. While a marked improvement in relation to environmental mitigation and compensation issues was beyond dispute, the progress achieved in dealing with electricity supply/demand issues was influenced by unusual economic circumstances. Despite the thorough analytical scrutiny given to Hydro's planning approach during the Site C hearings, it was the sharp economic decline of the 1982 recession which decisively discredited it. Economic circumstances had destroyed Hydro's case for Site C in an unambiguous manner, and both the Utilities Commission and the government had little choice but to deny the utility's application to proceed. If the recession had been less severe, or had occurred several years later than it did, this outcome might not have occurred despite the serious flaws uncovered in Hydro's case.
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9.1 Overview

In this concluding chapter, we review the pattern of electric power policy outlined in the preceding five chapters in light of the theoretical framework set out in Chapter 2. First, we deal with the question of the role played by the provincial state in British Columbia's electric power development. Since the paradigm of economic rationality is the one most commonly adopted for normative policy analysis, we begin with an assessment of the extent to which the British Columbia policy experience corresponds to it. In order to account for the failings of this paradigm we turn to an examination of the institutional dynamics of public policy using the institutionalist, neo-marxist and neo-conservative approaches, focusing on three key questions raised in the foregoing narrative. These are the extent of the state's regulatory role, the nationalization of the electric power industry, and the varying degree of attention given to the external environmental and social costs of hydro-electric power development. We then examine the relationship between the electric power policy goals of the 1950s and '60s and the planning failures of the 1970s. The concluding section discusses the extent to which alternative institutional arrangements can overcome the deficiencies revealed by the experience of electric power planning in British Columbia.

9.2 Economic Rationality and the Role of the State

In the first part of Chapter 2 we saw that from the point of view of economic rationality, the state intervenes only to achieve Pareto or potential Pareto improvements in society's allocation of goods and services. A Pareto improvement is said to be possible when a particular
policy can make some members of the community better off without making others worse off (See above p. 16 - 17). Certain types of imperfections such as lack of competition, uncertainty, and externalities occasionally arise in market economies, and public policy will be employed to alleviate them; thereby increasing society's overall level of welfare (See above, pp. 16 - 22).

It can be argued that the market failure approach to the analysis of public policy represents a normative ideal against which policies can be assessed rather than a framework capable of explaining their adoption. While this characterization is generally valid, the use of economic rationality as a criterion for assessing the policy outputs of the state assumes that it can be achieved in practice. To the extent that it is observed to be absent in a sequence of policy choices, attention is focused on 1. the institutional barriers to economically rational behaviour identified by our other three perspectives, and 2. the adequacy of economic efficiency as the overriding consideration in policy choice. Therefore, it is worth trying to "explain" policy using an initial assumption of economic rationality, even if it is assumed in advance that such an explanation is bound to be inadequate (Allison, 1971).

We saw in Chapter 2 that market imperfections have been particularly pronounced in the electric power industry, and the preceding narrative has demonstrated that British Columbia has been no exception. In the thirty or so years following the beginning of the electric power industry, however, public policy did not really address these market imperfections. Governments acquiesced in the creation of dominant electric power monopolies and made no serious effort to regulate their activities despite the fact that both the techniques and institutions of public utility regulation had been developed elsewhere in North America.
It is true that the British Columbia government did move into the area of economic regulation on the eve of World War II and devoted considerable effort to creating an effective system of economic regulation. However, the subsequent implementation of this regulatory regime failed to live up to these initial accomplishments, with only the most cursory supervision being exercised.

The initial foray of the B.C. provincial government into the public ownership of electric power utilities was quite consistent with a desire to achieve greater economic efficiency. As outlined by the Committee on Rural Electrification, the fragmented nature of the province's outlying public utilities prevented the exploitation of the economies of scale necessary to produce lower rates and improved service. Public ownership allowed these economies of scale to be achieved and removed the uncertainties which made it difficult for small private utilities to raise capital for expansion.

The larger nationalization of the electric power industry in 1961 and the events surrounding it are less consistent with a desire to rectify market failures. Certainly, it can be argued that the institutional fragmentation of the electric power industry into hostile public and private producing companies created economic inefficiencies, particularly in planning for new generating sources. In other words, the private costs and benefits faced by each utility when considering new sources of power diverged from public ones. This divergence occurred both because a fragmented market prevented the internalization of the benefits of scale economies inherent in new power production and because there was a legacy of "non-rational" ideological antagonism between public and private utilities which inhibited their ability to make the mutually beneficial agreements necessary to achieve these new scale economies.
However, provincial policy aggravated rather than alleviated this situation by trying to promote massive hydro development on two river systems simultaneously. With planning for Columbia development already well underway, the province's dominant private utility was reluctant to become involved in a major development on the Peace, and this reluctance prompted the government to nationalize both the BCE and the Peace project.

The only economic rationale justifying this desire on the part of the government to build both the Peace and the Columbia projects simultaneously was the realization of rents from hydro development by selling power to the United States on a longer term basis. Only the provincial government, it could be argued, was capable of overcoming the "irrational" federal ban on such exports by itself promoting hydro development, thereby ensuring positive economic benefits for British Columbia.

However, the above narrative clearly illustrates that no such consistent effort to achieve positive net benefits from export sales was made. Rather, both the Peace and Columbia developments were planned as additions to domestic power supply, and it was only at a later stage that the attempt was made to sell the Columbia's downstream benefits in the United States market. Largely because of the belated realization of this need to sell power in the export market, the terms achieved were not advantageous and the province suffered a significant economic loss.

Given the decision to proceed with the development of a large new increment of power supply on the Peace River, the power pricing policies pursued by B.C. Hydro in the mid 1960s were broadly consistent with economic rationality. If the incremental costs of new power supply were falling (a contention borne out by Figure 8.3) then correspondingly lower rates were economically justified even if a degree of subsidy was required.
However, there is no evidence that either the government or B.C. Hydro attempted to price explicitly on a marginal cost basis during this period, and when power costs began to rise in the early 1970s, an economically appropriate upward adjustment of rates did not occur. On strictly economic grounds, the provincial governments should have reacted to the sharp increases in the cost of energy from all sources by moving to marginal cost pricing, exploiting the province's comparative advantage by selling power in United States markets, and adopting a conservative approach to system expansion so as to avoid dissipating the province's future economic rents in excess capacity. However, electricity rates were held at or below average costs, the export market continued to be treated as a residual one, and there was a stubborn reluctance to admit that rising electricity prices would have any impact on future demand growth.

In response to economic events, however, there was a trend during the late 1970s toward a greater degree of economic efficiency in hydro planning. Water rentals were increased significantly, the use of subsidized capital from the province's pension funds was phased out and some reforms were introduced to bring rates closer to marginal costs.

In addressing the social and economic externalities of electric power development the role of the provincial government was also mixed. Some attention was given to internalizing environmental losses in the 1950s, but the large scale developments of the 1960s were accompanied by policies which appeared purposely to externalize them. The government did not so much fail to see many of the impacts of Peace and Columbia development; it quite consciously ignored them in the interests of cheaper power rates.

This stance was gradually followed by a more enlightened attitude, culminating in the comprehensive energy project assessment legislation of
1980 and the meticulous attention given to the mitigation and compensation aspects of power development at the Site C hearings.

In summary, it is clear that a desire to achieve an economically optimal allocation of society's resources has not been the primary aim of electric power policy in British Columbia. The fact that such motivations appear to have been present at some points, but not others, merely raises the question of other more satisfactory explanations for the overall policy trends in British Columbia.

9.3 The Institutional Dynamics of Electric Power Policy

We saw in Chapter 2 that both institutionalist and neo-marxist interpretations of public policy focus on two fundamental economic roles played by the state. On the one hand, the state is called upon to remove barriers to the growth of private economic activity (in Marxian terms, the accumulation function). On the other, it is called upon to protect valued aspects of the social fabric against the disruptive aspects of unrestrained economic activity (in Marxian terms, the legitimation function). Contrary to the assumptions of welfare economists, the extent to which these two types of policies are pursued and the balance struck between them is more a function of the demands made in the political marketplace than of considerations of overall economic costs and benefits.

Economists writing from an institutional perspective have viewed the economic role of the state in both these key areas as being strengthened by both technological and geographical factors (see above, pp. 25 - 34). Evolving productive technologies create large scale economic units which undermine the conditions necessary for unregulated markets, thereby giving
rise to the predominance of political markets. Similarly, economists writing on the staple tradition, have emphasized the key role played by the state in facilitating economic activity in regions which are heavily dependent on the extraction of natural resources. Neo-marxist theorists have asserted that the dynamics of class and power in capitalist societies act to bias the state's role toward underwriting accumulation and away from legitimation.

It is clear that the initial role of the provincial state in British Columbia's electric power industry was concerned largely with underwriting the growth of private economic activity, and that this goal was achieved by simply allocating Crown resource rights to private corporations. The prevalence of demands for government intervention to curb the market power of the dominant private electric utilities which resulted from these allocation policies is quite consistent with both an institutionalist interpretation and with the historical trend in other areas (see above pp. 33-35). However, the reluctance of the provincial government to respond to these demands illustrates that the "accumulation function" was the predominant one.

Since this trend was more pronounced in British Columbia than elsewhere, it can be argued that the staple base of the provincial economy was the key determining factor. Those large externally-based business interests whose access to capital was perceived as critical for the province's continued economic growth exercised an effective veto on the government's role as an arbiter in the electric power industry.

The fact remains, however, that the demands for government regulation of the electric power industry were ultimately successful. The province's dominant utility corporations were only able to delay, not prevent the
intrusion of the state into their affairs. Nevertheless, they were able through the 1950s to prevent this regulatory regime from exerting a significant degree of control over their activities.

Again, this development is consistent with both institutionalist and neo-marxist interpretations. In terms of the latter, dominant business interests were successful in ensuring that the "legitimation" activities represented by public utility regulation were very limited and largely symbolic. However, following Bernstein's analysis (see above, p. 34), it can be argued that once regulation had been achieved, the relative stability of electricity prices and the lack of any other salient issues led to a decline in general public interest. It was this lack of any countervailing source of demands which allowed the utilities to dominate the decision-making process.

The overall dominance of business interests in the decision-making surrounding utility regulation is also consistent with the neo-conservative interpretation. Particularly striking is the fact that the initial regulatory legislation of 1919 actually resulted from the demands of the regulated utility itself. Given the existence of one predominant actor with a critical economic interest in policy outcomes on the one hand and a much larger group with a relatively small interest on the other, it is not surprising that the regulatory decisions of the 1950s favoured the former.

The problem with the neo-marxist and neo-conservative interpretations, however, is that they do not really explain achievement of utility regulation in the early 1940s. There is no evidence that this regulatory regime was demanded by the regulated utilities. Rather, the historical account of Chapter 4 indicates that continual agitation by small business interests and other groups based on a number of specific grievances against
the dominant power monopolies was ultimately successful in forcing the state into a legitimation role.

It is possible to combine the neo-marxist and staple perspectives and suggest that changes in the nature of British Columbia's staple economy had the effect of undermining somewhat, the power and solidarity of the dominant business class on the subject of utility regulation. As British Columbia's economic base became larger, the sources of external capital became somewhat more diverse, with less reliance on traditional British financial markets. The central role played by the British Columbia Electric Railway Company in the province's dominant business elite therefore declined, and it was no longer seen as such a key element in the province's continued access to external capital markets. These changes were accentuated by the shift of ownership from Britain to Canada, which further weakened the dominant role of the utility while at the same time strengthening the demand for regulation.

In conclusion, the initial role of the state in British Columbia's electric power industry reflected an underlying tension between the accumulation and legitimation functions of the provincial state. The fact that the former was predominant is consistent with both neo-conservative and neo-marxist interpretations. However, these general theories do not by themselves account for either the ultimate achievement of regulatory control or the lag in this achievement relative to other jurisdiction. The institutionalist staple perspective, with its emphasis on the distinctive character of the province's economic structure is an indispensable element of any satisfactory explanation.

By far the most important explanatory issue in the evolution of British Columbia's electric power policy is related to the direct entrepreneurial role assumed by the government in the post-war period. Why
did the provincial government go beyond its previous emphasis on allocating resources to private corporations and its limited role as an economic arbiter between producing and consuming interests?

First, the neo-conservative perspective offers relatively little insight into the motives for nationalization. In the political marketplace of competing group interests, there appeared to be no dominant private group with an overwhelming interest in government ownership of the power industry. While it could be argued that the limited nationalization of 1945 was aimed at conferring significant benefits on marginal voters in the province's outlying communities, the larger nationalization of 1961 was undertaken by a government which had consistently campaigned against such a measure.

Similarly, a general neo-marxist perspective appears less than satisfactory. Pressure from business interests had been successful in preventing full scale nationalization in 1945, but in 1961 sustained and vociferous opposition from virtually all segments of the business class was unsuccessful in heading it off. The provincial government was determined to take over control of the power industry even if it meant a direct confrontation with those dominant business interests which it had previously gone out of its way to accommodate.

The atypical character of the 1961 nationalization has led to a tendency to explain it in terms of personality and unique historic events. Premier Bennett was forced to take over the BCE and the Peace River project because it represented the only way in which he could fulfill his grandiose dreams of resource development. Presumably, if there had been no W.A.C. Bennett, the BCE would have remained in private hands and the role of the provincial state would have been much more limited.
The narrative of Chapter 5 shows that there is a large element of truth in this characterization. However, it is less than satisfactory, primarily because it fails to explain why Bennett's dreams of grandeur took the particular form that they did. The starting point for a more theoretical explanation lies in a generalization advanced by the structuralist neo-marxist scholar, Clause Offe. We saw in Chapter 2 that Offe advanced the idea that the more interventionist tendencies of the state in contemporary capitalist societies can be traced to the changing requirements of the accumulation function. Whereas, at an earlier stage, the state could support accumulation by merely allocating resources which it already possessed (primarily land and coercive authority), it subsequently found it necessary to produce particular goods and services itself.

This idea, of course, immediately raises the question of why the nature of the accumulation function should undergo such a change. The answer lies in the identification of technical and institutional factors which prevented the state from fulfilling its role in more traditional ways, and here again the staple perspective is useful.

First, the commodity of electric power came to play an increasingly important role in British Columbia's key staple industries. In both the forest and mining industries, industrialization via forward linkages (mainly into pulp and paper and metal smelting) was particularly electricity intensive. Hence, it is not surprising that it was perceived as a key economic catalyst. The provincial state, by providing abundant low cost electricity, could remove barriers to economic expansion in the key resource sectors.

The narrative of Chapter 5 shows the extent to which the provincial government tried to achieve this goal via more traditional means.
Beginning with the Alcan agreement, overwhelming reliance was placed on the allocation of Crown resources to private entrepreneurs in order to achieve large-scale, low cost power production. While this approach had sufficed in the pre-war period, the scale of new hydro projects relative to available demand had increased significantly during the 1950s. Consequently, it became difficult to induce private entrepreneurs to take the risks associated with the large capital investments necessary to bring them into production. Apart from aluminum, there was no single source of demand which could absorb the output of a large, distant hydro project, so that the risk of insufficient demand, and consequently financial loss, was always present. Ultimately, the state was forced to underwrite the risk itself.

The question remains, however, as to why public entrepreneurship rather than regulation or large direct subsidies were employed. First, given the goals of facilitating power development and minimizing its cost to key industries, the Crown corporation was more suitable in a technical sense. Regulating the activities of private companies through the use of incentives or legal sanctions involves extensive monitoring costs. As noted in Chapter 2, regulation of private firms was a practical means of exercising broad supervision over the level of monopoly profits, but it was inherently less suited to influencing underlying production costs or to inducing private firms to expand in pursuit of economies of scale (see above p. 37).

In addition, the use of the Crown corporation to facilitate the expansion of electric power production in the interests of economic development was well established in other provinces, particularly Ontario. In British Columbia itself, circumstances had led to a change in the focus of public power following the initial nationalizations of 1945. While the
outlying utilities had been nationalized primarily to improve the quality of rural electrical service, the proximity of a major hydro power source and a large new pulp and paper industry on Vancouver Island led to an emphasis on industrial subsidization. This early experience illustrated the possibilities of public power as an economic development tool.

While we have suggested that the neo-conservative perspective does not throw much light on the ultimate motive for nationalization, it does provide additional explanation for the decision to employ public entrepreneurship. In Chapter 2, we noted that a number of theorists have suggested that the Crown corporation is often employed as a device for concealing the extent to which it emphasizes the benefits produced by public subsidies while concealing the true incidence of costs. The traditional rationale underlying power policy in both the pre-war period and through the 1950s involved the public subsidization of hydro development. However, the costs associated with the allocation of hydro sites to private corporations on favourable terms were largely hidden since they represented uncollected rents on these sites. However, the larger hydro developments of the 1950s would have required more direct and more visible public subsidies to large corporations. Public ownership produced visible benefits in terms of lower power rates, but allowed a large element of this subsidy to remain hidden as a subnormal return to the capital employed in the Crown hydro utility.

Finally, there is the question of the varying treatment of the external environmental and social costs of hydro electric power development. We have already noted that a market failure approach, which assumes that the state acts to restore economic efficiency, is inadequate because, during the 1960s, environmental costs were deliberately externalized. From a neo-marxist perspective this deliberate externalization of social costs is
not surprising since the primary role of the state is to facilitate the private accumulation of capital. The legitimation functions associated with attempts to force the internalization of social costs will be curtailed when they conflict with these basic accumulation activities. In the case of hydro development during the 1960s, the provincial state was engaged in a major effort to underwrite or facilitate private accumulation. Consequently any systematic attempt to take the environmental impacts of these developments into account would have raised power rates, thereby undermining this effort.

The role of the state in the externalization of the costs of hydro development is more difficult to interpret from a neo-conservative perspective. While there was a fairly concentrated interest in low power rates, particularly among large industrial users, the total benefits produced by these rates were not enormous and those conferred specifically by the externalization of social costs were much smaller still. On the other hand, the losses suffered by those who bore the brunt of the flooding on the Columbia system were relatively more significant. Not only were they more intensely distributed relative to the gains enjoyed by power users, but they were both larger and more concentrated than those suffered in subsequent hydro developments where the attention given to environmental considerations was much greater.

It is evident from the foregoing discussion that the dynamics of public policy change are more complex than the simple outcome of demands of varying strength and concentration. The key missing element is that of ideas. The overriding goal of the provincial government in power planning during the 1960s arose, not so much from the specific demands of particular interests, but from a set of assumptions concerning the role of the state in a staple economy and the key role of electric power in facilitating its
expansion. This set of ideas required policies which were favourable to the interests of existing and prospective capitalists, particularly those in the resource sector, but were not entirely attributable to specific demands from this group.

As outlined in Chapter 5 and 6, the neglect of environmental impacts in the planning of the two projects for which they were the most pronounced was due to the fact that any effort to take them into account was incompatible with the overriding goal that the government had set for itself. As discussed in the concluding section of Chapter 5 (pp. 223 - 227), this neglect was intensified by the tendency of this overriding concern with facilitating resource development to undermine those institutional mechanisms through which environmental concerns could be expressed.

This focus on the key role played by ideas in the neglect of environmental impacts during the 1960s also helps explain the gradual trend towards a more satisfactory treatment of them during the 1970s. While it can be argued that a key element of this trend was the election of an NDP government in 1972, this event merely accelerated an underlying process which was already underway. On the one hand, the detrimental environmental impacts resulting from the developments of the 1960s, combined with the increasing global concern with environmental problems, created a public sentiment in favour of more satisfactory environmental protection mechanisms for new hydro developments.

While much of the agitation for such mechanisms came from regional interests faced with the threat of specific losses, the sentiment in favour of greater environmental awareness became considerably broader. The process is best described in terms of Habermas's "legitimation crisis" in which the state's intimate involvement in a particular economic process
generates demands that its decision-making conform to broader social norms. These norms can include substantive elements like the need to preserve the quality of the environment for future generations, distributional elements relating to the fairness of compensating those who suffer from the negative impacts of decision-making, and procedural elements relating to the fairness of the process through which such decisions are made.

The progress made by the environmental movement in the 1970s was not due so much to its strength as a "lobby" exerting direct political pressure on decision-makers, but to its ability to relate its goals and demands to these broader social norms. Government felt obliged to include environmental concerns in the structure of decision-making and this inclusion, in turn, created new demands for more effective treatment of environmental concerns.

The culmination of this process in British Columbia occurred in 1980. Faced with the prospect of a sustained period of major new energy development, the provincial government felt obliged to legitimize its decision-making structures by introducing a comprehensive system through which the external social and environmental impacts of these developments could be taken into account.

The progress made by the environmental movement in British Columbia was also due to the fact that, up to a point, it did not fundamentally threaten any large established interests. As already noted, the impact of measures associated with a greater degree of environmental awareness, mitigation, and compensation was not major in terms of the overall economic well-being of power consumers.

In addition, while the new environmental awareness of the 1970s did erode B.C. Hydro's monopoly position in the power planning field, it did not really undermine its predominance as an organization. Rather, its
institutional importance was actually strengthened by the addition of new organizational resources to deal with environmental questions and by an increase in the length of the planning stage associated with new projects (see p. 379 above).

It was only when it impinged on the justification for these new projects that the environmental movement threatened the organizational pre-eminence of B.C. Hydro. Consequently, despite the demands of environmental groups, consideration of environmental impacts remained divorced from Hydro's overall system planning decisions.

9.4 From Power Policy to Power Planning

During the 1960s, a fundamental shift occurred in the dynamics of British Columbia's electric power policy. The activity of the state shifted from the articulation and implementation of policy on a grand scale, aimed at achieving the broad economic goals associated with provincial resource development to a reliance on planning. By planning, I mean not only the increasing reliance on an institutionalized process of rational decision-making systematically relating actions to goals, but also the dominance of this process by technical experts rather than politicians. From the late 1960s on, both politicians and the more general policy making functions of the provincial state took a back seat, as the role of the experts within the province's new public power corporation became predominant.

Contrary to the expectations of those who view such a development as essential to the success of the state in dealing with complex economic questions, this shift was associated with a major planning failure. British Columbia's electric power system was seriously overbuilt and it was only the imposition of a greater degree of external control on the system
planners in the early 1980s which prevented the emergence of an even
greater overcapacity problem.

It is useful to state the situation faced by the planners during the
early 1970s in terms suggested by the work of Etzioni, Vickers and Dunn
reviewed in Chapter 2. The overall policy goals underlying the creation of
an electric power planning process represented a developmental hypothesis
or reigning paradigm. By these terms I mean a set of goals and assumptions
which gives structure and meaning to the process of rational goal oriented
planning and which is tested on a continuous basis, with reference to a
changing socio-economic environment. This reigning paradigm has been
described above and can be summarized in the following points:

1) The commodity of electric power represents a key element in the
development of British Columbia's staple based economy.

2) Consequently expansion and industrial progress can be encouraged
by measures which ensure the continuous availability of electric power at
the lowest possible cost.

3) Conversely, any shortfall in power availability would slow down
the process of economic development and should be avoided at all cost.

4) The economic structure of British Columbia will continue to be
based largely on the extraction of forest and mineral staples and on the
energy intensive processing of these staples.

The key question then, is why power planners failed to take account of
the underlying changes described in Chapter 3 and to adopt their system
planning activities in response to them. In fact, the narrative of Chapter
8 indicates that they did more than simply ignore them. There appeared to
be a conscious effort to deny any evidence indicating that such changes
were occurring, to hold fast to the planning paradigm of the 1960s, and to seize on any evidence (no matter how tenuous) that supported this paradigm.

As we saw in Chapter 2, for both neo-marxist and neo-conservative theories of the state, such failures of adaptability are to be expected. The play of class or group interests in society seriously biases the state’s activities in such a way that effective rational planning for society as a whole is impossible (see above pp. 63 – 64).

From a neo-marxist perspective, Offe’s idea of "rationality crisis" throws some light on at least part of the problem. As outlined in Chapter 2, Offe asserted that the state’s failure to apply rational goal-oriented planning to economic problems resulted from the unwillingness of private capital to allow it to exercise the necessary control over key variables of the economic system (see above p. 64).

Based on a well known article by Herman Daly (1976), it has been widely argued that, given the uncertainties inherent in the effort to forecast the future demand for electricity, the only way to avoid costly errors is to bring the key variables under the control of public policy. A closely parallel argument, often made by environmental advocates in British Columbia, is that real consideration can only be given to environmental preservation by a conscious policy favouring a less energy intensive economic structure.

We have seen however, that the provincial government in British Columbia was extremely reluctant to give any explicit economic policy direction to electric power policy. Even the rather broad and non-specific interventionist tone of the 1980 energy policy statement raised significant opposition from large resource corporations, and any attempt to implement more specific programs would have been even more vigorously resisted.
Offe's generalization that the state tends to limit the processes of pluralistic bargaining when they interfere with overall state policies perceived to be favourable to capital accumulation is also borne out by the B.C. experience. In both the Revelstoke and Site C decision-making processes, there was a conscious effort to limit the public expression of conflicting information and policy perspectives, particularly when they touched on the question of project justification. This tendency was also written into the Utilities Commission Act of 1980, which gave the government very broad leeway to determine the scope of the pluralistic decision-making process associated with energy project review.

This line of explanation, however, is incomplete. While it does go some distance toward accounting for the failure of the provincial government to assert itself more directly in power planning matters, it does not deal with the initial impetus for over-expansion within the Crown Corporation itself. Regardless of the merits of a greater degree of overall economic planning in electric power decisions, over-expansion could have easily been avoided by simple caution in the fact of uncertainty.

While it can be argued that British Columbia's dominant business interests derived some benefit from the provincial government's underwriting of lower-cost, larger scale power development during the 1960s, as well as from the policy of underpricing bulk electricity relative to its marginal cost, the same cannot be said for the planning approach taken by B.C. Hydro during the 1970s. The consistent willingness of the Crown utility to run the risk of overcapacity had potentially large financial consequences for the bulk electricity consumers who would ultimately pay much of the cost of such excess capacity.

This tendency toward over-expansion within the Crown corporation is best explained with reference to neo-conservative ideas. The unprecedented
expansion of British Columbia's electric power system in the 1960s and 70s under public ownership was accompanied by the establishment of a large bureaucracy with a vested interest in the continuation of this expansion. As we saw in Chapters 6 and 7, the Crown corporation quickly expanded its role from hydroelectric dam construction to overall system planning; and in doing so it absorbed key areas of organizational expertise, particularly system engineering into this expanding structure (see above pp. 349 - 350). Hence, at the very point when the prospect for continued expansion of the province's electric power system became more doubtful, the power planning function came under the control of a large bureaucratic organization with a vested interest in such continued expansion.

This vested interest in system expansion can be interpreted as an attempt by B.C. Hydro's managers to seek rewards in terms of "pay, power and prestige." An expanding Crown corporation meant more staff, opportunities for advancement and more pay. Because B.C. Hydro was a non-profit corporation, with no claim on the capitalized value of an efficiently run enterprise, the only avenue to self-advancement lay in organizational growth.

Although the B.C. Utilities Commission's 1981 rate hearings produced ample evidence of this tendency of Hydro's managers to promote the growth of B.C. Hydro as a corporate entity (see above pp. 413 - 417), the organizational imperatives favouring system expansion were more profound. The two rivers development policy launched by the provincial government in the 1960s set in motion a pace of hydro planning and construction which could be sustained only by a remarkable degree of continuous economic growth. While the optimism surrounding the resource boom of the mid-1960s gave the prospect of such growth a degree of plausibility, the recessions the 1970s made it appear increasingly unlikely. However, the mere preservation of
B.C. Hydro at the size and level of organizational structure which it had achieved by the mid-1970s required the continued rapid growth of both the resource based economy and the electric power system. In organizational terms it was survival rather than the prospect of future expansion which was at stake. This fact was dramatically illustrated in the early 1980s when a halt in the expansion of the electric power system led to a massive reduction in B.C. Hydro's staff.

In conclusion, the pressures toward the over-expansion of the electric power system during the 1970s were created by the interaction of two dominant factors. One was the overall policy preoccupation with underwriting the growth and development of British Columbia's staple-based economy through the provision of ample low priced electric energy. This preoccupation, culminating in the two rivers policy led to a period of unprecedented expansion for the electric power system. It was, however, the institutionalization of this expansion in the form of a Crown hydro corporation which gave it the momentum to continue in the face of a changing economic environment.

While the dominant player during the 1970s was the Crown hydro corporation with its vested interest in system expansion, this dominance occurred because the provincial government chose not to challenge it. Only part of the explanation lies in the general difficulty of undertaking any economic planning which interferes with the prerogatives of private capital (see above, pp. PG19 - PG20). More fundamentally, government policy makers, particularly those in the Social Credit party which regained power in late 1975, retained their old preconceptions of the link between continued hydro development and economic growth. Although the recession of the mid-1970s created a somewhat more cautious attitude, the sharp increase in energy and commodity prices in the late 1970s resulted in a quick, if
short-lived, revival of the promotional hydro policies of the 1960s (see above, pp. 383 - 386).

It can be argued that, if either of the two factors just described had been absent, the tendency toward over-expansion of the electric power system in British Columbia during the 1970s would have been less pronounced. If the promotional policies of the 1950s and '60s had not resulted in the two rivers policy, both the degree of initial hydro expansion and the size of the power producing organization would have been smaller. Hence, even if the electric power system had been nationalized, the degree of future expansion required to maintain the size of its organization would have been less. Similarly, without the persistence of the policy assumptions of the 1960s into the 1970s, the government would probably have taken a more critical stance toward Hydro's expansion plans.

If on the other hand, the resource development policies of the 1950s and 1960s had not resulted in the emergence of a large, powerful Crown corporation a critical re-examination of these policies in the 1970s would have been easier. As it was, such a critical re-examination required not only that policy makers question the validity of past goals in light of new information; it also required that they overcome the resistance of a powerful organized interest group with the ability to supply policy makers with highly selective information reinforcing the validity of their previous approach.*

9.5 Policy, Institutions and the Search for a More Effective Approach to Power Planning

What sorts of institutional changes have the potential to produce a more satisfactory approach to electric power planning problems?

*In this regard, see the quote from Trebilcock, et al. on p. 67 above.
This question immediately raises the fundamental divergence of opinion regarding the role of the state emphasized in the concluding section of Chapter 2. Whereas the market failure and institutionalist interpretations see the state as necessarily playing a central role in reconciling the outcomes of the private market system with a broader public interest, neo-marxists and neo-conservatives view its role in terms of the pursuit of self-interest by particular economic groups. All three of the institutionally based approaches (institutionalism, neo-marxism, and neo-conservatism) contain roughly similar accounts of the pathologies afflicting modern bureaucracy. However, while the institutionalists, pluralists and the public choice variant of neo-conservatism see such problems as amenable to institutional solution, both the neo-marxists and especially the neo-conservatives tend to view the state as inherently incapable of reflecting any broad public interest. For the neo-marxist, discussion of institutional reform is pointless in the absence of a more fundamental transformation of the economic system, whereas for the neo-conservative it is synonymous with deregulation and a return to a reliance on private markets.

A key question, therefore, is the extent to which the factors identified by the neo-marxists and neo-conservatives preclude any meaningful discussion of positive institutional change as a means to improve the policy-making process. It can be argued in general terms that neither of these theoretical approaches does preclude the possibility of such change. Neo-marxian analysis asserts the inherent subservience of the state's legitimation role to the imperatives of the accumulation function. Given the historical fact that contemporary capitalist economic systems are based upon the accumulation of capital (Heilbroner, 1985) such a generalization is undoubtedly valid as far as it goes. In any complex established social
system, the degree of institutionalized non-revolutionary change from the status quo is inherently limited. However, as Heilbroner (1976) has pointed out, there is considerable variation in the scope of the state's legitimation function in western nations, and the possibilities in any given instance are not deterministically given.

Similarly, the generalizations of the neo-conservatives concerning the impact of economically self-interested behaviour on the role of the state have a large degree of truth. They too, however, are not deterministic because it is transparently false to assert that all human social behavior is motivated by such self-interest. Altruistic behaviour and the broad acceptance of ethical norms are also key aspects of any social system and it is the ability of political demands to appeal to these behavioural motivations which often account for their success. Therefore, while particular institutional configurations, when combined with self-interested rational behaviour may produce dysfunctional results, the possibility of restructuring such institutions so as to remove an undesirable incentive structure cannot be precluded.

The empirical evidence examined in this thesis supports these general arguments. While the response has been both delayed and imperfect, the policy outputs of the British Columbia provincial state in the area of electric power policy have responded to broader considerations of the public interest. In particular, significant progress was made during the 1970s toward incorporating the environmental and social costs of hydro development into electric power planning decisions in response to public demands. While the expansionist tendencies of the public corporation did lead to the construction of excess capacity in the provincial electric power system, institutional changes introduced in the late 1970s and early '80s were instrumental in preventing an even greater degree of over-
building. By the early 1980s, the supposedly inexorable trend toward the self-perpetuating growth of government agencies had been brought to an abrupt and dramatic end.

Clearly, then, the problem is not one of a provincial state whose actions in the area of electric power policy have been totally devoid of any notion of the public interest. Rather, it is one of slow response to changing economic circumstances and social priorities. As we have seen, two such social priorities which have received inadequate consideration in the operation of political markets within the confines of existing institutions are the achievement of economic efficiency in overall power planning decisions and the incomplete incorporation of social and environmental costs into such decisions.

The failure of the provincial state to plan the expansion of the electric power system in an economically rational manner has occurred for two reasons. In the first place, institutional factors have created powerful incentives rewarding such inefficient behaviour by key decision makers. In the second, for the large numbers of citizens who would benefit from a more efficient approach to hydro development, there has been no incentive system which relates support for such policies to increased welfare.

We have seen that, on the political level, economically inefficient behaviour has been due largely to the dominance of a particular set of ideas relating the development of electricity to the growth of the staple-based economy. Unlike other staples such as forest products and petroleum, electricity has not been perceived primarily as a staple product in its own right, where development for both domestic and export consumption would produce important economic benefits in terms of employment and economic rent. Since the benefits of hydro-electric development were assumed to be
related to its contribution to provincial economic expansion, it is not surprising that the policy of allocating rents through prices below true economic costs was perceived as conferring a social benefit. Similarly, given the perceived importance of hydro power to economic development, the risk of a shortage resulting from underexpansion had much more salience than the risk of overexpansion and the dissipation of economic rent.

As we have seen in Chapter 2, the failure of decision makers to alter a dominant policy paradigm in the face of conflicting information has been widely observed. Such a problem can only be rectified by structuring decision making institutions in such a way that such paradigms are consistently questioned. One element of this restructuring would involve placing policy choices within a context which raises all the more fundamental issues associated with these choices. In the case of electric power, this change would mean incorporating electric power planning into a broader economic strategy. Electric system plans would be developed with reference to the costs and benefits of other energy resources (including conservation) on the one hand and the economic priorities of the province on the other.*

Another element would involve the provision of resources to allow a full examination of options, developed from the perspective of different paradigms, both within and without the traditional institutions of government. Such an examination could also be facilitated by requiring that electric system plans be subject to a participatory public hearing process similar to that currently employed for individual power projects.

*This broader approach to electric power planning is gradually being adopted by United States Utilities and the bodies which regulate them. See Cavanagh, 1986.
The second key institutional factor contributing to inefficiency in electric system planning has been the incentive structure facing the managers of the public power corporation. While, as we have seen, the policies developed by these managers can be overruled at the political level if they depart too far from perceptions of the public interest (as in the Site C decision documented in Chapter 8), the type of regulatory scrutiny introduced in British Columbia in the early 1980s may prove to be insufficient.

First, the initiative in system planning remains with the Crown corporation; with public scrutiny being only after these plans have been determined. Second, the level of activity and resources necessary to exert effective ongoing regulatory control over a large complex corporate entity are substantial. The history of utility regulation suggests the possibility of a gradual decline in the effectiveness of such regulation as the initial policy impetus to exert control over the utility dissipates. The utility with its monopoly of information and its close access to the regulatory process again becomes dominant.

Alternatively, there is the possibility that the degree of continuous regulatory scrutiny necessary to achieve an adequate degree of public control over the activities of the power utility could undermine the morale of its staff, thereby impairing its effectiveness. The utility would continue to be the dominant actor in the power planning field, but its initiatives would be continually interfered with by "outsiders."

An alternative approach is to combine the existing regulatory measures with a more fundamental restructuring of the electric power production system. First, the forecasting and strategic system planning activities would be reconstituted as a separate agency. This change would divorce these key functions from the self-interest of the power producing utility
in system expansion. It would also allow system planning and the selection of alternatives to be undertaken on the basis of their social costs and benefits, rather than those to the power producing utility. This change would reinforce the restructuring of the power planning process referred to above.

Finally, following a recommendation of the now-defunct Legislative Committee on Crown Corporations (1979), the remaining operating functions of B.C. Hydro should be more clearly disaggregated into several distinct entities responsible for construction, sales and administration. These three entities would, in turn, operate under a holding organization responsible for rate setting and overall financial planning.

These changes would fix the organizational responsibilities of the various components of the electric power utility more precisely, and make the ongoing task of regulatory scrutiny easier. As is now provided for under the Utilities Commission Act, the provincial Cabinet would continue to determine rate setting criteria by special directive to the Utilities Commission.

The other side of the efficiency question involves the lack of incentive provided to decision makers to pursue economically efficient power planning strategies. By and large, hydro resources in British Columbia belong to all citizens, but individual citizens have no direct stake in their efficient management. This problem could be at least partially corrected by pricing electricity at true economic cost and providing a "resource dividend" based on the economic rent generated by hydro resources. The impact of alternative hydro development strategies on the size of the resource dividend would then become a more important consideration in the final policy choice.
The second principal failure of the power planning process in B.C. is the lack of attention given to the social and environmental aspects of hydro development. While, as we have seen, there has been a gradual improvement in the degree of consideration given to these elements, this consideration has focused almost exclusively on the identification and measurement of impacts. The key question of how such impacts, once recognized, are to be incorporated into power planning decisions has not been given sufficient recognition. Hence, even though recent project hearing processes have involved extensive participation by environmental groups and resulted in a wide range of compensation and mitigation proposals, a considerable degree of dissatisfaction remains.

The key ingredient missing from the current process is any explicit consideration of the property rights governing the political marketplace through which socio-environmental externalities are taken account of. Just as economic markets are characterized by a structure of property rights which influence both the allocation and distribution of outcomes, so are political markets. Mishan’s (1975) example of the smoker and the non-smoker sharing a railway carriage, in which the agreement on whether or not smoking will occur depends on who has the ultimate right to enforce his point of view, is well known.

Similarly, the outcome of any policy process in which compensation for the negative impacts of resource development is involved will depend on the existence of political rights to the use of the resource. It makes a great deal of difference whether the citizens affected by a resource development receive compensation on the basis of an economist’s calculation of their willingness to pay for amenities being taken from them, or whether they possess a legal right to be compensated for their loss.
Although the Site C hearing panel in British Columbia concluded that the former approach should govern the translation of impact assessment into mitigation and compensation outcomes, it can be argued that the latter approach is both fairer and more effective. First, the principal willingness to accept compensation corresponds much more closely to the actual situation created by the large-scale resource developments discussed in this thesis. A disruptive resource use is intruding on an existing complex of private property rights, environmental amenities and social amenities enjoyed by the residents of a particular region. It is generally accepted in common law that such disruptions to private property rights are subject to compensation by the party creating the disruption, and even most expropriation statutes give those expropriated significant rights of legal appeal if compensation is considered inadequate. If the public amenities characterizing a given environment are at least as equally important as the sum of private rights in contributing to the overall well-being of a region, their value should also be determined on the basis of a collective willingness to accept compensation.

More fundamentally, only the principal of the willingness to accept compensation has the capability of being translated into an acceptable bargaining process. While willingness to pay has gained a high level of acceptance as an analytical method for determining resource values (see for example, Clawson, 1958; and Krutilla and Fisher, 1976), it has not been widely advocated as an actual bargaining principal. There appears to be a fundamental reluctance to create a political marketplace in which those suffering the social and environmental consequences of resource developments would be obliged to pay the developer to either forego his project or make it more acceptable. Consequently, the "market" created by the
willingness to pay concept has always been a hypothetical one, based on the calculations of economists rather than the explicitly expressed preferences of those with a direct stake in the outcome.

Willingness to accept compensation, on the other hand, does have the potential for implementation as an actual bargaining mechanism, capable of internalizing the social and environmental consequences created by large-scale resource development. If a regional political entity, acting in behalf of all citizens, had the right to demand compensation for such a development, there would be no question of its social and environmental consequences being ignored. The community would be forced to formulate a collective position on the costs and benefits of the development in order to build a bargaining position. The outcome of the bargaining process would become one in which regional interests have participated directly, thereby increasing its acceptability.

This approach, of course, raises a number of practical questions, the resolution of which are beyond the scope of this thesis. For example, 1. What are the extent of the amenity rights possessed by regions, 2. At what point could the provincial government intervene in any impasse between developers and regions and 3. What sorts of regional political institutions would be compatible with such an extension of amenity rights?

It is, of course, impossible to say in advance whether the net impact of the above changes would produce a marked improvement in British Columbia's future electric power planning. Much would depend on the qualities of the politicians and officials ultimately responsible for making key decisions and on the level of active interest by the public at large. Their thrust, however, is to focus more responsibility on these
ultimate decision makers, to continuously present them with competing policy perspectives, and to provide the public at large with meaningful opportunities to influence the key decisions with which they must live.
9.6 References


