

**TAX SHIFTING IS NOT 'WIN-WIN': THE EMPLOYMENT-RELATED EQUITY
IMPACTS OF ECOLOGICAL FISCAL REFORM**

by

BARBARA MONTGOMERY

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Department of Community and Regional Planning

The University of British Columbia
Vancouver, Canada

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Abstract

Ecological fiscal reform (EFR) is a policy that is usually framed as shifting taxes from "goods" (like investment or labour) onto "bads" (like pollution). It is commonly asserted to result in a 'double-dividend'. The first dividend refers to achieving environmental objectives; the second dividend refers to an increase in employment. It is generally thought that this 'win-win' outcome will automatically come about through the efficient workings of the invisible hand of the market.

In this thesis I evaluate the employment-related equity impacts of shifting taxes from labour to carbon emitting activities. The direct ecological steering effect of EFR is also discussed but is given less emphasis than equity concerns. This is because I think that sustainable development policies that create or make worse inequality among humans will reduce the efficacy of ecological goals of such policies over the long-term (i.e. equity is necessary because inequity tends to exacerbate environmental degradation).

I look at both theoretical and empirical conclusions from the literature on the employment impacts of a tax shift. I evaluate the likelihood of the employment dividend and the conditions required for it to occur, in addition to adding identities to economic scenarios to evaluate distributional impacts. Dominant discourse on the subject is critically analyzed to draw further conclusions about potential employment-related equity impacts of EFR.

I conclude that 'win-win' is not guaranteed; the market will not automatically bring about a fair distribution of costs of this policy initiative. Environmentally motivated policy choices must be accompanied by socially enlightened ones if we are to achieve enduring improvement in ecological health.

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1 Introduction and Problem Statement

1.1 Climate change and the 'ecological crisis'

The weight of scientific evidence suggests that "humans are heating the planet" (Retallack and Bunyard 1999, 60; IPCC 1995). Economic activity has caused a significant increase in the atmospheric concentration of greenhouse gases since pre-industrial times. Heat-trapping gases are natural phenomena but the use of fossil fuels to feed the industrial economic machine has resulted in a dramatic increase in the concentration of these gases in the atmosphere (in particular, carbon dioxide). As a result, average global temperatures are increasing. The causal relationship here is fairly certain: ice-core data shows convincing historical correlation between carbon dioxide (CO₂) concentrations and temperature fluctuations (Petit et al. 1999).

Greenhouse gas accumulation is having a destabilizing effect on global climate systems. In the 1990s virtually every climate record of the preceding century was broken, and violent weather events (such as droughts, floods, and storms) have increased in frequency and severity over this same period (Retallack and Bunyard 1999).

Climate change is part of the larger trend of global ecological overshoot: humanity's aggregate ecological footprint has exceeded global carrying capacity.¹ Put simply, we humans are living beyond our means. We are drawing down the stock of natural assets that sustain us and harming and displacing the other 20 million or so species that inhabit the earth. Among the evidence supporting this assessment is the damage done to the earth's protective ozone layer, declining global fish populations, increasing water pollution, the loss of biodiversity, and the 40% of terrestrial photosynthetic net primary production that human beings appropriate (Goodland 1991; Vitousek et al. 1986).

¹ An **ecological footprint** is the total area of land and water required to produce the resources consumed and absorb wastes produced by an individual or population wherever on earth the relevant land is located, and **carrying capacity** refers to the maximum sustained 'load' that a population can impose on the environment (Wackernagel and Rees 1996).

1.2 The concept of sustainability; Ecological sustainability requires stabilizing atmospheric CO₂

The term 'sustainability' is generally used to refer to the property of balanced resilience among social, economic and ecological systems over the long term. A recurrent analogy is that of the three-legged stool. At root though, sustainability is an ecological concept, and that is how it is meant when I use it without a qualifier. After all, "without ecological sustainability no other forms of sustainability would be possible" (Zovanyi 1998, 161).

'Sustainable development' is one approach to operationalizing the concept of sustainability (in the three-legged stool sense of the word). I use the term 'sustainable development' to refer to attempts to make the economic system of the industrial growth society² more ecologically sustainable. Literature on mainstream approaches to sustainable development emphasizes the imperative of sustaining the current economic system and protecting it from environment-related economic change (see for example, Hawken 1993; Leisinger 1998; Renner 1991; World Commission on Environment and Development 1987).³

Given its foundational significance for the health and sustainability of human communities it is important to identify necessary conditions for ecological sustainability. Two significant requirements for achieving ecological sustainability are: restoring and maintaining ecosystem integrity, and stopping "non-evolutionary loss of biodiversity" (Sutton 2000). The destabilizing effect of climate change described above is not compatible with these criteria for sustainability.

² John Livingston (1985, 4) uses this term to refer to "the branch and time of Western culture in which we live" where growth is considered to be the best and only medicine for most all that ails society.

³ Sustainability and sustainable development are often used interchangeably. Wackernagel and Rees (1996) provide a succinct commentary on the varied and frequently contradictory nature of common usage of these terms.

Further increase in the concentration of CO₂ in the atmosphere will result in even more frequent and severe weather events and will have a harmful effect on the functioning of ecosystems. The rate of species extinction will be greater than it would have been in the absence of climate change brought on by humans. The Inter-Governmental Panel on Climate Change (IPCC) estimates that 0.1°C per decade is the maximum increase in temperature that will allow ecosystems to adapt and/or migration to occur (Carley and Spapens 1998). A 'business as usual' scenario is expected to result in an increase in average global temperature of 0.3°C per decade. A further call to action is the fact that IPCC models likely underestimate average warming. They predict that 'no action' will result in a doubling of atmospheric CO₂ concentrations within the next century; however, recent more reliable estimates indicate that concentrations are more likely to quadruple in this time frame (Goldsmith and Retallack 1999).⁴

*Stabilizing CO₂ concentrations in the atmosphere is a necessary condition for ecological sustainability.*⁵

The sustainability of human communities requires that the ecological impact of economic activity be greatly reduced. Global ecological sustainability requires that human consumption of the products and services of nature does not exceed their rate of production; waste produced does not exceed the ecosphere's assimilative capacity; and economic activity operates in such a way that not only are the earth's essential life support functions protected, but also that the resilience and biodiversity of ecosystems is preserved (Rees 1995c). Sustainability requires policies that encourage the reduction of material/energy throughput.⁶ In order to stabilize the climate, further accumulation of greenhouse gases in the atmosphere must cease.

⁴ The most recent report by the IPCC confirms that the pace of climate change exceeds earlier predictions: they now estimate that average global temperature is likely to rise by almost 6°C over the next hundred years. See the IPCC's Third Assessment Report "Climate Change 2001: The Scientific Basis" at www.ipcc.ch/.

⁵ CO₂ emissions comprise the bulk of material outflows created by the human economy (Matthews and Ottke 2000). Stabilizing CO₂ is one of many necessary conditions for sustainability; it is not sufficient on its own. Reducing the impact of human activity on the ecosphere requires a drastic reduction in use of all materials and energy (including those which do not emit greenhouse gases into the atmosphere) and other activities that result in habitat destruction.

⁶ **Throughput** is a term that refers to the "whole process in which resources enter the economic system as inputs and emerge as outputs and/or wastes" (Harris 1995, 50).

1.3 Stabilizing atmospheric CO₂ requires a certain policy response

To stabilize atmospheric CO₂ concentrations total emissions must be reduced to at least 60% of 1990 levels. This means that a drastic reduction in the use of fossil fuels is also required for sustainability.⁷ As put by Simon Retallack and Peter Bunyard (1999, 60):

Severe storms, floods, droughts, dust storms, sea surges, crumbling coastlines, salt water intrusion of groundwater, failing crops, dying forests, the inundation of low-lying islands, and the spread of endemic diseases such as malaria, dengue fever and schistosomiasis is on the cards if the consumption of fossil fuels is not phased out.

The ecologists are not alone in asserting that something must be done to slow climate change. In 1997, the Economist's Statement on Climate Change was endorsed by 2500 economists. This short document states that "global climate change carries with it significant environmental, economic, social and geopolitical risks and that preventative steps are justified."⁸ It goes on to affirm that the most efficient way to slow climate change is through market-based policies to reduce greenhouse gas emissions.

Drastically reducing, if not phasing out the use of fossil fuels completely, necessitates profound changes in the industrial growth society. According to Edward Goldsmith, former editor of *The Ecologist* magazine, "action must take the form of a crash programme in which the necessary changes must be compressed into a period of time that is undoubtedly too short for comfort" (1999, 143). His term for this required response reflects the reality that slowing climate change is certain to have adjustment costs. Among suggested actions is an exponential tax increase on all economic activities that contribute to greenhouse gas emissions.

⁷ An additional argument for reducing human use of fossil fuels is the substantial evidence that industrial society will have to phase out the use of oil in any case. Colin Campbell and Jean Laherrère (1998) predict that total demand will exceed supply removed from the earth within the next decade.

⁸ The Economist's Statement on Climate Change was sponsored by Redefining Progress, a non-profit research institute focused on promoting ecologically sustainable and socially equitable economic policies. The statement can be viewed on the internet at: www.rprogress.org/pubs/ecstat.html.

1.4 Ecological fiscal reform is not a 'free lunch'

Ecological fiscal reform commonly takes the form of a policy of shifting taxes from "goods" (like labour) to "bads" (like carbon emitting activities).⁹ It is commonly asserted to be good news for both the environment and employment (Carley and Spapens 1998; Hamond et al 1997; Durning and Bauman 1998; Rees 1995a). This 'win-win' outcome is referred to as a 'double-dividend'.¹⁰ According to standard economic theory, reducing taxes on labour will cause firms to hire more workers. Increasing taxes on other inputs to the production process (in this context, fossil fuel sources of energy) is asserted to cause thrifty and resourceful firms to either conserve such inputs, or innovate alternative processes or inputs. This too is expected to have an employment creating effect.¹¹

Increasing taxes on carbon emitting activities is likely to result in job gains in energy conservation and alternative energy industries (Renner 2000; Sonneborn 2000). However, Colley (1997) is doubtful that an expansion in more sustainable energy production will actually amount to a net increase in jobs given that the energy sector is capital intensive and is prone to replacing humans with machines. Of course, the qualitatively different nature of alternative energy industries may mean that they will not have the same labour minimizing tendencies as their predecessors. They may in fact be more labour intensive and reverse the trend of human labour being displaced by fossil fuels.

⁹ There are other possible forms of EFR. For example, taxes could be shifted from income to waste creation. The rationale for raising taxes on carbon emitting activities was articulated in the first three sections of this chapter. There are several reasons that I focus on reduced taxes on labour as the revenue recycling mechanism (the way that environment-related tax revenues are put back into the economy). Real world examples of EFR are found mostly within Europe where reducing unemployment is a prominent policy objective, and therefore the bulk of empirical academic attention to EFR is within this context (Bosquet 2000; Bovenberg and van der Ploeg 1998; Brännlund and Gren 1999; Eissa et al. 2000). It is also the case that this form of EFR is relevant to an exploration of the intersection of jobs and sustainability. A third reason, as will be discussed later in this thesis, is that equity impacts of carbon taxes and issues pertaining to reducing payroll taxes are appropriate parallel analyses. They provide a good case study of how EFR is cast as both social policy and environmental policy, and serve to illustrate the influence of prevailing trends of marketization and deregulation in this realm.

¹⁰ The second dividend can also refer to other economic improvements such as increased efficiency or welfare. For reasons articulated in preceding footnote, I refer here to the case of an employment dividend.

¹¹ Policy discourse on EFR characterizes the quantity of work in terms of numbers of jobs not the number of hours worked. Although discourse should give more consideration to the polarization of work hours within industrialized countries, this thesis does not explore this issue.

Increasing taxes on carbon emitting activities will also result in job loss.¹² Making energy more expensive and indeed phasing out fossil fuels altogether will have both direct and indirect negative effects on existing jobs. Some workers will be affected more than others. It is also the case that jobs created as a result of environmental policies are often not of the same type, geography or timing as the ones that disappear due to these policies (Jacobs 1993). Jobs created as a result of economic shifts induced by EFR may not be accessible to displaced workers. Further, economic models of the impacts of EFR predict that 'win-win' is not guaranteed. Conditions identified by economic models to bring about a net increase in employment include preventing wages from increasing (Bosquet 2000). A carbon tax will result in an overall increase in the price level, and restricting wage increases means that real wages will fall.¹³ For these reasons, the burden of adjustment costs of EFR will fall disproportionately on workers in affected industries and low-wage workers in general.¹⁴

1.5 Equity as a prerequisite for ecological sustainability

My interest in the equity impacts of sustainable development policy is rooted in a belief in the principles of social justice for their own sake, and my concern for the well-being of all life on earth. The first point refers to my belief that equity is an important social goal and

¹² This thesis focuses on the short-run employment impacts of EFR. These effects on the economic well-being of workers are considered particularly significant according to the logic that "if the immediate effect of a change is deleterious, then, until further proof to the contrary, the final effect is deleterious" (Polanyi 1957, 37).

¹³ Raising prices is arguably one of the primary goals of EFR. However, as will be discussed in more detail later there are several reasons to be wary of policy that suggests real wages should be prevented from increasing.

¹⁴ There are other significant distributional impacts of ecological tax reform that unfortunately are not discussed in this thesis. EFR of the type described above will have more general regressive impacts alongside direct job loss and wage impacts. For example, energy expenditures as a proportion of income are considerably higher for the poor, and it is harder for them to reduce consumption due to their economic circumstance and the fact that low-cost rental dwellings are often poorly insulated. When revenue recycling is limited to reducing taxes on labour, people who do not work at paid employment are effectively subsidizing the payroll tax reduction. A carbon tax would likely result in an overall increase in the price level that will impact everyone, but people outside the workforce will not benefit from the reduction of taxes on labour. (Even if EFR should result in an increase in employment such that income taxes collected by government increase and permit reductions in income tax rates, those outside the workforce will still lose since they do not usually pay income taxes to begin with. Reducing the sales tax would be more beneficial to this group of people.) If revenue recycling is not limited to payroll tax reductions some regressive impacts of EFR can be addressed elsewhere in the tax system, for example through a negative income tax or energy efficiency upgrades for low-income people. It is important to remember, however, that broad-based regressive impacts and direct impacts to affected workers are two separate issues. While both are important, this thesis focuses on the latter.

that the distribution of economic costs resulting from EFR ought to be fair.¹⁵ The second relates to the political ecology of human induced ecological decline (i.e. relationship between inequalities in economic wealth and power and environmental degradation).

This second reason is based on the hypothesis that equity amongst humans is a necessary condition for ecological sustainability.¹⁶ This hypothesis can be illustrated in two ways: inequity exacerbates unsustainability and sustainability requires equity. I acknowledge that such assertions are impossible to prove.¹⁷ It is conceivably dubious to even make such universal statements since both theoretical and actual examples exist that indicate equity and ecological sustainability do not necessarily come hand in hand, and since an obvious tension exists between the two in terms of social choices regarding environmental policy. These points are acknowledged in the discussion below of how inequality impacts ecological systems both locally and globally. This discussion is structured according to the following categories of analysis: poverty and wealth; power inequities and social decisions; and additional social and political dynamics that influence sustainability.

¹⁵ By 'fair' I do not mean that each individual, income group or set of workers bears the cost of EFR in equal amounts. This thesis gives emphasis to the distribution of negative economic impacts and thus considerations of fairness for the most part pertain to the proportional distribution of economic costs to individuals and social groups. Boothroyd (1991) argues that 'fair' might not be the most appropriate terminology for the articulation of social goals in relation to sustainability since in common interpretation 'fair' refers to procedure and not outcomes. However, I use the term 'fair' for the most part in reference to outcomes, although some attention is given to issues of power and representation in social decisions.

¹⁶ It should also be noted that a greater degree of equity between humans and non-human nature is also a necessary condition for ecological sustainability. Although not given the attention it deserves here, it is well to be cautious of the anthropocentric nature of sustainable development (i.e. the enduring ability of the humans to exploit 'natural resources' - in both the source and sink sense of the term). This is relevant for the practical reason that anthropocentrism is inherently 'unecological' and a threat to all life on earth (Zovanyi 1998). The 'paradox of anthropocentrism' refers to the recognition that current environmental breakdown is a product of anthropocentrism, and that continuing to consider only human goals and welfare will eventually result in a world that is not hospitable to either (Manes 1990).

¹⁷ It is worth noting that I am not arguing that equity is a *sufficient* condition for sustainability.

1.5.1 poverty, wealth and environmental degradation

Much of the literature on sustainable development identifies intergenerational equity as a key principle. The uncompromised ability of future generations to meet their needs is central to the definition of sustainable development advanced by the World Commission on Environment and Development (WCED). Intragenerational equity is not so often identified as an explicit requirement of sustainable development or sustainability. When it does appear the context usually pertains to how inequality exacerbates environmental degradation at the local level in the majority world, as the poor are compelled to act in ways that degrade the environment in response an imperative of survival (Boyce 1994).¹⁸ For example, when landless peasants are forced to cultivate marginal land that as a result becomes further depleted (WCED 1987).

Not as common are examples of the effects on ecological integrity of disparities in economic wealth and power within the minority world. Likely this is because we are not really living where we are in ecological terms - i.e. the Vancouver/Lower Mainland region appropriates a land area nineteen times larger than it is (Wackernagel and Rees 1996). The processes of ecological capital accumulation occur at varied and dispersed geographies (we are appropriating carrying capacity from other places in the world), and therefore are not as easily observable. Based on this analysis, it is asserted that overconsumption by the wealthy is among the leading causes of environmental degradation (Gomes et al. 1994; Rees and Westra 2000, Wackernagel and Rees 1996).

¹⁸ Edmund O'Sullivan (1999, 18) suggests the terms "minority world" (named so for the fact that it has less peoples and population, most of which was formerly known as the 'first world') and "majority world" (having more peoples and population, formerly known as the 'third world'). I adopt this terminology over other more common syntax to distinguish global divides in material consumption and political advantage and because without 'countries' as qualifier these terms extend beyond political borders.

While it is undeniably the case that overconsumption by high-income groups has a large ecological impact, this is not the whole story. I would argue that the significance of wealth to unsustainability is not solely a function of the consumptive decisions of the wealthy, but is also related to what allows this consumption to occur. What creates or deepens poverty in many countries of the world is what permits overconsumption both within these countries and beyond.¹⁹ As Richard Norgaard points out, "with less inequality, there would be fewer rich able to travel and fewer poor to serve them cheaply in tropical countries" (1998, 47). Even within countries of the minority world it is arguable that the consumptive activities of the rich are financed/facilitated through the subordination of the poor (a good example is minimum wage and below workers in both service and manufacturing industries).

While I am arguing that overconsumption requires inequity, I do not mean to imply that it is not possible for egalitarian societies or communities to overconsume. My point is simply that through both direct and indirect means inequality (as expressed in both poverty and wealth) is among the leading causes of environmental degradation.

1.5.2 power inequities, social decisions and environmental degradation

James Boyce (1994) presents a framework that explicates the relationship between inequality and environmental degradation that generally holds for a variety of scales and geographies. He offers two hypotheses. The first states that economic activity that degrades the environment produces 'winners' and 'losers', and that the extent of environmental degradation will depend on the balance of power between these two groups. This analysis is developed in reference to what Boyce terms the "power-weighted social decision rule" (170). The power-weighted social decision rule (SDR) states that: "A's ability to impose external costs on B depends on A's power relative to B" (171).²⁰ Relative power is determined by characteristics like wealth, class, or ethnicity, the number of losers relative to

¹⁹ Overconsumption is also facilitated by the use of modern technology and international trade.

²⁰ This statement refers to more to the political arena than to a situation between individuals. The social decision framework used to illustrate this analysis depicts the level of environmental degradation as a function of marginal benefits of winners and marginal costs of losers of an environmentally degrading activity. The numeric is 'willingness to pay' (for winners to receive benefits, for losers to avoid costs). It is an objectionable measure for its obvious bias in favour of the rich but one that does have bearing on how social decisions are made.

winners, and the existing political framework.

It is usually the case that individuals that are richer also have more power and influence than relatively poorer folks. Boyce's discussion of the SDR focuses on the case where losers "lack the power to prevent the winners from imposing costs on them" (170). Boyce asserts that the consumptive activities of the relatively wealthy winners are more prevalent and likely characterized by a higher level of environmental degradation per unit of consumption than those of the relatively poorer losers.²¹

The second hypothesis that Boyce advances is that environmental degradation increases as a result of increasing inequality in wealth and power (other things being equal). The analysis here extends from the first hypothesis and considers the effects of a regressive income redistribution on the level of environmental degradation through effects on various determinants of environmental valuation. The conclusion: a regressive income redistribution will have a negative impact on environmental quality.

International trade provides a good example of the negative impact on the environment of inequities in wealth and power. Inherently unequal exchange results from the fact that countries of the minority world have greater wealth and power than countries of the majority world. This inequality (exacerbated by global capitalist dynamics) necessarily leads to the plunder of the earth through underpayment for resources and labour that flow from the majority world to the minority world (Hornborg 1998a).²²

²¹ Boyce's analysis is not without its critics. For example, Scruggs (1998) doubts Boyce's assertion that wealthier groups/individuals tend to engage in and benefit from activities that contribute to environmental degradation more so than do the poor. Ecological Footprint (EF) analysis demonstrates that it is more than likely Scruggs is wrong: the average EF of the lowest income quintile in Canada is less than 3 hectares per capita, while the richest quintile has an average per capita EF of over 12 hectares (Wackernagel and Rees 1996).

²² Globalization and the accompanying mantra of 'competitiveness' further induce ecological decline through the international dynamics of downward harmonization in terms of environmental standards, wages and work conditions.

It is also possible to illustrate Boyce's SDR in a local level, minority world context. Low-income parents juggling multiple jobs may prefer to spend the time they are not working at paid employment with their children, instead of protesting the construction of an overpriced and otherwise undesirable transit development that will take away one of the last green spaces in their neighbourhood.²³ Additional negative ecological effects may ensue if the cost of this transit system creates a deficiency in affordable and convenient bus routes and increases the marginal benefit of driving a car.²⁴

The environmental justice movement has drawn attention to how inequality (based on race, income, or other power-related variables) is exacerbated by environmental degradation.²⁵ Robert Bullard (1990) shows that race and class correlate with exposure to pollution in the United States, although race does so more strongly. Howard McCurdy (1995) documents the imposition of noxious land uses (including a tar factory, slaughter house, tannery, coal-handling facility, and open city dump) by white decision makers on the black settlement of Africville, Nova Scotia. These examples contribute to an understanding of how inequality exacerbates environmental degradation. If landfill sites and polluting industries couldn't just be dumped next to neighbourhoods where people of colour live, then human waste products and noxious activities would have to be dealt with in less myopic ways. Norgaard (2000) argues that intragenerational inequity influences environmental valuation which in turn justifies sending the world's pollution to the poor.²⁶

1.5.3 additional reasons why inequality works against sustainability

Building a more ecologically sustainable society requires popular support for environmental policies. If people are worried about their personal economic security, concern for

²³ Boyce argues that monetary valuations of costs to avoid effects of an environmentally degrading activity will depend on the preferences of winners and losers. Preferences are in part a function of how environmental benefits are valued in reference to other demands, and are largely influenced by income level.

²⁴ This is because, as Boyce notes, "the benefit that consumers derive from an environmentally degrading activity depends in part on the availability of less environmentally degrading alternatives" (1994, 175).

²⁵ Environmental justice refers to the "just distribution of environmental goods and bads among human populations" (Dobson 1998, 20). Environmental injustice is documented and analyzed in the environmental racism literature (see Bullard 1990; Rees and Westra 2000; Westra and Wenz 1995).

²⁶ As noted earlier, the predominant approach to environmental valuation relies on 'willingness to pay' measures. By such measures the value of environmental benefits and costs differ across income groups. This results in a bias towards the interests of the rich.

environmental protection will undoubtedly become subordinate to that (Kohler 1996). Fear of job loss by workers in affected industries contributes to opposition to environmental policies (Burrows 2001). For example, forest industry workers in British Columbia strongly opposed the Commission on Resources and Environment land use plan for sustainability on Vancouver Island because of the threat it posed to their economic livelihoods.²⁷

Sustainability requires that people in the minority world stop living beyond their means (their ecological footprints must shrink). It has already been noted that overconsumption requires inequity (international dynamics related to political and economic power being the most obvious example). Inequity can also influence consumption through social dynamics as inequality has the negative side-effect of individual and societal dissatisfaction and may therefore contribute to consumerism. (For many people the act of purchasing consumer items has positive - albeit temporary - psychosocial benefits.) Increased consumption of consumer items is not conducive to reducing one's ecological footprint. Further reinforcing consumerism is the image of competition for scarce resources which accompanies increased inequality. This image "can generate a feeling that there is not enough to go around, [and so] how can I get mine first" (Arnett 1986). If we are all competing for shares of a disappearing pie, the pie will certainly disappear faster.

1.5.4 social justice and ecological sustainability: inherent tension?

Andrew Dobson (1998) provides a theoretical exploration of the relationship between social justice and environmental sustainability, asking whether this relationship is mutually reinforcing or if it necessarily conflicts. Citing the dearth of empirical studies on the subject, Dobson asserts that we cannot conclude that either social justice or environmental sustainability is functional to the other and that many examples point to an inherent tension between the two objectives.

²⁷ "In March 1994, 15 thousand forest workers and their families congregated at the British Columbia (BC) Legislature to denounce a new land use plan for Vancouver Island and demand the resignation of the plan's commissioner" (Reed 2000, 364).

I do not deny that this tension exists. In fact, the existence of this tension is part of the very rationale for this thesis (i.e. environmental policies to slow climate change have various equity impacts and 'losers' may block such policies). However, the tension between the two objectives in policy choices does not necessarily mean they are irreconcilable. Indeed, it may be more demonstrative of the present system being incompatible with either social justice or ecological sustainability. In the context of access to resources (a common example of how inequality exacerbates environmental degradation) this conclusion is echoed by Sharachchandra Lélé who cautions that "equity in resource access may not lead to sustainable use unless new institutions for resource management are carefully built and nurtured" (1998, 254).

1.6 Why distributional impacts of EFR are important

The preceding discussion demonstrates that in addition to moral arguments for equity, there are also practical ones from the perspective of ecological sustainability. The intersection of inequality and ecological processes underscores the importance of the distributional impacts of EFR. Sustainable development policies that create or perpetuate inequality among humans will reduce the efficacy of ecological goals of such policies over the long-term.

2 Purpose of thesis, Research questions, and Relevance to planning

This chapter describes the purpose of this thesis and the relevant research questions. It also includes a statement of personal rationale, the relevance of my topic and approach to planning, and a note on language used.

2.1 Purpose of thesis

The purpose of this thesis is to identify and argue for social imperatives that should inform any tax shift policy with a focus on equity impacts for workers. It is not my intent to evaluate whether EFR will accomplish specific environmental objectives. Nor am I looking to identify optimal conditions to best design a tax shift in order to ensure that a double-dividend occurs. Rather, I hope to argue convincingly that government policy and social choices that aim to advance sustainability should ensure a fair distribution of any gains or costs given that there is a strong case that sustainability requires equity. The market will not ensure a just transition, and EFR must be embarked on with this in mind if ecologically sustainable and socially desirable outcomes are to result.

As noted earlier, the form of EFR that I focus on provides a good case study of how EFR is cast as both social policy and environmental policy, and that this is taking place within a political environment of marketization and deregulation. This is significant because changes in the tax system (one form of how we choose to govern social and market relationships) change our relationships to one another in society. Therefore, in addition to identifying employment-related equity impacts of EFR, this thesis also seeks to explore how dominant conceptualizations of EFR may foster a retreat from the social good of taxation.

A second sub-theme in this thesis pertains to the broader political and ethical context of the policy intervention examined, and the overall soundness of market-based approaches to ecological sustainability. I explore whether the institution of the market can be reformed (i.e. through 'ecologizing market forces') to address the environmental problems it currently facilitates, and argue that efforts towards sustainability will fall short so long as society remains subordinate to the market.

2.2 Research questions

What are the employment-related equity impacts of ecological fiscal reform?

- *What impacts on jobs can be identified from economic theory and empirical studies?*
- *What can be inferred from discourse on the subject?*
- *What measures are required to ensure a fair distribution of socioeconomic costs and benefits of EFR?*

2.3 Personal rationale: What is sustainability for?

I think it is important to include a personal problem statement to explain my approach and the reasons I have chosen the particular topic that I have. My biases are for the most part obvious throughout this thesis, but I think it is good to state such personal philosophies outright. It also in part a personal exploration for the purposes of consciousness-raising to help me be a mindful radical planner and contribute positively to this world.

Given the changing climate and the larger context of ecological decline described earlier, it is clear that human ways must change. I am frequently dismayed, however, at the analyses and prescriptions offered in much of the literature on sustainable development. My general skepticism and aversion to sustainable development as a practical strategy for fostering sustainability may already be evident. However, the concept of sustainable development is the dominant approach to considering and addressing environmental problems. It is also the case that human societies must innovate more ecologically sustainable systems of production and distribution to meet their material needs. For these reasons the concept warrants attention. My aim is constructive critique in the interest of both transforming the concept and being better able to anticipate and cope with the impacts of its policies. I make use of EFR as a case study in this endeavour.

I use the term ecological crisis in quotations in section 1.1 because it is a term that reinforces the conceptualization of a separation between humans and the non-human realm. It therefore obscures the fact that the crisis is actually one in terms of societal relationships with nature

(Keil 1998).²⁸ There are also compelling arguments that the 'ecological crisis' is also the result of social, economic and political relationships between humans (Bookchin 1990). The reason I bring this up is because for me it's all about how we are defining the problem. How problems are defined have an inalienable effect on the solutions developed in response.

William Rees states that our social condition of *human ecological dysfunction* is one source of ecological overshoot because "humans as consumer organisms have become parasitic on the world's ecosystems, through growth in numbers and material demand" (2000a, 399, 400). This state of human ecological dysfunction stems from erroneous beliefs about how the world works (i.e. techno-scientific perspective) and corresponding inappropriate values (i.e. maximizing material consumption). Culturally and therefore analytically we are blind to our ecological dilemma. Rees goes on to point out that "cumulative learning and behavioural plasticity" (406) have expanded the ability of humans to disrupt the ecosphere.²⁹ While it may be true that our maladaptive condition is the result of 'sociobiological' conditioning, it is also the case that human relationships with non-human nature are expressed and facilitated by our primary organizing institution: the market economy.

It is significant that the interpretation of sustainable development advocated by the political mainstream does not challenge capitalist processes and institutions. Aside from seeking to internalize 'environmental externalities' and alleviate poverty in 'developing' nations, conventional sustainable development does not challenge the fundamental values and beliefs underpinning the status quo. In short, it does not consider or acknowledge the social or cultural causes of ecological unsustainability.

²⁸ Even the term 'nature' reinforces this separation. However, given common usage of the term and the fact that the root of our concern is the relationship between humans and non-human nature in this thesis I use 'nature' to mean all "earth phenomena external to man and his structures" (Livingston 1985, 4).

²⁹ Over the past three centuries, human have affected colossal environmental change. Kates et al. (1990) conclude that virtually every component of the biosphere has been changed or altered through human action. They state that "transformed, managed and utilized ecosystems constitute about half of the ice-free earth; human mobilized material and energy flows rival those of nature" (13).

Cultural causes of unsustainability relate to the dominant worldview (expansionist) that ecological economists show not to be in concert with thermodynamic reality.³⁰ Social causes relate to the structure of economic relations, in particular, the institution of the market economy and its steadfast facilitation of the private accumulation of capital (Hartman 1998). This will be discussed more in chapters three and five, but I think its important to acknowledge here that capitalism is inherently unsustainable as it propagates and accelerates material throughput by the human economy. The unsustainability of this system is also demonstrated by the fact that inequality is an inescapable by-product of capitalist processes. Further growth in material throughput in a 'full world' means scarcer resources and this will have impacts on equity.³¹

Just what is it that we are trying to sustain? Given the points made in the preceding discussion and other general reading on the topic, it would seem to me that the project is mostly one of sustaining or 'greening' the status quo. I am aware that equity figures quite prominently in some standard definitions of sustainable development, and that not all efforts towards 'sustainable societies' refer to ensuring that a social system in its present form exists in perpetuity (as pointed out in Robinson et al. 1990). However, while specific definitions emphasize equity, general discourse and particular policy formulations do not share this orientation. Rarely do proposed reforms focus on structural economic forces that, in addition to ecological dysfunction and cultural values, are root causes of the problem (Rees and Westra 2000).

³⁰ The analysis of ecological economics is founded on the principles of thermodynamics. The first law states that neither energy nor matter can be created or destroyed, and demonstrates that the planet is essentially a closed system. The second law states that entropy is increasing (entropy is the amount of energy not available for work) which confirms that consumption of energy on earth is an irreversible process. This confirms that there are material limits to growth.

³¹ Thomas Homer-Dixon (1999) provides support for this conclusion in his examination of the negative social consequences of environmental scarcity. Environmental scarcity often causes groups of people to become ecologically marginalized and has implications for their social and economic well-being. (Homer-Dixon's main thesis is that lack of access to resources can lead to violent conflict between different groups, and his conclusions are based on case studies in the majority world.)

As Peter Marcuse, Professor of Urban Planning at Columbia University, notes "sustainability is not a goal; it is a constraint on the achievement of other goals" (Marcuse 1998). For this reason I like the definition of sustainability offered by Redefining Progress. Their definition of sustainability relates to reconciling two goals: sustaining human life and maintaining the integrity of nature. In this way, sustainability is *for* human "quality of life within the means of nature" (Redefining Progress 2000).

2.4 Relevance to planning

2.4.1 planning in general

Karl Polanyi (1957) asserts that planning arose in response to negative market outcomes. He points out that self-regulating markets necessitate planning: in response to negative market outcomes society is required to take measures for its own protection. (Ecological fiscal reform is one example of such measures.) In this way, planning can also be seen as an activity to guide future action in service of the public interest (Forrester 1989). John Friedmann (1987, 11) defines planning as:

[A] forward-looking activity that selects from the past those elements that are useful in analyzing existing conditions from a vantage point of the future - the changes that are thought to be desirable and how they must be brought about.

This definition illustrates the subjective nature of planning. It also demonstrates that planning is very much an endeavour involving analysis of a problem or situation, and making use of the lessons of history to determine the best course of action. The emphasis on action in the interest of desirable future outcomes in these conceptions of planning indicates that planning is naturally oriented towards notions of sustainability.

To the extent that sustainability requires the review of policies designed today to meet the needs of today in such a way that they do not make things worse in the future, it is an important concept, though for planners it is not a very new one.
(Marcuse 1998)

Planning is also said to be an ethical inquiry. This too is relevant in the context of planning for sustainability. According to Rich Harrill, "the difference between 'shallow' and 'deep' sustainability may not lie entirely with the refinement of procedural or substantive models, but with the ethical resolve and political action required to change our social and ecological destiny" (1999, 74). As noted earlier, this thesis does not focus solely on the theoretical mechanics of EFR but considers the broader political and ethical context of this policy intervention in the interest of ensuring EFR makes a positive contribution to social and ecological health.

2.4.2 public policy for sustainable development

The governments of Canada and British Columbia are currently giving serious consideration to ecological fiscal reform. Canada's National Round Table on the Environment and the Economy has undertaken to review the benefits, costs, technical feasibility, and potential designs of EFR. In conjunction with an expert group of stakeholders NRTEE's Economic Instruments' Committee "will help to inform the debate on ecological tax reform and to advance the use of market-based approaches for environmental improvement in Canada" (NRTEE 2000). The Green Economy Initiative of the province of British Columbia released a discussion paper on tax shifting in November 1999. Pilot projects planned thus far do not involve reductions in taxes on labour or a broadly applied increase in energy taxes. However, the discussion paper indicates that such things are being considered (Taylor, Jaccard and Olewiler 1999). However these initiatives play out, it is well to remember that public policy that seriously contemplates bringing about ecological improvement should pay particular attention to equity. It must seek to ensure that economic relationships are governed by principles of justice and humanity (Marris 1998).

2.4.3 progressive planning and counter-hegemonic discourse

Planning is not just a technical endeavour nor is it value-neutral. In *Planning in the Face of Power*, John Forester argues that "planners must be able to think and act politically ... to anticipate and reshape relations of power and powerlessness" (Forester 1989, 7). The book's focus is the practical challenges of planning in the public interest in capitalist society with its

inherent power differentials. Forester's point is especially relevant in the context of planning for sustainability. Ecological sustainability requires considerable changes to how we do things and these decisions will impact different social groups in different ways. For these reasons, Laurie Adkin (1998, xii) notes:

Struggles around the concept of sustainable and desirable development are struggles about who makes the decisions, which interests are defeated, marginalized, or never represented, and which interests predominate.

Progressive planning requires an appreciation of the broader context of power relations within political and economic structures. It fails if it does not consider the reality of power and ends up "disguising the very inequalities of power it set out to counteract" (Marris 1998, 17). One strategy that can inform progressive planning is counter-hegemonic discourse.³² In the context of sustainable development and the crisis of society's relationship to nature, counter-hegemonic discourse is a discourse that rejects the growthist, productivist, capitalist, and modernist features of sustainable development and draws on principles of ethics and environmental justice (Keil et al. 1998).

It is important to be aware of ideological currents in these debates, not to malign the efforts of others nor only to assume the easy role of critic, but to cultivate an awareness of competing agendas, the kinds of questions that should be asked, and the variety of voices that need to be included in these decisions. Planning for sustainability that does not challenge the status quo (current debilitating paradigm and outcomes) and that has growth and capital accumulation (financial and natural) still on the agenda is not at all likely to lead to ecologically sustainable or socially desirable outcomes.

³² The term 'hegemony' refers to the institutions and economic and political power of dominant social groups. I use the term 'counter-hegemony' to refer to that which opposes harmful aspects of dominant perspectives.

2.5 Note on language

In this thesis I try to accompany technical and academic terminology with definitions in plainer language either in footnotes or within the text. Regardless, it is unlikely that this paper will be accessible to a broad audience and I apologize for that.

Certain terms require immediate definition given my regular use of them and their potential to confuse readers not already familiar with them. 'Mainstream' and 'conventional' are descriptors that I frequently make use of to denote that I think that something is missing from a particular perspective or idea.³³ Politically, they refer to approaches rooted in the status quo in cases where the status quo in my opinion is clearly deficient. When they are used to describe economics or economists, they refer to the neoclassical perspective that does not see ecological limits to economic growth and tends toward other implausible economic abstractions. A similar distinction is meant between 'ecological economists' and 'environmental economists' - the former recognizes that the economic system is a subsystem of the ecosphere, while the latter is more coincident with the growthist perspective of conventional economics.

³³ This is not to say that all mainstream or conventional approaches are unsound or morally bereft.

3 Analytic framework and research methods

The economic and ecological rationale for EFR is developed in the literature of ecological economics. Ecological economics tells us that the market economy is myopic and therefore, that prices need to tell more of the truth (von Weizsäcker 1994). Social, institutional and political forces influence environment-economy relationships and approaches to understanding these relationships. Therefore, the analysis of ecological economics must be accompanied by considerations relating to political ecology. This chapter describes my analytic framework: ecological economics, political ecology, and the necessary synthesis of the two. It then goes on to talk about the methods that I use to analyze EFR in the chapters that follow.

3.1 Analytic framework

3.1.1 ecological economics

The number of humans on the planet, the scale and impact of human activity, and the rate at which both are increasing is such that we must reconceptualize the outlook of economics to be one of full-world as opposed to empty-world economics (Daly 1991). Ecological economics demonstrates that there are real limits to physical material growth of human enterprise (Goodland 1991). Conventional economic analysis, however, portrays the economy as a self-sustaining, independent and isolated system, capable of infinite expansion (Rees 1995a). Prugh et al. succinctly frame this misperception as follows, "the fundamental error of the dominant economic worldview is to treat land (the environment) as merely a factor of production (and one of declining importance at that)" (1999, 19). In reality, the economic system is a subsystem of the global ecosystem and it cannot grow beyond the system of which it is a subset (Daly 1994).

3.1.2 political ecology

Broadly speaking, political ecology is an *inquiry* into the political and ideological origins of the relationships between human societies and nature (Keil et al. 1998). Political ecology

blends political economy (which looks at the distribution of power in relation to productive relationships) and ecological analysis (with an emphasis on human-environment relationships). It looks at the "dialectic between individuals, their productive activity in human society and nature" (Greenberg and Park 1994, 1). Political ecology is important because if we want to devise solutions to various 'crises' we need a good understanding of factors contributing to perceived problems.

Some people use the term political ecology to mean a particular *ideology* related to a movement to bring about an 'ecological society' (for example, Lipietz 1995; Roussopoulos 1993). They ascribe tenets and characteristics to it including: opposition to imperialism of the state, criticism of rational scientific management of non-human nature, and transformation of systems of social and economic relations. It is also used to refer to the *study* of ecological or environmental politics (i.e. eco-socialism, green social democracies, eco-Marxism, social ecology).

A recent article that links political ecology and planning theory defines political ecology as both *inquiry* and *programme*: "Political ecology is the inquiry into the causes and consequences of environmental change, with the goal of facilitating sustainable development through the reconstruction of social and political systems" (Harrill 1999, 67). While I certainly support the goal of social and institutional transformation to bring about ecological sustainability, I generally use the term according to the inquiry definition (i.e. as a lens). Variables relevant to this form of inquiry include: ideological and interest-based classifications of actors; the role of the state; class and ethnic structures; gender; environmental decision making; and environmental history (Harrill 1999). Other variables include the economic, environmental and political context for environmental decision-making, and the structures and values that shape these decisions.

3.1.3 'necessary synthesis' of political ecology and ecological economics

Ecological economics is a relatively new and evolving discipline with few 'doctrines'. Costanza et al. define the field to include the "entire web of interactions between economic

and ecological sectors" (1991, 3). However, the focus in practice has tended to be more narrow, focussing on empirical approaches to economic management and environmental valuation. According to Michael M'Gonigle ecological economists are still looking at the world "through an essentially neo-classical prism of monetary exchange values and discount rates" (1999, 12). Less attention is given to the broader political context for these policies. For these reasons:

Ecological economics needs political ecology, for it is this body of analysis which is oriented to discerning the necessary underpinnings for systemic institutional change, that is, for a new sustainable configuration of institutions, infrastructures, and power relations into which society might grow.

(M'Gonigle 1999, 15)

Given the fact that inequity is an inescapable bi-product of an economic system based primarily on competition and that inequity exacerbates environmental degradation, in addition to challenging basic market assumptions, ecological economics must challenge the institutions, outcomes and power dynamics of the market economy.³⁴ To truly 'turn the world upside down'³⁵, ecological economics must be nested within the larger framework of *ecological political economy*. I use the 'necessary synthesis' of ecological economics and political ecology proposed by M'Gonigle to structure my research approach.

³⁴ The institutions governing international trade are a good set to challenge, for example. International trade agreements work against ecological goals as they propagate the movement of goods around the world and forbid import restrictions based on environmental production standards (Goldsmith 1996).

³⁵ This is a reference to the goals of the Diggers, a deeply religious group of pacifist agrarian radicals in 17th century England. The Diggers stood for equity and justice, they believed that all men should be free and fed regardless of their social or economic class; essentially, they sought radical change in the structure of society (Winstanley [1649] 1989). M'Gonigle is referring to the fact that the intellectual roots of ecological economics contained both a thermodynamically-informed critique of the tools and assumptions of conventional economics, and a challenge to prevailing political and institutional structures. The current focus tends to be on empirical approaches to economic management and environmental valuation, with less attention given to the broader political context for these policies or institutional restructuring likely required.

3.2 Methods used and why

Broadly speaking, this thesis is a policy analysis of ecological fiscal reform. This means that it examines both the outcomes and the rationale for this particular policy. Policy analysis is an endeavour that focuses on how knowledge of a problem is linked to proposed action. It seeks to solve problems based on systematic analysis of data (Friedmann 1987). The 'data' analyzed in this thesis consists of general discourse on EFR, discourse and empirical conclusions of economic studies of EFR, and descriptive statistics pertaining to basic economic and environmental trends which provide important context for this policy intervention.

The sources I make use of in this thesis fall into four broad categories: economic theory and empirical analysis; academic publications in political economy and sustainability; policy documents from independent agencies or arms-length government institutions; and discussion papers/publications for popular consumption by these same agencies. The focus of analysis within these sources is usually the US or the countries of Europe, and where possible I have indicated Canadian implications.

3.2.1 *economic impact analysis*

Standard impact analysis of an event or policy usually takes the form of a conditional predictive model, using 'if /then' reasoning (Davis 1990).³⁶ The same holds for this analysis of the economic impacts of EFR. (Another way to phrase my main research question would be to say "if taxes on carbon-emitting activities are increased and taxes on labour are reduced then what employment-related equity impacts will result?").

I look at both theoretical and empirical conclusions from the literature on the employment impacts of EFR (general case of tax on CO₂ emissions, revenue recycled through reduced taxes on labour). I discuss the likelihood of the employment dividend and the conditions required for it to occur. To add 'identities' to double-dividend scenarios I compare the nature

³⁶ A drawback of conventional policy analysis is the linear and mechanistic nature of its tools and approaches. It is an approach that does not account for systemic feedback and unpredictable events.

(skill sets, wage levels, geography, timing) of jobs lost and jobs gained to assess whether workers displaced through EFR will have access to jobs that may be created.

This analysis of economic impacts of EFR is undertaken in awareness of two caveats. First, most policy analysis is strongly influenced by principles of micro-economics and many of the assumptions upon which neo-classical economic theory is based are invalidated through comparison to the real world (see section 5.2). Second, policy analysis is also influenced by the prevailing political framework governing economic ideas (Bradford 2000). In spite of these two caveats, analysis based on microeconomic principles is an approach that tends to hold sway in the policy arena, and politics are an inescapable presence in any endeavour. For this reason, mainstream economic arguments are presented but are accompanied by various qualifications.

3.2.2 discourse and discourse analysis

The second method I employ to evaluate EFR from the perspective of both ecological economics and political ecology is discourse analysis. I do so because discourse frames our understanding of economics, ecology, politics and ethics (Keil et al. 1998). Discourse in this sense means more than conversation or argument. It refers to a set of ideas, concepts, categorizations, and practices. Discourse is significant in terms of environmental policy because policy developments in this context are greatly influenced by how environmental problems are socially constructed, and because policy-making involves the defining of problems in such a way that solutions for them can be found (Hajer 1995).³⁷ Social and economic policies are also influenced by the discourse of dominant ideological approaches. Stephen McBride (2000) identifies the presence of a neo-liberal economic paradigm within Canadian social and economic policy, and argues that the framework for labour market

³⁷ Hajer states that "policy making can be analyzed as a set of practices that are meant to process fragmented and contradictory statements to be able to create the sort of problems that institutions can handle and for which solutions can be found" (1995, 15).

policy has been thus conditioned.³⁸

In this thesis discourse analysis seeks to identify which understanding of ecological and economic problems (relevant to EFR) are dominant and the resulting influence on policies advanced. Discourse analysis relates not only to the content and tone of what is said but also to the surrounding institutional and political context. In other words, to the ensemble of factors that influence how we conceive of economic and environmental problems.

My examination of policy discourse on EFR is for the most part restricted to policy documents discussion papers/publications for popular consumption from independent policy institutes and government-related organizations. I draw primarily from three main research and environmental organizations:

- *Worldwatch Institute*, a research organization whose analysis pertains to issues that affect prospects for a sustainable society;
- *Northwest Environment Watch*, a non-profit research centre dedicated to promoting a sustainable economy in the Pacific Northwest; and
- *Organization for Economic Cooperation and Development (OECD)*, an organization whose members are national governments and whose mandate is the promotion of sustained economic growth, increased world trade and raising standards of living in member countries.³⁹

These organizations have a strong presence in policy discourse on EFR. The research and analysis of the Worldwatch Institute and Northwest Environment Watch is often reported by the news media, and the OECD recently co-sponsored an Environment Canada conference on the use of economic instruments in environmental policy.⁴⁰

³⁸ Neoliberalism is an ideology that extols the virtues of the rule of market capitalism. It privileges 'free' enterprise and aims to facilitate it through the elimination of regulations, barriers to trade, or any other state imposed constraints. It subordinates all other actors to the primacy of the market with little regard for social harm that may result.

³⁹ Member countries are countries of the minority world, and among others include Canada, Denmark, France, Germany, the Netherlands, the United Kingdom, and the United States.

⁴⁰ The website with the conference report is www.ec.gc.ca/eco-n-ference/.

3.2.3 discourse on sustainable development: worldviews, ecological modernization, and natural capitalism

While the analysis presented in the following two chapters will focus on the specific policy of EFR, it is necessary to comment on the general concept of sustainable development to provide a background for this analysis. The discussion below relates to general discourse on sustainable development, with particular emphasis given to worldviews, and the concepts of ecological modernization and natural capitalism.

Edmund O'Sullivan observes that "we in the northern hemisphere have been saturated with voices that prevent us from critically reflecting on the momentous period in which we are living" (1999, 40). He is referring to influences on social and cultural conditioning that extol the virtues of 'progress' (in particular, the notion that industrial capitalism is a natural, linear and desirable path of development) and that propagate consumer values. In my view, the discourse on sustainable development does not engage in this much needed reflection. To respond adequately to the current ecological crisis what is required is a thorough critique and definition of the problem and its contributing factors. This structural analysis should inform proposed solutions.

Many environmental economists do not see economic growth and sustainability as incompatible (see for example, Gilpin 2000; Goldin and Winters 1995). In fact, the World Commission on Environment and Development advocates the ecologically impossible solution of more economic growth (Prugh et al. 1999; Rees 1990). This view holds that gross domestic product (GDP) can increase without resulting in growth in material throughput. In theory, increased efficiency in resource use should enable economic growth to occur in tandem with dematerialization. Unfortunately, this theory depends on questionable assumptions (see section 4.3.5). Despite increased materials efficiency dematerialization is not occurring, partly because we don't have EFR to tax away the savings. For example, if money gains from energy efficiency savings are re-spent on alternative forms of consumption gross throughput may increase (Rees 2000b).

While being largely a response to ecological constraints on continued material growth, conventional approaches to sustainable development do not believe that there are finite physical limits to both the source and sink capacities of the ecosphere. In the ecological economics literature this distinction is framed as weak vs. strong ecological sustainability. *Strong sustainability* refers to maintenance of natural capital stocks; *weak sustainability* requires maintenance of aggregate capital stocks (human-made, financial, natural). Advocates of weak sustainability generally think that manufactured capital is a perfect substitute for natural capital - thus, as stocks of natural capital are depleted, market forces and human ingenuity will ensure that suitable replacements are produced. For the most part, sustainable development proceeds according to the criteria of weak sustainability with the assumptions of the neo-classical economic framework intact.

The problem is not only one of differing perceptions regarding the existence of ecological limits to human activity and the potential for human ingenuity and technological expertise to reconcile economic imperatives with ecological sustainability. One of the main problems is industrial capitalism. As Laurie Adkin notes, the profit motive of capitalist society is "the root of most economic decisions and as a logic fundamentally antagonistic to the goals of equality, ecology, health and security of livelihood" (1992, 145).

The interpretation of sustainable development advanced by the political mainstream does not question the institutions associated with the dominant worldview (i.e. capitalism and industrialism) and lead us "to believe that sustainability can be achieved with all those institutions and their values intact" (Worster 1993, 142). I think that mainstream approaches to sustainability can generally be referred to as eco-capitalist. Either unaware or undisturbed by the chronic inefficiencies of capitalism (i.e. unemployment) and the contradiction between the physical growth dynamic of capitalism and the throughput contraction necessary for ecological sustainability, many proponents of sustainable development call for 'ecologizing market forces' as the most efficient way to deal with environmental problems. They assert that the processes of capitalism can be creatively adjusted to improve social, ecological and economic health (Carley and Spapens 1998). This is a paradox of problem as cure. While a thorough articulation of the fundamental incompatibility of capitalism and

ecological sustainability is beyond the scope of this thesis, it is well to take note of Einstein's maxim that a problem cannot be solved with the same level of thinking that created it.

Ecological modernization serves to illustrate the contradiction apparent here. It refers to "the discourse that recognizes the structural character of the environmental problematique but none the less assumes that existing political, economic, and social institutions can internalize the care for the environment" (Hajer 1995, 25). Ecological modernization is a means of conceptualizing environmental problems and delineating the accepted confines of responses that presumes the success of a 'techno-institutional' fix within existing institutional frameworks. Some would argue that ecological modernization is not solely a technocratic approach and that it places emphasis on social innovations (Mol and Spaargaren 2000). However, it remains a theory that acknowledges that ecological problems result from a failure of the institutional arrangements of modern industrial society but asserts that environmental problems can still be solved within this framework. The institutional layout will stay the same (market system, industrial production, state structure, use and development of modern technology) but will accommodate drastic environmental reforms.

Ecological fiscal reform is a policy that can be characterized as falling within an ecological modernization approach. EFR asserts that the institution of the market can be reformed to address the environmental problems it currently facilitates. Proponents of this approach tend to think that alternatives to capitalism have proved unfeasible, and that capitalism is sufficiently reflexive that with some assistance it can effectively respond to environmental signals (Mol and Spaargaren 2000).

Natural capitalism is a term currently gaining popularity in the literature that deals with economic and ecological sustainability. It is a concept that seeks to reconcile capitalist economic activity with ecological realities. Among its main proponents are Paul Hawken, Amory Lovins and L. Hunter Lovins, and they have recently published a book on the subject. The book provides a comprehensive and well-articulated analysis of the ecological oversights of the market economy and several strategies for response with an emphasis on reformed accounting and efficiency gains. The problem with the way things are now is

identified as the undervaluation of natural capital that results in the inefficient use of it (given the finite planet that we live on). They state that "nearly all environmental and social harm is an artifact of the uneconomically wasteful use of human and natural resources " (1999, 10).

3.2.4 market capitalism and market-based policies

The logic of market-based policy instruments is that modifying the system of incentives faced by economic agents will affect their internal self-interest calculus and thus work with market forces to induce change in behaviour. The market, however, considers only exchange values, favours corporate institutions with power and resources, and does not give voice to non-human life, future or past generations (Plant and Albert 1991). At best, market-based solutions provide incomplete environmental controls and only partially provide the social and material needs of human life.

In most economies preceding that of the industrial growth society, the market was embedded in social relations. In *The Great Transformation*, Karl Polanyi (1957) argues that under capitalism social relationships are subordinate to market relationships. In other words, society is run "as an adjunct to the market" (57). Daly and Cobb (1989) convey Polanyi's argument by distinguishing between "market" and "Market"; the former corresponding to an economic system of markets embedded in society and the latter to the system of industrial capitalism where it is society that is subordinate to the market.

[L]abour and land are no other than the human beings themselves of which every society consists and the natural surroundings in which it exists. To include them in the market mechanism means to subordinate the substance of society itself to the laws of the market. (71)

Polanyi's analysis reveals that market capitalism has a negative impact on social and ecological health.⁴¹ He viewed the commodification of land and labour as being a significant cause of both environmental degradation and human economic hardship. Destructive effects

⁴¹ Polanyi's critique pertains to an *uncontrolled* and *self-regulating* market system. Although most Western economic systems are far from being void of all constraints, in this era where market rule not government rule is the prevailing orthodoxy Polanyi's insights are of increasing significance.

are inherent to the market economy that treats both land and labour as discrete tradable units (which they are not) and in doing so destroys integral relationships. In response to the harmful effects of the "Market", Sachs et al. identify the most pragmatic task for 'greening the north' to be creating "a market economy that is (once again) embedded in a greater whole we call society rather than a market society where the rules of supply and demand determine all of human existence" (1998, 93). This is the challenge for policy that seeks to reconcile human existence with ecological sustainability.

3.3 Why this approach to EFR?

I consider EFR to be a fairly useful, albeit mainstream approach to sustainability. That it is consistent with mainstream analysis may well be a strength in terms of political feasibility, and it can arguably assist us in buying time needed to plan a more radical transformation. However, the mainstream orientation of discourse on EFR is also a downfall for reasons outlined already (relating to worldview, ideological orientation, and degree of attention to issues of equity). How EFR is cast in dominant discourse does not give much weight to the social good of taxation. Instead, market forces are portrayed as the best way to deliver both environmental amenity and welfare gains to individuals.

Last year I attended a tax shifting conference organized by Northwest Environment Watch (an environmental organization engaged in policy research and lobbying in the Pacific Northwest), and co-sponsored by the BC government. All participants received a copy of a book co-written by Alan Durning called *Tax Shift: How to Help the Economy, Improve the Environment, and Get the Tax Man off Our Backs*. This book makes several valid points. However, it has a 'taxes are evil'/supply-side economics tone of which I am critical. The book voices loud concerns about dampened productivity resulting from taxes, a "tax grab" from individuals and profit-making firms, and "a tax system with only one coherent goal: capturing money" (13). It extols the virtues of a "tax shift revolt" to foster "individual responsibility" (31). At the same time it affirms that this tax shift idea is a politically neutral concept (5).⁴²

It should be noted that the authors are speaking mostly in the context of the United States where public services (such as health care) provide but a shadow version of the social safety net in Canada which itself is fast eroding (Burke 2000). However, I think that the references

⁴² Supply-side economics is a close cousin of neoliberalism. It is generally preoccupied with incentives and disincentives to work, save, invest, and innovate. Taxes and social insurance are considered to be disincentives to productive work. Government is generally considered too large and a drag on economic productivity. Further hampering productivity are the inefficiencies caused by regulations. Thus, usual prescriptions relate to cutting taxes, income support programs, the public sector, and doing away with regulations, all in the interest of greater efficiency and economic output.

to taxes in this book constitute implicit value judgements about the benefits to citizens of taxation. In Canada taxes fund numerous social and environmental benefits, such as sewage treatment, hospitals, and schools. Taxes also fund social insurance programs and the functions of government, and income taxes serve the purpose of mitigating income disparities.

Further reading led me to some even more interesting ideas on the subject and fueled my misgivings regarding the guiding philosophy behind dominant conceptions of EFR. For example, David Roodman (1997) of the Worldwatch Institute acknowledges that there will be winners and losers as a result of EFR. However, he sees the resulting challenge to be one of building political coalitions among potential winners: "The task for environmental tax reformers is to build alliances with the winning majority" (9).

Policies to discourage activities that emit greenhouse gases are urgently needed, and for this reason I support EFR. I agree that urgent action is necessary to avert, or at least mitigate, ecosystem collapse, but I do not think that forging ahead without adequate attention to potential losers is a sensible or compassionate course of action. Policies based on analyses that grant limited attention to equity impacts will ultimately fail to produce ecologically sane or socially desirable outcomes. However, given the inherent tendency of industrial capitalism to erode both social and ecological health, I think that policies for sustainability cannot solely consist of market correction but should facilitate a fundamentally more appropriate role for the market. Central to this task is placing social goals ahead of market goals.

The next chapter will discuss how increasing taxes on activities that pollute or otherwise degrade the natural environment can contribute to ecological sustainability. It describes economic concepts relevant to the employment impacts of EFR, outlines the 'selling features' and accompanying drawbacks of this policy, and argues that taxation should not be the only instrument of environmental policy. Chapter five focuses on employment-related impacts of a carbon tax and using revenue generated to reduce payroll taxes. Descriptive statistics and results from economic modeling studies are presented to demonstrate that

some workers are likely to bear the burden of adjustment costs of this policy. Additional reasons indicating that socially equitable and ecologically sound outcomes will not result from EFR (as it is conceived in dominant discourse) are identified based on an analysis of policy discourse. This chapter also describes how Polanyi's insights contribute to a critique of current conceptions of EFR.

4 Ecological Fiscal Reform

Ecological fiscal reform has already been introduced as a policy of shifting taxes from "goods" to "bads". In general, "goods" are framed as wealth-creating activities such as work and investment, and "bads" are said to refer to wealth depleting activities such as pollution and environmental degradation (Hamond et al. 1997).⁴³ Taxes collected through EFR are used to finance reductions in other taxes or fees, or are used to fund incentives to encourage less environmentally harmful behaviour. This is referred to as *revenue recycling*. This thesis considers the case of shifting taxes from labour to carbon emitting activities. This form of EFR is seen as both a strategy to induce the conservation of energy (and its material inputs and waste products) and to stimulate the demand for labour. EFR also goes by the names of environmental tax reform, ecological tax reform, green tax swapping, green tax reform and tax shifting (Bosquet 2000).

4.1 The ecological economics of EFR

4.1.1 logic and advantages of taxes over other approaches to environmental problems

There are several reasons for the current popularity of EFR: widespread consensus as to the economic efficiency of market-based approaches to environmental problems, increased political and civic interest in the incentive signals of taxes, and institutional acceptance of the 'polluter pays principle'.

Historically, regulations have been the dominant instrument of environmental policy. For the most part, regulations specify a certain standard of pollution abatement or environmental compliance to which firms must adhere. A 'command and control' approach to reducing atmospheric content of CO₂ would consist of imposing legal limits on the amount of emissions from each individual source. More recently, market instruments, such as

⁴³ It should be noted that in actuality 'work' and 'investment' are neutral terms; they are not intrinsically good or bad.

environmental taxes and charges, have gained ascendancy in the realm of environmental policy.

static efficiency

The economic efficiency of taxes over regulations is among the axioms of environmental economics (see for example, Gilpin 2000; Hamond et al. 1997; Tietenberg 1992). Taxes allow environmental goals to be met at less total cost than regulations. This is because regulations do not take into account the fact that costs for resource conservation and/or pollution abatement vary across firms. Taxes on ecologically harmful activities create incentive to limit the activity or to reduce the amount of environmental damage that results from it. Individual profit maximizing firms will conserve/abate up to the point where the tax equals their marginal cost of compliance. Firms with low-cost pollution abatement will therefore treat more and higher-cost firms will treat less. In this way, taxes allow pollution to be reduced at the lowest total financial cost to firms. Taxes are also said to have the cost advantage of administrative simplicity. For example, it is easier to place a tax on energy inputs according to their carbon content at the point of sale than it is to regulate 'end of pipe' CO₂ emissions.

That taxes result in the same amount of environmental control as regulations at a lower cost is referred to as *static efficiency* (what is most economically efficient at a particular point in time). The concept of economic efficiency has a variety of definitions and interpretations. Most commonly, it refers to a situation of maximum output per unit of economic input (and in such cases is also referred to as *productive efficiency*). This definition is coincident with both profit maximization and utility constraints; profit is usually maximized at the point of greatest revenue (from output) per unit of cost, and aggregate utility is usually considered to be positively related to output (i.e. the more available consumption the better).⁴⁴ It is

⁴⁴ Readers should note the contrasting perspectives of conventional and full-world/ecological economics here. Conventional economics sees production and consumption as both highly desirable and distinct activities, and characterizes an 'efficient market' as one where all productive factors are employed. Ecological economics, however, sees all production as consumption (Rees 1995c), and does not subscribe to the 'more is better' philosophy reflected in conventional definitions of efficient levels of output. Ecological economists would define an 'efficient market' as one where prices embody as much ecologically relevant information as possible.

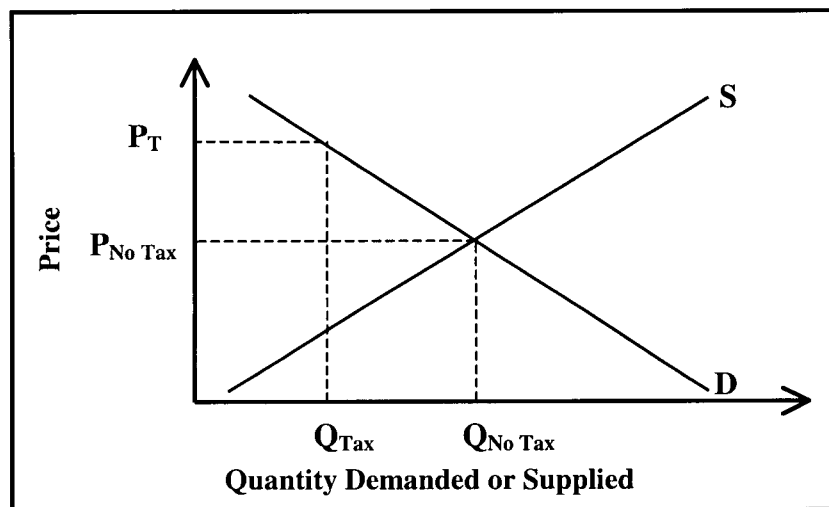
important to note that productive efficiency is distinct from *engineering efficiency*, the latter referring to maximum output per unit of material input.

the incentive signals of taxes

There is a growing consensus amongst environmental interest groups and environmental policy makers that more attention should be given to the question of *what* is taxed.

Economic theory tells us that we get less of what we tax (i.e. the greater the price the lower the quantity demanded). The graph below illustrates this economic reasoning. In the absence of a tax, the price is $P_{No\ Tax}$ and quantity demanded by consumers and supplied by producers is $Q_{No\ Tax}$. The effect of introducing a tax causes the price to rise to P_{Tax} , resulting in a decrease in the quantity demanded to Q_{Tax} .

Figure 1: The price effects of taxes



Proponents of EFR point to the illogic of the current tax system. They say that instead of taxing things we need less of (like carbon emissions) the tax system penalizes the very things that we need more of (like jobs) (Hamond et al. 1997). Mainstream economic theory has long emphasized the second part of this argument.

polluter pays principle

In 1972, the UN Conference on the Human Environment affirmed the legitimacy of the polluter pays principle as a keystone of environmental policy. This principle states that the

polluter should pay the full cost of controlling pollution. It could also appropriately be termed the 'public pays principle' since producers will pass these costs on (Gilpin 2000). This is significant in the context of EFR because it is often the case that price increases for producers will be passed on to consumers in the form of higher prices and to workers in the form of lower wages and/or levels of employment.

4.1.2 rationale for increased environment-related taxes

The reality of global ecological decline described at the outset of this thesis has many causes. At various points in chapters 1 to 3, my suspicions as to significant culprits are noted. Mainstream economists and environmental economists, however, tend to identify a different cluster of concepts.

market failure and environmental externalities

The market does not take into account the ecological or social costs of economic activity. Environmental economists refer to this as an occurrence of 'market failure'. Central to this idea of market failure is the concept of an *externality*: where the costs or benefits of an activity are not born by their producer.⁴⁵ A negative environmental externality refers to "environmental damage that results from the consumption and/or production of a good or service that is not directly reflected in the price that is charged for the good or service, or compensated for in some non-price way" (Taylor, Jaccard and Olewiler 1999). For example, the market price of electricity is unlikely to account for the fact that hydroelectric dams decimate fish stocks and lead to extinctions, or that "electricity ratepayers will search their bills in vain for a 'biodiversity loss surcharge'" (Prugh et al. 1999, 122). Climate change is a negative externality that results from the use of fossil fuels in industry and other energy intensive human pursuits such as car driving. The costs of habitat destruction due to climate change are borne by all species. Money costs incurred to compensate for violent weather events, pollution damage, failing crops and dying forests accrue to society at large, as do

⁴⁵ Daly and Cobb (1989) remark on the significance of the name 'externality': "The term suggests both that the phenomena are external to the market and also that they are external to the main body of theory built on the market as an economic concept" (52). What is often identified as external to markets is actually inherent to them (Polanyi 1957), as discussed in section 3.2.3.

defensive expenditures to avoid such negative impacts (i.e. dykes and coastal flood protection).

Fish stocks can also be decimated by overexploitation on the part of human fishers. That the full cost of overfishing is not borne by those who do so is symptomatic of a particular source of environmental externalities: *common property resources*. Common property resources are resources without formally established property rights to which access is not limited.⁴⁶

Public goods are a specific type of common property resource; access is not limited, nor could it be since such resources aren't divisible. The atmosphere is both a common property resource (providing an essential sink function for various by-products of industrial processes) and a public good (providing climatic regulating services and other life support functions).

prices do not tell the truth

The creation of environmental externalities is facilitated by the fact that prices do not tell the ecological 'truth'.⁴⁷ Market prices for natural assets reflect only the exchange value of specific traded goods or services. They do not convey any information about the size of the stock of such assets, the rate at which they are renewed, or their value in terms of broader life support functions (Rees 1995a). Prices for fossil fuels do not reflect the ecological harm resulting from their combustion. Subsidies exacerbate the myopic nature of market prices and have ecologically harmful effects. This is particularly the case for subsidies to the energy sector in Canada (Rees 1995b).

⁴⁶ It should also be noted that this can also happen when the stock is privately owned and the discount rate significantly exceeds the reproduction rate of the resource (which it usually does).

⁴⁷ The absence of market prices (as is the case with public goods and most common property resources) is also ecologically dishonest, since the value by default is effectively zero.

It is desirable from both an economic and environmental perspective to increase the price of currently underpriced resources. In the 1920s, economist Arthur Pigou suggested that environmental externalities could be 'internalized' by setting a tax equal to the (estimated) marginal cost of environmental damage. EFR is a market corrective in the sense that increased taxes on resource depletion make prices more in concert with ecological realities.⁴⁸ Since prices for energy are artificially low (due to subsidies and externalized ecological and economic costs), a carbon tax would make energy prices tell more of the truth and discourage the emission of CO₂ into the atmosphere.

Adding to the ecological benefits of increased environmental taxes is an economic rationale. The economic costs of ecological decline in terms of present and future defensive expenditures are huge. The global costs of climate change are predicted by the Intergovernmental Panel on Climate Change to be between \$270 and \$316 billion (Goldsmith and Henderson 1999). These are likely conservative estimates given that IPCC models underestimate the extent of climate change (as noted in chapter one).

4.1.3 rationale for reducing 'distortionary' taxes⁴⁹

In the language of mainstream economics taxes are 'distortions' that artificially inflate market prices and lead to welfare losses.⁵⁰ A deadweight loss is an economic concept that refers to the loss of total surplus that results from producing less than an efficient level of output.⁵¹ Figure 2 graphically illustrates the concept of a deadweight loss. In general terms,

⁴⁸ In the ideal case of a full market corrective the tax would eliminate the externality costs entirely (i.e. revenue expended to repair damage).

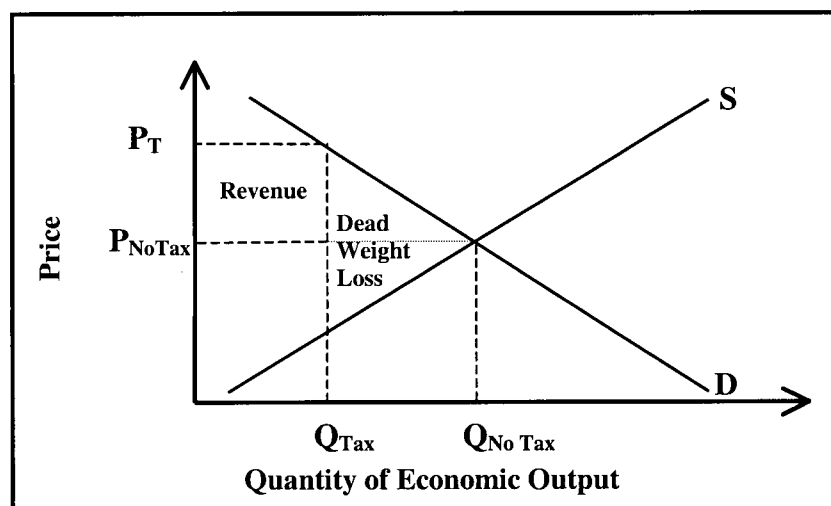
⁴⁹ The argument presented here is based on the economic theory of competitive equilibrium - a flawed model based on a number of unrealistic assumptions (see section 5.2). It is reproduced to illustrate the prevailing economic rationale for EFR.

⁵⁰ Environmental and ecological economics do not characterize a tax on an environmentally harmful activity or product as a price distortion since the tax is a step towards internalizing an environmental externality.

⁵¹ Some economists make use of the following more restrictive definition of deadweight loss: "the result of a tax-induced change in behaviour that has a cost that is greater than revenue raised" (Eissa et al. 2000, 1). However, the definition initially offered is by far the most prevalent. (Figure 2 also illustrates the more restrictive definition: a deadweight loss exists if the area labeled 'deadweight loss' is larger than the area labeled 'revenue'.)

it is a gain not gained (which according to economic theory amounts to a loss in welfare).⁵² Each dollar raised through taxation is thought to have a dampening effect on productivity. According to this logic, reducing 'distortionary' taxes will result in improved productive efficiency. It is thus seen as a desirable course of action to reduce the "deadweight loss" associated with taxes (Durning and Bauman 1998).

Figure 2: Deadweight loss



According to standard economic theory, taxes on labour (usually levied on both employees and employers) discourage people from engaging in productive work, as well as deter employers from hiring workers. University economics textbooks portray the supply of labour as a function of wages or income (although not the only determinant) (see for example, Bruce 1995; Lipsey et al. 1991). A tax reduces the wage rate for each unit of

⁵² It is possible that a welfare gain can exceed the loss of productivity, but it depends on how you define the term. As defined by economists welfare is synonymous with utility (McKittrick 1997). Economic utility is usually a function of consumption of goods and services that are produced. Thus, for mainstream economists welfare is linked to productivity. In contrast, defining welfare in terms of health and happiness (which after a certain point is not contingent on consumption of goods and services) would not necessarily equate a 'gain not gained' in terms of material consumption with a loss in welfare. Therefore, while benefits received from taxes (i.e. healthcare, environmental expenditures) may well outweigh the 'opportunity cost' of forgone consumption and actually increase welfare (in spite of lower levels of production), the term welfare is used above in the conventional and material sense.

labour supplied (usually up to some maximum amount), and will therefore have negative influence on the amount of labour supplied.⁵³

The demand for labour is similarly portrayed as a function of the price of labour. Neo-classical labour market theory asserts that the key determinant of demand for labour is the effect of the cost of each additional worker on a firm's total revenue (Bruce 1995). Payroll taxes (which are determined by the number of workers a firm employs) are seen to reduce a firm's net marginal revenue product of labour, thus decreasing the demand for labour. This reasoning suggests that reducing payroll taxes has the potential to address the problem of unemployment.

Another rationale for reducing taxes on labour is that it encourages labour intensive production. Human labour is far less of a throughput-intensive input into the production process than other energy inputs. This factor substitution implies progress towards sustainability.

4.2 Relevant concepts pertaining to economic impacts of a tax shift

4.2.1 'incidence' of a tax

The 'incidence' of a tax refers to where the 'burden' of the tax is felt. *Forward incidence* means that the tax is passed on to consumers in the form of increased prices for final products and services. *Backward incidence* means that the impact of the tax is passed 'backwards' to the owners of factors of production (which is likely to have implications for both jobs and wages). Usual assumptions amongst economists about tax incidence are that taxes on wages are borne by workers, and taxes on both final and intermediate goods are

⁵³ This argument does not take into account whether or not an individual can afford to reduce the hours they work regardless of the wage rate, or other factors relating to the bargaining power of workers, such as the supply of jobs.

borne by consumers (Metcalf 1998). These assumptions are often incorporated into economic models, although in some cases the directional incidence of the tax is allowed to vary.

A tax is said to be *regressive* when the average tax rate decreases as income increases. In other words, when lower income people pay a larger proportion of their income in tax than do people with higher incomes. An average tax rate that increases with income is *progressive*. A *proportional* tax is one where the average tax rate is constant across income levels.

4.2.2 employment impacts

Both the tax increases and tax reductions of EFR will have implications for employment. A popular technique to estimate the potential job creation effects of reduced payroll taxes is an elasticity calculation. An *elasticity* is a measure of the percent change in one variable (usually quantity demanded or quantity supplied) induced by the percent change in another (usually market price).⁵⁴ The *elasticity of demand for labour* refers to the responsiveness of the demand for labour with respect to changes in the cost of labour (i.e. wage rate plus payroll taxes).

It is usually the case that the examination of the distributional impacts of environment-related tax increases relates mostly to the forward incidence of these taxes, and it is often noted that more research is needed with respect to backward incidence (Hamond et al. 1999). For example, Taylor (1999) models the environmental and economic effects of a revenue neutral EFR scenario in British Columbia. She projects potential ecological impacts and revenue generated (from water, solid waste and energy taxes). To model the employment effects of reduced labour taxes (Workers' Compensation contributions) she uses an elasticity calculation to project a positive effect on employment. The gross gain in employment is estimated to be 4.4% greater than a 'business as usual' scenario, however, it is

⁵⁴ This relationship relies on the condition of *ceteris paribus* (a phrase used by economists to mean 'all other relevant variables unchanged').

noted that such projections do not consider jobs that may be lost as a result of increased environmental taxes.

Increases in environment-related taxes will result in job loss in certain economic sectors more so than in others. The extent of impacts will to some degree be influenced by how revenue is recycled, but from an equity perspective it is important to note that the positive impact on jobs of a general reduction in payroll taxes will be less concentrated than the negative employment impacts of environment-related tax increases.

4.3 'In theory': Selling features and accompanying cautions

4.3.1 double-dividends

EFR is often framed as a 'no regret' or 'free lunch' policy because it is said to produce a double-dividend.⁵⁵ In other words, EFR will bring about both economic and environmental benefits. In the present analysis, a double-dividend refers to reduced CO₂ emissions and a net gain in employment (or reduction in unemployment). Some analyses suggest the possibility of a 'strong' double-dividend (such as McKittrick 1997; Parry and Bento 1998). This would be where EFR always results in an overall gain in efficiency (i.e. even if environmental benefits do not materialize, the use of revenue from environmental tax increases to fund reductions in other taxes will always result in a net increase in efficiency).

As will be evident in the following chapter, conclusions as to the existence of a double-dividend vary substantially according to modeling approach. Neither form of the hypothesis is guaranteed. It is often noted, however, that regardless of whether a double-dividend materializes the overall economic costs of decreasing CO₂ emissions are lower with the use of revenue recycling (not restricted to the reduction of taxes on labour).

⁵⁵ The term 'free lunch' is an expression used by economists to refer to solving two problems with one device, and frequently appears in the literature on EFR (for example, Brännlund and Gren 1999; Hamond et al. 1997; Neumayer 1999).

4.3.2 *revenue neutrality*

One of the principles of EFR as most define it is the characteristic of *revenue neutrality* (for example, Hamond et al. 1997; Durning and Bauman 1998). Revenue neutrality refers to a situation where any increase in environmental taxes is offset by reductions in other taxes. Government revenue (and, therefore, aggregate expenditure by taxpayers) is intended to remain unchanged. Whether or not in reality it is possible to achieve revenue neutrality is up for debate, but throughout the literature this assertion appears again and again. Advocates of EFR want the public to know that it is not intended as a 'tax grab'. According to Ernst von Weizsäcker, one of the pioneers of EFR, "revenue neutrality is of crucial political importance" (1994, 131).

Another fiscal critique is that governments will become dependent on that which they wish to eliminate. If taxes on the carbon content of fuel successfully decrease carbon dioxide emissions, governments will ultimately be faced with a shrinking tax base. This, however, can be addressed by periodically increasing the tax rate.

Another critique of revenue neutrality is that in terms of overall ecological goals it may be self-defeating. Hoerner (2000) models an EFR scenario that demonstrates that many industries (i.e. those that are not energy intensive) will see a net tax reduction.⁵⁶ This change in net revenue for these firms may result in increased consumption of other ecologically harmful products.

4.3.3 *civic principles*

EFR is said to promote civic values. Having prices tell more of the truth allows humans/economic agents to more easily make less myopic choices. Increased taxes on 'ecological bads' have pedagogical value and can help promote public awareness of environmental goals. It is also asserted that the tax system will no longer punish virtues (like work) while ignoring vices (like fossil fuel addiction) (Durning and Bauman 1999).

⁵⁶ Hoerner's model is discussed in more detail in section 5.2.1.

Much of the literature on tax shifting comes from outside Canada and, therefore, some qualifying comments are required with respect to this last point. I don't know much about how taxes are raised or spent in the United States, however, I am certain that taxation in Canada is not best described as punishment. The current tax system is not without civic virtue. Taxes fund social programs like health care, education, and social services, as well as infrastructure and environmental programs that we all benefit from (Marshall 2000). The income tax system somewhat mitigates income disparities (Yalnizyan 1998).

what are payroll taxes anyway?

Payroll taxes in the Canadian context constitute both employer and employee contributions to Worker's Compensation, the Canada Pension Plan (CPP), and Employment Insurance (EI).⁵⁷ These are hard-won benefits attached to pay-offs and it is inaccurate to solely conceptualize them as a 'cost' of labour. CPP and EI are income support programs that provide financial assistance to those in need, such as seniors and people who are out of work that qualify for unemployment insurance. Worker's Compensation provides insurance protection for workers who are injured on the job.

Taylor (1999) reports that the Chamber of Commerce and the Canadian Federation of Independent Business think payroll taxes in Canada should be reduced to promote employment. Studies by Canadian economists provide some support for this position (see Baran 1996 for a review of the literature), however, how employers react to payroll taxes is subject to considerable debate (Bédard 1998).

It should be noted that most economic analyses of the impact of payroll taxes on the demand for labour assume that the elasticity with respect to payroll charges is symmetric. Empirical studies conclude that increasing payroll charges has a dampening effect on employment.

⁵⁷ Worker's Compensation premiums are administered at the provincial level, while social security contributions fall under federal jurisdiction. Both employers and employees contribute to CPP and EI (CPP in equal proportions, for EI employers contribute 1.4 times that of employee contribution). In the case of Workers Compensation, it's only employers that directly contribute (in BC its \$1.79/\$100 of worker payroll). They are more accurately termed 'payroll charges' as in Canada they are not always levied as a percentage of total payroll (Taylor 1999).

These studies rely on elasticity calculations derived from situations where payroll taxes did not decline, and therefore does not actually prove that reducing payroll taxes has employment creating effects (Taylor 1999).

The Canadian Labour Congress (2000) asserts that payroll taxes in Canada are low compared to other countries and they tend to be born more by employees than employers. In 1994, payroll taxes in Canada as a percentage of total taxation was the lowest of the G-7 countries (Bédard 1998). While both employees and employers contribute, ultimately the employer contribution of the tax is passed on to workers in form of lower wages or employment. The CLC also points out that EI premiums are closely linked to benefits later received and that changing contributions will likely impact the delivery of services.

4.3.4 ecological steering effect

EFR has a greater *ecological steering effect* than does a hypothecated tax. Hypothecation refers to the situation where the revenue from a tax or charge is allocated to specific environmentally motivated uses (usually determined/administered by the government's ministry of environment). In the case of EFR, revenue from environmental taxes is remitted to the department of finance and is generally directed to allow reductions in other taxes. While hypothecated charges tend to initially result in a steeper ecological steering effect, the steering effect of EFR has the potential to be greater in the long run because the use of revenue recycling allows more scope for continued tax increases (von Weizsäcker 1994).

taxes are not always the best road to ecological improvement⁵⁸

While taxes have the advantage of economic efficiency over regulations, which of the two approaches is better depends on specific ecological objectives and the type of environmental problem to be addressed. When it is imperative that certain pollutants be eliminated or do not exceed a certain level, regulation is likely the better option. It is not always possible to estimate the optimal tax rate. This is particularly relevant given the present scale of human

⁵⁸ This argument does not assert that present forms of government regulation are adequate means to maintain stocks of natural resources. Government management of resources is oriented towards development not conservation and therefore leads to resource depletion, as the collapse of the Atlantic fishery demonstrates (see Rogers 1995).

activity and corresponding impact on the earth. Taxes and efficiency gains are not concepts that embody limits on aggregate throughput. This points to potential problems in effectively operationalizing this policy.

It is also the case, as Neumayer (1999) points out, that the advantages of static efficiency have frequently been exaggerated. This occurs through comparisons between ideal theoretical outcomes of market-based instruments and command and control examples from the real world. Actual implementation of market-based instruments, however, is subject to administrative and political problems that can reduce optimal outcomes. It is also important to note that some sort of regulatory structure is needed to ensure that market-based instruments can operate.

4.3.5 *dynamic efficiency*

An additional efficiency-related advantage of taxes is that they create incentive for continued innovation. This is referred to as *dynamic efficiency*.⁵⁹ In theory, increased gasoline taxes will encourage fuel conservation in the short run and over the longer term will lead to the development of alternative fuels that do not emit CO₂. According to Hawken et al. (1999) there are no limits to innovation: the efficiency revolution (led by the private sector) will bring about radical productivity gains. They assert that the multiplicative effect of efficiency gains will be such that "over the next half century, even if the global economy expanded by 6- to 8-fold, the rate of releasing carbon burning fossil fuels could simultaneously decrease by anywhere from one-third to nine-tenths below the current rate" (244).

⁵⁹ 'Dynamic efficiency' has also been defined as the efficient allocation of resources over time, according to economic criteria of equal present value across time periods (Tietenberg 1992). The two definitions offered here may not be mutually exclusive but given the objectionable attributes of present valuation, I support the first.

efficiency revolution caution

There is much optimism that increased efficiency will result in ecological savings. It is possible, however, that increased efficiency will lead to increased throughput unless accompanied by EFR (Rees 1995a). In the late 1800s, Stanley Jevons observed that increased efficiency in the use of coal lowered costs and resulted in a tenfold increase in total consumption of this fuel in iron smelting. While a lot has changed in the past hundred years to make energy efficiency gains likely to result in less of a 'Jevons effect' - in particular, energy costs becoming relatively less significant costs to producers - it is still well to be wary of the efficiency revolution. Energy/material efficiency gains often result in lower prices and higher incomes which run counter to ecological goals:

If more efficient furnaces lower home heating costs, households may respond by enjoying higher comfort levels and fuel consumption is unaffected. Alternately, efficiency-induced savings by individuals may be redirected to alternative forms of consumption, canceling some or all of the initial gain. (Rees 2000b, 3)

shades of green: material throughput and the 'new economy'

It is often said that achieving sustainability requires that human economic activity become decoupled from material throughput (for example, Woollard and Rees 1999). Some proponents of sustainable development think that sustainable industries of the future include telecommunications, high-tech, film and tourism.⁶⁰ EFR is often seen as a way for primary industries that are resource intensive to be replaced by a 'service' and 'information' economy that is less reliant on physical inputs from the natural world. But *can* humans live by services alone? Is the information economy *really* less material intensive than the much maligned extractive industries?

The proliferation of information technology and gains in materials efficiency has thus far not been part of a process of reducing material consumption. A World Resources Institute report provides evidence that dematerialization is not occurring in industrialized countries: despite increased efficiency in use of materials the waste outputs of production are steadily

⁶⁰ Even if it were true - which it is not - people working in these industries may spend their income on high impact consumer items like cars and houses.

increasing (Matthews and Ottke 2000). Amounts of energy and material inputs required to produce a computer are huge. In addition to the 33,000 liters of water used, over the lifecycle of a computer, 15 to 19 tons of materials are consumed (production, use and recycling) (Sarkar 1999). As noted by the Silicon Valley Toxics Coalition (SVTC), "there are few other products for which the sum of the environmental impacts of raw material extraction, industrial refining and production, use and disposal is so extensive".⁶¹ Another unsustainable feature of high-tech production is that it uses a number of highly toxic materials that are harmful to the environment. The SVTC also notes the link between worker health and chemical exposure in this industry. A majority of workers in high-tech semi-skilled production jobs handle hazardous chemicals, and those exposed are most often people of colour and are predominantly women.

⁶¹ The website of this organization is located at: www.svtc.org/.

4.4 EFR in Practice

Carbon taxes are among the most revenue generating of environment-related tax increases. In Sweden, the CO₂ tax currently brings in 2-3% of total tax revenue (Bosquet 2000). Roodman (1998) reports that on a worldwide scale, CO₂ taxes could ultimately provide 15% of government revenues. Energy-related macroeconomic tax shifts predominate in both economic literature and existing real world examples. The table below indicates the accompanying trend of revenue recycling through reducing taxes applied to labour (both personal income and social security contributions).

Table 1: International Examples of EFR

YEAR	COUNTRY	ECOLOGICAL FISCAL REFORM
1990	Sweden	Taxes raised on CO ₂ and SO ₂ . Tax cuts on personal income, energy (in agriculture) and education. Represented 2.4% of total tax revenue.
1994	Denmark	Taxes raised on CO ₂ and SO ₂ , as well as gasoline, electricity, water, waste, cars and capital income. Tax cuts on personal income and social security contributions. Represented 6% total tax revenue.
1996	Netherlands	Taxes raised on CO ₂ . Tax cuts on personal income, social security and corporate taxes. Represented 0.5% of total tax revenue.
1996	United Kingdom	Taxes raised on landfill. Tax cuts on social security contributions. Represented 0.1% of total tax revenue (for 1997).
1997	Finland	Taxes raised on CO ₂ and landfill. Tax cuts on personal income and social security contributions. Represented 0.5% of total tax revenue (for 1999).
1999	Norway	Taxes raised on CO ₂ and SO ₂ and diesel. Tax cuts on personal income. Represented 0.2% of total tax revenue.
1999	Germany	Taxes raised on petroleum products. Tax cuts on social security contributions. Represented 1% of total tax revenue.
1999	Italy	Taxes raised on petroleum products. Tax cuts on social security contributions. Represented less than 0.1% of total tax revenue.

(Adapted from Bosquet 2000)

5 Case study: EFR to mitigate climate change

5.1 A carbon tax for Canada?

The focus of this chapter is the specific EFR scenario of a tax on fuels that emit CO₂ with revenue recycled through reduced taxes on labour. It describes the current policy context; details the economic impacts of a carbon tax as they pertain to the labour market with a focus on affected workers; and describes potential job growth in sectors that benefit as a result of this form of EFR. It also critically examines discourse advocating this policy and the implications for social decisions that seek to promote collective well-being. The chapter concludes by describing the planning implications of this analysis. Chapter six will present conclusions about the employment-related equity impacts of EFR and discuss the broader implications of the findings of this thesis.

5.1.1 current policy context

Canada has the dubious distinction of being the second highest per capita emitter of greenhouse gases among western industrialized countries. The Kyoto Protocol set a target for emissions reductions in industrialized countries at 6% below 1990 levels. (A reduction which only represents a fraction of the 60% required to stabilize global atmospheric concentrations of greenhouse gases). This target was to be achieved by 2010, however, to date there has been no international agreement on how the accord will be implemented. Between 1990 and 1996 Canada's greenhouse gas emissions increased by 12% from 599 to 670 megatonnes (Mt.), and by 2010 emissions are projected to reach 740 Mt. (Hornung 1998).

Canada's fossil fuel dependency and resistance to change is a significant cause of presently stalled negotiations on the implementation of the Kyoto accord. In fact, Canada is seeking credit for national forests that act as carbon sinks to shrink our required emissions reductions (MacKinnon 2000). However, some branches of government, such as British Columbia's Green Secretariat, and government sponsored initiatives, such as the National Round Table on Environment and Economy, have stated a commitment to investigating policies for reducing greenhouse gas emissions. Growing awareness of the urgent necessity to slow climate change and increased implementation of EFR policies in other countries will eventually require that Canada take action. Even the Canadian military is among those concerned about the threat of global warming; foreign vessels can now make their way through more of the Arctic archipelago due to the melting of ice caps which poses a threat to national security.⁶²

5.1.2 possible policy scenarios

The Pembina Institute and the David Suzuki Foundation recommend EFR as a vehicle to reduce greenhouse gas emissions according to Kyoto objectives (Hornung 1998). Suggested action includes imposing an energy tax on all non-renewable energy sources and that they be taxed in relation to their carbon content. Revenue would be recycled through equivalent reductions in other taxes (payroll, sales, and income). Tax increases would continue over time according to an established schedule.

The Canadian Centre for Policy Alternatives proposes a similar tax increase to reduce greenhouse gas emissions (Marshall 2000). They suggest a carbon tax be applied to all fuels used in Canada (proportional to their carbon content), with an additional surtax on a portion of excess profits of energy companies. Revenue recycling under this scenario has several mechanisms including: increasing provincial transit budgets, reducing the goods and services tax, transition funding for displaced workers, and energy efficiency tax credits.⁶³

⁶² Action in response to this perceived threat involves increased use of snowmobile patrols which will result in a net addition of CO₂ emissions ('Military sees peril in Arctic', *Globe and Mail*, December 8th, 2000, A1, A8).

⁶³ It is interesting to note that the proposals for EFR in Canada do not emphasize reducing the externalities associated with fossil fuel use which some would argue is the economically rational follow-through to internalizing externalities.

5.2 economic impact analysis

This section explores the employment-related equity impacts of EFR using descriptive statistics and results from empirical economic analyses. While it is distinct from the analysis of policy discourse (section 5.3), this section also constitutes an analysis of discourse. It is important to remember that numbers and comparative statistics are scarcely value-free. For example, conclusions as to whether a double-dividend will occur are strongly contingent on the assumptions of economic models (Sanstad and Wolff 2000). Despite this, the results of economic models are presented to illustrate debates that exist and because these models influence policy discourse.

notes on models and modeling

EFR is a fairly recent policy development in terms of implementation and this constrains conclusions that can be drawn from real world examples. Most economic studies therefore model hypothetical scenarios. An economic model usually takes the form of an equation or set of equations that specify relationships among variables. Each variable in an equation is usually preceded by a coefficient (a numeric term that specifies the relationship between that variable and changes in other variables).

While economic models produce much in the way of informational outputs, it is important to note that they are neither complete nor undistorted representations of reality. It is usually the case that the assumptions on which these models are based make it difficult to accept their results at face value (Eissa et al. 2000). A good example is the ubiquitous assumption of 'perfect competition'. This term describes a market structure where there is a large number of buyers and sellers (i.e. no monopolies or oligopolies); there are no barriers to entry or exit; sellers offer a homogenous product; all market participants are price-takers (i.e. they cannot influence the price); and buyers and sellers have full information regarding products and prices in all present and future markets (Bruce 1995).

In the real world nothing like this mythical market structure exists. Monopolies and oligopolies abound - in particular in the energy sector where a few large companies

dominate the oil industry and electric utilities are notoriously lone sellers in that market. In a labour market context a 'homogenous product' is an obvious fiction since all workers do not have the same attributes and opportunities. The assumption that buyers are price takers means that sellers (including workers who sell their labour) can sell as much as they want at the market price (Lipsey et al. 1991) and is clearly not true in reality. For example, the equilibrium condition of markets clearing implies that any unemployment that exists is voluntary which does not coincide with the real world.

In addition to the fictional nature of perfect competition, the assumptions of conventional economics are problematic from the perspective of ecological economics. As noted in chapter one, ecological economists and conventional economists disagree regarding what forms of capital are complements and which are substitutes (the distinction between weak sustainability and strong sustainability).

There are two approaches to economic modeling: partial equilibrium and general equilibrium. In economics, equilibrium refers to a situation where quantity demanded equals quantity supplied (markets clear). A *partial equilibrium* analysis focuses on a particular economic sector and does not take into account feedback between sectors (i.e. other variables are assumed unchanged). A *general equilibrium* approach is broader and more nuanced in the sense that it takes into account several sectors and the economic relationships between them.

The general competitive equilibrium approach to predicting the economic impacts of EFR on different sectors is most prevalent in the academic literature (Eissa et al. 2000).⁶⁴ Partial equilibrium analysis does not sufficiently account for interactions between sectors (McCoy 1997). For example, determining impacts on employment requires consideration of the fact that demand for labour may be influenced by reduced payroll taxes, as well as by price changes to production inputs that result from carbon taxes. The usual form is a computational general equilibrium (CGE) model, which is basically a computer model that mathematically represents the determinants of demand and supply in each market (including cross-linkages with other sectors). It then "searches out an equilibrium set of prices at which, in every market, the quantity demanded equals the quantity supplied" (MiKitrick 1997, 421). The CGE model assumes full and efficient utilization of all the factors of production; it assumes the initial condition of *pareto optimality*.⁶⁵

In addition to the general drawbacks of the general equilibrium approach, there are two additional caveats that pertain to CGE models. The construction of a detailed model requires a large number of arbitrary assumptions and there often exists considerable debate as to the values of variable coefficients.⁶⁶ There are also behavioural adjustments that computational general equilibrium models do not take into account (Hoerner 2000).⁶⁷

Another attribute of economic models worth noting here is the dispassionate nature of this type of analysis in regard to predicted impacts (i.e. job loss) and the highly abstract and 'ideal' portrayal of economic relations. This is cause for concern from an equity perspective. As Colley (1997, 87) notes:

⁶⁴ Macroeconometric models are another empirical technique to estimating the economic impacts of EFR, however, they do not disaggregate effects across sectors but focus on overall effects of price shocks (Eissa et al. 2000).

⁶⁵ A distribution that is 'pareto optimal' is one where no one can be made better off without making someone else worse off. A 'potential pareto improvement' (also known as 'Kaldor's compensation principle') exists if the winners can compensate the losers and still win. It does not matter whether the winners actually compensate the losers or not, just that there has been a sufficiently large overall gain such that losses are not considered significant. It is worth noting that these conceptualizations ascribe a place of priority to the status quo (i.e. state of affairs before change) (Scitovszky 1941).

⁶⁶ For example, coefficients are often elasticities (or are calibrated based on elasticities). Estimates of elasticities vary considerably from one empirical study to the next (Hoerner 2000).

⁶⁷ A behavioural adjustment in the context of increased fuel prices could consist of investment in energy efficiency technology or switching to an alternate source of energy.

In their mathematical models of the economy, changes to price inputs, taxes and exchange rates are fed in and the change to a new equilibrium occurs in an instant. There is no friction, there is no recognition or even conception of the way in which real economies work - that factories and communities cannot close down in an instant and relocate; that there are often huge social costs to changes in the economy that are not factored into the models.

5.2.1 affected sectors and implications for employment

A carbon tax will increase the price of coal and other fuels whose combustion emits CO₂. It will adversely impact some industries more than others. Energy-related industries (such as oil refining, coal mining, and electricity production) and energy intensive industries (such as heavy manufacturing and transportation) will be among those impacted the most.

Industry accounts for 37% of greenhouse gas emissions in Canada.⁶⁸ Oil and gas production account for the bulk of industrial emissions (44 Mt.), followed by iron and steel (15 Mt.), pipelines (11 Mt.), pulp and paper and sawmills (10 Mt.), and chemical manufacturing (7.6 Mt.) (Hornung 1998). The transportation sector is responsible for 1/4 of total greenhouse gas emissions (freight accounting for half of that), and this share is increasing rapidly (Smith 2000). In 1995, total kilotonnes of CO₂ emitted by the transportation industry was 165,625, and trucks were responsible for 36% of this (Statistics Canada 2000b). Electricity generation accounts for approximately 17% of Canadian greenhouse gas emissions. This is mainly due to the fact that coal and other fossil fuels are common inputs in the production of electricity. The largest share of coal demand (89%) comes from electrical utilities (Statistics Canada 2000a).

Andrew Hoerner (2000) examines the impacts to industry of a revenue-neutral tax shift in the United States. The economic impacts of a pollution and energy tax (PET)⁶⁹ are modeled

⁶⁸ Estimates of greenhouse gas emissions are for the year 1995.

⁶⁹ The PET consists of a carbon tax of \$50 per ton (levied on fossil fuels in proportion to their carbon content). Energy from hydro and nuclear sources is also taxed so that the price increase in carbon-emitting sources of energy does not result in other ecologically harmful activities, such as the building of more nuclear power stations. The amount of revenue generated by the PET is determined using industry-specific energy consumption and energy demand functions. Induced emissions reductions are not reported by the model.

according to two different scenarios of revenue recycling (a cut in payroll taxes and a cut in taxes paid on capital gains by firms).⁷⁰ The model assumes that the PET tax increase has a forward incidence (since it is standard in the literature to do so). Two revenue recycling scenarios are run separately. The first, according to the incidence assumption that the tax reduction is fully passed forward (to consumers in the form of lower product prices); the second revenue recycling scenario assumes that the tax reduction is passed backwards (either workers or capital owners accrue higher income).

Industries that Hoerner's model predicts will be negatively affected include fossil fuels and petroleum products, electricity, cement and other energy intensive activities (i.e. mining and large-scale production of metals and chemicals).⁷¹ These results do not vary substantially between revenue recycling or incidence assumption. Under the revenue recycling scenario of reduced taxes on labour, Hoerner's model concludes that industries with a net tax increases of 3 percent or more are reported to account for less than 3.5 percent of employment. Hoerner concludes that only a small percentage of industries would be harmed as a result of EFR, but adds that "although the substantial majority of production and employment are in firms that would receive a net tax cut, the percentage reduction in the price of 'winner' firms are on average smaller than the percentage price increase for the adversely affected firms" (4).

McKittrick (1997) looks at a Canadian scenario of an increase in taxes on carbon emitting activities according to several revenue-neutral scenarios for recycling tax receipts.⁷² Sectoral

⁷⁰ Since the model is designed to be revenue neutral, tax cuts (for both labour and capital) are endogenously determined according to the amount of revenue generated by the PET. Tax cuts are industry-specific: for labour determined by the industry's share of the national labour force, and for capital tax reductions by the industry's share of total national payments to capital. The model used is an input-output model which takes into account economic relationships between a large number of sectors (almost 500 in Hoerner's study), however, it does not make macroeconomic predictions (and so is silent on double-dividend conclusions).

⁷¹ The PET is passed forward to consumers in terms of higher product prices and firms are negatively affected through reduced demand induced by the price increase.

⁷² The model used is a CGE model. The Canadian economy is divided into six production sectors and 10 commodities, and is built using a series of nested equations that specify budget constraints and demand relationships (elasticity values used in the model were estimated by the author using econometric techniques). It is a static equilibrium model which means that household savings and the capital stock and investment demands of industry are assumed to be fixed. Fuel tax rates are determined endogenously within the model using fuel use to CO₂ emissions ratios, and according to the constraint of a 12.5% reduction in CO₂ emissions (estimated reduction required to meet the Rio target, base year is 2000).

impacts are reported in terms of magnitude relative to a base case of no change in taxes. McKitrick predicts a 27% reduction in demand for coal, with a much smaller (2 - 4%) fall in total demand for other sources of energy, including refined fuels and natural gas. These results are fairly consistent across revenue recycling scenarios. As would be expected, the profitability of mining, oil extraction and refineries fall, accompanied by a smaller negative impact on manufacturing and services. Employment impacts reported under the revenue recycling scenario of payroll tax reductions are not dramatic.⁷³ The service sector shows the largest increase (2.5%) and only employment in mining and oil extraction is reported to be negatively impacted (-1.9%).⁷⁴

Both Hoerner and McKitrick's studies show that direct economic impacts are concentrated in a relatively small number of industries. Hoerner does not provide estimates of job loss but his analysis indicates that impacts to affected sectors will be significant. One reason that McKitrick does not find significant negative employment impacts may be due to the fact that emissions reductions in his model only amount to 12.5% of emissions for the year 2000.

Hoerner and McKitrick's findings must be interpreted in light of the preceding discussion pertaining to the uncertainties of economic models – in particular the CGE model and the various assumptions upon which it is based. For example, in the case of elasticity inputs to models the variety of estimates that exist in the literature (both in terms of labour elasticity and the responsiveness of energy demand to changes in price) indicates that impacts estimated by models could be larger or smaller. It is also the case (as will be discussed in section 5.2.5) that just because impacts may not affect many workers or that overall sectoral effects are not large it is not the case that they are not important.

⁷³ Payroll tax cuts are applied to all industries in equal proportions, and employer and employee reductions are equivalent.

⁷⁴ Employment impacts for other sectors: agriculture (1.3%), refineries (1.2%), utilities (0.1%), and manufacturing (0.2%). The positive impact on employment in refineries is a function of the model specification; fixed capital is assumed which according to McKitrick implies that output does not change in response to price changes. (Should output have been allowed to adjust one would expect employment to be adversely affected.)

McKittrick notes that tax increases will increase the cost of consumer goods and reduce real wages. This outcome is arguably one of the primary goals of EFR. Higher prices for goods and services and lower consumption are in many ways desirable from the perspective of ecological sustainability. However, this effect on prices is regressive since low-wage workers will face the largest proportional (to income) rise in prices.⁷⁵

It is also important to note that although higher incomes correlate with larger ecological footprints (Wackernagel and Rees 1996), this does not mean that for all income levels a drop in pay will advance more ecologically sustainable consumption levels. Even if this were the case, it is not fair that certain groups in society must do so involuntarily while other groups do not.

5.2.2 affected workers

Table 2 depicts numbers of workers and average weekly earnings for economic sectors in Canada that would be adversely impacted by a carbon tax. It should be noted that the table conceals geographic distribution of employment and does not represent indirect employment associated with affected industries. (The point of this table is to demonstrate the size of the workforce and the earnings of workers in these industries. Earning levels of threatened jobs will be compared to earnings within job growth industries that affected workers would be qualified to work in with limited retraining.)

⁷⁵ If payroll tax reductions are designed to be progressive (i.e. targeted to low-wage workers) this may be less the case.

Table 2: Workers and Earnings in Affected Sectors

SECTOR	NUMBER OF WORKERS	WAGES*
Mining, Quarrying and Oil Wells**	142,400	\$1,152.38/week
Mining	45,600	\$1,140.29/week
Coal Mines	8,157	\$1,121.22/week
Manufacturing		
Refining & Smelting (non-ferrous metal)	20,900	\$1,019.50/week
Pulp & Paper	64,500	\$1,037.56/week
Sawmills	73,800	\$773.05/week
Transportation	483,000	\$753.96/week
Truck Transport	158,800	\$682.65/week

Sources: Statistics Canada 2000c and data that originate from the Statistics Canada CANSIM Data Base, Matrix 4288. "CANSIM" is an official Mark of Statistics Canada.

*Refers to average weekly earnings for all employees including overtime for August 2000.

** Figures in bolded text represent industry aggregates; figures not in bold are industries within these categories (i.e. bold/unbold not additive).

Employment in mining, quarrying and oil well industries is concentrated in Alberta (50%), followed by Ontario (13%), Quebec (11%) and British Columbia (9%). Employment in this sector has been increasing in recent years.⁷⁶ Refining and smelting employment is also concentrated in Alberta. Since oil and gas extraction and refining accounts for the lion's share of emissions from industry this sector is likely to experience job loss as a result of EFR.

The coal industry employs approximately 8,000 people in Canada, and is likely to be among the hardest hit by EFR. Employment in the coal industry in Canada is concentrated in Nova Scotia (15%), British Columbia (45%), and Saskatchewan and Alberta (38%). Alberta has the largest number of coal mining establishments, and BC has the largest number of workers and accounts for more than half the value of Canadian coal production (Statistics Canada 2000a).

⁷⁶ It should be noted that this sector has a very low employment/investment ration. In conventional energy industries the range (in U.S. dollars) is \$1 million to \$5 million of investment per job created (Colley 1997).

5.2.3 *the double dividend: what do economic models predict?*

While improvement in both environment and economy as a result of EFR is possible, it is not automatic. In general, the following factors will influence whether or not an employment dividend accompanies the environmental dividend: existing tax distortions, existing labour market conditions, drasticness of EFR measures, and how well they are integrated with other economic policies (Wuppertal Institute 1997).⁷⁷ These conclusions are echoed by Bovenberg and van der Ploeg (1998) who say that the double dividend *can* exist, but that it depends on the degree of substitution between the resource input that is being taxed and labour, the share of each as a factor of production, and if resource taxes were not large to begin with. McKittrick (1997) concludes that a double-dividend approach to environmental policy can reduce the economic cost of action to curb CO₂ emissions in Canada. Specifically, that it is possible for EFR to result in a small increase in real wages and employment and to increase economic growth. (McKittrick's model does not represent particularly drastic tax increases.)

Recent studies, however, tend to raise more questions than they answer. Eissa et al. (2000) conclude that available evidence indicates that if there is a second dividend it is more likely to come in the form of wage increases, and whether there will be any employment impacts is not clear. Sanstad and Wolff (2000) examine a variety of existing models and conclude that while a 'strong' double-dividend is disproved, whether or not a double-dividend will occur remains an open question.⁷⁸

A lot depends on the particular form of model used and assumptions upon which it is based. For example, Perry and Bento (2000) maintain that studies which refute the double-dividend do not characterize labour taxes as distortionary enough (i.e. these studies underestimate the negative effect of labour taxes on wages and/or employment). Parry and Bento construct a

⁷⁷ The employment dividend can refer to increased wages or numbers of jobs. In this chapter I comment on both but focus mostly on changes in the number of jobs.

⁷⁸ The strong double-dividend hypothesis was defined earlier (section 4.2.1) as the case where EFR always results in an overall efficiency gain.

model where labour taxes are more distortionary than previous studies have assumed them to be, and are able to demonstrate the possibility of a significant double-dividend.⁷⁹

It is not my intent here to suggest a conclusion regarding the double-dividend debate. Whether or not a double-dividend materializes is in some ways peripheral to the equity question. This is because it is a debate that focuses on net effects not distributional impacts. Scenarios to date do not consider identities associated with employment increases and decreases.⁸⁰

While the results of modeled scenarios vary considerably, what they say in aggregate provides the basis for some conclusions. Based on an analysis of over 130 modeling studies Benoît Bosquet (2000) concludes that EFR is likely have the following effects: significant reduction in pollution, small increase in employment, marginal change in production, a fall in investment, and an increase in the price level.⁸¹ It is noted that effects will vary depending on the particular tax shift, that there must exist inefficiencies in the tax system, and that the employment increase only holds if real wages go down. This last conclusion is illustrated in the following quotation:

One important caveat is that for employment gains to materialize, the labor market must be flexible. Models underscore the need for preventing wage-price spirals in the wake of environmental taxes. (24)

This is a conclusion that is determined by how the model is constructed. In particular, the use of the economic relationship of elasticity of demand for labour which portrays the size of the employed labour force and the wage rate as inversely related. This conclusion is also one that is dictated by the fact that the view of human labour as commodity permeates conventional economics. In both policy and real world contexts, this perspective likely

⁷⁹ This is a good example of the usual problem with modeling complex systems. The economy is a complex, self-organizing system. Economic models, however, treat it as a single, mechanical, more-or-less linear system which self-guides to equilibrium. With such models it is easy to 'predict' the outcome (of the model, not reality) by changing the input parameters to suit one's purposes.

⁸⁰ By 'identities' I mean different the categories of workers impacted either positively or negatively by EFR.

⁸¹ The majority of models looked at involve increases in energy taxes, where revenue is recycled by reductions in taxes on labour. Countries of analysis are mostly within Europe.

works to the detriment of fair and beneficial outcomes for workers. The inequity of this situation is well-captured by Polanyi who states:

It is not for the commodity to decide where it should be offered for sale, to what purpose it should be used, at what price it should be offered for sale, at what price it should be allowed to change hands, and in what manner it should be consumed or destroyed. (1957, 176)

Bosquet cites numerous sources that conclude a flexible labour market is required for employment gains to materialize. It is important to note that the term 'labour market flexibility' has a range of economic interpretations. Among economists it refers to a bundle of labour market characteristics such as wages that are flexible downwards or upwards, and workers that are willing to change occupations or employers or relocate. It is often the case that popular usage of the term refers to downward wage flexibility and is within a distinctly neoliberal context.

5.2.4 sectors that benefit and potential jobs created

Employment growth as a result of EFR is likely to occur in the following sectors: wind energy, solar energy, energy efficiency and waste prevention, and the service and information technology sectors. The box below provides some examples of the kinds of jobs that might be created within these sectors. Many of these jobs require specialized and expensive education, while others require simpler retraining. The first three categories relate to alternative energy technologies, a growth industry that is predicted to expand as a result of EFR-induced decline in traditional energy industries. The fourth category (service and information industries) is included as a potential area for employment growth because firms in this category will not be directly impacted by the tax increase (given their nature and the geography of the production processes they are supported by). These industries will benefit from lower taxes on labour. It is assumed that this will stimulate employment in these industries.

Box 1: Expanding Sectors and Potential Jobs

Wind Energy

Meteorologists, surveyors, structural engineers, metal workers, computer operators, as well as jobs in maintenance and upkeep (Renner 2000).

Solar Energy

Engineers, electricians, plumbers, architects, designers, as well as jobs in manufacturing, marketing, and installation (Renner 2000).

Energy Efficiency and Waste Prevention

Designers, engineers, social marketers, inspectors, and jobs in building, renovation (i.e. insulation and retrofits), maintenance, repair, recycling and sorting.

Service and Information Technology

Computer programmers, data processors, managers, and jobs in retail, tourism, and food service.

Job creation that may result from lower payroll taxes is likely to occur in low-wage sectors. These include areas of the service sector and manufacturing sector listed in the following table. These types of jobs do not require specific or hard to attain skill sets. Table three provides a general description of types of jobs that may be created.

Table 3: Earnings in the Service and Manufacturing Industries

SECTOR	KINDS OF JOBS	WAGES*
Service Sector	Accommodation, Food & Beverage	\$247.52/week
	Amusement and Recreation	\$408.08/week
	Retail	\$378.34/week
Manufacturing	Non-durable Goods	\$721.04/week
	Food Processing	\$645.95/week
Blue-collar Environment Industry**	Building, Developing & General Contracting (Residential)	\$685.52/week
	Building, Developing & General Contracting (Non-Residential)	\$842.89/week
	Trade Contracting	\$705.92/week
	Services to Buildings and Dwellings	\$323.80/week

Sources: Statistics Canada 2000c, and data that originate from the Statistics Canada CANSIM Data Base, Matrix 4288. "CANSIM" is an official Mark of Statistics Canada.

*Refers to average weekly earnings for all employees including overtime for August 2000.

**This category was created to be representative of potential 'environment industry' jobs. Existing job categories are reported that may approximate potential blue-collar jobs created in alternative energy or energy conservation industries.

5.2.5 adding identities to double dividend scenarios

Comparing jobs likely created and jobs that may be lost reveals a discrepancy in skill sets and wage levels. Both the descriptive statistics and results of economic models presented above indicate that the burden of adjustment costs to this policy is likely to fall on workers in affected sectors and low-wage workers in general (who will be hit hardest by an overall increase in the price level). Occupations where job loss may occur outlined in Table 2 are not well-matched with those listed in Box 1. Further, persons working in adversely affected industries are unlikely to be qualified for jobs with commensurate pay in the 'new economy'.⁸²

Table 3 indicates that categories of blue-collar job growth may not be as well-paid as jobs that may be lost described in Table 2. There are also issues related to geography that may prevent displaced workers from finding alternative employment. For example, coal mines are not usually located in regions with strong and diversified economies. Wind power

⁸² As noted in section 5.2.2., while reduced purchasing power may be desirable from the perspective of sustainability it is not guaranteed that this will translate into a reduction in throughput.

locations may be restricted to coastlines or other windy places. Timing is another important consideration (i.e. finding a new job takes time, job creation in alternative energy industries induced by EFR will not take place overnight).

5.3 analysis of policy discourse

This section explores employment-related equity impacts of EFR based on what influential policy organizations are saying. Discourse analysis is important because developments in environmental policy are greatly influenced by how environmental problems are socially constructed (Hajer 1995).⁸³

5.3.1 *relevant concepts: discourse coalitions and storylines*

Maarten Hajer (1995) identifies two key concepts relevant to an analysis of environmental discourse: storylines and discourse coalitions. A **storyline** is just what it sounds like, a set of ideas, explanations and conceptions about a particular environmental problem. The effect of storylines is to bound the problem under consideration. It can conclude debates that may still be unresolved, portray movement away from or towards academic consensus, and depict actors as victims, problem-solvers, expert scientists, or as scaremongers. In framing the problems, storylines shape solutions:

Problems can be conceptualized in such a way that they pose an institutional challenge, they can be scaled down so as to become institutionally manageable incidents, or they can be seen as processes of structural change that are beyond human intervention. (40-41)

A **discourse coalition** is a complimentary group of storylines, the practices and techniques that these storylines are based on, and the actors that advance them. These coalitions develop and promote certain ways of talking and thinking about environmental problems. Hajer notes that discourse coalitions are distinct from advocacy coalitions which are made up of actors that share both normative and causal beliefs and who act together. Advocacy

⁸³ Discourse analysis was defined in chapter three as an analysis of the content, tone and surrounding institutional and political context of a particular discourse.

coalitions form between individuals and organized groups while discourse coalition is a concept that refers to the broader social stage.

According to Hajer the term is not meant to imply that members of a particular discourse coalition have met or that they have planned out a strategy with one another. Members of a discourse coalition might not even have a shared perception as to the definition of the problem; however, they promote similar storylines regarding both environmental problems and likely solutions. He makes this distinction for two reasons. First, he does not see "social constructs as a function of the interests of a group of actors" (59), and second, he is not of the opinion that "actions and perceptions should be understood against the background of deeply held beliefs or belief systems" (59). While I follow Hajer's terminology, I do not presume that as a general rule discourse coalitions operate without coordinating actions, and nor do I think that actions and perceptions are unrelated to the worldview and ideological orientation of actors.

As noted in chapter three, my examination of policy discourse on EFR draws from three main sources (the Worldwatch Institute, Northwest Environment Watch, and the OECD). These organizations are members of the same discourse coalition.⁸⁴ According to Hajer's definition, Northwest Environment Watch and the Worldwatch Institute also make up an advocacy coalition.⁸⁵ The relationship between these groups is also apparent by the frequent references to each other's assertions and positions in an affirming manner. The OECD itself is an advocacy coalition of member countries.

⁸⁴ NEW is run by former associates of the WWI. Other members of this coalition would be mainstream sustainable development experts and environmental economists.

⁸⁵ Another member of this advocacy coalition (in regards to policy responses to the issue of climate change) is the DaimlerChrysler corporation. Worldwatch Institute's internet site (www.worldwatch.org) describes a policy briefing for the UN conference held in November 2000 intended to advance agreement on the implementation of Kyoto. The intent of the briefing (excerpts of which can be listened to online) was to "form new coalitions to address climate change". The coalition behind the briefing was made up of the Worldwatch Institute, a German organization affiliated with the Green Party, and DaimlerChrysler (car manufacturer now heavily investing in fuel cell research).

5.3.2 *variables of interest*

In this thesis I aim to shed light on the political ecology of EFR. In chapter three a number of variables relevant to the study of political, institutional and ecological dimensions of societal relationships to nature were identified. My examination of policy discourse on EFR makes use of a narrower set of factors for analysis. I focus on the market economy and the values and ideological position of actors in relation to this institution. I am aware that 'societal relationships' comprise more than just the institution of the market, and in particular that cultural and 'sociobiological' conditioning also play a central role in the unsustainability of the industrial growth society. However, due to the market's dominant influence in society and in policy making and the fact that the focus of this thesis is market adjustments to foster sustainability, economic outcomes and institutional structures of the market system comprise the most immediate and consuming context.

5.3.3 *defining the problem: market as problem and cure*

The dominant storyline in the literature on EFR is that market failures externalize the costs of economic activity and lead to environmental degradation. This can be corrected through adjusting prices such that they embody more information about the ecological impact of the good or service in question (Hamond et al. 1997; Roodman 1997; von Weizsäcker 1994). Correcting market failures is considered to be a matter of "getting the signals right" (to borrow the title of a Worldwatch Institute publication by David Roodman). According to this storyline, the "right" price signals will not only help human economies be less ecologically damaging, but also bring about an efficiency revolution.⁸⁶

A similar storyline is applied to the labour market. This storyline is coincident with mainstream economic theory: payroll taxes inflate the price of labour and result in higher unemployment than otherwise would occur. Thus, unemployment is seen as a problem of pricing.

⁸⁶ Efficiency in this context refers to the engineering definition.

Policy recommendations by this discourse coalition are motivated by the twin goals of a prosperous economy and environmental protection. However, aside from seeking to internalize 'environmental externalities' the dominant interpretation of EFR does not challenge other undesirable aspects of the status quo (i.e. distributional inequity), and this may run counter to ecological goals motivating this policy. That EFR is rooted in values and approaches of the status quo is evident in the emphasis on cost-minimization and marketization in most evaluative accounts of this policy.

The overarching theme advanced by dominant discourse on EFR is that while the environmental problem in question may be cause for alarm, the solution is not. The dominant social paradigm (industrial capitalist expansionism) can be 'fixed' at the margins by internalizing externalities. The main storyline is as follows: through EFR market signals (taxes) can be adjusted to respond to the problem of climate change and ensure that the costs of this response are reduced by generating economic benefits through revenue recycling. Cost-effective progress towards ecological sustainability will best come about through dynamic efficiency and increased economic efficiency in the labour market. CO₂ emissions will decrease and new practices and technologies will emerge to facilitate further reductions. This can occur primarily through market means and existing institutional structures.

Dominant discourse is of the ecological modernization variety.⁸⁷ Structural change in economic or social relations is not seen as the main road to ecological sustainability for human societies. This points to a fundamental flaw of EFR: it upholds a system where society is subordinate to the market not the other way around. This assertion is based on Polanyi's insight that destructive effects are inherent to markets not external to them. The result of EFR is to further commodify both humans and nature.

Ray Rogers argues that the project of 'internalizing externalities' can be seen in political terms as a process "of transferring human communities and natural communities into forms

⁸⁷ Ecological modernization was defined in chapter three as an approach to understanding and responding to environmental problems that presumes the success of a 'techno-institutional' fix within existing institutional frameworks.

of valuation and property that suit the market" (2000, 170).⁸⁸ While tax increases to reduce carbon emissions are in one sense a beneficial restraint on markets, EFR is essentially a policy that attempts to address environmental problems and social and economic problems (i.e. unemployment) according to market rule.⁸⁹ Dominant discourse portrays unemployment and excessive carbon emissions as solely a problem of pricing (valuing them in terms of market outcomes). Casting the problem of global warming and unemployment as the results of broader social and institutional relations suggests a rather different definition of the problem (i.e. in large part the problem is the market system's treatment of nature and human labour). There does not exist a discourse coalition in the context of EFR that advances this storyline.

In addition to the socially and ecologically erosive effects of markets identified by Polanyi, EFR as part of an eco-capitalist framework will not work because capitalism is incompatible with sustainability. There are two parallel reasons for this conclusion. The first is that capitalism is a system of economic organization that is based on unequal exchange in terms of interrelated economic and ecological processes (Hornborg 1998b). After all, profit is based on underpayment for workers and resources. Some would even argue that capitalism requires a pool of unemployed workers for the labour market to function to the maximum benefit of owners of capital (O'Connor 1973; Swanson 1997). The fact that inequality is endemic to capitalism is not good news for ecological sustainability because inequality tends to exacerbate environmental degradation, and inequality is a necessary condition for the rich of the world to overconsume (as argued in section 1.5.2).

⁸⁸ Rogers goes on to point out that "what results is an enclosure movement that marginalizes those that are not essential to the increasing internalization of political power in the economy"(170). This was essentially the problem faced by the 17th century Diggers as a result of the enclosure movement.

⁸⁹ If revenue from carbon taxes was used to fund a negative income tax scheme (instead of reducing payroll taxes) then displaced workers would be guaranteed to receive a basic income. Daly and Cobb (1989) have suggested that EFR might require reconsideration of negative income taxes to ensure adequate compensation to the poor. A national policy guaranteeing a certain minimum annual income to all Canadians would have many benefits (i.e. relieving absolute poverty). This measure would arguably remove some of the negative implications of EFR that I have characterized above (i.e. it would be a step towards changing the employment contract in our society). However, it does not address the fact that certain groups of workers will be disproportionately affected.

The second reason, drawing again on the insights of Alf Hornborg, is that capitalist growth necessarily entails the process of physical accumulation. The growth imperative of capitalist processes accelerates natural resource depletion. Physical expansion is required by capitalism, as it can never fully comprise its own market. Karl Marx was aware of the ecological dimensions of capitalist accumulation.⁹⁰ In *Capital* there is discussion of the import to England of the soils of Ireland along with other observations regarding capitalism's "simultaneous degradation of the worker and the soil" (Moore 2000). These points are relevant to current renderings of sustainable development that advocate eco-capitalist approaches.

All this is not to say that we should abandon EFR because it may merely contribute to the efficiency of the status quo. It is a necessary first step towards reorienting the economic system to be less ecologically erosive. However, given the significant equity impacts of EFR and the potential for inequity to exacerbate environmental degradation, for EFR to be an effective agent of sustainability it must place social goals over market goals. Discourse pertaining to EFR must give more emphasis to equity as a social and economic requirement for sustainability.

5.3.4 characterizing solutions

Several messages are conveyed in solutions characterized in dominant discourse. These include: distributional impacts are not significant; job loss would occur otherwise; and the new economy will absorb displaced workers.

distributional impacts are not significant

The OECD considers distributional issues to be not significant, asserting that "concerns regarding fairness and competitive capacity are often overstated, even though they must be kept under close scrutiny" (1997, 7). In its publication on green taxes the discussion of distributional impacts of EFR is restricted to impacts on households and on the

⁹⁰ Daly and Cobb (1989) have noted that Marx did not consider the value of land in his theories of value and production that entirely focussed on labour. However, Moore (2000) convincingly argues that Marx did in fact give consideration to the ecology of capital accumulation. Marx's economic understanding is also one born of a more empty-world era.

competitiveness of economic sectors. With respect to households, a tax on fuels in proportion to their carbon content is identified as regressive since lower income households spend a larger proportion of their income on heating than do higher income households.⁹¹ They go on to assert that:

Although difficult, it is important to assess the net distributional impact [of EFR]. For instance, while a regressive impact may affect poorer households, related environmental improvements may be distributed progressively. (10)

A net distributional impact is a counter-intuitive idea. It appears that the OECD thinks progressively distributed environmental improvements somehow justify the fact that low-income groups will be made economically worse-off by this policy. 'Distributional impact' refers to how an event or outcome affects different groups. Aggregating the impacts of different events or outcomes for these groups detracts from the significance of particular outcomes. In addition, comparing outcomes (i.e. economic adversity, environmental benefits) is highly subjective. While a rich person may prefer cleaner air over an additional dollar of income, this is not necessarily the case for someone who does not have enough money.

This idea of a net distributional impact appears again in this publication in a discussion of options to lessen disproportional impacts. It is proposed that compensation (i.e. payment to groups made worse off) should be evaluated in light of other potential allocations of economic benefits (i.e. other tax reductions). Since most taxes on labour are considered to be regressive, the OECD argues that reducing these taxes will:

... offset the additional regressivity introduced by the environmental tax, so that the overall distributional impact of the environmental tax reform, taking into account the use of revenues, is at least neutral, if not distributionally progressive. (43)

⁹¹ It is again important to note that other revenue recycling mechanisms could mitigate some of the adverse impacts of EFR. For example, instead of reducing payroll taxes income taxes could be decreased (in a progressive manner).

This statement is a circuitous way of saying that a negative distributional impact (from introduced environmental taxes) is justified in comparison to the progressive distribution of benefits of reducing payroll taxes. However, the OECD is not evaluating distributional impacts. They are talking about an aggregate effect. While it may be that a positive effect on employment results from EFR, these benefits are broadly distributed. The decrease in net "regressivity" to which they refer occurs for a broader group than is adversely impacted. Compensation, in contrast, is usually targeted to specific individuals or income groups. The OECD is saying that compensation payments may not be needed since *overall* things have been made better.⁹²

While their discussion of distributional impacts does not explicitly address impacts for workers, it is asserted that the size and existence of a double-dividend will be a function of labour market flexibility. As noted in section 5.2.2, this conclusion is substantiated to some degree in empirical studies by economists. These studies, however, are based on a number of normative assumptions that bias their results. It is also a statement with a certain political intonation.⁹³

job loss would occur otherwise

Publications by the Worldwatch Institute emphasize that although coal miners are likely to be thrown out of work as a result of a carbon tax, employment in coal mining had been falling for the past dozen years and accounts for only a small percent of total employment (Renner 1991; Roodman 1997). It is also noted that employment in other extractive sectors

⁹² The OECD's position is coincident with the Marshallian perspective in welfare economics: welfare is improved if the net value of a change is positive (Scitovsky 1941). This view of course is unlikely to consider that a loss in welfare for those negatively impacted by a change may be more significant than the gain in welfare by those positively impacted.

⁹³ Although commenting on the environmental problem of acid rain and associated policy responses in the Netherlands, Hajer's observation that ecological modernization has a distinctive affinity with neo-liberal ideas is supported in the context of EFR.

(such as oil and gas production) is on the decline already. The OECD (1997) points out that automation and restructuring have resulted in job loss far greater than what is likely to result from EFR.

I do not dispute the validity of these assertions; however, I see as problematic the use of such assertions to relativize/justify equity impacts of EFR. It is important to note that technological change and EFR are two separate issues. Technological change is already underway. Job loss that has resulted can be viewed as a residual social choice (which ought to be addressed). In contrast, economic change from EFR is a social choice expressed through a single policy.⁹⁴ As such, impacts should be anticipated and responses should be planned.

Roodman's (1997) discussion of economic trends that have contributed to the disappearance of certain jobs in recent years has disturbing implications from the perspective of organized labour. He suggests that "wages held by well-organized workers seem to be spurring employers to move abroad, automate or simply not expand" (44). Regardless of the validity of this hypothesis, a clear message in this statement is that unionized workers and high wages have a dampening effect on employment. The policy implication would be that such things subtract from the health of the economy and should be discouraged. Roodman does not appear to be as concerned with the economic well-being of individual workers.

new economy will absorb displaced workers

Much of the popular literature on EFR presents optimistic prospects for employment creation in service industries (in particular, the information economy) and the environment industry, with a tendency to focus on net effects. The Worldwatch Institute cites economic expansion in the service economy as having the potential to "mop up" workers displaced

⁹⁴ It is arguable that technological change is also a conscious social choice, however, it is facilitated through a variety of policies and forces (i.e. corporate advertising).

(Renner 2000). It is noted that these jobs may be lower paying. Northwest Environment Watch provides a similar perspective about the job growth possibilities of a shift to an economy no longer based on extractive industries in the Pacific Northwest (i.e. Durning (1999) notes the creation of a bifurcated labour market).

action necessary

Northwest Environment Watch asserts that that leadership and education about the true state of the tax 'burden' are required to start off the next 'tax revolt'. They suggest the strategy of building coalitions of forces that "lose big from the existing system and can win big from tax shifts" (Durning and Bauman 1998, 86). This is similar to action to implement EFR suggested by the Worldwatch Institute: educating the public and identifying and organizing potential winners (Roodman 1997). While the Worldwatch Institute does not ignore the plight of potential losers, they caution that "as mindful as policymakers should be of the side effects of environmental tax shifting, they should not lose sight of the great benefits for society as a whole, particularly for investors and workers on the winning side of a tax shift" (36).

Not all publications by the Worldwatch Institute advance the same political strategy. Renner (2000) emphasizes the potential gains of EFR and the general soundness of market mechanisms to bring about a more sustainable economy, but he also argues that governments have a role and a responsibility to facilitate transition. He states that "public policy needs to facilitate the transition to sustainable economies by assisting individuals and communities" (31). This includes the mobilization of transition funds for workers disproportionately affected by increased taxes. This kind of argument should figure more prominently in policy documents and academic literature on EFR.

5.3.5 look who's talking: actors in dominant discourse coalition

Organization for Economic Cooperation and Development

Given the influence that the OECD has on policy developments in member countries, additional information about this organization provides instructive context. They frequently

advise governments of member countries to reduce deficits and cut taxes. This same advice was recently applied to Canada's budgetary surplus, with the added counsel that spending increases should be limited to bettering the "productive capacity of the economy" instead of being allocated to such things as regional benefits through unemployment insurance (Crane 2000). The OECD also sees as necessary a shift away from government being the "principal provider of goods and services to one of partner, catalyst and facilitator" (1998, 13). They assert that the state should not run enterprises (since privatization brings efficiency gains, and private firms are more adaptable to environmental pressures), nor should it 'over manage' markets or provide open-ended economic support measures.

The ideological orientation of this organization is cause for some wariness in the interpretation and implementation of their policy recommendations. This is particularly the case in the realm of labour market policy. The *OECD Jobs Study* advanced the 'hypothesis' that countries with less flexible labour markets tend to have higher levels of unemployment (OECD 1994). The corresponding *OECD Jobs Strategy* recommends that member countries:

Make wage and labour costs more flexible by removing restrictions that prevent wages from reflecting local conditions and individual skill levels, in particular of younger workers.

Reform employment security provisions that inhibit the expansion of employment in the private sector.

Reform unemployment and related benefit systems ... such that societies' fundamental equity goals are achieved in ways that impinge far less on the efficient functioning of the labour market.

(OECD 1998, 4)

These recommendations are pertinent to their discussion of the double-dividend materializing as a function of labour market flexibility. The aversion to social security provisions and economic support measures is also interesting to note given that reducing payroll taxes is a commonly advocated form of revenue recycling by this organization. OECD recommendations for EFR should be seen in light of the other economic and fiscal policies they advocate.

Northwest Environment Watch and Worldwatch Institute

These two organizations do not have as prominent an ideological profile as does the OECD. Both organizations have mandates relating to bringing about a sustainable society; both advocate reform of economic practices to reduce the harmful impact of humans on the earth and foster a prosperous society. They are funded by foundations and donations by individual members, and each is guided by a board of directors. The Worldwatch Institute seeks to inform both policy makers and the public about "the links between the world economy and its environmental support system." Northwest Environment Watch aims to influence the public agenda with respect to sustainability through a 'tree-top' strategy.⁹⁵

5.3.6 broader economic and political context

In this era of globalization, the ability of governments to tax and regulate economic activity is severely constrained, and as a result citizens are being required to relinquish traditional entitlements of the welfare state (Marris 1998). The current political climate is one where government intervention is regarded with suspicion and social welfare policy is seen to erode attributes such as individual responsibility and industriousness. It is now the case that social policies like social assistance and employment insurance aim primarily to reduce 'dependency' and encourage wage labour as the most desirable form of social policy (Burke 2000).

It is important to note that the welfare state is not just about entitlements, although the many social benefits of taxation noted earlier in this thesis are certainly significant. Social programs represent a collective decision and shared effort to ensure that all citizens have access to the means of a life that is whole. For these reasons it is well to question how changes in taxation – such as the ones proposed in dominant conceptions of EFR – change our relationship to each other.

Over the past three decades taxes have been among the few forces somewhat mitigating the 'growing gap' between the rich and poor in Canada. In 1973 average market income of

⁹⁵ This means that they seek to target public opinion through the media, and to influence key decision makers and politicians.

families in the top 20% of the income distribution was 21 times that of those in the bottom 20%; in 1994 this figure had grown to 101. In terms of after tax income, however, the income gap remained relatively constant with the top income quintile earning 7 times as much as the bottom income quintile in both 1973 and 1994 (Yalnizyan 1998).

Throughout this thesis I emphasize the incongruity between economic theory and the real world and note that dominant discourse on EFR draws heavily on conventional economic analysis. This is significant because, as Daly and Cobb note, "the individualistic model of economic theory leads to advocating policies that weaken existing patterns of social relationships" (1989, 163). Discourse on EFR extols the virtues and desirability of individual gain and ignores the collective interests that taxes serve. Taxation is portrayed as accomplishing social goals through what it *untaxes* not through social programs. Taxes are viewed solely as "the cost of government" (Roodman 1997, 7) and considered "primarily as a means of raising revenue" (Hamond et al. 1997, 2). They are not seen as a social good that contributes to a common social infrastructure.

5.4 Planning implications of this thesis

Several measures can assist in ensuring a fair distribution of the socioeconomic costs and benefits of EFR. Common strategies to address challenges of EFR include: having tax increases be modest, gradual and known in advance, and using some revenues to assist disproportionately affected groups (i.e. low-income renters, displaced workers, and regions with a high proportion of affected industries). Since the focus of this thesis is the employment-related equity impacts of EFR I will briefly describe one strategy for addressing impacts for workers.

5.4.1 coping with sustainable development: Just Transition

Various groups within the labour movement, including the Canadian Labour Congress, the Vancouver and District Labour Council, the Canadian Autoworkers' Union, and the Communications, Energy and Paperworkers Union advocate a policy of 'Just Transition'. It is a response to shifts in the economy and employment that have been precipitated by

environment-related economic change that aims to ensure that the burden of adjustment costs of this transition is not unfairly born by workers (Canadian Labour Congress 1999). Mae Burrows defines Just Transition as "fair and positive arrangements that help affected workers shift to alternative, environmentally desirable jobs" (2001, 30). Basically, it's about facilitating labour-environment coalitions and planning processes (with meaningful worker and community involvement), to promote a shift to sustainable production, and to ensure that workers are treated fairly in the process.

Two principles central to Just Transition identified by Burrows are: 1) the right of displaced workers to education and retraining programs, alternative employment commensurate with previous employment, or compensation, and 2) the requirement that alternative employment is secure and beneficial to ecological and community sustainability. For this to occur, Just Transition must be anticipatory and must be accompanied by coordinated 'green jobs' initiatives.

It is important to acknowledge that Just Transition is only one part of a broader policy debate. As M'Gonigle points out, we need to identify structural reforms; sustainability requires systemic institutional change. Just Transition is more of a coping mechanism than a structural reform, although it could be designed to assist in facilitating more radical change as suggested by both Burrows and the CLC (i.e. in addition to compensation to workers, transition funds could assist communities in sustainable community economic development).

To stabilize the climate and provide the inhabitants of the planet with sufficient livelihoods Western society must dramatically shift direction. We must move "towards an economy that is run by small and medium, relatively low-tech companies, catering for mainly local, regional, and national markets, rather than an economy controlled by massive high-tech transnationals catering for a world market. In other words, we must shift towards a localized

rather than a globalized economy" (Goldsmith 1999, 146).⁹⁶ Even if EFR does result in a gain in jobs in the context of a global capitalist economy it cannot be sustained.

According to Goldsmith (1996) political relocation will be assisted through economic relocation. The design of the revenue recycling mechanism of EFR may be of use in bringing about economic relocation. For example, Rees (1995b) suggests that an appropriate strategy for revenue recycling of a carbon tax would be to invest in community eco-system based forestry management programs to create employment and generate additional ecological benefits. There are likely other ways for EFR to facilitate a fundamentally more appropriate role for the market.

⁹⁶ Such a change will have implications for employment far more dramatic than EFR and requires large-scale anticipatory planning. It highlights the importance of ensuring transition from EFR is just, and given the vast impacts some sort of basic income program may be part of a suitable response.

6 Conclusions

This thesis demonstrates the inevitable discomfort of policy adjustments to reduce human-induced climate change. Economic reasoning and discourse analysis illustrate that EFR has economic impacts that will affect certain industries and types of workers. Chapter one provided evidence to support the conclusion that EFR must be designed with fairness and compassion otherwise it will not lead to ecologically enduring solutions. The critique of capitalist market structures also provided evidence that within an economy dominated by the market ecological sustainability will remain elusive. Within a market economy the burden of adjustment costs of EFR will fall on workers.

EFR that increases taxes on carbon emitting fuels and reduces taxes on labour provides a good case of how EFR is cast as both social policy and environmental policy, and how this change is taking place under a prevailing spirit of marketization and deregulation. This is significant because of how changes in the tax system (how we choose to govern social and market relationships) change our relationships to one another in society. To avoid the negative human and ecological impacts of a market economy requires vigilant attention to equity impacts; an imperative of distributional equity must inform any tax shift policy. It is also likely that a rethinking of the ethical and ideological underpinnings of the present social and economic system is required.

6.1 Limitations of this study

There are several limitations to this study. As noted earlier, the focus on employment impacts does not consider the unwaged or existing underemployed and undercompensated workers. The wholesale challenge to social institutions that M'Gonigle says is currently absent from most ecological economics is not as well explored here as it deserves to be. Issues of international fairness related to EFR are not mentioned in this thesis. They should figure more prominently in such debates if the goal is one of global ecological sustainability.

Sachs et al. (1998) identify the importance of international dynamics in the realm of EFR. As a result of the implementation of this policy in industrialized countries, countries in the majority world that depend on income from exports of carbon emitting fuels will see revenues fall. This could lead to them having to increase exports in order to recover the same amount of income.⁹⁷ This is not good for global ecological sustainability, nor for equity given the fact that it is likely the already rich countries that will be recouping the tax revenue. Minority world countries that adopt EFR will also benefit from the development of alternative energy and environmental and the products of these innovations can then be sold to the rest of the world. Further study from a world systems perspective would be useful with respect to this point.

6.2 linking economic and ethical ideas: a challenge for policy

This thesis articulates several reasons to doubt the desirability of approaches to sustainability primarily based on the principles of the market economy. This is not only because the "Market" erodes ecological conditions but also because (as Polanyi noted) a market economy requires a market society.⁹⁸ Ray Rogers (2000) reminds us that economic and ethical ideas used to be more closely linked, and argues that we would be well-served if the two were again to converge. Economists of today, however, acknowledge that markets are free of ethical constraints and that they must be to function efficiently. They concede that intervention (of varying degrees) may be required where market failure frustrates social goals. The general orientation of conventional economic logic, however, subordinates social goals to market efficiency.

Increased materials efficiency is necessary for the survival of all life on earth, especially given the rate at which throughput is increasing. For this reason EFR is urgently needed.

⁹⁷ If the tax is imposed at the well-head or mineshaft, the resource-exporting country collects the revenue. This may assist in prolonging the revenue stream. However, while a high depletion tax may compensate for induced lower demand, the economic conditions within low-income countries and the low rates of return on primary resources in comparison to financial assets in global markets it is unlikely that environmentally motivated taxes will be introduced or endure in these settings.

⁹⁸ Polanyi states: "once the economic system is organized in separate institutions, based on specific motives and conferring a special status, society must be shaped in such a manner as to allow that system to function according to its own laws" (1957, 57).

However, policy for sustainability ought to advance higher goals and purpose than simply survival. This thesis has argued that human quality of life will best come about through equity and that equity is necessary for humans to live within the means of nature. For these reasons, environmentally motivated policy choices must be accompanied by socially enlightened ones if we are to achieve enduring improvement in ecological health.

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