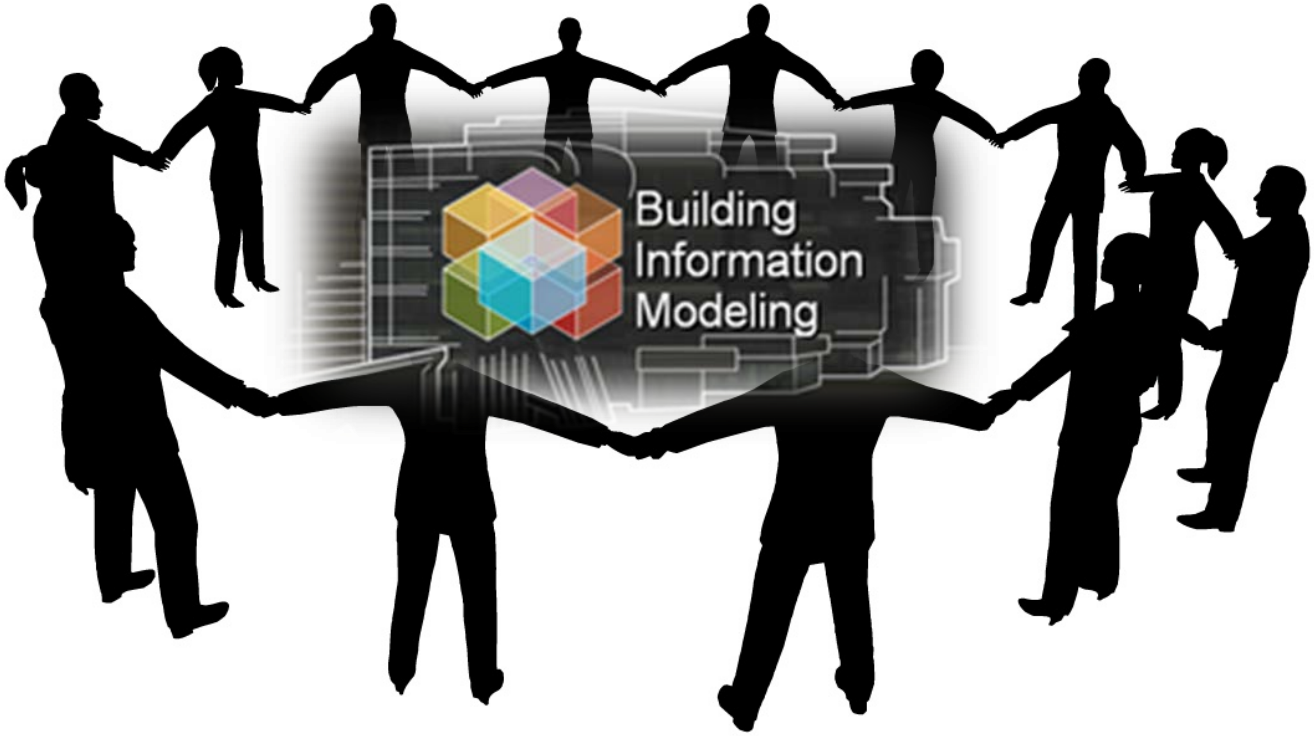
The Interface Between Building Information Models and The Public



Raghav Grover, Peixian (Ariel) Li and Thomas M. Froese

June 8, 2015

Outline

- Introduction
- Points of Departure
- Use Case for Design Phase
- Use Case for Operations Phase
- Future Work

Introduction

- **End-user engagement**: Crowdsourcing, Blogging, Social Media, Surveys, Interviews
- **Other industries:** Automobile, Product Development

Construction Industry

- Average North American: **87% time** inside buildings (Klepeis et al. 2001)

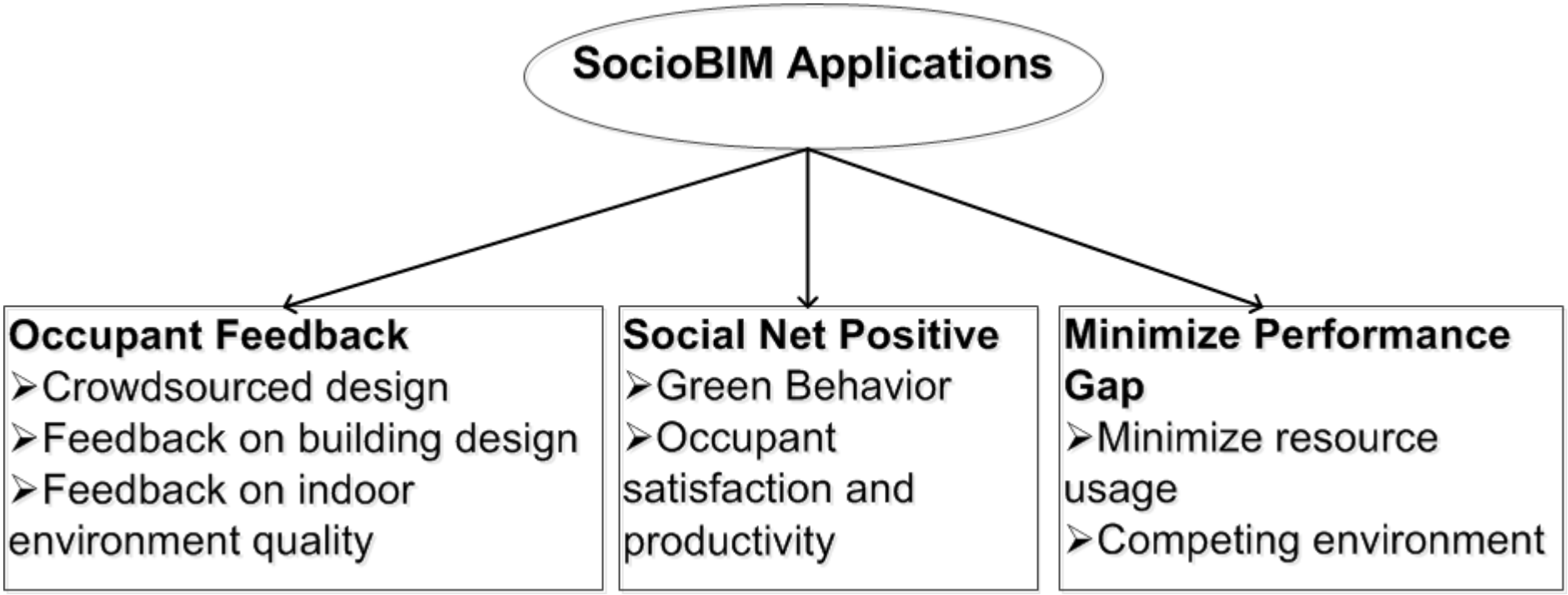
Do we have a say in the way buildings are designed or operated?

Construction Industry

- **Architects** - Design in Silo, minimal end-user feedback
- **Performance Gap** (Turner and Frankel 2008)
- **No higher satisfaction** – Green Buildings v/s Conventional buildings (Birt & Newsham, 2009; Altomonte & Schiavon, 2013)

- **Potential:** BIM, currently focus on professionals
- **Public-Building Interactions:** Design and Operations Phase

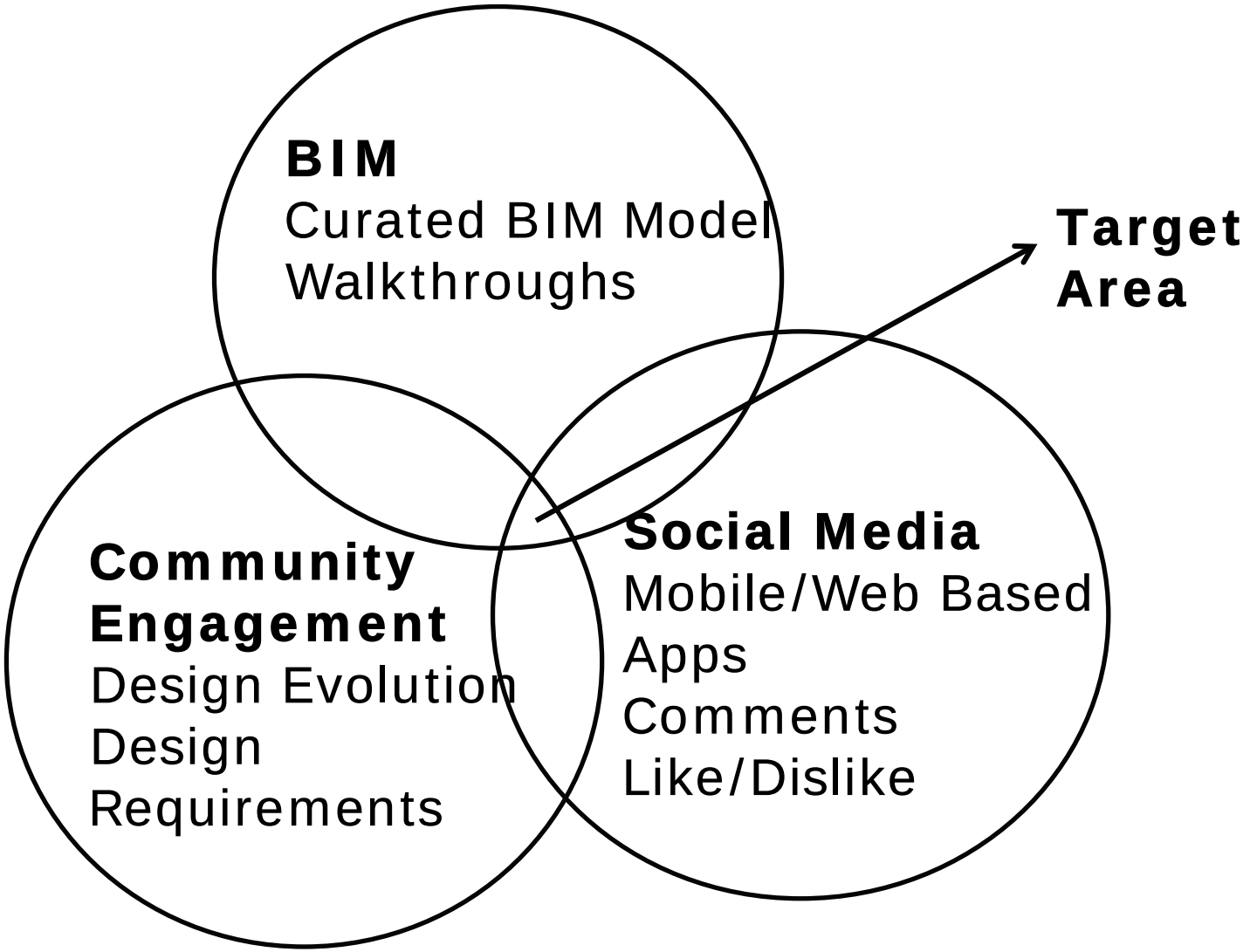
Objectives


SocioBIM Applications
Occupant Feedback
➢Crowdsourced design
➢Feedback on building design
➢Feedback on indoor environment quality
Social Net Positive
➢Green Behavior
➢Occupant satisfaction and productivity
Minimize Performance Gap
➢Minimize resource usage
➢Competing environment

Green 2.0

- Developed at University of Toronto
- **BIM Platform:** Open Source, IFC based middleware platform
- **Available to public users**
- **Modules: BIM Communication**, Social Network Analytics, **Green In & Out**

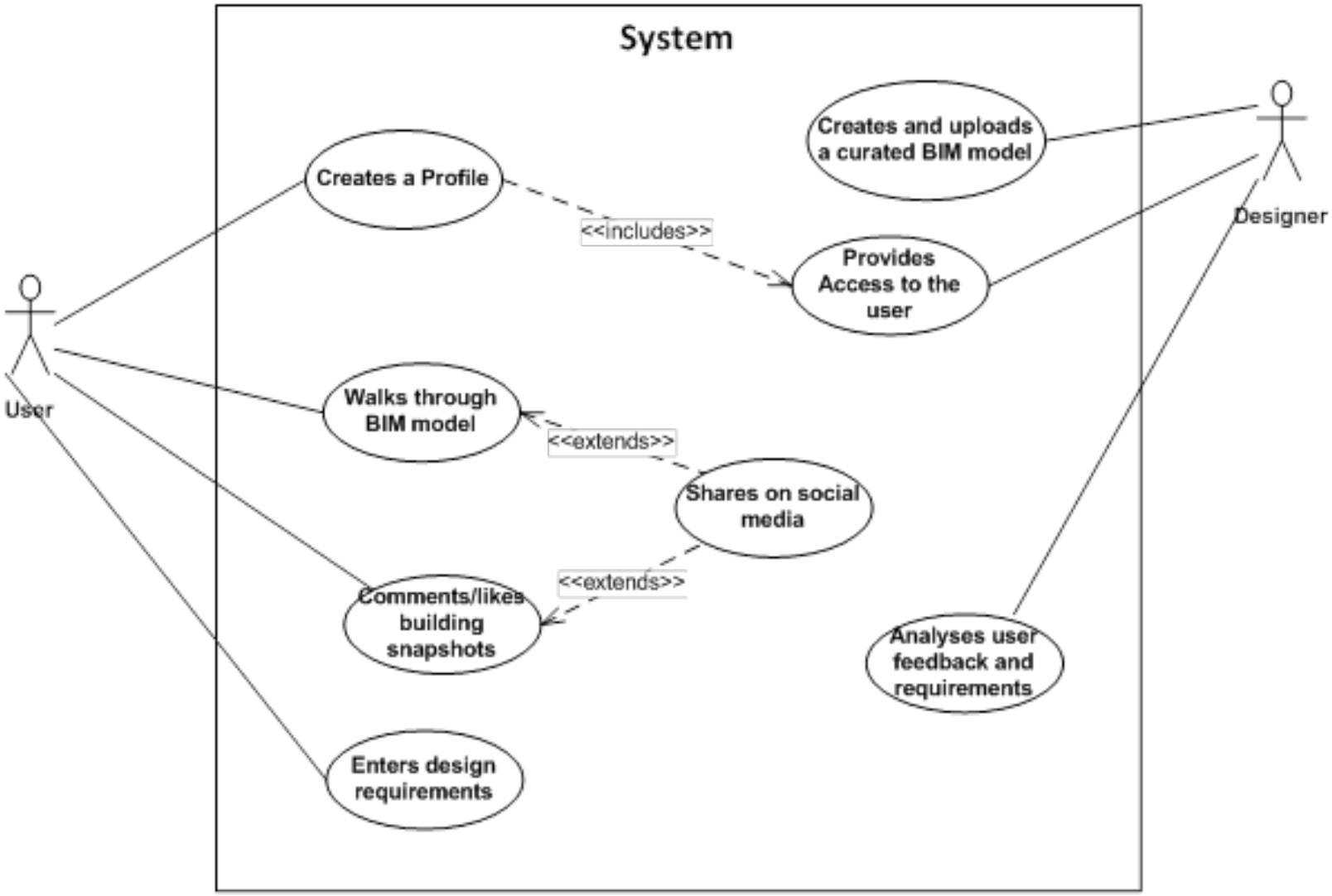
Design Phase



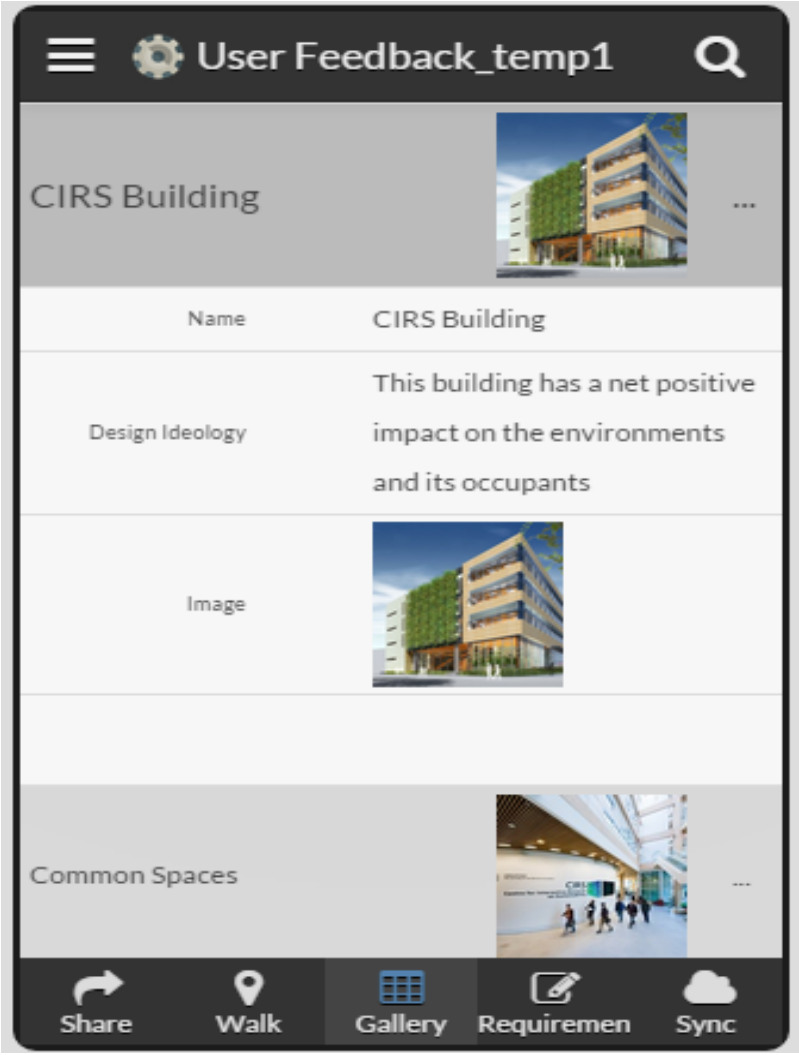
POINTS OF DEPARTURE

- **VIC-MET:** Engage end-user with designer, Captures end-user needs and requirements (Christiansson et al. 2011).
- **Finno-Kaita and Nissola Railway Line Projects (Helsinki):** 3D models, Walk-throughs, Comments (Jäväjä et al. 2013)
- No tool to connect BIM to end-users

Use Case: Design Phase



Application Mock-ups



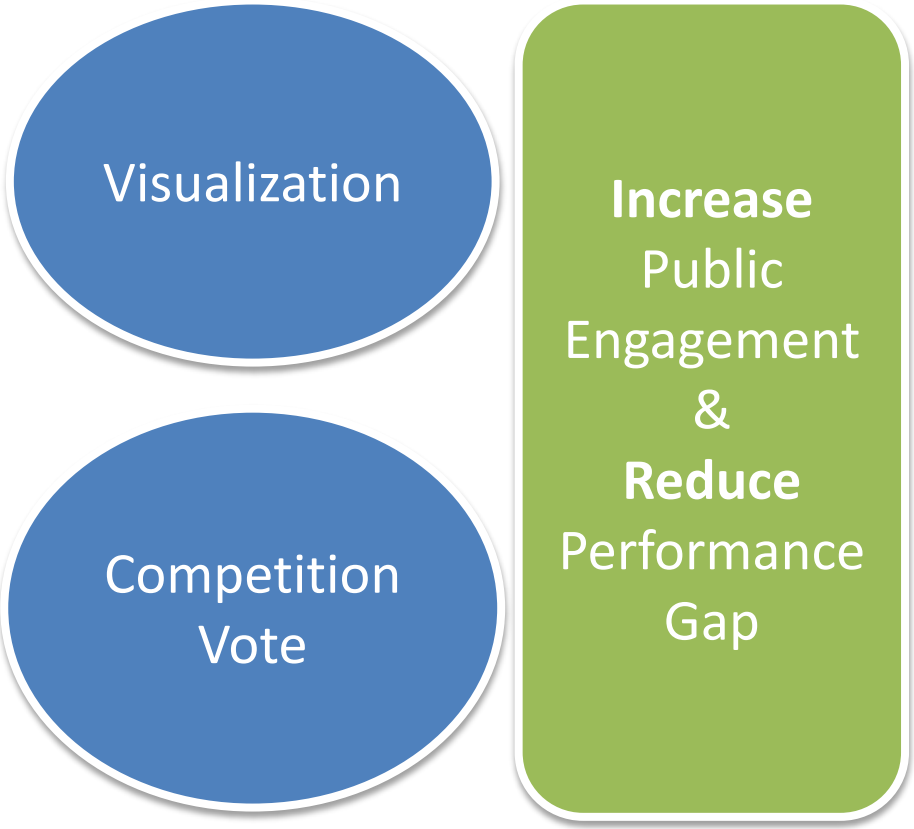
Use Case: Operation Phase

Well established

Add

By

To



Points of Departure

MOST research (Chien, S. et al. 2011)

- Heating/cooling system, electricity, temperature, humidity…
- Laptop and smart phones
- Simple and clear
- “Comparison” – “Competition”

GreenNetwork: “Green Work Style”, Track and Share Energy Use (Lehrer et al. 2014)

SmartCampus: Living Lab methodology, User energy behavior transformation (Nina et al. 2014)

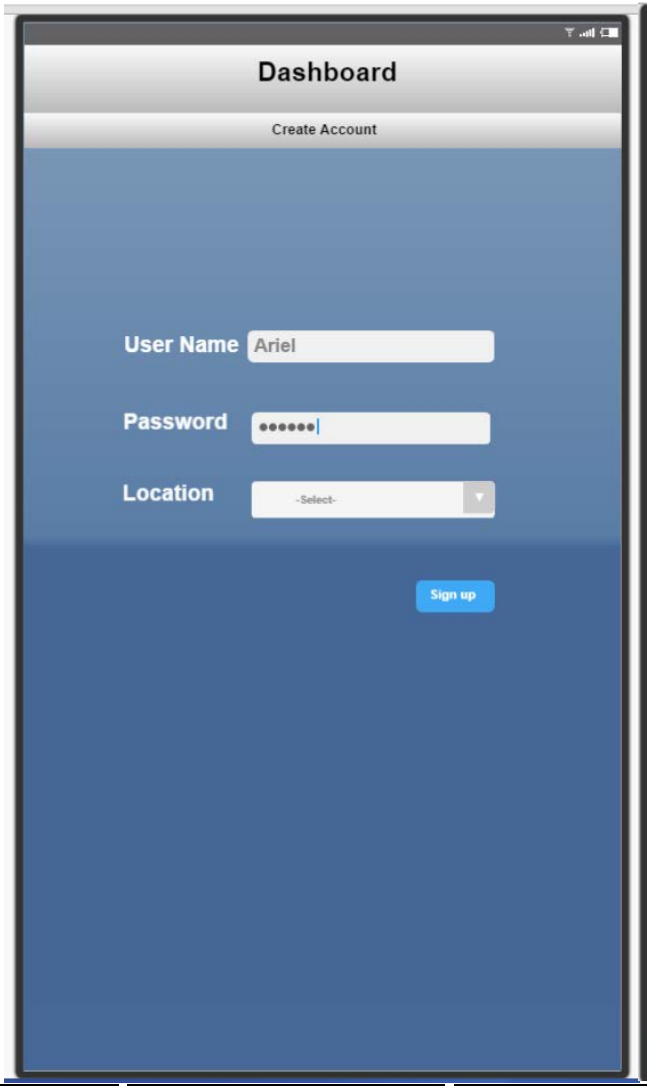
Dashboard Functions

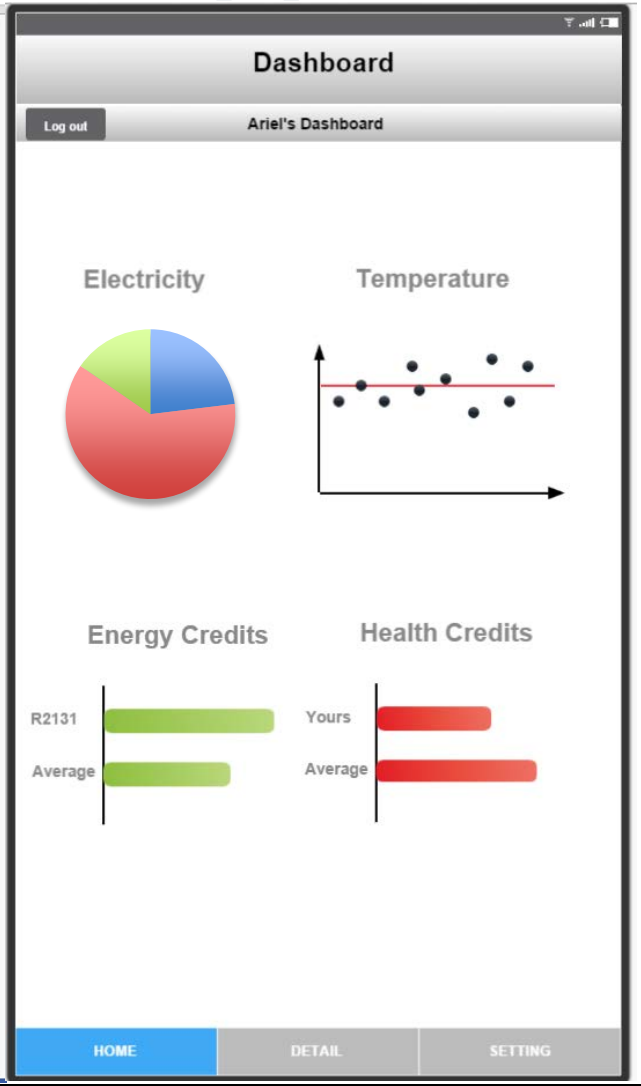
Everyone	Inhabitants	Building Manager
• View electricity usage of the location • View temperature with votes • View room credits	• Create Profile • Vote on temperature • View individual health credits • Enter their mode of commute to building, use of stair v/s elevators, etc.	• Access to temperature preferences • Adjust the temperature • Assign health credits and room credits

App Versions

Everyone	Inhabitants	Building Manager
✓		
✓	✓	
✓		✓

Mobile App Mock-up





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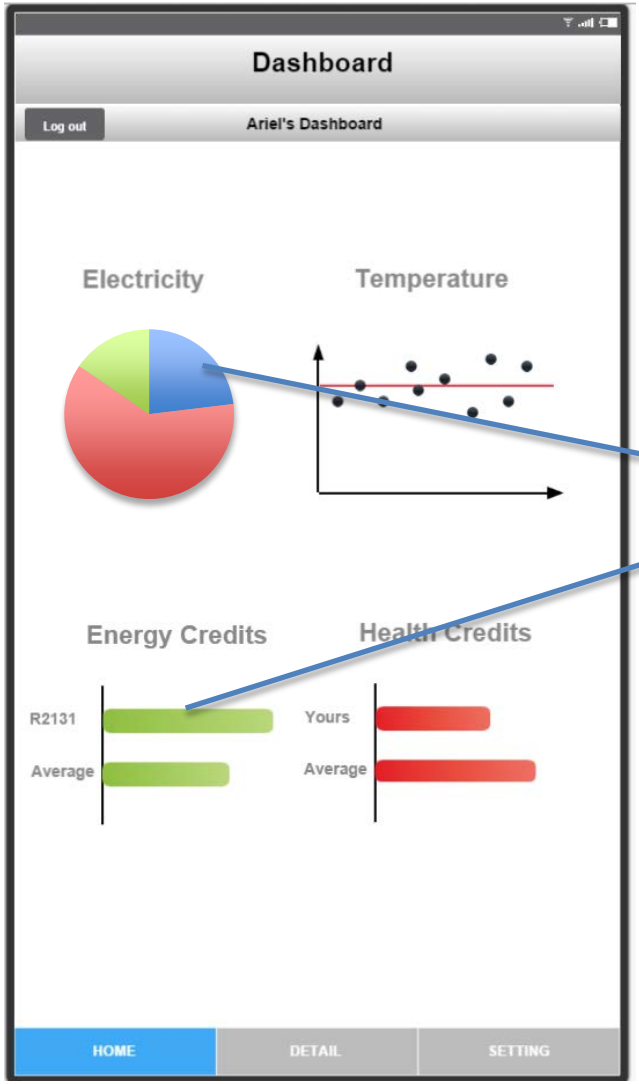

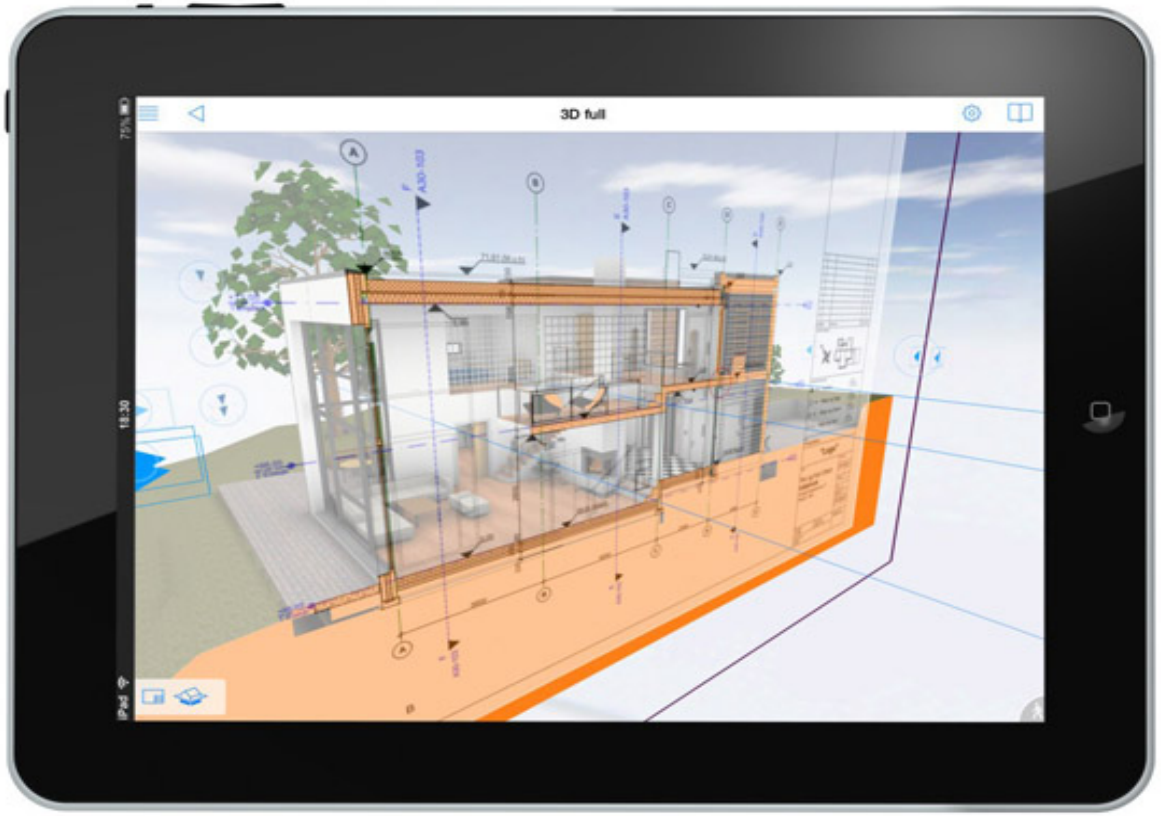

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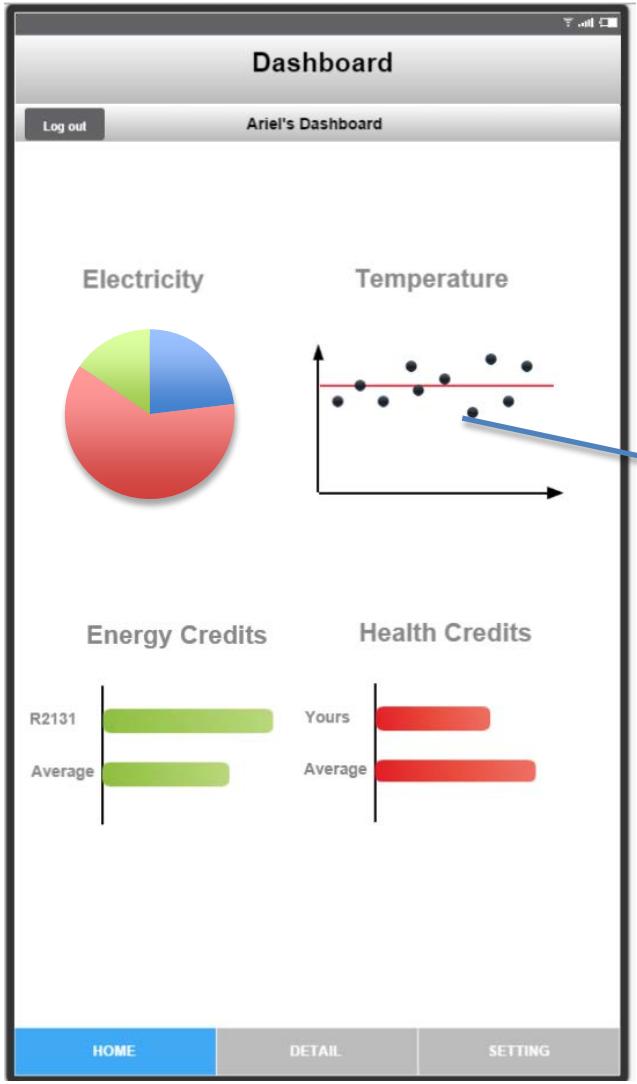

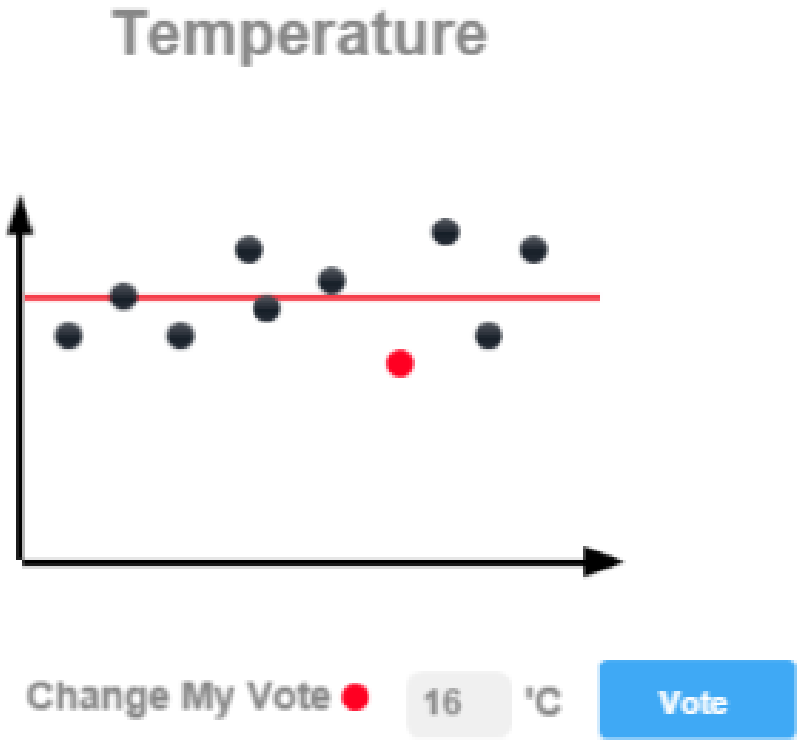

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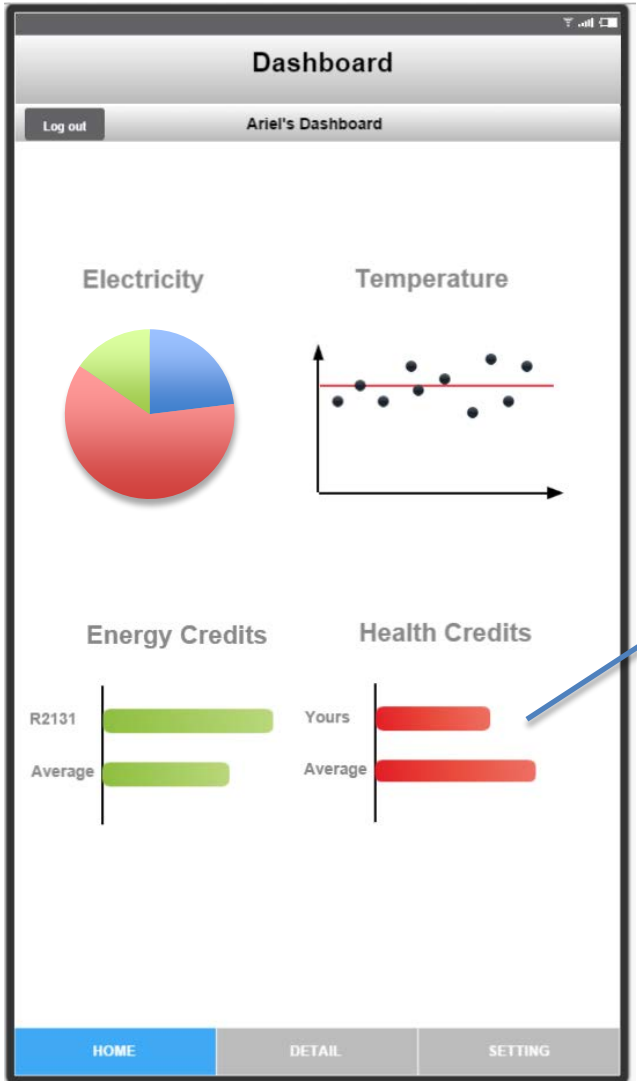

Future Work

- **Existing Use Cases**
  - Develop the App
  - Prototype in UBC buildings
- **More Use Cases**
  - Occupants' need
  - Scientific suggestions

THANK YOU

QUESTIONS?

a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA