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

- BIM
  - Curated BIM Model
  - Walkthroughs

- Community Engagement
  - Design Evolution
  - Design Requirements

- Social Media
  - Mobile/Web Based Apps
  - Comments
  - Like/Dislike

Target Area
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

System

- Creates a Profile
  - <<includes>>
  - Creates and uploads a curated BIM model
    - Provides Access to the user
- User
  - Walks through BIM model
    - <<extends>>
    - Shares on social media
      - Coment/likes building snapshots
        - <<extends>>
        - Enters design requirements
          - Analyses user feedback and requirements
Application Mock-ups

CIRS Building

Name

CIRS Building

Design Ideology

This building has a net positive impact on the environments and its occupants

Image

Common Spaces

...
Use Case: Operation Phase

Well established

Add

By

Visualization

Competition Vote

To

Increase Public Engagement & Reduce Performance Gap
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

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<tr>
<th>Everyone</th>
<th>Inhabitants</th>
<th>Building Manager</th>
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<tbody>
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<td>• View electricity usage of the location</td>
<td>• Create Profile • Vote on temperature • View individual health credits • Enter their mode of commute to building, use of stair v/s elevators, etc.</td>
<td>• Access to temperature preferences • Adjust the temperature • Assign health credits and room credits</td>
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## App Versions

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Mobile App Mock-up
Mobile App Mock-up
Mobile App Mock-up

Dashboard

- Electricity
- Temperature

Energy Credits
- R2131
- Average

Health Credits
- Yours
- Average

How many times did you use stairs today?

3

Enter
Future Work

- **Existing Use Cases**
  - Develop the App
  - Prototype in UBC buildings

- **More Use Cases**
  - Occupants’ need
  - Scientific suggestions
THANK YOU
QUESTIONS?