# **Building Energy Information Visualization and Dashboards**

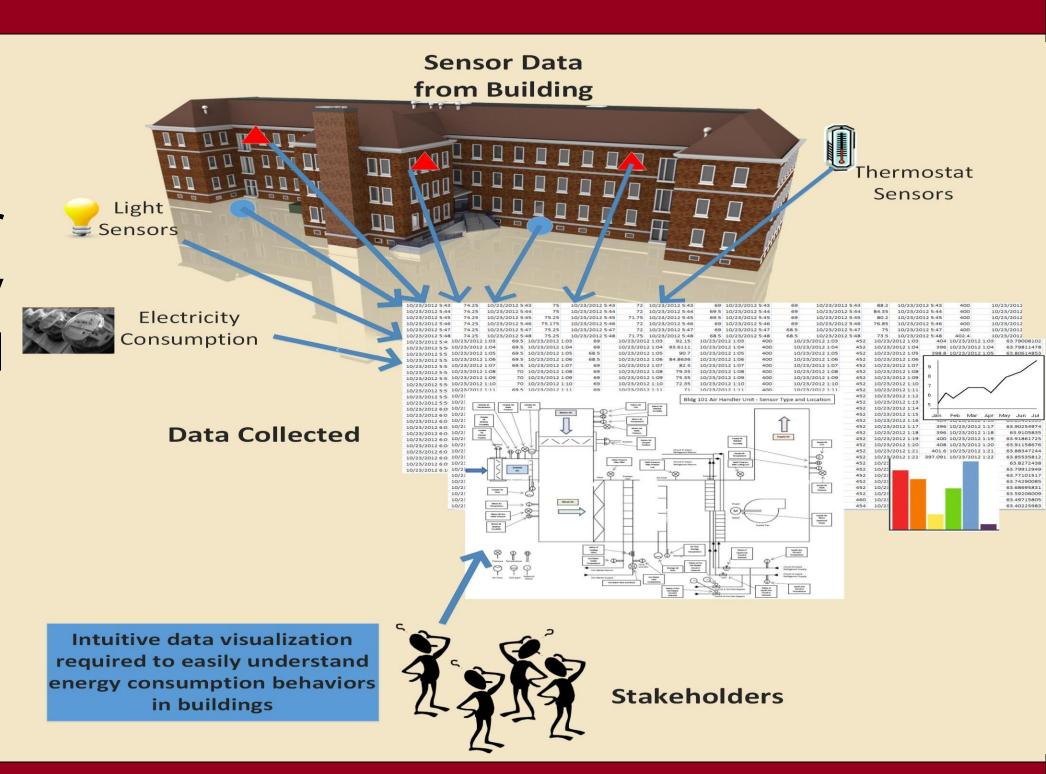
Graduate Student: Varun Kumaraswamy, PhD Candidate, CEE, CMU



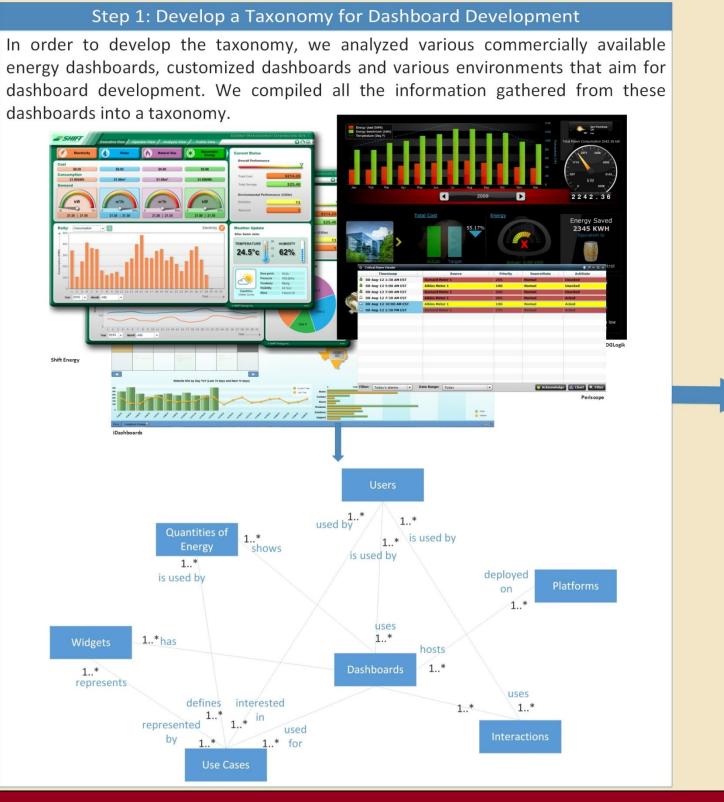


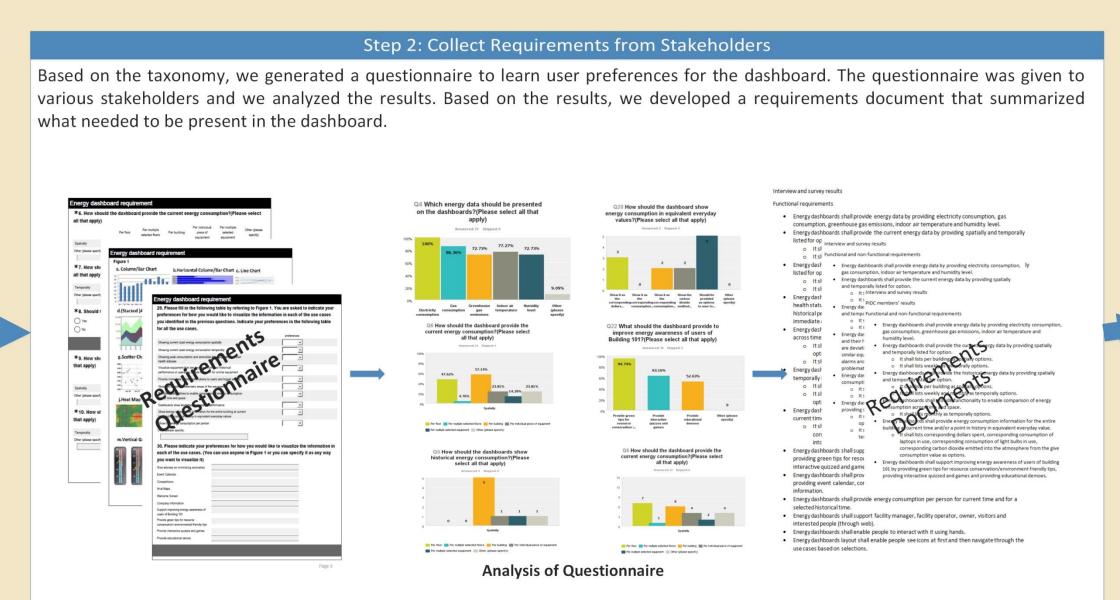
#### Motivation

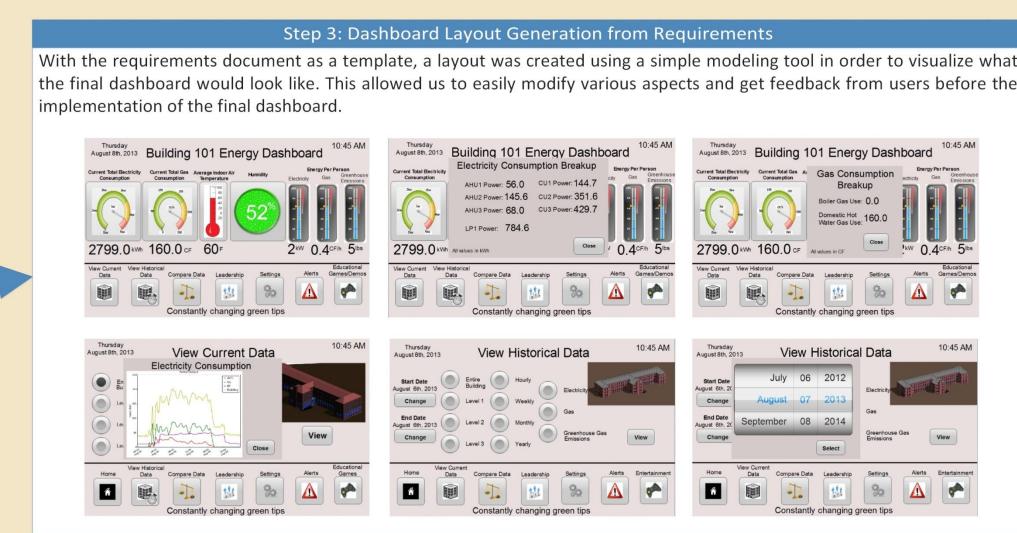
- > The Energy Efficient Buildings Hub aims to transform the energy efficiency market for existing small and medium-sized commercial buildings.
- ➤ Large investments are made for sensor systems in buildings that monitor and control energy consumption. These systems help to be aware of energy consumption, increase energy efficiency, reduce energy use and understand system performance.
- > Large amounts of sensor and building automation system data is collected
- ➤ Very difficult and time consuming to go through all the collected data manually → a quick way to comprehend all the data based on the needs of the stakeholders (visitors/occupants/FMS/owners) is necessary.



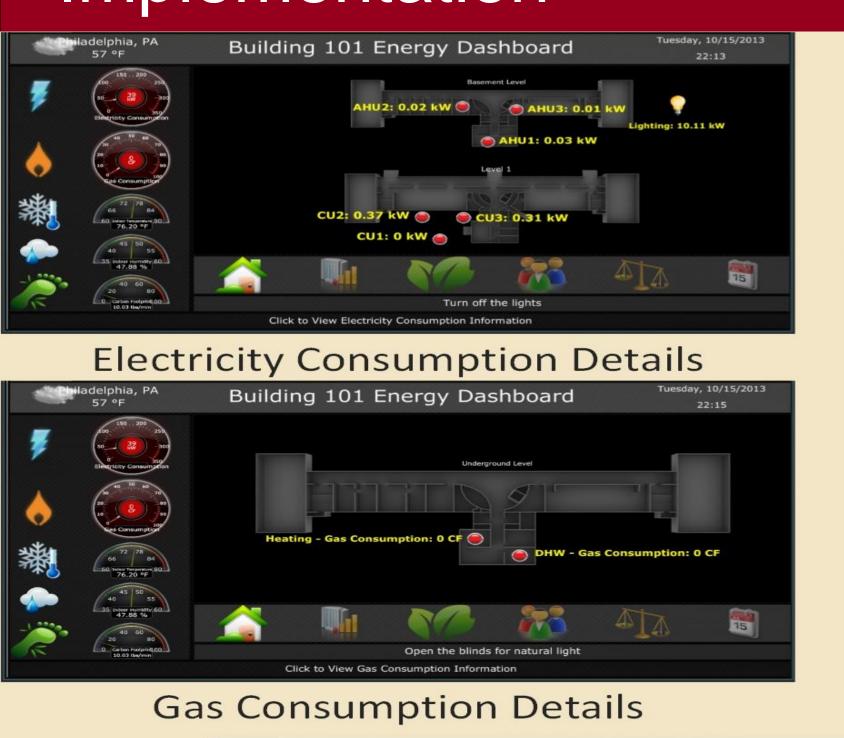
### Vision & Approach







### Implementation





Main Screen

Building 101 Energy Dashboard



Philadelphia, PA 57 °F Building 101 Energy Dashboard

Level 2 77.1 °F 78.6 °F 78.0 °F 78.2 °F 78.0 °F 78.0 °F 78.2 °F 78.0 °F 78.0 °F 77.4 °F

50 38 100 0 35 100 0 35 100 0 35 100 0 35 100 0

5.0 %

Building 101 Energy Dashboard

Tuesday, 10/15/2013
22:23

Choose Data to View

Exercisely
Choose Area

Whole Building
Start Date

10/8/2013
End Date

10/8/2013
End Date

10/10/2013
View

Open the blinds for natural light

Indoor Room Temperature Details

**Indoor Humidity Details** 

View Historical Data/Trends

## Contributions

- >Taxonomy of building energy dashboards for generation of future dashboards in other buildings
- >A requirements engineering based approach to develop formal and customized dashboards

#### Publications