Developing a Decision Support System for Energy Efficient Communities

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Background

Buildings (through electricity consumption) are responsible for 39% of U.S. carbon emissions. Residential buildings account for slightly more than 50% of these emissions. Due to increased population and economic development, the total energy used in buildings continues to rise. At this rate, the country can expect to see consumption rates rise 0.8% per year between now and 2030. Home owners want to make their homes energy efficient, but there are several tools that allow them to monitor consumption.

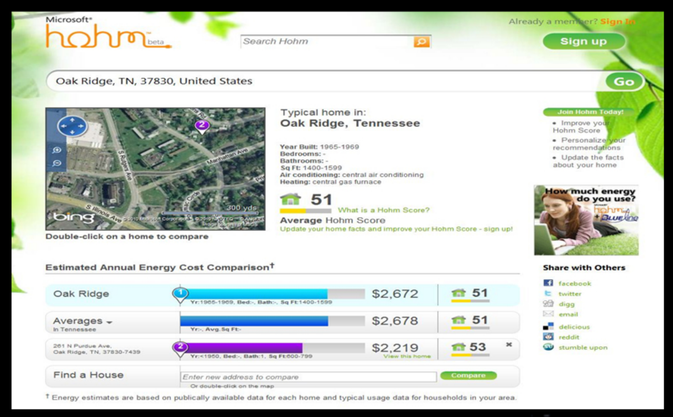

Figure 1. Microsoft Hohm is a consumption monitoring tool.

Research Objectives

- Develop decision support system that will help home owners monitor electricity consumption trends
- Evaluate impacts of weather on consumption
- Compare consumption trends to neighbors
- Evaluate impact of energy efficiency initiatives

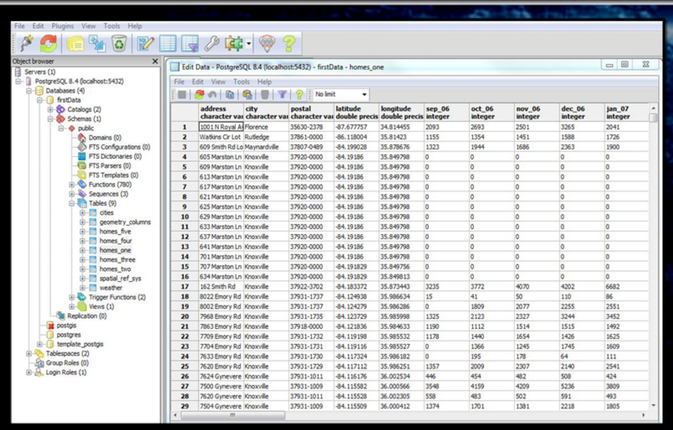

Figure 2. Table created using PostrgreSQL.

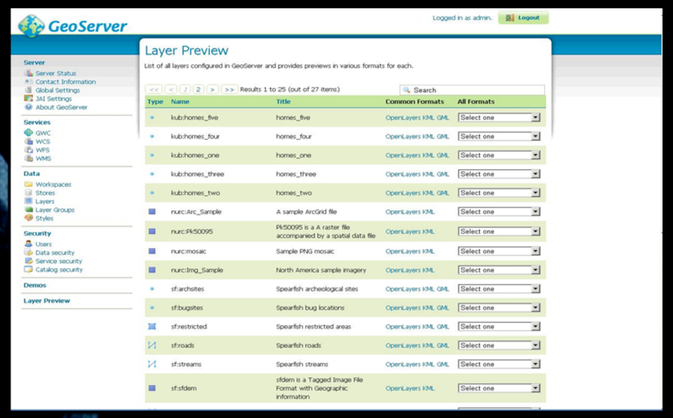

Figure 3. WMS Layers created with Geoserver.

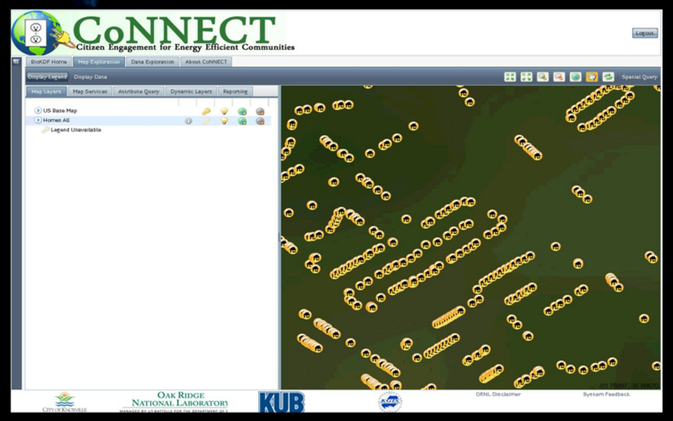

Figure 4. Style of layers edited and added to the web application.

Methodology

- Created a .csv file from an excel spreadsheet containing over 160,000 residential addresses
- Created table using PostrgeSQL containing home addresses and specific geographic locations
- Uploaded table onto Geoserver creating map layer(s)
- Edited layer(s) style and added them to web application

Results

- Web application named Citizens Engagement for Energy Efficient Communities (CoNNECT)
- Completed basic decision support system
- User interface displaying uploaded data
- All geographic data visible on a U.S. map
- Displayed Knox County household energy data

Future Research

- Create comparison system between homes
- Add more secure password system and improve information security
- Upload more data and compare homes across country
- Create increasingly interactive methods and continuously help make users more energy efficient

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