# UNIVERSITY OF FLORIDA

## *Unifying Home Asset and Operations Ratings: Adaptive Management via Open Data and Participation*

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May 2011 Progress report

**Description:** Recent environmental, social, and economic challenges are fostering a wave of interest in maximizing energy efficiency and conservation (EE+C) in existing U.S. homes. Long standing programs, ratings, and metrics are being reapplied into new stimulus initiatives such as the *Recovery through Retrofit*[1] program. Simultaneously, electric and gas utilities are expanding their demand side management (DSM) programs from weatherization and conventional technology replacement incentives to include conservation behavior campaigns with "recommendation algorithms" designed to assist in homeowner energy retrofit decision making. Furthermore, loan programs are emerging to address the financial barriers that commonly limit initiation of the necessary retrofits.

Collectively, these approaches most often project future home energy performance based on engineering models of the physical characteristics of homes (i.e., "asset ratings"). Yet to date, the marketplace is inadequately integrating historical household energy consumption patterns (i.e., "operational ratings") into the decision tree to optimize retrofit program efficacy and consumer benefits. Moving toward the unification of asset and operational ratings is crucial for successful program management, proper monitoring/measurement/verification (MMV), loan risk assessment, and for the persistence of reduced home energy use over time. However, unification will not be easy. This research project combines qualitative and quantitative research methods in social science and building science using Florida case studies to evaluate the opportunities and constraints of asset and operational rating unification and the steps necessary to get there. Relationships between our project and the collaborative, transparent, and participatory nature of "open government" initiatives are also being explored.

**Budget:** $24,000
**University:** UF
**External Collaborators:** Nick Taylor (Ph.D. Student, UF School of Natural Resources & Environment), Jennison Kipp (Assistant In, UF Program for Resource Efficient Communities)

## Progress Summary

Key qualitative survey questions on asset and operational ratings and their interactions were developed for a series of focus group sessions conducted in February and March, 2011. These sessions explored household utility service information needs and the usability of a home energy and water reporting website (http://gainesville-green.com/) for customers within the Gainesville Regional Utilities service territory (University of Florida IRB-02 #2011-U-0003). Though these sessions were funded under a separate grant project, the integration of asset and operational rating issues into the research design was made possible by this FESC project.

The combination of individual user testing and semi-structured group interviews was developed as a first phase investigation into how diverse users with unique needs perceive of the website, its features, and its functions. Approximately 1,500 minutes of individual usability testing audio feedback for 37 separate individuals and 440 minutes of focus group audio feedback for 7 separate stakeholder groups was collected.

[1] See, http://www.whitehouse.gov/assets/documents/Recovery_Through_Retrofit_Final_Report.pdf

These stakeholder groups consisted of the following 6 group types: (1) homebuilders; (2) homeowners; (3) Realtors®; (4) local government staff/officials; (5) home energy raters; and (6) bankers/loan originators.

Preliminary findings from these qualitative data provided a foundation for the in-depth inclusion of asset and operational rating considerations into a significantly larger grant proposal as detailed in the "Funds Leveraged" section. Transcriptions are still in progress and long term qualitative data analysis will inform future directions for both the original grant under which the research took place, as well as this FESC grant. Additional collaborations are in the nascent stages of development.

| **New collaborations** | | |
|---|---|---|
| **Partner** | **Title or short description of the collaboration** | **Funding** |
| Charlotte Software Systems | UF/PREC is in discussion with this potential collaborator on a variety of potential benefits from utilizing non-linear computational optimization for evaluating various energy efficiency and climate action strategies in the residential sector including the inputs, interactions, and outputs of asset and operational rating systems. | Opportunities under consideration |
| Gainesville-Alachua County Association of Realtors® (GACAR) | Very preliminary discussion has begun on potential future collaboration on integrating residential asset and operational rating information into Multiple Listing Service (MLS) data and/or various local "green" real estate efforts. | N/A |
| Alachua County Department of Growth Management | Very preliminary discussion has begun on potential future collaboration on integrating residential asset and operational rating information into property appraiser data, building code enforcement data, and/or various local "green" building efforts. | N/A |

| **Proposals** | | | | | | |
|---|---|---|---|---|---|---|
| **Title** | **Agency** | **Reference Number** | **Investigators Collaborators** | **Funding requested** | **Duration** | **Date submitted** |
| EnergyIT: Home Energy Use Software for Education, Comparison, and Evaluation | DOE Office of Science | DE-FOA-0000508 | PI: Pierce Jones<br>Co-PI: Hal Knowles<br>Collaborators: Jennison Kipp & Nick Taylor | $243,008<br>(UF Subcontract portion on a $992,020 overall proposal) | 2 years<br>(Anticipated from July 2011 – June 2013) | April 4, 2011 |
| Gainesville Regional Utilities: On-Bill Energy Efficiency Financing Program Proposal | Gainesville Regional Utilities (Municipally Owned Utility) | N/A (Unsolicited proposal) | PI: Pierce Jones | Gainesville Regional Utilities: On-Bill Energy Efficiency Financing Program Proposal | Gainesville Regional Utilities (Municipally Owned Utility) | N/A (Unsolicited proposal) |

*EnergyIT: Home Energy Use Software for Education, Comparison, and Evaluation*

Hal Knowles, Co-PI and the primary supported person on this FESC project was a major University of Florida Program for Resource Efficient Communities (UF/PREC) contributor to the development of this

new proposal. UF/PREC proposed to provide the following services in continued collaborative support of the Energy Tracking Software Platform:

1. Continued development, testing, and refinement of protocols and algorithms for accurately comparing energy/water performance of homes/buildings;
2. Data analysis, trend evaluation, and measurement/verification of operational energy/water performance, building asset mix, efficiency measures implemented, and their interaction effects;
3. Support for the development of an energy/water efficiency and conservation measure "recommendation engine" tailored according to building operational performance and asset mix;
4. Support for the development, deployment, and analysis of survey instrument(s) and new/improved feature sets (e.g., visualization tools, associated narrative, goal-based competitions, community-based social marketing strategies, and crowdsourced data entry pathways such as home energy auditor forms and user-specified behavioral and asset conditions).

*Gainesville Regional Utilities: On-Bill Energy Efficiency Financing Program Proposal*

Hal Knowles, Co-PI and the primary supported person on this FESC project was a major University of Florida Program for Resource Efficient Communities (UF/PREC) contributor to the development of this new proposal. UF/PREC proposed to provide the following five major services as a subcontractor for this energy efficiency financing program: (1) energy pre-screening; (2) consumer education; (3) contractor training; (4) quality control; and (5) measurement and verification.