May 2014 Progress Report

Unifying Home Asset & Operational Ratings: Adaptive Management via Open Data & Participation

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Budget: $24,000

Project 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.

The secondary supplemental research will expand on themes and insights gained through the first phase of this existing FESC project. Specifically, these insights suggest that even when adding operational data to building asset data, the reductionist approach to evaluating home energy performance by controlling for known variables may continue to offer an incomplete picture of the complexities of performance trends and the influence of unknown and/or misunderstood variables. Furthermore, the home improvement industry may need to consider the possibility that the magnitude of total energy consumption, while a worthwhile metric and with its net reduction a worthwhile goal, is also an incomplete indicator of home energy performance optimization.

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Data networking and collaborative negotiations have been ongoing. JEA in Jacksonville has provided several million meter readings at 15-minute time intervals for approximately 400 homes from fiscal year

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

2011 through the 1st quarter of 2014. TalGov Utility Billing Services Division has provided several million meter readings at monthly time intervals for approximately 100,000 homes. Both utilities are currently processing additional datasets for various aspects of the research. 15-minute, hourly, and daily weather data has been procured from the Florida Automated Weather Network for Station #160 in Monticello (near Tallahassee) and for Station #180 in Macclenny (near Jacksonville).

Additionally, Dr. Larry Liebovitch has been invited, and accepted, into Hal's Ph.D. advisory committee due to his long standing knowledge and experience with fractal dimensional statistical methods in the social and physiological sciences. Methodology and research parameters are in development as applicable to the use of the SAS Enterprise Guide for data cleaning, screening, sorting, filtering, querying, and related statistical data management and to MATLAB for fractal dimensional statistical analytics.

Funds Leveraged/New Partnerships Created

New collaborations		
Partner name	Title or short description of the collaboration	Funding, if applicable
Larry Liebovitch, Ph.D.	Larry has been officially integrated into Hal's Ph.D. advisory committee as a "Special Member" from Queens College CUNY (http://people.qc.cuny.edu/faculty/Larry.Liebovitch/Pages/Default.aspx)	Not applicable
Several Building Contractors	UF/PREC is currently building partnerships with building professionals to serve as "Participating Independent Contractors" in the loan program.	Tied to revenue from the delivery of the loan program