SMART Scale

Small Market Advanced Retrofit Transformation Program

2015 Building Technologies Office Peer Review

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

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Project Summary

Timeline:

- Start date: October 1, 2013
- Planned end date: September 30, 2016

Key Milestones :

- **June 2014:** Research and develop list of measures needed to enhance Ecology Action's DI 2.0 model to achieve an average of at least 20% energy savings
- **June 2015:** Review of EM&V on completed projects showing an average savings of greater than 20%
- **September 2016:** Develop and publish Funding and National Roll-out Plan.

Budget:

Total DOE $ to date: $677,968
Total future DOE $: $1,322,032
Total Cost share: $2,000,000

Target Market/Audience:

- **Target Market:** Small & Medium Businesses (SMB) under 50,000 SQFT
- **Target Audience:** Utility and Government Administrators of SMB energy efficiency programs

Key Partners:

New Buildings Institute (NBI)
Electric and Gas Industries Association
Sacramento Municipal Utility District (SMUD)

Project Goal:

1. Enhance the DI 2.0 program model so that it consistently achieves an average of 20% all fuel energy savings per building.
2. Transfer the ability to deliver deep retrofits to contractors and assure that these contractors can reach an average of at least 20% savings at scale.

Purpose and Objectives

Problem Statement:

The prevailing delivery model for driving energy efficiency in the SMB market is a zero customer cost, limited measure, direct install program. *This model is (1) not comprehensive, (2) does not achieve deep energy savings (3) does not produce accurate project level savings and (4) is not scalable.*

SMART Scale Target Market and Audience:

- **Market:** Small and Medium Businesses under 50,000 SQFT. This market segment contains 4.6 million businesses nationally and represents 40% of annual national commercial energy consumption.
- **Audience:** Utility and Government Administrators of Energy Efficiency Programs

SMART Scale Impact:

The SMART Scale program will develop a platform to be used by administrators of SMB Energy Efficiency programs that will achieve and average of 20% energy savings per building by offering a comprehensive set of measures, integrated financing tools and expedited project M&V via a contractor-driven delivery model.

Project Endpoints	Measurement
• Technical ability to cost effectively accomplish an average of at least 20% energy savings per building. • A method for empowering and incentivizing contractors to deliver comprehensive energy efficiency upgrades to commercial customers. • A scaling plan for rollout of the SMART Scale Program Platform to Utility and Government Partners.	• **Near term:** Analysis of weather normalized 12 months pre/post retrofit utility data to confirm project energy savings • **Intermediate term:** Program and project QA/QC of SMART Scale Program Contractors projects • **Long term:** Programmatic M&V of Utility and Government SMB EE Programs using the SMART Scale Program Platform

Approach

Focus on technical requirements to deliver an average of 20% energy savings per building. Improve the successful DI 2.0 methodology by adding HVAC measures.

Development of contractor enabled delivery model. The SMART Scale team will work with a diverse stakeholder group of industry experts to define and refine the delivery method.

Key Issues:

1. Integrate HVAC measures into DI 2.0 methodology to accomplish 20% all fuel savings.
2. Collect 12 months pre/post utility bill data from SMUD and PG&E for accurate project and program M&V.
3. Develop integrated financing tool to support deep projects and improve customer participation rates for SMART Scale projects.

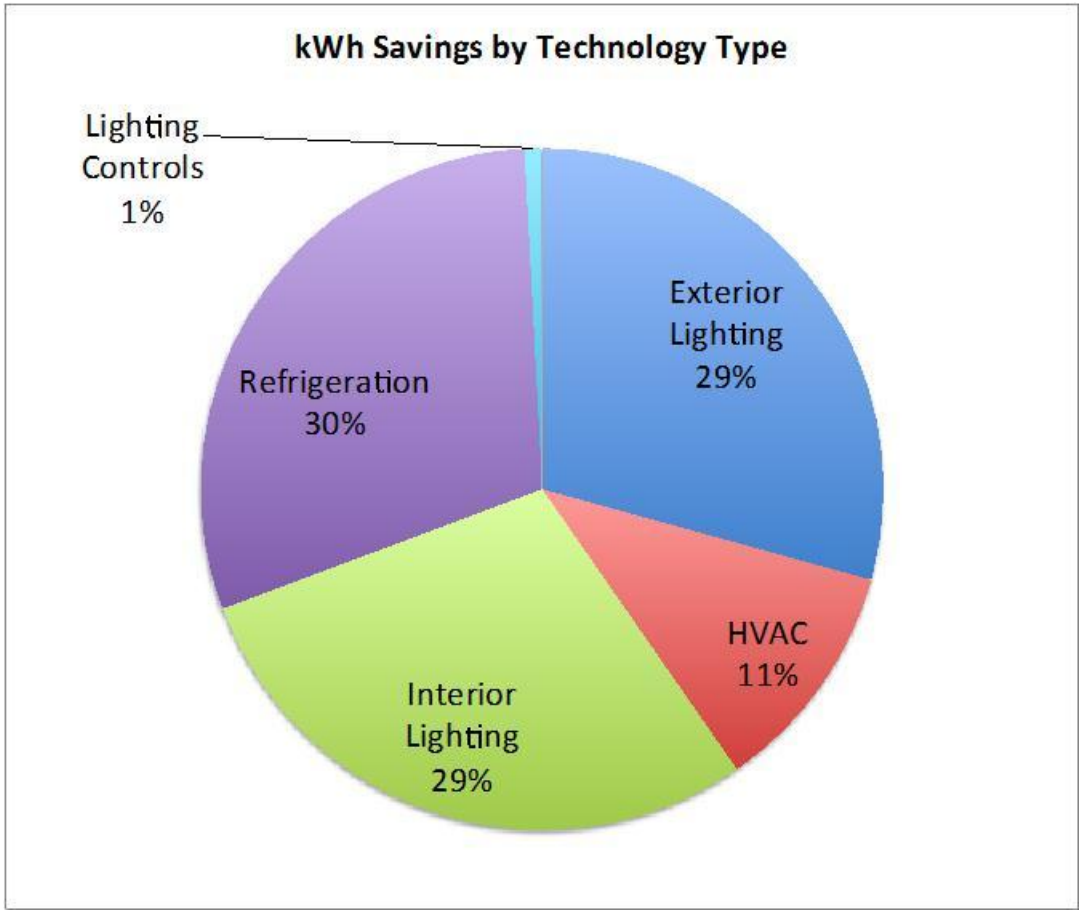
Distinctive Characteristics:

SMART Scale is being delivered in collaboration with the Complete Energy Solutions (CES) program administered by the Sacramento Utility District (SMUD) and delivered by Ecology Action. This has allowed the project to take advantage of existing momentum and infrastructure while making incremental enhancements to an established and proven program delivery model (DI 2.0) and calculation methodology.

Progress and Accomplishments: Volume and Comprehensiveness

Lesson Learned: It is possible to deliver a high volume of savings and also focus on comprehensive retrofits.

	kWh Svgs	% of Total kWh Svgs
Savings from Single Measure Type	6,443,737	33%
Savings from Multiple Measure Type	13,298,212	67%
Total Savings	19,741,949	100%



Project Summary	Number of Customers	Percent of projects
Lighting Only	169	47%
Lighting + Refrigeration	129	36%
Refrigeration Only	26	7%
Lighting, Vending and Refrigeration	11	3%
HVAC Only	15	4%
Lighting + Vending	5	1%
Lighting + HVAC	3	1%
Total	358	100%

41%

of customers installed multiple measure types

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Progress and Accomplishments: Measurement and Verification

Lesson Learned: If you want high quality customer bill data, go to the billing department.

12 months weather normalized pre/post retrofit customer bill data

Summary	Indiv. Dataset Metrics			Combined Dataset Metrics		
	EA Close 2014	**SMUD 2013**	**SMUD 2014**	**EA & SMUD 2013**	**EA & SMUD 2014**	**SMUD 2 years & EA**
Acct #s	339	283	297	281	295	271
% of total	100%	83%	88%	83%	87%	80%
Has Buidling Type	339	n/a	n/a	279	293	269
Sas sqft	66	n/a	n/a	60	60	58

FirstView Analysis	
Building Type	**#**
Assembly (ASM)	5
Office - Large (OFL)	4
Office - Small (OFS)	4
Retail - Single-Story Large (RTL)	1
Retail - Small (RTS)	6
Total	**20**

Progress and Accomplishments: Advanced HVAC Retrofit Pilot

Lessons Learned:

1) The market is not ready for HVAC programs focused on tune-up and/or replacement.

2) Even measures with generous rebates can be hard to sell.

The Pilot:

Catalyst is an HVAC retrofit for packaged units that adds a variable frequency drive (VFD), demand-controlled ventilation (DCV), thermostat controls, and economizer controls, with a web interface for remote management and fault detection.

- Estimated energy savings 20-50%
- Pilot requirements:
  - Customer's meter must be <499 kW in peak demand
  - Buildings enrolled must be <50,000 sq ft
  - Site must have at least two 7.5 ton RTUs; no RTUs smaller than 5 tons will be eligible
  - Site must have at least 4000 annual occupied hours; the higher the better
  - Incentive will be $310/ton

Progress and Accomplishments: Contractor Enabled Scaling

Lessons Learned:

1) Working with multiple contractors on a project complicates the sales and installation process.

2) Having contractors take on more responsibility can work.

Heritage Park Project:

- First customer in Catalyst HVAC Pilot
- 2 Contractors involved in the project
  - Cooper Oates – HVAC and Pool Pumps
  - Allied – Interior and Exterior Lighting
- HVAC driven by Cooper Oates, Lighting driven by Ecology Action and team coordination on pool pumps

Contractor Enabled Scaling:

Avail, a Program Contractor, took on expanded role by driving sales process:

- Delivered 9.8 GWh of 19.7 GWh – 49% of program savings
- Served 183 or 358 customers - 51% of customers
- Of 635 projects, Avail completed 379 – 59%
- Developed and sold 203 of their 379 projects – 53%
- The projects developed and sold by Avail accounted for 4.7 GWh – 23% of program total

Progress and Accomplishments: Project Highlight

Heritage Park Clubhouse

- 25,000 sqft
- First participant in Catalyst Pilot Project
- Contractor Driven

27%

reduction in kWh. Therm analysis pending.

Heritage Park Project	
Retrofit Type	**Estimated kWh**
Interior Lighting	31,754
Exterior Lighting	41,656
HVAC	46,557
Pool Pump	62,703
Total	182,670

Progress and Accomplishments: Market Impacts

Market Impacts

- **Up-leveling the way small and medium energy efficiency programs are designed, administered and delivered.**

  Provide a roadmap and set of tools for utility and government energy efficiency program administrators.

- **Increased contractor capacity to sell, specify, install, and report savings**

  Provide contractors access to portfolio level lead generation, integrated financing tools, software-augmented auditing, and streamlined M&V.

- **Completion of comprehensive energy efficiency projects.**

  Phase one and two activities are being delivered through Ecology Action's ongoing efficiency program for SMUD. Field implementation is underway and is on track to accomplish the goal of completing 315 deep energy retrofits by the end of the second budget period.

Project Integration and Collaboration

Project Integration:

Program staff have regular coordination meetings with SMUD and PG&E.

Partners, Subcontractors, and Collaborators:

- **New Buildings Institute:** National leader in applied building science facilitating market transformation through advanced design, policy and technology solutions. NBI provides services and tools to the SMART Scale Program and will serves as the lead for M&V, measure identification and the development of reports that demonstrate the energy savings accomplishments of the program.

- **Electric & Gas Industries Association:** National leader in contractor development and management and delivery of streamlined financing for contractors. EGIA leads the contractor stakeholder recruitment and engagement process to vet and roll out the contractor centric delivery model.

Next Steps and Future Plans

Next Steps and Future Plans:

- Ramp up field activities towards to the goal of 315 deep energy retrofits by end of second budget period.
- Continue work with SMUD to develop and implement contractor enabled delivery model.
- Expansion of Advanced HVAC Pilot
- Work with Utility partners to integrate On-bill financing for customers

REFERENCE SLIDES

Project Budget

Project Budget: Current expenditures are within expectations.
Variances: The SMART Scale program is under budget at this point. As field activities increase it is expected that the program will return to the projected budget expenditure rate.
Cost to Date: $1,407,197 or 35% of total program budget
Additional Funding: N/A

Budget History					
October 2013– FY2014 (past)		FY2015 (current)		FY2016 – September 2016(planned)	
DOE	Cost-share	DOE	Cost-share	DOE	Cost-share
$503,704	$541,217	$765,602	$747,682	$621,872	$627,087

Project Plan and Schedule