Lesson for Improving Home Upgrade Programs – Better Buildings Accelerator

Wednesday, May 11 from 3:45 – 5:00 pm ET

Hear how home upgrade program administrators have reduced administrative burdens for themselves and their partners and are achieving better results. Home Upgrade Program Accelerator Partners will share their strategies to enhance data management, contractor relationships, and customer experiences and approaches to improve program processes. Explore how these ideas can be implemented in programs across the country.
Lesson for Improving Home Upgrade Programs

Better Buildings Accelerator

Moderator:
Dale Hoffmeyer
DOE
VISION

Accelerating adoption data management strategies, including implementation of HPXML throughout the home energy upgrade industry will enable streamlined collection, transfer, and management of data, reduce administrative burden, and improve quality assurance.
Administrators of home energy upgrade programs:

- **Pledge** to implement HPXML and improve program effectiveness.
- **Identify** opportunities for process improvements.
- **Participate** in technical assistance and/or peer sharing forums.
- **Share** materials, results, and lessons learned from their innovative approaches.
- **Report** on progress annually including providing information on reducing program administration costs.
Accelerator Benefits

- Help organizations implement HPXML and other process improvements
- Peer exchange of knowledge and experience
- Reduce program cost and enhance effectiveness
- Improve participating contractor satisfaction
- Receive public recognition as leader in accelerating growth of home energy upgrades
Examples of Improving Data Processing

Higher Cost Effectiveness, Greater Satisfaction

- 50% Less admin time to review and approve projects
- 66% Reduction in data processing time for APS reporting
- 31% Lower contractor admin time to submit projects
- 3x Increase in trade ally satisfaction

APS results from process improvements and HPXML, May 2015 ACI Conference
Auto-populating HPwES certificate of completion using HPXML
Enable partners to automatically simplify complex, HPXML-formatted home data into Home Energy Score inputs and generate a Home Energy Score

Minimize customization of partners’ software systems

Translate HPXML-formatted data into Home Energy Score API data format
ENERGY STAR Home Advisor

- ENERGY STAR Home Advisor is a free online tool that allows you to:
  - Get custom recommendations based on the efficiency features in your home
  - See a summary of energy-saving features of your home in your Home Profile
  - Track your home’s energy performance

- Option to use HPXML to send data to populate the Home Profile from software after an audit or home improvement job

- Future development: HPXML exports from the Home Advisor to facilitate interactions with other systems and applications

www.energystar.gov/homeadvisor

Questions? Email: Hudson.Rebecca@epa.gov for more information
Today’s Panelist

Tim Miller, Enhabit

Melanie Paskevich, Neighborworks of Western Vermont HEAT Squad

Torsten Glidden, Build It Green
Streamlining Processes and Data for Contractors and Customers

Tim Miller, CEO, Enhabit
Program Overview

• Statewide, from Portland pilot
• Contractors, lenders, communities
• Deep retrofits – $13-15K avg
• Approaching 5,000 homes
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Leading programs are helping lift HP to a new level.

CEW: The 2nd program in the country on HPXML—using the tools you already use.

HPXML: The National Data Standard for Home Performance Projects

- Measure impact.
- Optimize the offering.
- Target customers.
- Share your results with you.
- Future: choice in the tools you use every day.
- While keeping costs down.
A complex system
Difficult to adapt
Facing new services and market pressures
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Transition to ‘Threshold’
Web-based Tool

Had to replace Workbook (complex, unsupportable)
Risk with external tool >> internal skunkworks
Immediate results >> clear vision
• Web-based (prepopulated, version control, flexibility), HPXML structure, easy to use, mobile

Risks: homegrown tool (myopia, un-supportable path again, staff risk)
Mitigation: common language, 3rd party back-up

Status: Rollout nearly complete, all adopting, improvement with each training

Big Wins:
• Contractor satisfaction
• Contractor time (saves 50-100 min. per project)
• Staff time (saves 70 min. per project, roughly .5FTE)
Threshold on a computer
Threshold on a phone
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Transition to Custom Configuration of Salesforce

New services & budget pressures >> new solution
Considered build-our-own, new 3rd party tool, SF; decided on SF

Risks:  Configuration vendor/cost, over-design, inflexibility, long-term maintenance
Mitigation:  Interviewed for ‘configuration’ approach; a standard platform in a competitive space; growing internal expertise

Status:  Configuration/dev on-path; building a ‘backbone’ of key functionality first
Looking back…

- Be really sure why you’re building something on your own – and thoughtful about when you’ll outgrow it…

- Understand why you’re using a vendor-built system. What customer type is it really designed for, and is that you? Will you be evolving away?

How unusual is your program? Does it have to be?
Additional Information
THE WORK
• Air sealing + Duct sealing
• Insulate attic, walls, floors
• Window replacement

THE COST
$15,000

THE RESULTS
Less drafts
Healthier indoor air
Lower utility bills

“If you spend the money now, you won’t spend it on utility bills or trips to the hospital because of your asthma or because you got a disease.”

--Gerry Winfield
Enhabit Homeowner
Lessons for Improving Home Upgrade Programs
NeighborWorks of Western VT

- **Nonprofit** housing organization
- One-stop-shop
- Provide all the answers and support homebuyers and owners need
- Keep customer’s best interest front and center
- **Realty, Lending, Financial Counseling and Education, Home Repair, HEAT Squad**
- Part of a national nonprofit network, *NeighborWorks America*
Meet the HEAT Squad

- Providing support to improve efficiency of homes/businesses, regardless of income since 2010
- **Reduced cost audits**, same day audit reports, objective advice, help with contractors, in-house financing
- Available in five counties, half of Vermont
- Completed almost 4,000 audits and 1,500 projects
- **Partners**: Efficiency VT, Green Mountain Power, Local Contractors, Energy Committees and Champions
Our Struggle-Strategy-Synergy

- **Struggle** of multiple data entry
- **Strategy** to streamline data entry
- **Synergy** of the overall program
Struggle: Multiple Data Entry

Lori spends 45 min. processing (1) audit intake... CRAZY!
Audit

Corey spends almost 2 hr. submitting (1) audit..... CRAZY!
Strategy: Streamline Data Entry

Intake goes from 45 min. to 15 min.- cut by 2/3!!
(For 1 audit processed, Lori can now process 3 audits)

HUGE INCREASE IN PRODUCTIVITY!
Audit data entry goes from 1 hr. 40 min. to 1 hr. 5 min.—almost cut in half!!

HUGE INCREASE IN PRODUCTIVITY!
Synergy: Overall Program

"The combined power of a group of things when they are working together that is greater than the total power achieved by each working separately." - Cambridge Dictionaries Online

- Expanding with less resources (staff), streamlining data entry allows more customers thru the program = more revenue $$

- Auditors spend less time with audit data entry to do more customer service, higher conversion rate = more revenue $$

MORE REVENUE = SUSTAINABLE PROGRAM
Hurdles Still to Overcome

- Build bridge between Salesforce & CAKE
- Work on bridge between CAKE & Efficiency VT
- Currently building bridge between website form and Salesforce (ready by Summer 2016)
- Investigate LEAN principles and implement to streamline program further
Thank You

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Better Buildings Summit
Washington DC
May 2016
Presentation Outline

• Home Upgrade Issues in California
• Responses (short- and long-term)
• Implementation Challenges
• Going Forward
• Questions and Comments
Home Upgrade Issues in California

1. Home Upgrade incentive program was limited to one energy-modeling software tool (*contractor pain-point*)
2. That software tool systematically over-predicted savings (*multiple stakeholder pain-point*)
3. CA Public Utilities Commission (CPUC) required additional software modeling options be made available
4. Four new software options were tested and passed modeled savings results screening
5. Newly approved software options have been under-utilized
Is The Program Delivering Savings?

Actual (billing analysis) vs. Projected Gas Savings

Stakeholders
• Utilities
• Counties & RENs
• Contractors & Customers
• Financing Entities
• Regulatory Commission
• Energy Commission
## The Response (short-term): Program Incentive Adjustment

<table>
<thead>
<tr>
<th>A. Savings/ Participation Level: % Reduction*</th>
<th>B. Savings percentage Incentive Amount</th>
<th>C. Energy Savings Incentive amounts $0.75/kWh and $2.00/therm*</th>
<th>D. Total Incentive D = (B+C) ≤ $6,500</th>
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</thead>
<tbody>
<tr>
<td>10%</td>
<td>$1,000</td>
<td>$0.75/kWh and $2.00/therm*</td>
<td>Final Incentive amount (maximum $6,500)</td>
</tr>
<tr>
<td>15%</td>
<td>$1,500</td>
<td>+ $0.75/kWh and $2.00/therm*</td>
<td>= Final Incentive amount (maximum $6,500)</td>
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<tr>
<td>20%</td>
<td>$2,000</td>
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<tr>
<td>25%</td>
<td>$2,500</td>
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<tr>
<td>30%</td>
<td>$3,000</td>
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<td>35%</td>
<td>$3,500</td>
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<td>40%</td>
<td>$4,000</td>
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<tr>
<td>45%+</td>
<td>$4,500</td>
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For EnergyPro modeled savings estimates, site energy percent savings and the kWh, kW & therm savings amounts will be determined by first applying the factors in the table below:

<table>
<thead>
<tr>
<th>Electric Energy and Demand (kWh and kW)</th>
<th>Natural Gas Energy (therm)</th>
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</thead>
<tbody>
<tr>
<td>Heated and Cooled Homes</td>
<td>0.4</td>
</tr>
<tr>
<td>Heated Only Homes</td>
<td>1.0</td>
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The Response (long-term): CPUC Project Directive

"We direct Commission Staff and the IOUs to work collaboratively with the California Energy Commission and other Energy Upgrade California stakeholders to identify approaches to adequately broaden allowable software under Energy Upgrade California while containing costs required for needed Commission Staff Reviews"
The Response (long-term): Addressing related issues

- **CalTEST** opens the door for more software choices
- **HPXML** makes this possible (‘speaking the same language’)
- **CalTRACK** drives more accurate modeling predictions over time
CalTEST

California Test for Energy Software Tools

• Library of typical EUC Homes with site-specific modeling inputs and matched utility bills

• Vendors use test to improve their modeling

• Program uses test as initial screening tool

• Initial adjustment factor may be applied to savings predictions
CalTEST Base Data Scope

- Selected, primarily, homes with large projected heating or cooling savings (to try to best capture range of variance)
- Selected 12 gas heated homes and 7 electrically cooled homes from Climate Zones 2, 3, 4, 7, 9, 10, 11, 12.
CalTEST Qualification

• Vendors can pass uncalibrated (for use without 13 months prior energy usage data) or calibrated
• Only software that passes CalTEST uncalibrated can be used without calibration to utility bill usage data
• Qualifying pass rates: 80% avg. modeled savings accuracy
CalTEST Vendor Status

• **Passed (Approved for use in CA):**
  - ✓ OptimiserEnergy - Optimiser V2.1
  - ✓ PSD - TREAT V4
  - ✓ Snugg Home - SnuggPro V4 (calibrated only)
  - ✓ Earth Advantage - CakeSystems (un-calibrated only)

• **Approval phased-out 2/1/2016:**
  - – PSD - TREAT V4 (*no kW output for CA*)
  - – EnergySoft - EnergyPro 5 (*proprietary XML file*)
EMPIRICAL SOFTWARE SCREENING TOOL

The purpose of CalTEST is as a screening tool that will determine a minimum level of accuracy of software based on actual CA homes. The test will provide data to software vendors that is similar to what would be collected in a real world audit, and based on data collected on the actual homes in the test set. We will then compare your predictions to our weather normalized actual savings to determine realization rate and variance of your tool.

We have carefully screened homes to find 20 homes representative of CA EUC homes in terms of climate, ECMs, energy use, measured savings, and a range of other variables. A complete summary of the selection process can be found in the selection documentation.

Vendor Steps for Completing CalTEST

CalTEST will be conducted in two phases. First, vendors will complete the spreadsheet below that does not contain usage data (uncalibrated). Once that is submitted a second sheet will be provided that includes usage data so that vendors can resubmit with calibration (per calibration requirements below).

Vendors are given the attached CalTEST Excel workbook containing a summary worksheet, weather data, and anonymized project from each of the 20 test houses for CalTest, without usage data. The first worksheet in the workbook is the summary of results from each of the test homes. Worksheets 2-21 contain the pre/post building characteristics, pre/post measurements, and pre/post
At-a-Glance Software Comparison Guide

Home Upgrade
Energy Upgrade California®

Advanced Home Upgrade
Software Modeling Options

Find out which is right for your business!
HPXML Makes Multiple Software Choices Feasible

• Input data (software/UI) is output in an ‘common language/structure’ (HPXML)

• HPXML Structure is broad and general (the skeleton), allowing for program modeling data capture needs and calculation requirements (the guts) to reside within HPXML framework

• Program specific details don’t necessarily present a ‘breaking change’ to HPXML

• HPXML is open-source and updates are managed by user/stakeholder consensus
HPXML Drives Alignment

• The software must be able to provide data in HPXML format
  – HPXML output data specification has been circulated and reviewed
  – Based heavily on APS/NYSERDA/LEAP requirements with CA-specific uses/definitions (within HPXML) as well as a couple of additions

• Each CA implementer is able to accept HPXML files into CRM and/or data-tracking systems.

• Software vendors update User Interface & Tools to meet CA requirements
HPXML Standard/Structure Maintained by DOE (NREL)
HPXML Structure Based on BPI & DOE Standards

ANSI/BPI-2400-S-2012
Standard Practice for Standardized Qualification of Whole-House Energy Savings Predictions by Calibration to Energy Use History

BPI-2100-S-2013
Standard for Home Performance-Related Data Transfer v2.1.0
CalTRACK: Delivery of Predicted Savings

California Data-Driven Tracking and Analysis

- Jobs tracked by software version used
- Savings predictions compared to weather normalized post retrofit billing data (Calibrated vs. Un-Calibrated)
- If inaccuracies identified at the software level, vendor can revise software or an adjustment factor can be applied to reconcile future model predictions
CalTRACK – Contractor Feedback

Avg. Gas Realization Rate (2010-2012 Data): 34%
Contractor Performance Report

- Comparison of contractors performance against other EUC participating contractors (by percentile not name):
  - Average realization rate on predictions
  - Variance levels
  - Efficacy of delivered savings by project size

- Detailed analysis to inform improvement
  - Performance on Heating / Cooling / Baseload
  - Types of measures employed
  - Program wide benchmarks

- Co-development of this report with contractors
Improve Motivation for Incentives

Now:
- The higher the savings a contractor predicts, the higher the incentive their clients get
- The less you can get away with doing, the more profitable you are

Future:
- The more savings the contractor delivers, the more incentive their clients get
- The better you deliver on savings, the more profitable you are (happy customers, pay-for-performance, etc.)
Align Incentives

Past: Incentives based only on % Savings
• Smaller projects tended to more easily achieve larger percentage with modest kwh/therms savings

Now/Future: Incentives based on predicted kWh/Therms savings using more accurate software
• Greater incentives align with those homes where the greatest overall kWh/therms savings can be achieved
Key Challenges in CA Implementation

- New software options have been under-utilized (comfort with using EnergyPro, transition impacts contractor processes)
- Contractor/User Training (sufficient scope & availability)
- Multiple Stakeholders, Multiple processes
- Existing QA Processes & Protocols
- Information Systems (validation & maintenance of standard)
Key Changes in CA Output Data Specifications

• Guiding Principles:
  – Build on APS/NYSERDA/LEAP use cases for CA program needs (CA Data Set)
  – Add elements to support CalTrack realization rates
  – Encourage calibration, implement BPI 2400 standard

• Key Changes:
  – Broke out consumption & savings by heating, cooling, baseload, kWh & Therms
  – Added kW savings based on hourly CA weather data by CA Climate Zone
  – Added pool pumps & thermostatic shower valves
  – Needed to refine data reporting dependencies
  – Needed to resolve/align measure nomenclature
Future State of the State

Key direct benefits that HPXML facilitates:

- Software accurately predicts savings on average
- Contractors deliver on predicted savings
- Homeowners get the energy savings that are proposed
- Programs pay for *actual* savings
- Stronger link between incentives and savings
Key *indirect* benefits that HPXML facilitates:

- Driving demand/quantifying value of energy efficiency work
  - Home Energy Score
  - Bringing green building data to the MLS
- Designing better, more cost-effective programs
  - Less risk (greater predictability) for investors
  - Better environment for private capital and industry investment
  - Data sharing and comparative analysis (CA, Other States, DOE, Other industries)
Timeline for Launch

CalTEST
- 20 Representative Homes
- 4 IOUS
- Climate Zones
- Typical EEMs
- Housing Types

Software On-Boarding
- Ability to upload, validate & parse HPXML output file
- Qualifying software approved for program use
- Contractor training
- Available for use

CalTRACK
- HPXML Required
- Ongoing system to track predictions vs. actuals
- Adjustment of predicted savings based on past performance
- Contractor performance reports

Timeline:
- 2014
- Q4 2014 – Q2 2015
- 2016
Questions and Comments

Contact:
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510-590-3360 x125
Thank You