Better Buildings
U.S. DEPARTMENT OF ENERGY

Data Standards Roadmap: Priorities and Actions for Driving Data Standardization in the Residential Energy Efficiency Industry

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Jan. 24, 2018

U.S. DEPARTMENT OF ENERGY

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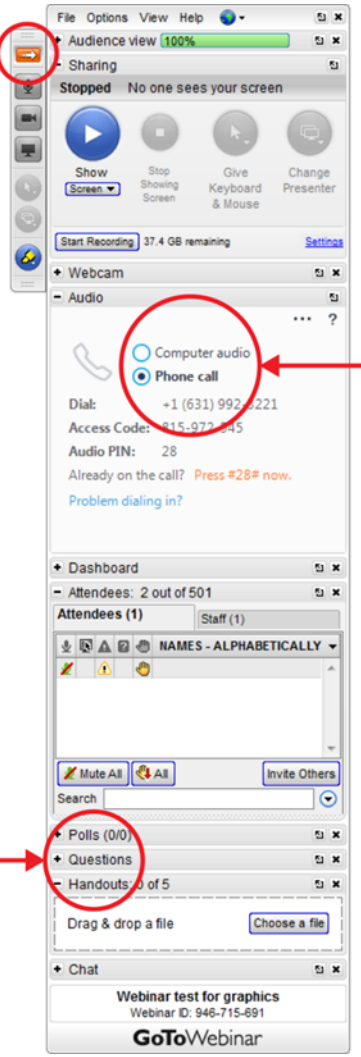

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Speakers

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Home Performance Coalition

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National Renewable Energy Laboratory

Home Performance Coalition

Data Standards Roadmap:

Priorities & Actions for Driving Data Standardization in Residential Energy Efficiency

January 24, 2018

Home Performance Coalition

National nonprofit that advances the residential energy efficiency industry through research & education.

- Support interoperability and reduction of program costs through the development of national data standards
- Make the value of energy efficient homes visible in the real estate transaction
- Reform cost-effectiveness screening practices
- Find intersections between smart grid technologies and home performance

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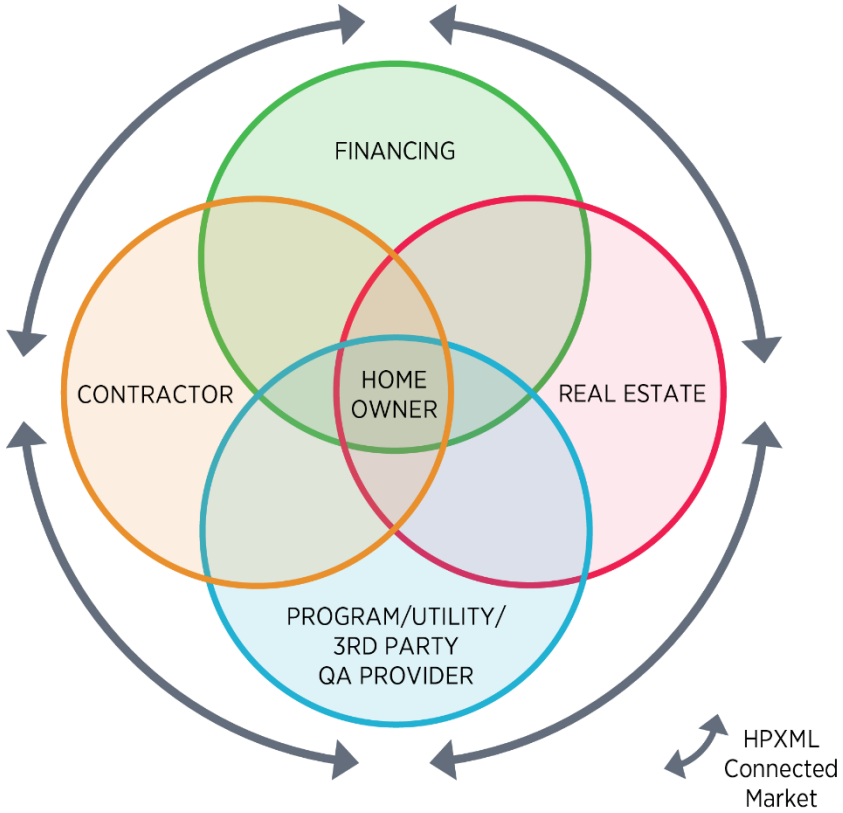
Agenda

- Roadmap purpose, vision
- Value of data standardization
- HPXML in the market today
- Challenges to adoption
- Roadmap strategies
- Next steps



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Poll Question #1

- Who’s on the line?

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Poll Question #2

- Are you familiar with HPXML?

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Roadmap Purpose

- Increase the value and use of the open data standard, HPXML, in the home energy upgrade market from 2016 – 2020
- Identify strategies for promoting the use of HPXML data collection templates by program administrators for specific use cases (e.g., data reported by a home performance contractor after an energy audit or completed home energy upgrade)

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What is HPXML?

- **HPXML Data Dictionary –** Establishes how data on residential energy performance, energy conservation measures, and the physical and operational attributes of a home is defined, formatted, transmitted, structured, and used so that there is a clear understanding of how data is represented in the industry.
- **Transfer Standard -** promotes the cost-effective exchange of information through a standard xml data transfer protocol.

www.hpxmlonline.com

hpxml

data dictionary + transfer standard

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Benefits of Standardization

The use of standards makes data usable to more than just the project or person that created the data.

Industry Efficiency

Improve industry efficiency by reducing the costs of collecting and exchanging data between market actors

Interoperability

Facilitate quicker and more automated transfer of information across a diverse set of market actors

High Quality Research

Standardize terminology and collect higher quality data as a means of tracking and quantifying work completed in the industry

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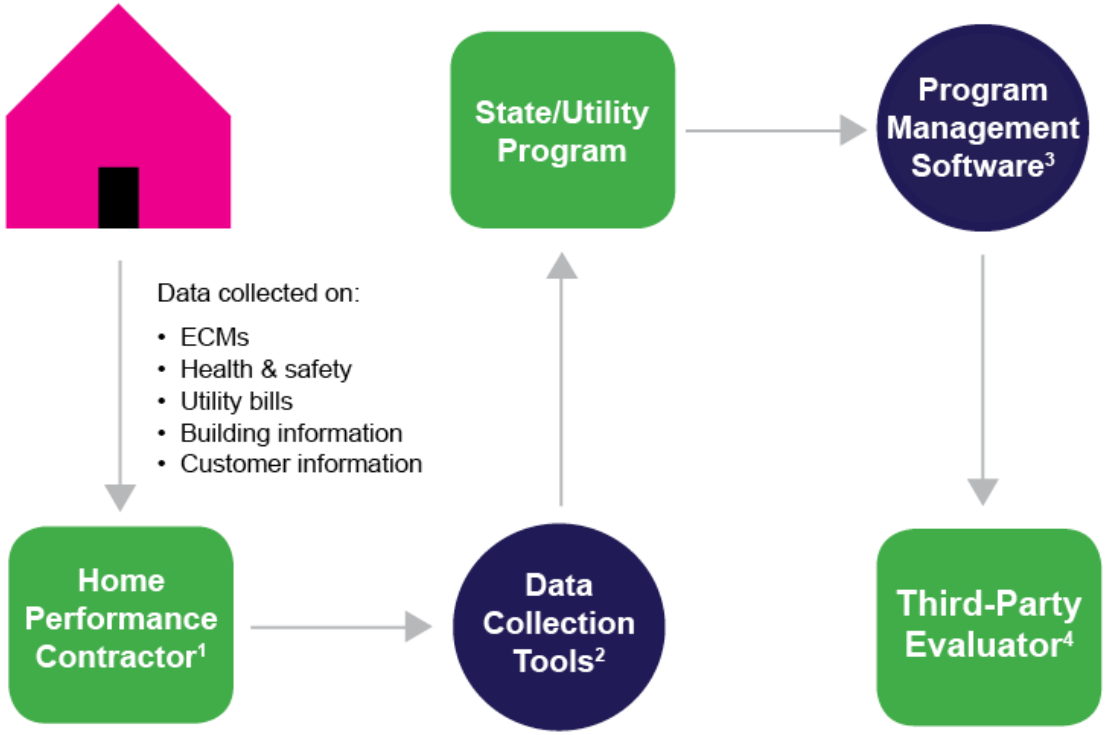
Standard Transfer of Home Energy Upgrade Data to Utility Program



Notes:

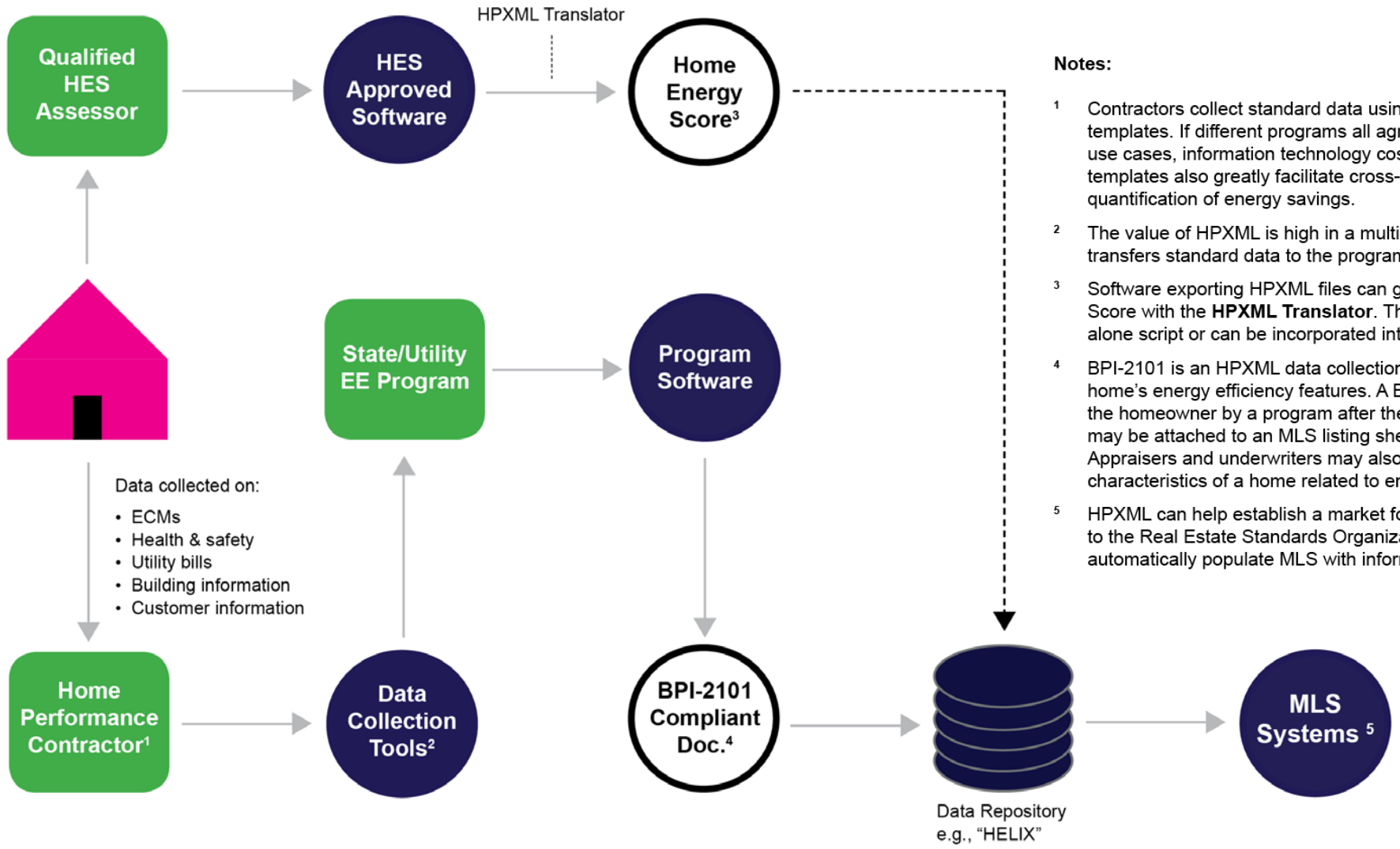
1. Contractors collect standard data using the **Audit** and **Upgrade** HPXML data collection templates. If different programs all agree to collect the same (or very similar) data for the same use cases, information technology costs could be reduced significantly. Standard data collection templates also greatly facilitate cross-program comparability, support research and the accurate quantification of energy savings.

2. The value of HPXML is high in a multiple software environment because each data collection tool transfers standard data to the program for validation, which improves data quality, reduces data redundancy, and improves the consistency and efficiency of data collection. Products may include data checks to validate against program requirements.

3. Using HPXML significantly reduces QA/QC labor costs. Because programs receive standardized data, automated data checks can be coded into program management software to validate against multiple program criteria. This reduces manual data entry, review, and approval.

4. Programs using HPXML can send a clean dataset to evaluators, reducing data management labor costs.

Standard Transfer of Home Energy Upgrade Data to MLS Systems



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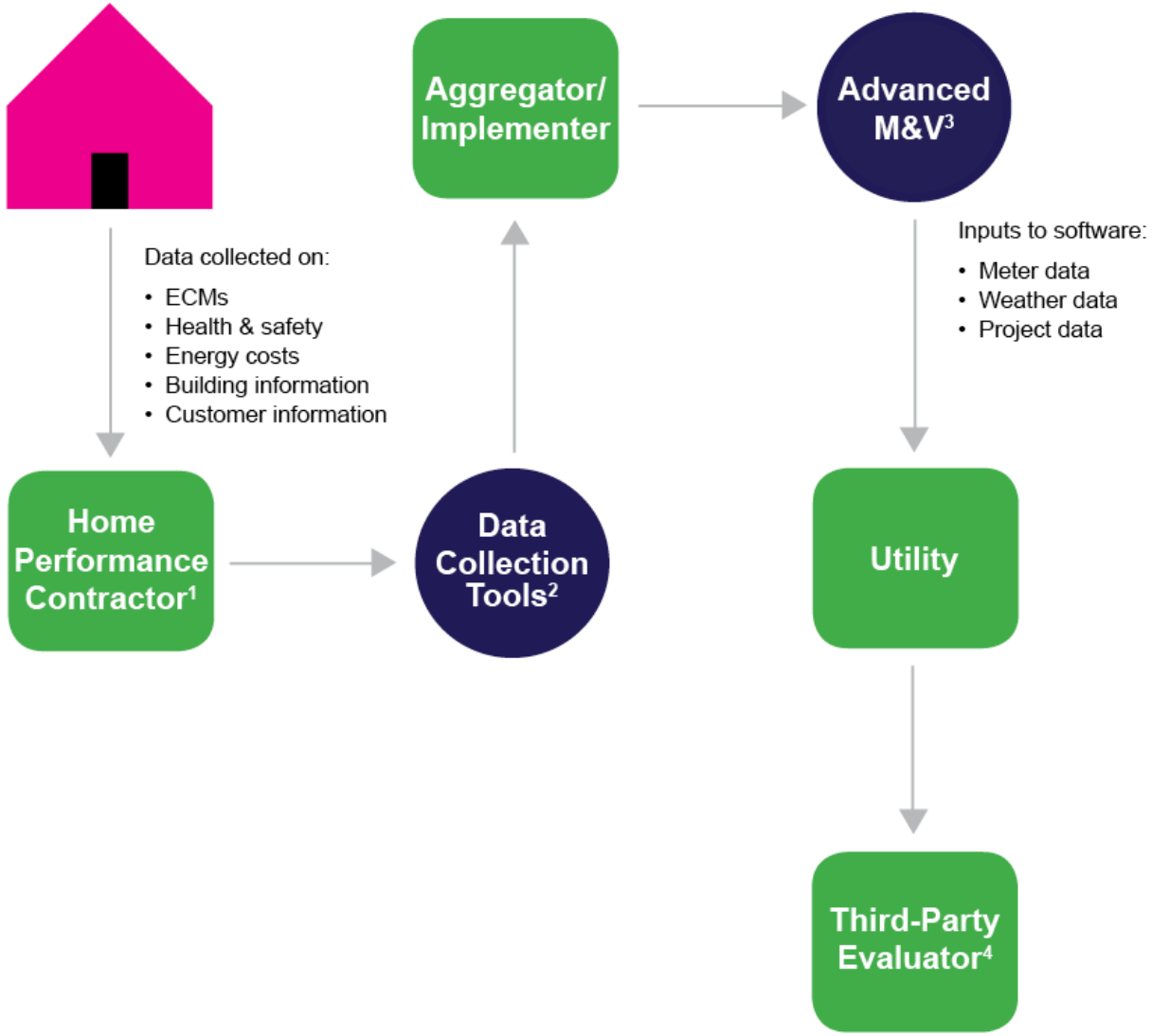
2. The value of HPXML is high in a multiple software environment because each data collection tool transfers standard data to the program for validation.
3. Software exporting HPXML files can generate inputs to the Department of Energy's Home Energy Score with the **HPXML Translator**. The HPXML Translator is available open source as a stand-alone script or can be incorporated into the Home Energy Score API.
4. BPI-2101 is an HPXML data collection template that specifies requirements for documenting a home's energy efficiency features. A BPI-2101 compliant document can be branded and issued to the homeowner by a program after the completion of an energy effiiency project. The document may be attached to an MLS listing sheet to demonstrate the home's relative energy efficiency. Appraisers and underwriters may also use the document as a source of information about characteristics of a home related to energy consumption and energy savings.
5. HPXML can help establish a market for home energy labeling consistency because it is mapped to the Real Estate Standards Organization's Data Dictionary. This alignment enables Realtors to automatically populate MLS with information on a home's energy efficiency features.

Performance Based Incentive System



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2. The value of HPXML is high in a multiple software environment because each data collection tool transfers standard data to the program for validation.

3. In a performance based incentive system (e.g., Pay for Performance), advanced M&V software is the basis for payments to contractors (via aggregators). The software continually measures a participant's usage to determine savings, as well as to identify usage and performance trends. Data standardization (of project data) enables software to become more efficient, scalable, and interoperable with other systems. Because project data is HPXML, software can be adopted across jurisdictions with little customization, resulting in savings for users.

4. Programs using HPXML can send a clean dataset to evaluators, reducing data management labor costs. Standardized data also enables the use of advanced M&V software and may help evaluation companies scale.

Vision

- Promote efficient exchange of residential building and energy per data among information trading partners (e.g., programs, contractors, implementers, government, MLS systems, etc.) as a way of reducing costs and improving transparency in the market
- Facilitate data consistency across jurisdictions through the adoption of common reporting templates
- Enable automation of data aggregation, cleaning, and analytic processes to eliminate duplicate data entry and reduce errors
- Produce high quality, large data sets to inform market research and the valuation of energy efficiency resources

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Audience

Stakeholder groups who use and benefit from data collected by home performance contractors during a home energy upgrade or the installation of individual energy conservation measures

- Program administrators
- Implementers/aggregators
- Software developers
- Regulators
- Contractors

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Today's Data Standards

- **HPXML** specifies a data dictionary and a standard data transfer protocol for all data commonly used in the home energy efficiency industry.
- **BEDES** is a dictionary of terms, definitions, and data formats created to facilitate the exchange of data on building characteristics and energy use for the commercial, multifamily and residential industries. **HPXML is the most widely used implementation of residential BEDES.
- **RESO Data Dictionary** standardizes terms used in MLS systems nationwide so that information can be easily shared and understood in the real estate industry.

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Timeline of Progress

2010
- Initial draft XML specification for home performance data (BPI/PSD) developed

2011
- BPI initiates data standards committee

2013
- BPI publishes home performance data standards 2100,2101, 2200 (HPXML 1.0)
- APS, LEAP, & NYSERDA pilot adoption of BPI (HPXML) data standards
- PSD, OptiMiser, Cake Systems, Snugg Pro are first audit software to use HPXML to transfer data

2014
- HPXML 2.0 and 2.1 completed
- DOE BEDES launched

2015
- HPXML Implementation Guide completed
- HEScore Translator completed
- Home Upgrade Program Accelerator launches

2016
- CA adoption of HPXML (Build It Green)
- Developer's File Validator and HPXML 2.2 completed

2017
- HPXML Online &, Developers Data Dictionary completed
- SEED HPXML Import completed
- ENERGY STAR Home Advisor imports HPXML

2018
- IL adoption of HPXML
- HPXML WG aligns HPXML with RESO/AI Addendum
- HPXML WG develops Energy Ratings Index use case to align HERS and HES
- HPXML WG education & outreach campaign

2019
- WAP/NEAT adopts HPXML

2020
- All residential energy audit software able to export HPXML file

Software Adoption of HPXML

HPXML Import and/or Export

- Auditor
- BEopt
- CakeSystems
- ECOS*
- Energy Orbit
- EnergySavvy
- ENERGY STAR Home Advisor
- GreenPro
- Home Energy Score
- NEAT*
- OpenEE Meter
- OptiMiser
- Pivotal Energy*
- REM*
- SEED
- TREAT
- SnuggPro

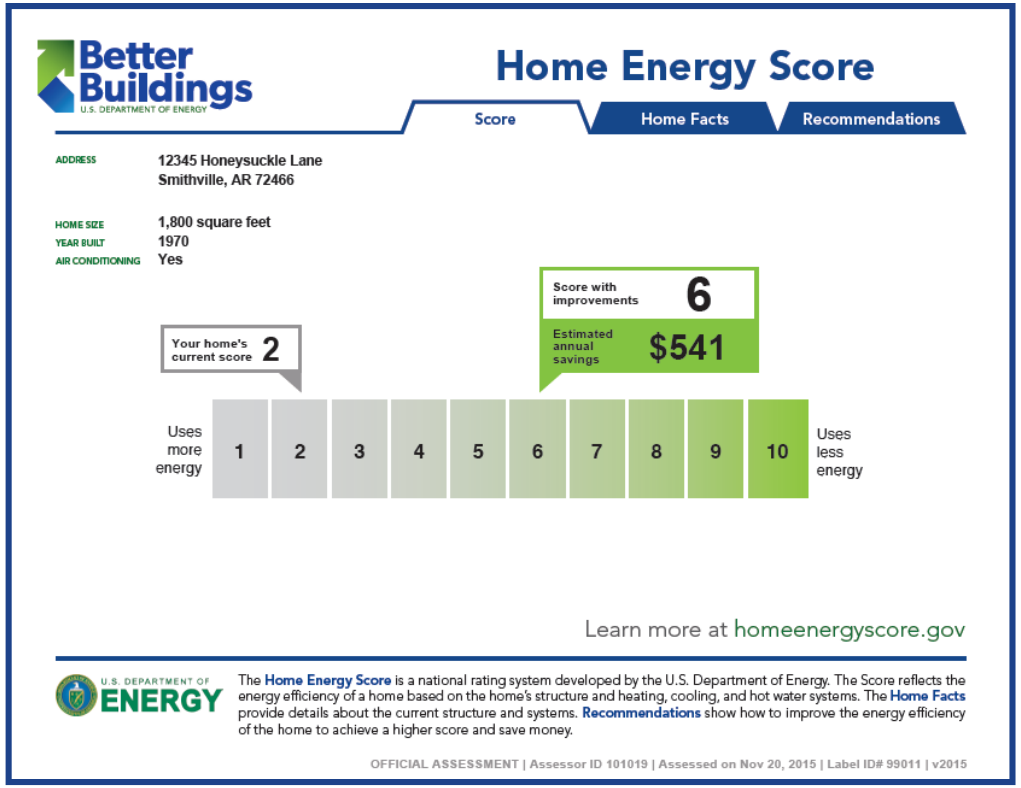
Not HPXML Compatible

- BEACON
- EnergyGuage
- EQ-QUIP
- HEAT
- MHEA

*planned or in progress

Home Energy Score HPXML Translator

- A translator automatically simplifies complex, HPXML-formatted home data into inputs to generate a Home Energy Score
- Built into the Home Energy Score API
- Minimizes need to customize assessment software



Standard Energy Efficiency Database Platform

- Recently added HPXML import and export functionality to support use of the SEED platform for residential building data aggregation and auto-population of efficiency data in real estate listings.

SEED
STANDARD ENERGY EFFICIENCY DATA
PLATFORM™
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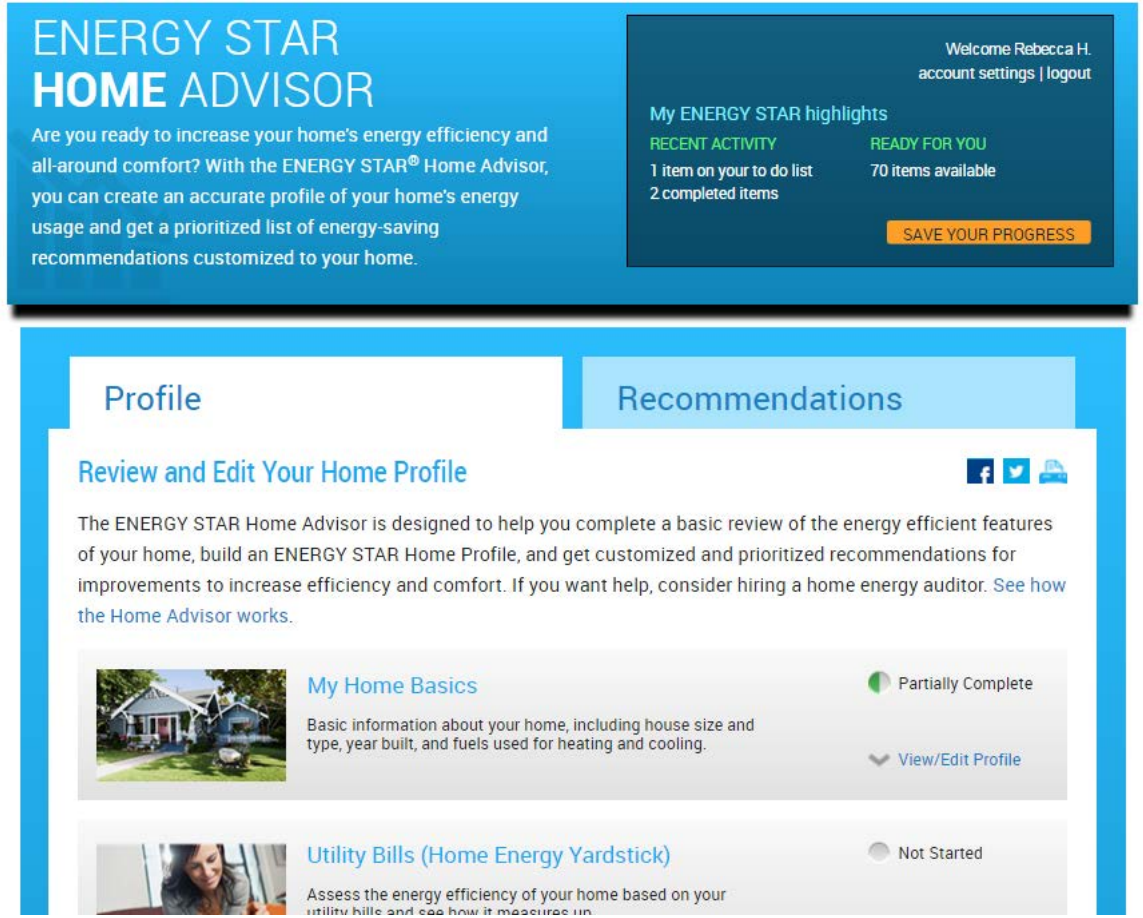
ENERGY STAR Home Advisor

- Auto populate using HPXML
- Developing HPXML export to facilitate interactions with other systems.



www.energystar.gov/homeadvisor

Questions? Email: Hudson.Rebecca@epa.gov for more information

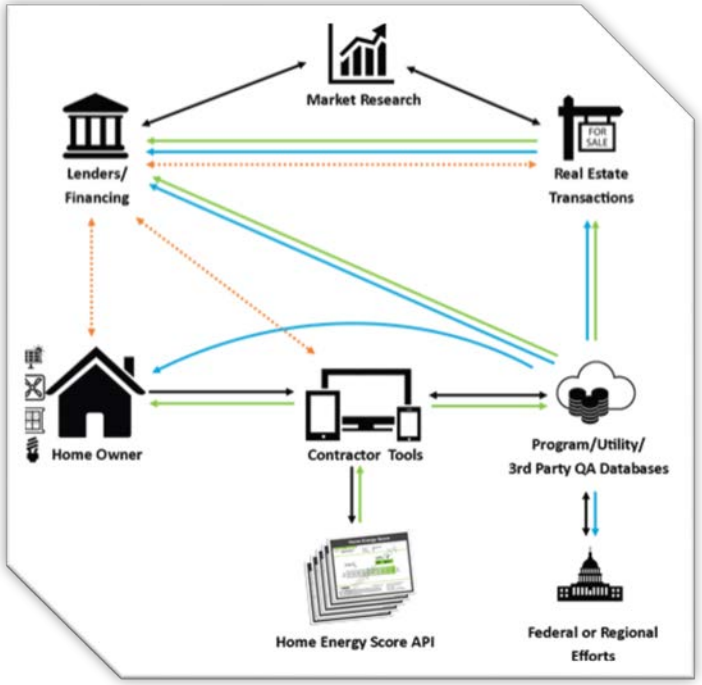
Home Performance Community Tools

- http://www.hpxmlonline.com provides information on the data standard, the value for the building performance industry, and tools to help programs and software developers.
- https://hpxml.nrel.gov provides a set of developer tools including: schema and use case validator, data dictionary, and mappings to other data standards.

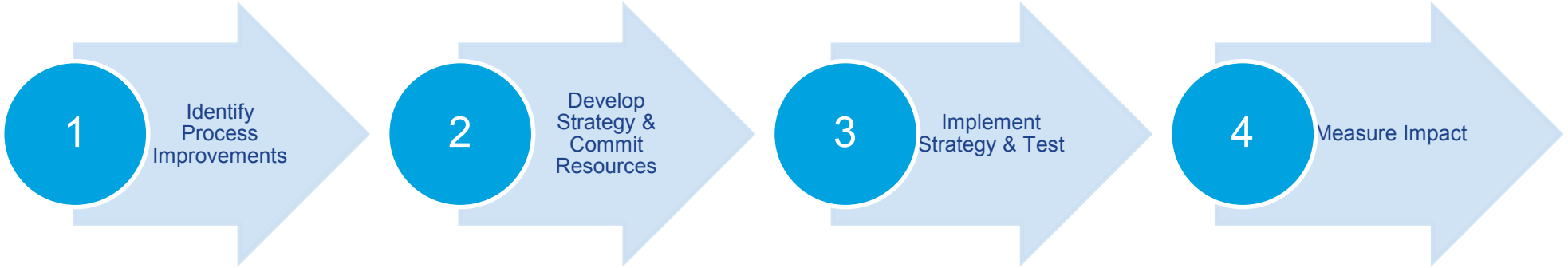
Home Upgrade Program Accelerator

Objective: Reduce the administrative burden and cost of programs by improving processes to:

- ✓ Manage and track home energy upgrades
- ✓ Review the quality of work
- ✓ Streamline data collection, management, & transfer (e.g., BEDES, HPXML)



Partners following four step process



Accelerator Partners

- APS
- NYSERDA
- Build It Green
- Enhabit
- Pearl Home Certification
- Building Performance Institute
- Midwest Energy Efficiency Alliance (MEEA)
- Neighborworks of Western Vermont HEAT Squad

Benefits

- ✓ Peer exchange of knowledge and experience
- ✓ Strategies to reduce program cost and enhance effectiveness, improve participating contractor satisfaction
- ✓ Receive public recognition as leader

APS Case Study

Results

Through program improvements, Arizona HPwES set out to improve contractor satisfaction, reduce labor costs, and increase the quality of service. Results are summarized in the box below.

- ⇧ **50%** increase in contractor satisfaction after launch of HPXML-based software environment.
- ⇩ **31%** decrease per project in contractor administrative labor following implementation of a more streamlined online reporting, rebate approval, and QA process.
- ⇩ **50%** decrease in quality assurance administrative labor following implementation of the new software environment.
- ⇧ Better project quality and consistency after launching Success with Home Energy Upgrades training.

Roadmap Vision

- Promote efficient exchange of residential building and energy per data among information trading partners (e.g., programs, contractors, implementers, government, MLS systems, etc.) as a way of reducing costs and improving transparency in the market
- Facilitate data consistency across jurisdictions through the adoption of common reporting templates
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Challenges

- Value of HPXML (and data standardization) is unclear
- HPXML is perceived as difficult or expensive to implement, particularly outside a planned software upgrade
- Customization of standard data collection templates adds to software development costs

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Plan Overview

- Launch education and outreach plan to communicate value of standardization
- Establish a market for home energy documentation consistency
- Ensure HPXML remains responsive to industry needs
- Establish process for keeping HPXML aligned with other data standards

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Priority #1: Outreach & Education

Goal – Program implementers, software developers, regulators, and other users value and support HPXML, and have access to resources needed to implement the standard.

- Task 1: Develop case studies that demonstrate impact
- Task 2: Target outreach to programs likely to adopt HPXML (e.g., software upgrade)
- Task 3: Promote general education and awareness of HPXML
- Task 4: Develop materials that reduce the costs of implementing HPXML
- Task 5: Provide technical support to programs/software implementing HPXML

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Poll Question #3

- Which stakeholder group is **most** critical to advancing data standardization?

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Priority #2:
Establish Home Energy Documentation Consistency

Goal – HPXML is the national data standard for documenting a home's energy efficiency features and performance for transfer to Multiple Listing Services.

- Task 1: Align HPXML with RESO Data Dictionary
- Task 2: Educate industry on value of HPXML data
- Task 3: Pilot BPI-2101
- Task 4: Continue to support 'auto-pop' efforts

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Priority #3: HPXML Meets Industry Needs

Goal – Ensure all necessary, stakeholder-identified changes, fixes, and additions to HPXML are made in a timely fashion through a transparent stakeholder process.

- Task 1: Regularly convene HPXML working group as a forum for identifying and resolving issues
- Task 2: Establish timeframe for users to update software after major version release (e.g., 3.0.0)

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Priority #4: Maintain Alignment w Industry Standards

Goal – HPXML is aligned with industry standards (e.g., BEDES, RESO) to facilitate interoperability and reduce transactional costs for program implementers.

- Task 1: Map HPXML (BPI-2101) to RESO Data Dictionary
- Task 2: Map HPXML to Appraisal Institute's Residential Green and Energy Efficiency Addendum
- Task 3: Develop process for maintaining standards coordination after new version releases

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Key Opportunities for Broader Adoption

- Require software to be HPXML compatible when issuing RFP/RFQs for program management software
- Require audit software with HPXML export capabilities for participation in program
- Adopt HPXML during major software upgrades
- Use HPXML data collection templates to standardize requirements for specific use cases

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Poll Question #4

- Which tools or actions are most important to broader deployment of HPXML?

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Next Steps

- Comment period (January 24th – February 6th)
- Final release of Data Standards Roadmap on February 27, 2018

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Thank You!

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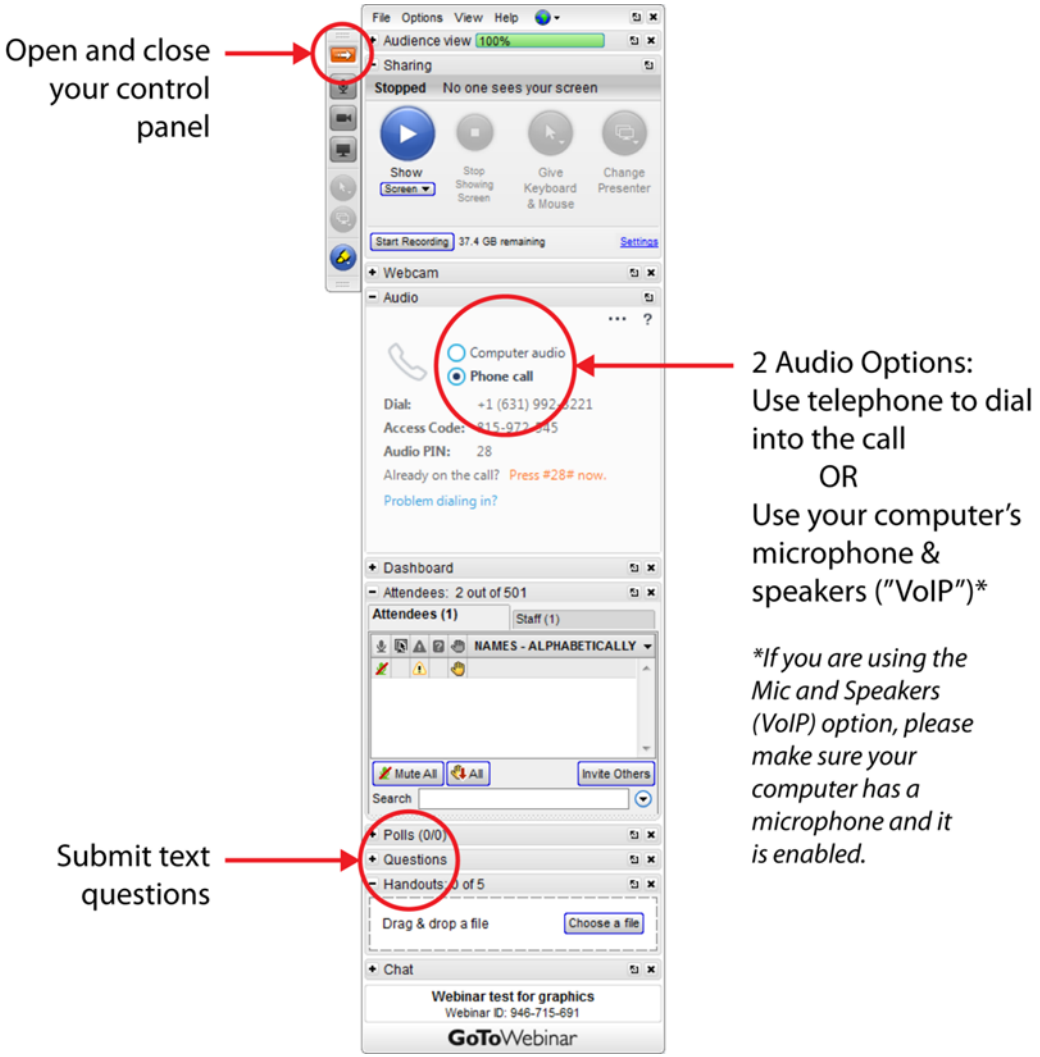
www.hpxmlonline.com

Q&A Session

Select the ‘questions’ pane on your screen and type in your question.



Thank you!

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