Better Buildings®
U.S. DEPARTMENT OF ENERGY

Overcoming the Home Upgrade Tower of Babel with HPXML

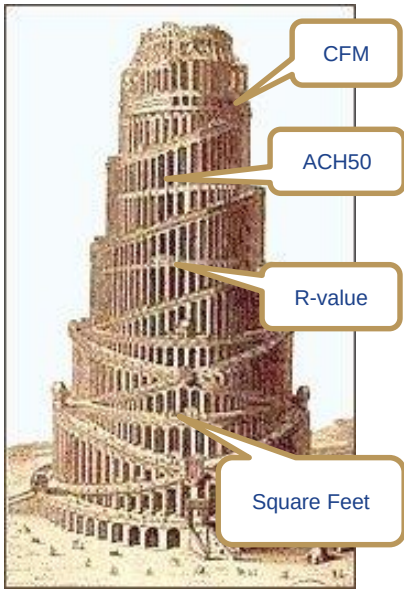
May 27, 2015

Moderator
Dale Hoffmeyer, DOE

U.S. DEPARTMENT OF ENERGY

What is a Home Upgrade Tower of Babel?

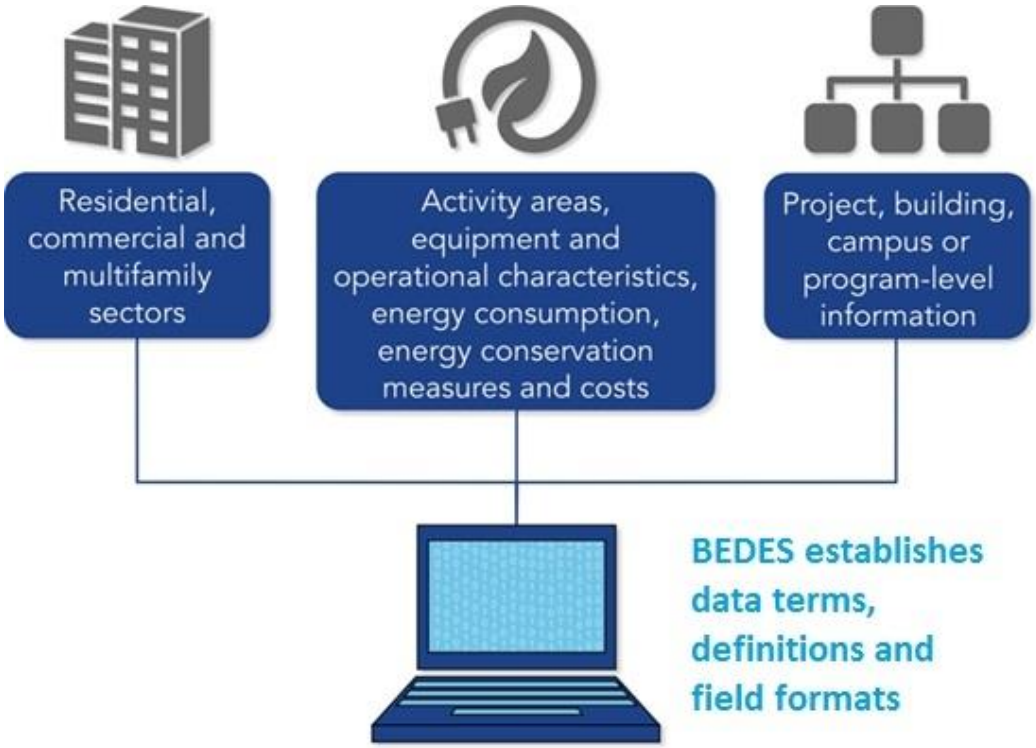
Collecting home energy upgrade data,
from hundreds of thousands of homes,
using inconsistent data fields,
definitions, units of measure,
and file formats.



- The opposite of data interoperability
- A significant administrative burden that limits home energy upgrade transactions
- **A barrier we can overcome**!

The Building Energy Data Exchange Specification (BEDES)

BEDES provides a common set of data terms, definitions and field formats that can be used by public and private software tools, data schemas and databases working within the building energy performance sector.



What is HPXML?

Two primary data standards published by the Building Performance Institute (BPI) for collecting and transferring home energy upgrade information.

- Dictionary of terms for home upgrades aligned with BEDES
  - Home Performance-Related Data Collection (BPI-2200)
- Schema for data transfer using extensible mark-up language (XML)
  - Home Performance-Related Data Transfer (BPI-2100)

EXAMPLE HPXML

```
<WaterHeatingSystem>
        <SystemIdentifier id="dhw1"/>
        <FuelType>natural gas</FuelType>
        <WaterHeaterType>storage water heater</WaterHeaterType>
        <Location>conditioned space</Location>
        <CombustionVentingSystem idref="combvent1"/>
</WaterHeatingSystem>
```

Our Panelists

- Gavin Hastings (Tierra Resource Consultants) will address:
  - Why HPXML was developed
  - The HPXML value proposition

- Julie Caracino (NYSERDA)
- Cynthia Adams (Pearl National Certification)
- Greg Thomas (PSD)

  will address:
  - How their organization uses HPXML
  - The benefits they anticipate from HPXML

Panel Discussion

- What other programs are implementing HPXML?
- What are other use cases for HPXML that we have not discussed?
- How does an organization get started implementing HPXML?
  - What resources are available if I am ready today to implement HPXML?
  - Is HPXML all I need?
- If my goal is to streamline data transfer and reduce costs, what have been some challenges with implementing HPXML?
- What do you see as the next big thing to improve data interoperability in the residential sector?
- What needs to be done over the next 3 years to overcome the information tower of babel and realize the full benefits of implementing HPXML?
- What are 3 takeaways you want your peers to leave with today?

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Understanding the Value of HPXML

Presented by: Gavin Hastings, Managing Consultant

Why HPXML?

- Standardize the collection of residential building data.
- Increase interoperability between industry software system.
- Create implementation consistency across jurisdictions to drive economies of scale.
- Create consistent, high quality, and large scale data sets to inform market research and valuation of EE resources.

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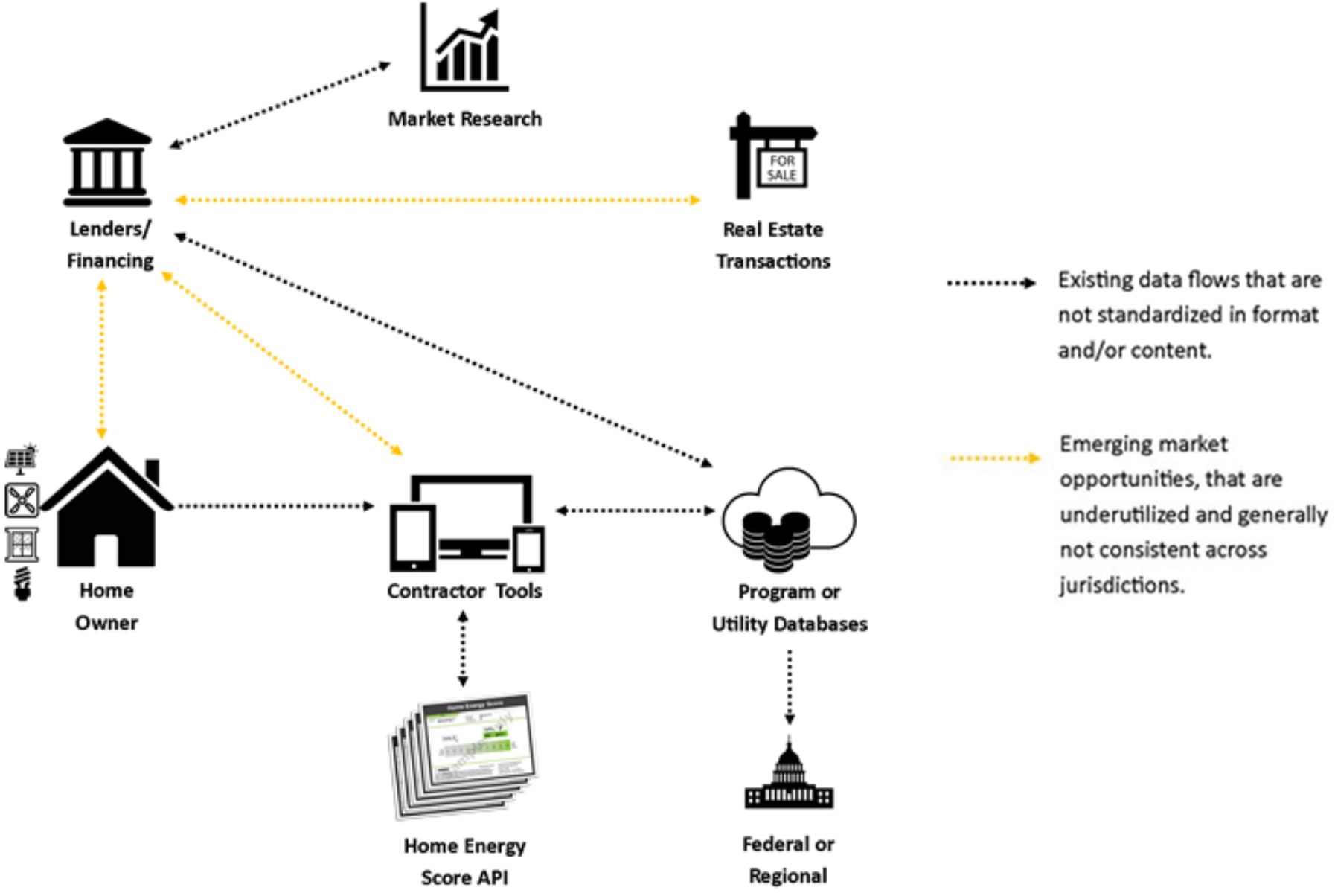
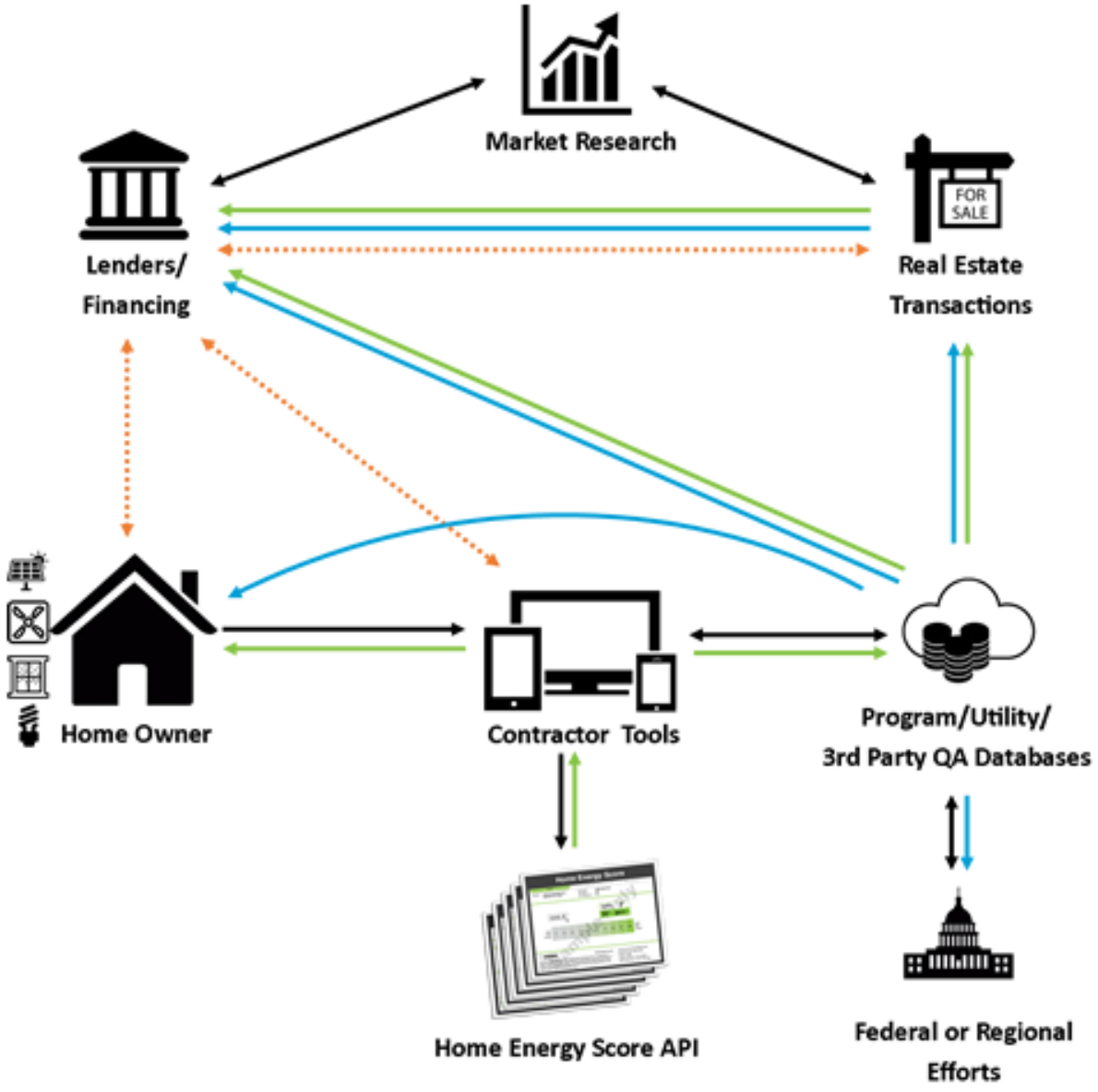
Creating a Streamlined and Connected Market Place

The Existing Data Infrastructure



HPXML Enabled Infrastructure



General data flows that will be improved by HPXML.

HPXML will facilitate the generation of Home Energy Scores via the API and then pass the Home Energy Score to other market actors.

HPXML will help populate and transfer a Home Performance with ENERGY STAR or other third party verified Certificates of Completion.

A more standardized and transparent market, facilitated by HPXML, will improve the recognition, valuation and funding opportunities throughout the residential energy efficiency marketplace.

NOTE: This graphic is designed to illustrate some of the potential ways that HPXML can assist the market. However, not all connections or impacts of HPXML could be captured in this illustration.

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Value Proposition for Programs Administrators

Increase Operational Efficiency

- Open software markets to allow contractor choice:
  - Example: APS Home Performance Program **doubled contractor satisfaction** with new software environment.
- Streamline data collections and auto validation:
  - Note: Build on the backs of those before you
  - Example: APS Home Performance Program **decrease admin cost per project by 50%**
- Streamline reporting and data transfer.

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Expanding Opportunities with HPXML

- Easier integration with Home Energy Score API
- ENERGY STAR Home Advisor tool integration
- Driving value in Real Estate
  - Combining efforts with other HPXML jurisdictions
  - Exporting to MLS (BPI-2101)
- Integration with other National databases
  - Streamline Reporting for Federal Program
  - Improved market research
- Access to emerging technologies for quantification of EE benefits.
- Many others…

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Value Proposition for Contractors and Trade Allies

Trade Ally Opportunities

- Choice in tools for data collection and modelling
  - Aligns better with contractor business systems
  - Take advantage of innovation
  - Integration with internal quality management
- Streamline user experience for lower participation costs
  - Example: APS program, contractors reporting **31% reduction in admin time per project**
- Potential integration with other services
  - Marketing
  - Financing
- Potential for seamless experience across markets and programs

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Thank You

- Questions?

- HPXML Implementation Guide, Visit:

  www.energystar.gov/hpxml

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Overcoming the Home Upgrade Tower of Babel with HPXML

Julie Caracino
NYSERDA Project Manager
Home Performance with ENERGY STAR

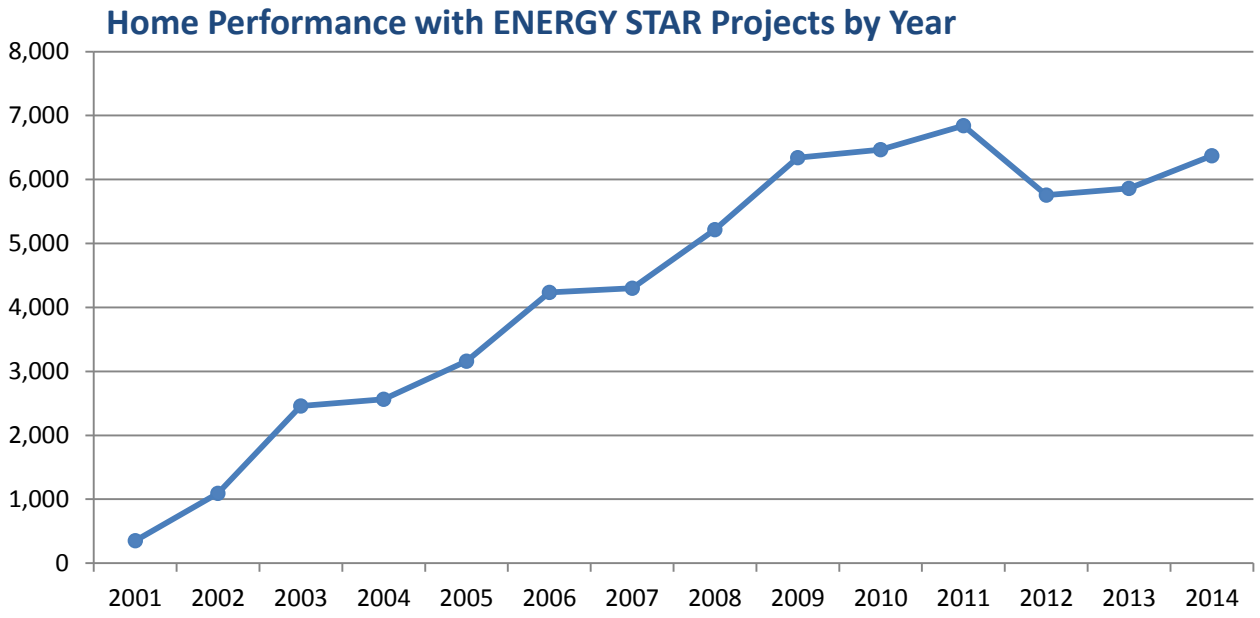
Agenda

- What is NYSERDA?
- How is NYSERDA using HPXML?
- What benefits do we anticipate from implementation?

Overview

- NYSERDA is a public benefits corporation established in 1975 to “advance innovative energy solutions in ways that improve New York’s economy and environment”
- Originally focused on R&D but now deploy numerous programs and perform energy analysis
  - Residential
  - Industrial
  - Commercial

Home Performance in New York State



Overview

- More than 63,000 projects since 2001
- 188 contractors
- Average project cost is $8,000
- Unsecured loan and on-bill financing available to most customers
- Free energy audits for 97% of NYS households

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Priorities for Adoption

1. Create an open modeling software market
2. Reduce data collection burden on contractors
3. Improve program analytics
4. Automate project approval through validation of standardized data
5. Export to local real estate market (BPI-2101, HES)
6. Facilitate sharing of information among multiple New York programs

Early Impacts of Adoption

- Make it easier for customers to choose and apply for the home performance program
- Make the application process for a home energy assessment clear, fast, and simple
- Make it easier for customer to select a home contractor at the time of application
- Reduce financing approval times
- Streamline and simplify CSG work scope review submitted by the contractor

- 95% of customers move from decision to use program to approved contract offer within 1 week.
- Reduced average workscope approval time from 8 days to 1.
- Reduced FTE's focused on approving projects from 3 to 1.
- Fewer forms, reduced data entry, and fewer visits for required paperwork.

Standardize Data Collection

- Adopt national HPXML Audit and Retrofit use cases
  - What data do we need to collect?
  - When do we need to collect it?
  - How do we make sure we are getting the data we need to meet program/QA/QC/regulatory reporting requirements?
- Partner with software tools to define and implement validation

New Workflow Development

- Automates project approvals for 85-90% of projects
  - "Kitchen table close"
- Supports processing of all projects in Optix Manage
  - Retire use CSG's Eligibility Screening Tool and database
- Phased in over 2015
- Supports HPXML

Planned Improvements in 2015

- Approve new tools for use in program in June 2015
  - OptiMiser, Snugg Pro, TREAT – HPXML, Cake Systems, Auditor
- Phase in new workflow over 2015
- Identify and automate additional processes (2015-2016)
  - Quality assurance/quality control
  - Coordination with EmPower
- Pilot BPI-2101-S-2013 Home Performance Certificate

Expected Outcomes from HPXML Implementation

- Contractors choose the tool that best meet their business needs
- Reduced processing time and costs for contractors and NYSERDA
- Consistent, high quality data across tools
- Targeted quality assurance/quality control
- Better coordination with EmPower
  - One platform, common dataset

THANK YOU!

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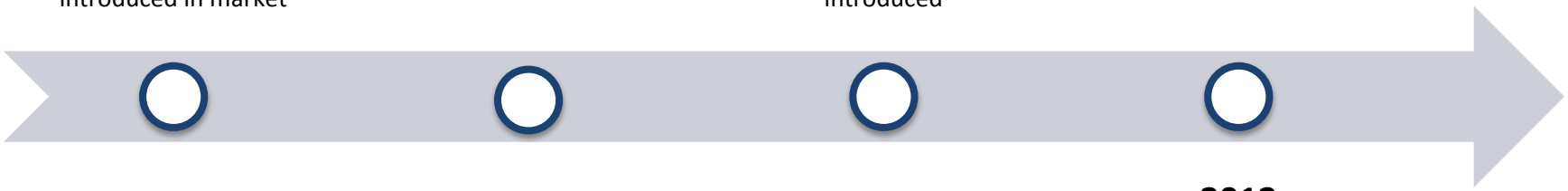
Home Performance in New York



2009

Utility efficiency programs introduced in market

2010

Free energy audits for 97% of NYS homeowners

Program expanded to Long Island (900,000+ homes)

Start of GJGNY unsecured loan

2011

Measure level TRC test introduced

2012

On-bill recovery financing available

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Clean Energy Fund

Ten-year “market transformation” plan designed to:

- Reduce barriers to home performance for contractors and customers
  - Limited awareness and trust in savings
  - Real estate market not accurately valuing energy efficiency
  - High ratio of soft costs to project costs
  - Limited homeowner commitment to energy efficiency
- Attract private capital to invest in clean energy
- Reduce greenhouse gas emissions

Funding

- Systems Benefit Charge (1996 – 2016)
- Energy Efficiency Portfolio Standard (EEPS)
  - 15% reduction in energy use in NYS by 2015
- Regional Greenhouse Gas Initiative (RGGI)
- Renewable Portfolio Standard (RPS)

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leap

local energy alliance program

The mission of the Local Energy Alliance Program is to lead the effort to retrofit buildings with energy efficient and renewable technologies. Our overarching goals include cost savings, job creation, energy self-reliance, and local economic development.

LEAP-VA Mission

LEAP's Program

- Nonprofit HPwES program sponsor serving two regions
- 20% efficiency gain required
- BBNP/SEP grant funds for rebates
- 1300+ upgrades completed – averaging 50/mo
- 30+ contractors

LEAP's HPXML Journey

- Multiple modeling software used by contactors
- Little to no incentive dollars for reporting compliance
- Program innovation designed to engage single measure contractors
- LEAP member of HPXML collaborative with APS, NYSERDA, BPI, and NHPC (now HPC)


ENERGY
RESPONSE
CORPS
plug


Snugg Home


OPTIMISER
power | simplicity | accuracy


EnergySavvy
Smart software for smart programs

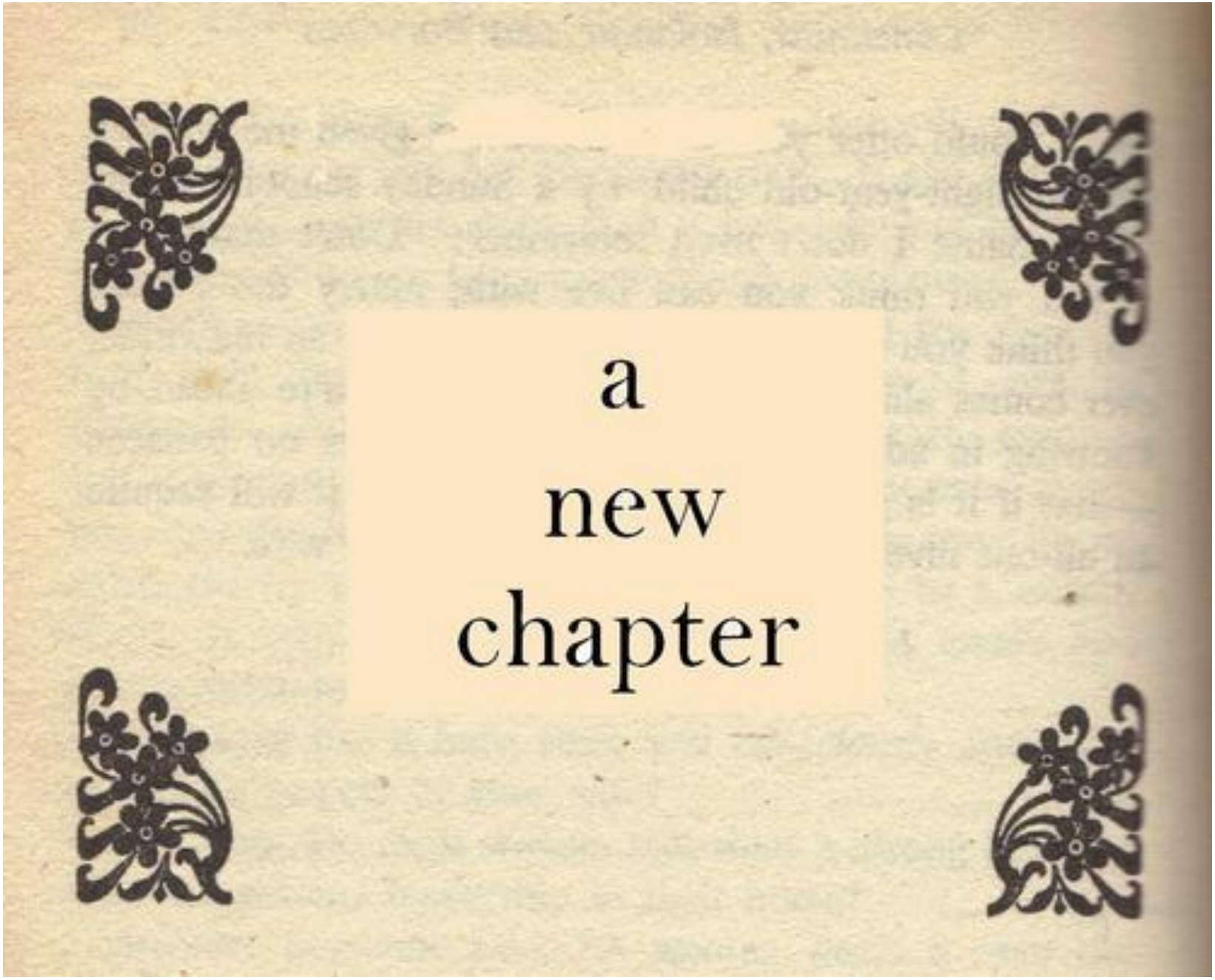
Journey's End

- HPXML implemented behind schedule
- It worked – data was transferred
- *However*, LEAP unable to achieve scale to cover admin w/o grant funding
- Ergo, no more fancy software

Market Transformation through Data

- BPI 2100 and 2200 (Home Performance XML)
- BPI-2101-S-2011 Standard Requirements for a Certificate of Completion for Whole-House Energy Efficiency Upgrades
- Dept. of Energy's Home Energy Score
- Green MLS (RESO/RETS Data Dictionary) Standardized fields for all MLS's

We have laid the HPXML foundation…what's next?

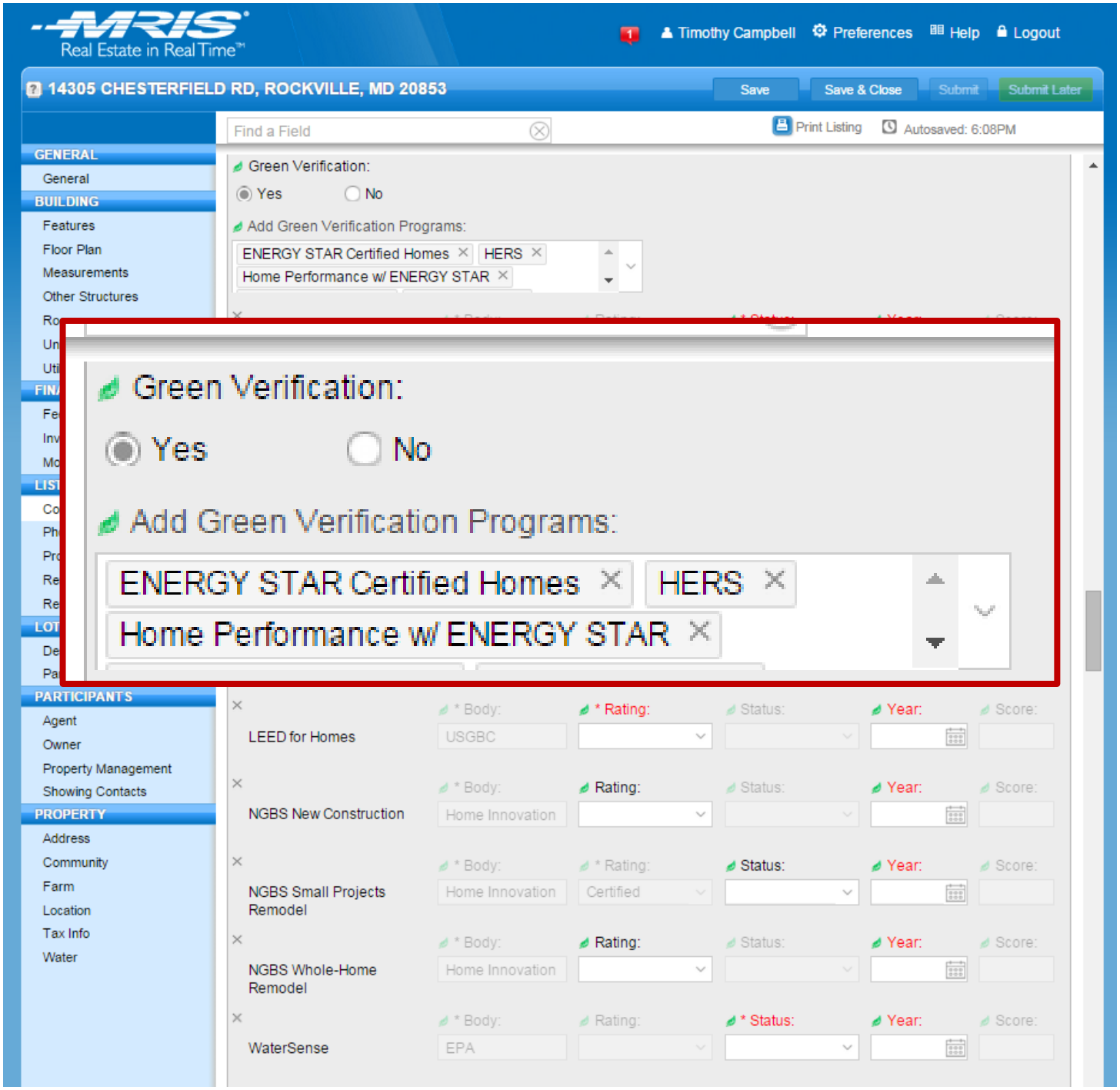

a
new
chapter

A New Opportunity

- Market-based residential certification program
- Leverage HPwES
- Partnership with LEAP (providing QA)
- Certification software will be developed to give and receive HPXML data

Goals for Our Participation in DOE's Residential Program Accelerator

- Demonstrate utility of developing program software infrastructure around HPXML from the ground up
- Use HPXML to generate a BPI-2101-compliant certificate (no need to "translate" a database into the relevant terms)
- Use HPXML to transfer data to real estate professionals (appraisers and real estate agents)
- Potentially use HPXML for receiving standard data sets from multiple contractor software tools (e.g., HEScore)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Measurements
Other Structures
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Owner
Property Management
Showing Contacts
PROPERTY
Address
Community
Farm
Location
Tax Info
Water
Green Verification:
Yes
No
Add Green Verification Programs:
ENERGY STAR Certified Homes
HERS
Home Performance w/ ENERGY STAR
* Body:
* Rating:
Status:
Year:
Score:
LEED for Homes
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NGBS New Construction
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NGBS Small Projects Remodel
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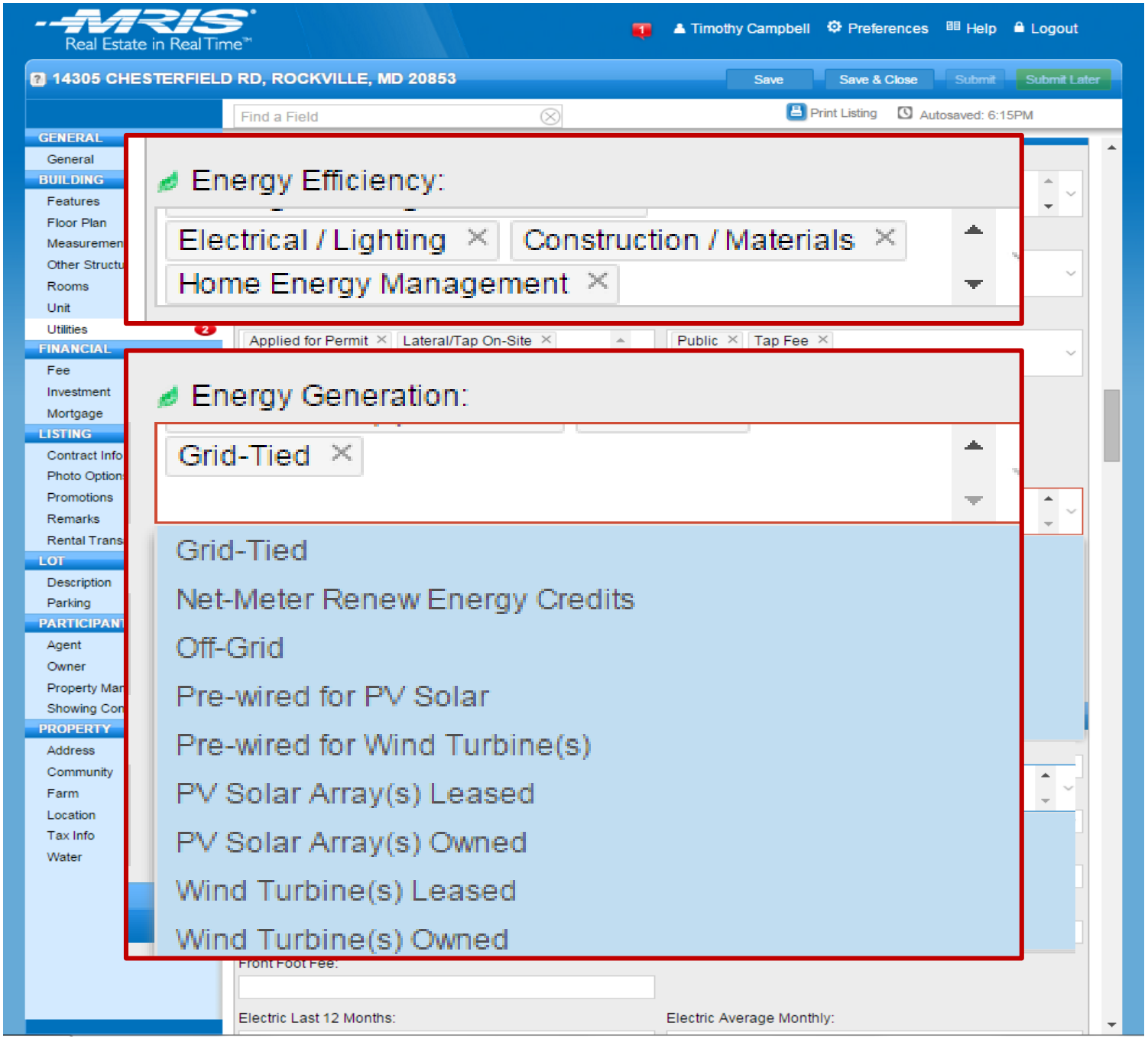
NGBS Whole-Home Remodel
WaterSense
EPA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Farm
Location
Tax Info
Water
Energy Efficiency:
Electrical / Lighting
Construction / Materials
Home Energy Management
Applied for Permit
Lateral/Tap On-Site
Public
Tap Fee
Energy Generation:
Grid-Tied
Grid-Tied
Net-Meter Renew Energy Credits
Off-Grid
Pre-wired for PV Solar
Pre-wired for Wind Turbine(s)
PV Solar Array(s) Leased
PV Solar Array(s) Owned
Wind Turbine(s) Leased
Wind Turbine(s) Owned
Front Foot Fee:
Electric Last 12 Months:
Electric Average Monthly:

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PERFORMANCE SYSTEMS DEVELOPMENT

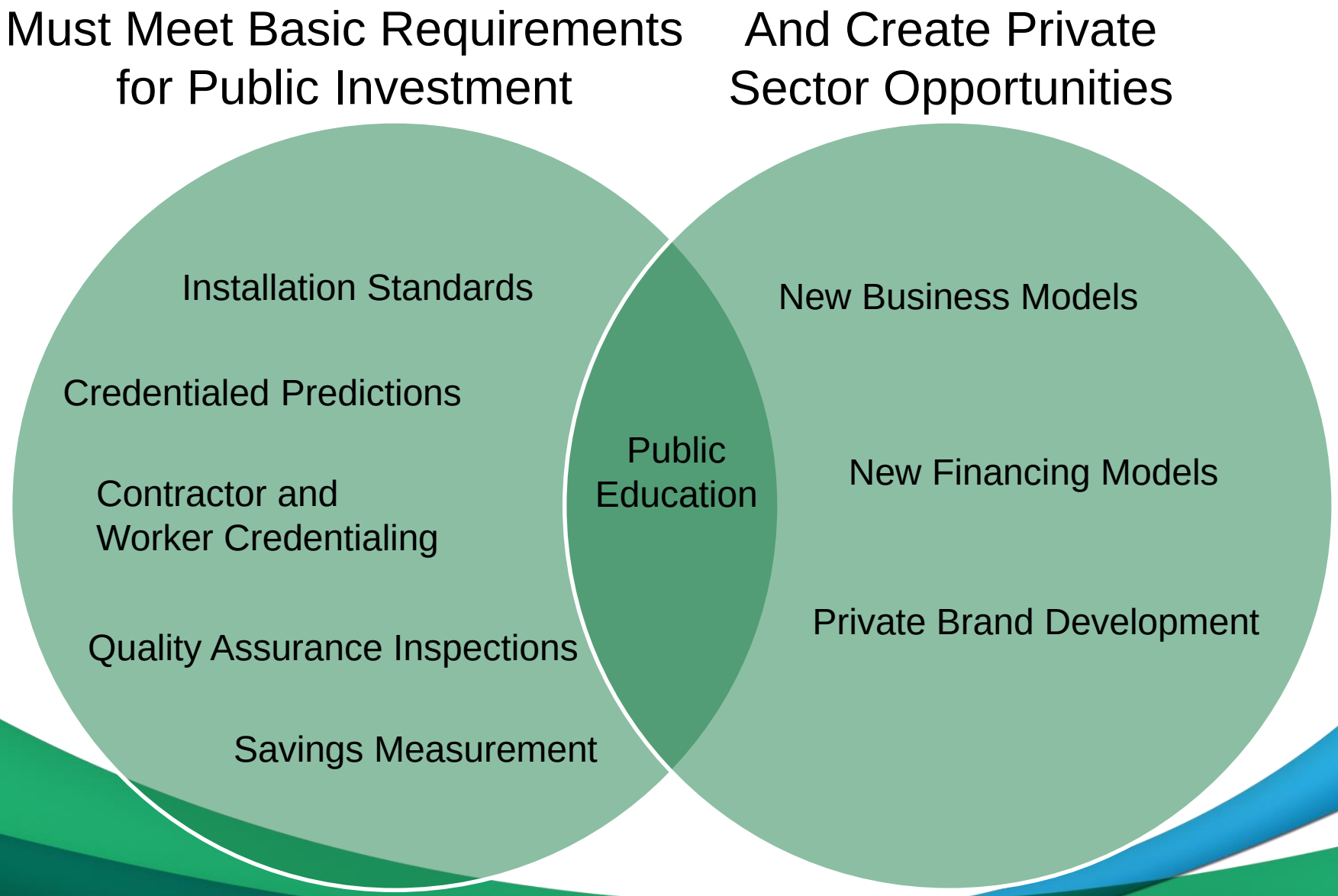
We Speak Building

Accelerating Residential EE Data for Programs and Contractors

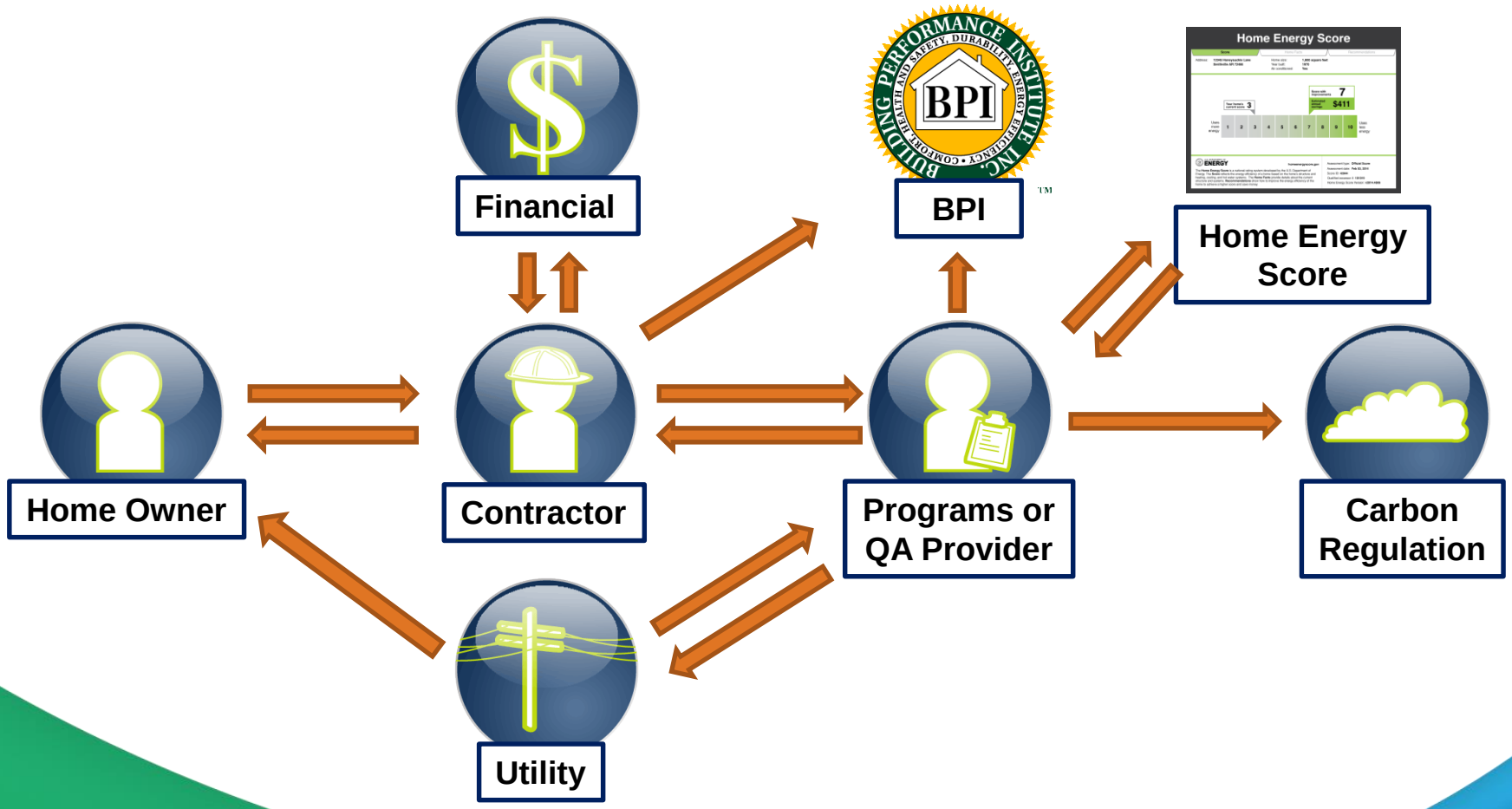
By Greg Thomas

CEO, Performance Systems Development

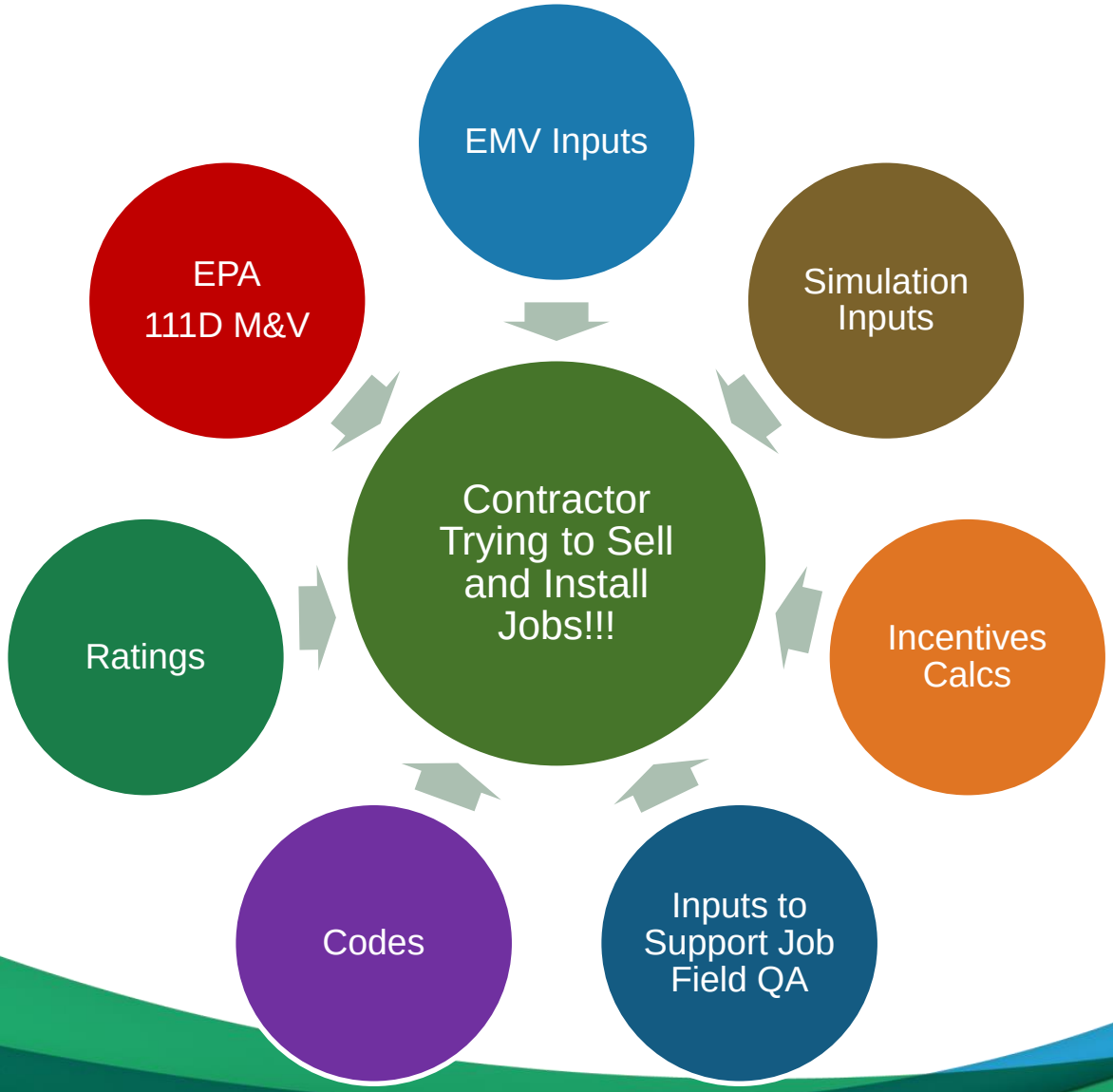
EE Programs Are Public-Private Partnerships



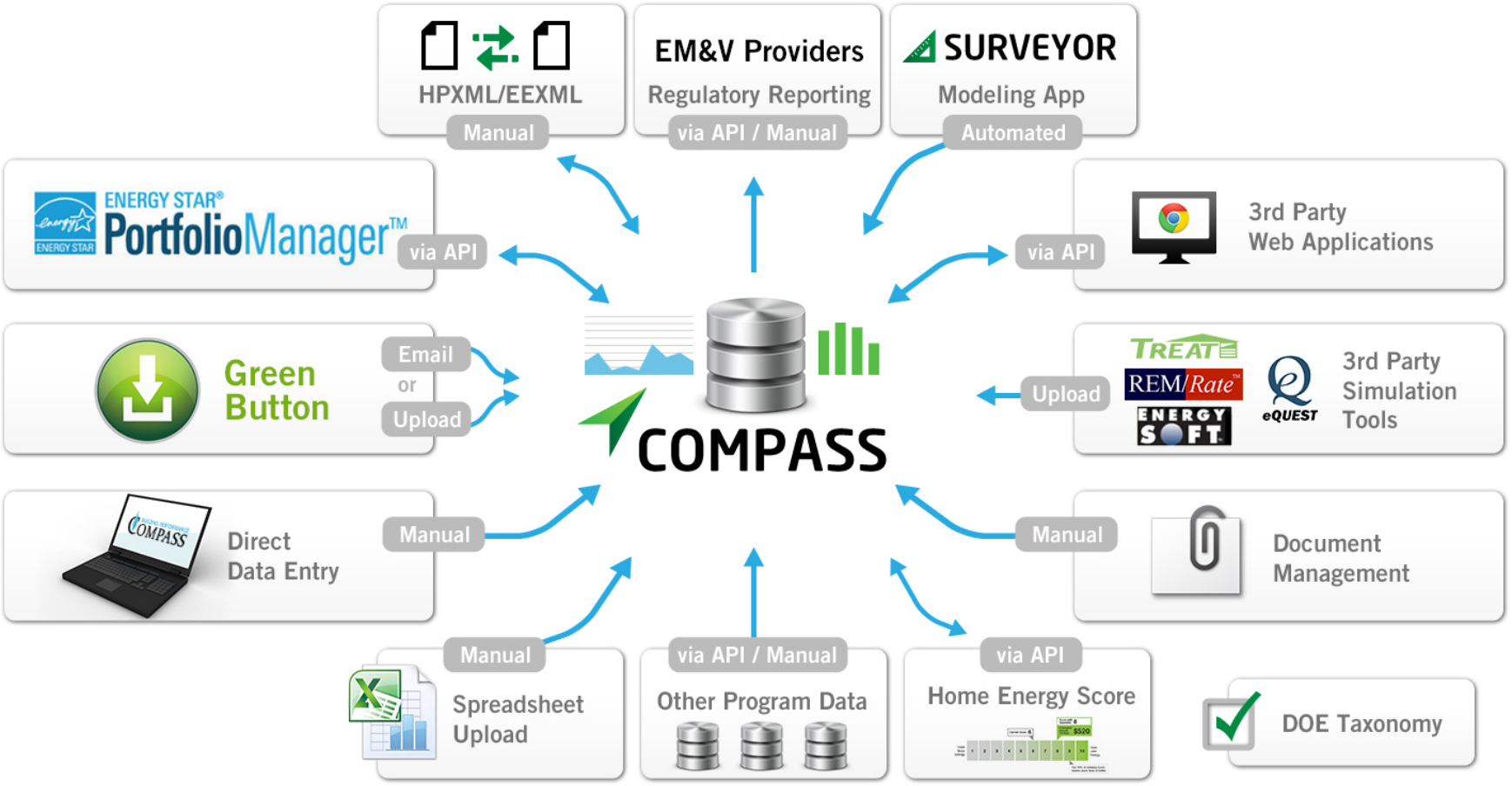
Results in Data Flow for Residential Whole Building Energy Efficiency Program



All These Data Requirement are Colliding at the Contractor and Causing Pain!

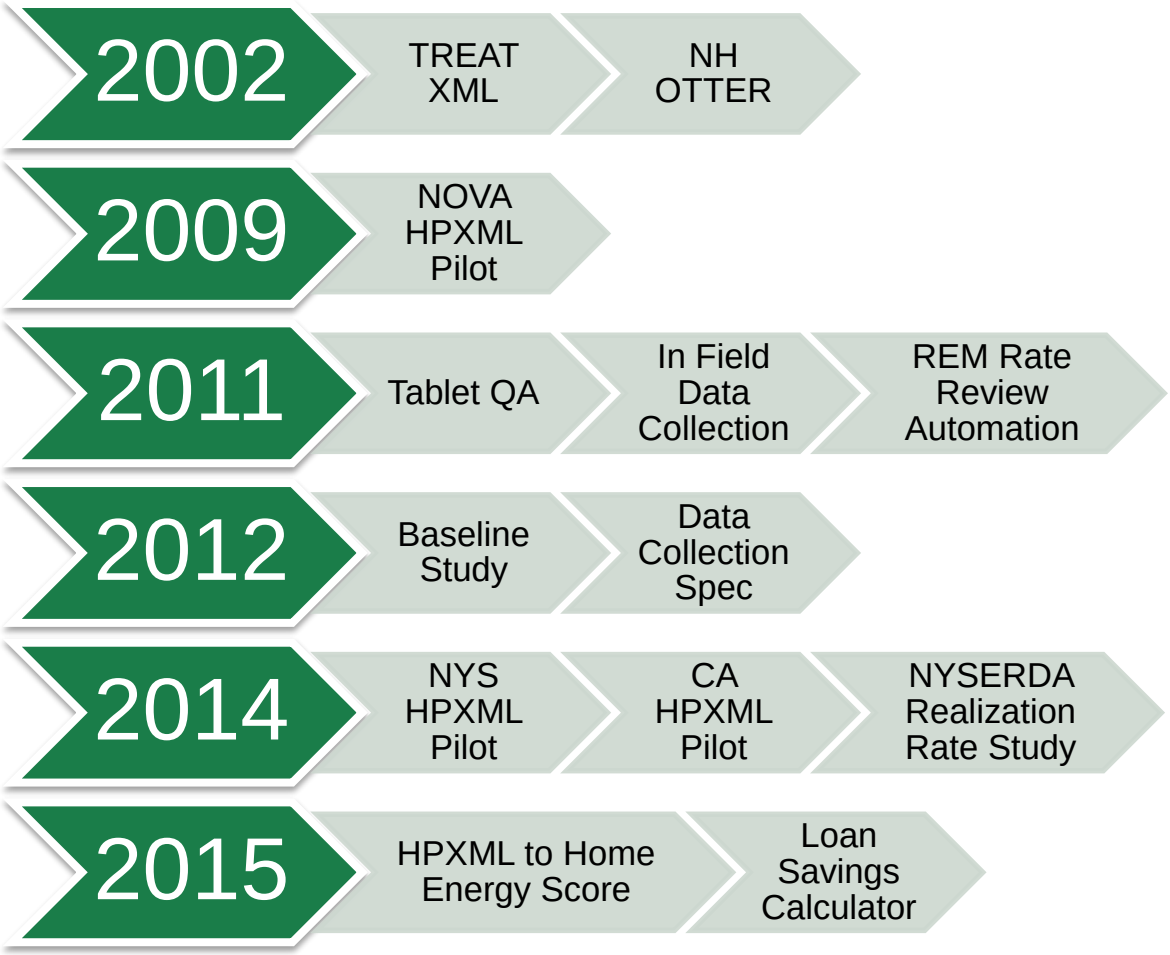


Complex Program Implementer Data Integration



PERFORMANCE SYSTEMS DEVELOPMENT

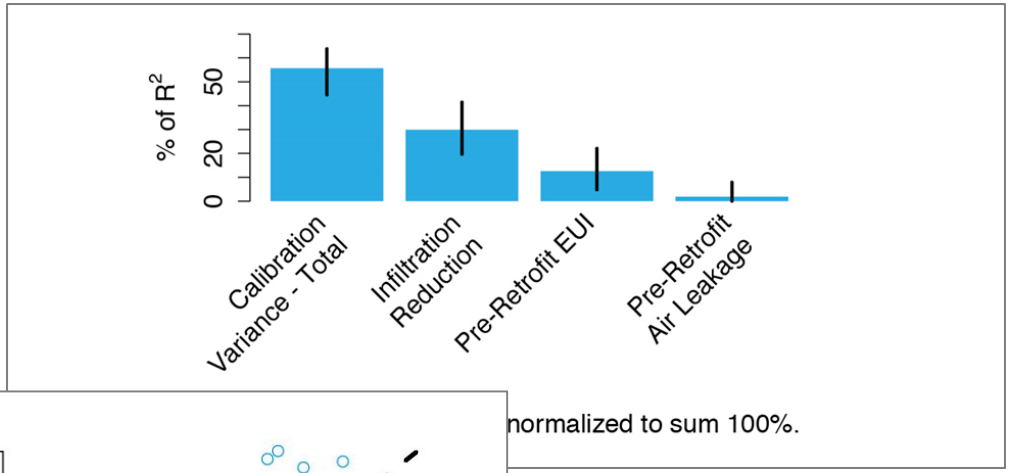
Emerging Standardization for Residential EE XML (HPXML)

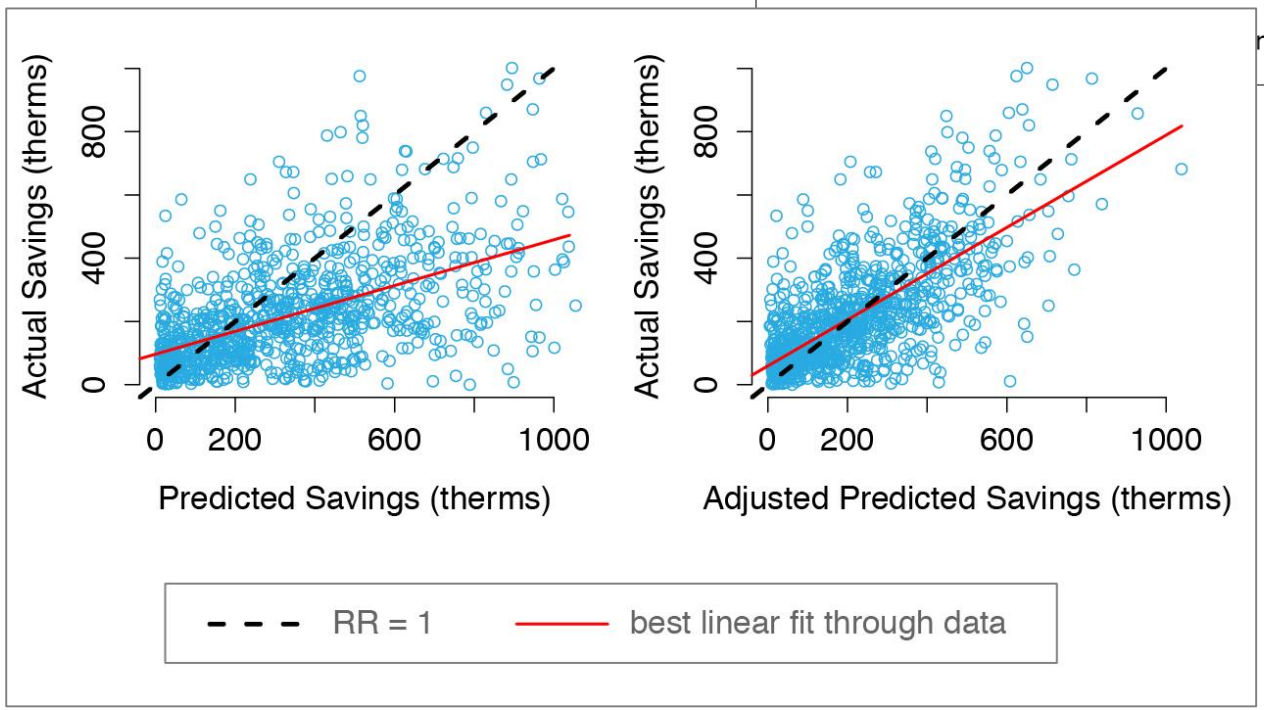


PERFORMANCE SYSTEMS DEVELOPMENT

Leveraging Residential EE XML Data for Market Insight and Transformation

NYSERDA Funded HPwES Realization Rate Study





DOE Funded Conversion of the Same TREAT XML into Draft Home Energy Scores for Analysis

PERFORMANCE SYSTEMS DEVELOPMENT

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