



HERS, ENERGY STAR and Beyond! The Value of High Performance Homes and Energy Ratings



RESNET 2018

2/28/2018



Objectives

1. Share techniques that encourage cross program collaboration.
2. Define methodologies to count energy savings across multiple programs.
3. Describe how program data can be used to support code, inform program design, and be used in Real Estate transactions.



Who Are We?



Who Are We?

- Neil Grigsby, Northwest Energy Efficiency Alliance



- Matt Christie, TRC



- Mark Wyman, Energy Trust of Oregon



- Bob Burns, Pivotal Energy Solutions

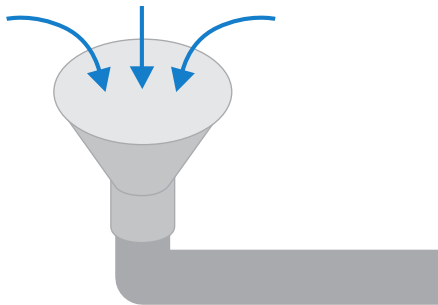


Northwest Energy Efficiency Alliance



Accelerating Energy Efficiency

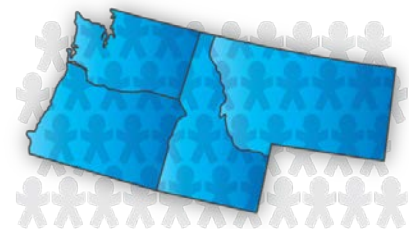
Fill the Energy
Efficiency
Pipeline



Accelerate
Market
Adoption



Leverage
the Power of
the Region





Energy Trust of Oregon

Independent
nonprofit

Serving 1.6 million customers of
Portland General Electric,
Pacific Power, NW Natural,
Cascade Natural Gas and Avista

Providing access
to affordable
energy

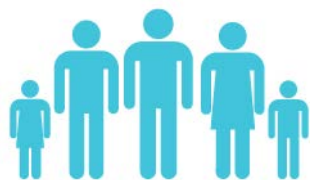
Generating
homegrown,
renewable power

Building a
stronger Oregon
and SW
Washington



15 years of affordable energy

From Energy Trust's investment of \$1.5 billion in utility customer funds:



Nearly 660,000 sites transformed into energy efficient, healthy, comfortable and productive homes and businesses



10,000 clean energy systems generating renewable power from the sun, wind, water, geothermal heat and biopower



\$6.9 billion in savings over time on participant utility bills from their energy-efficiency and solar investments



20 million tons of carbon dioxide emissions kept out of our air, equal to removing 3.5 million cars from our roads for a year

Pivotal Energy Solutions

- Founded in 2011
- Based in Phoenix, AZ
- Focus: Data Sharing and Workflow Management for the Energy Efficiency Industry
- Axis Users: Program Sponsors, Utilities, HERS Providers, Raters, QA Organizations, Home Builders



***Over 19.5k SF/MF new home certifications
in the PNW***



Northwest Energy Efficiency Alliance (NEEA)

Neil Grigsby, Portfolio Program Manager

2/28/2018

NEEA's role in New Construction Support

- Technical Assistance and Training
- Marketing
- Quality Assurance
- Program Infrastructure
 - * **Data Collection**

Navigating the Northwest

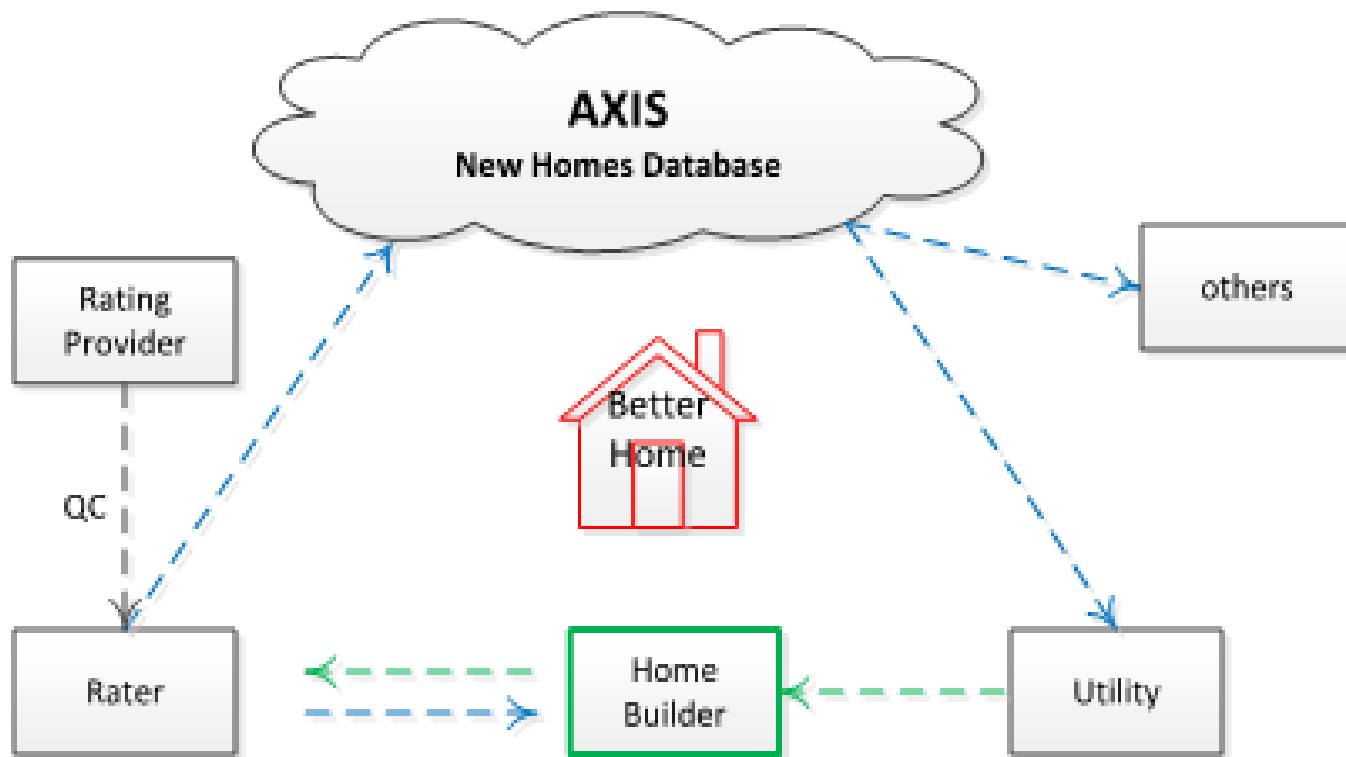




Regional Consistency and Alignment

- Modeling protocols
- **Data collection**
 - Energy savings of new homes built in the NW
 - Inform market trends, code proposals, and long term planning.

Creating a Centralized Data Hub



Data Sharing

PROGRAM NAME	PROGRAM TYPE	CLAIM SAVINGS IN 2017	DATA SOURCE
BUILT GREEN - KING/SNO	HCP	YES	INFORMAL DATA SHARING
ENERGY PERFORMANCE SCORE	UTILITY	YES	AXIS
ENERGY STAR CERTIFIED NEW HOMES	HCP	YES	AXIS
NATIONAL GREEN BUILDING STANDARDS	HCP	YES	AXIS + ADD'L DATA INFORMAL
NEXT STEP HOMES - PHASE 3	UTILITY	YES	AXIS
NW ENERGY STAR HOMES	HCP	YES	AXIS
RESNET HERS INDEX	HCP	YES	INFORMAL DATA SHARING
UTILITY INCENTIVE V1	UTILITY	YES	AXIS
UTILITY INCENTIVE V2	UTILITY	YES	AXIS
EARTH ADVANTAGE HOME CERTIFICATION	HCP	YES	AXIS
BUILT GREEN - TRI-CITIES	HCP	MAYBE	AXIS
PASSIVE HOUSE - PHIUS+	HCP	MAYBE	INFORMAL DATA SHARING
LEED FOR HOMES	HCP	MAYBE	INFORMAL DATA SHARING
PACIFIC POWER / ROCKY MOUNTAIN POWER NC HOMES	UTILITY	NO	INFORMAL DATA SHARING
BUILT GREEN - OTHER	HCP	NO (low volume)	
HOME ENERGY SCORE	HCP	NO (low volume)	
LIVING BUILDING CHALLENGE	HCP	NO (low volume)	
ZERO ENERGY READY HOMES	HCP	NO (low volume & redundancy)	

Savings Report: 2012-2017

Energy Savings Methodolgies



Programs

NATIONAL



REGIONAL

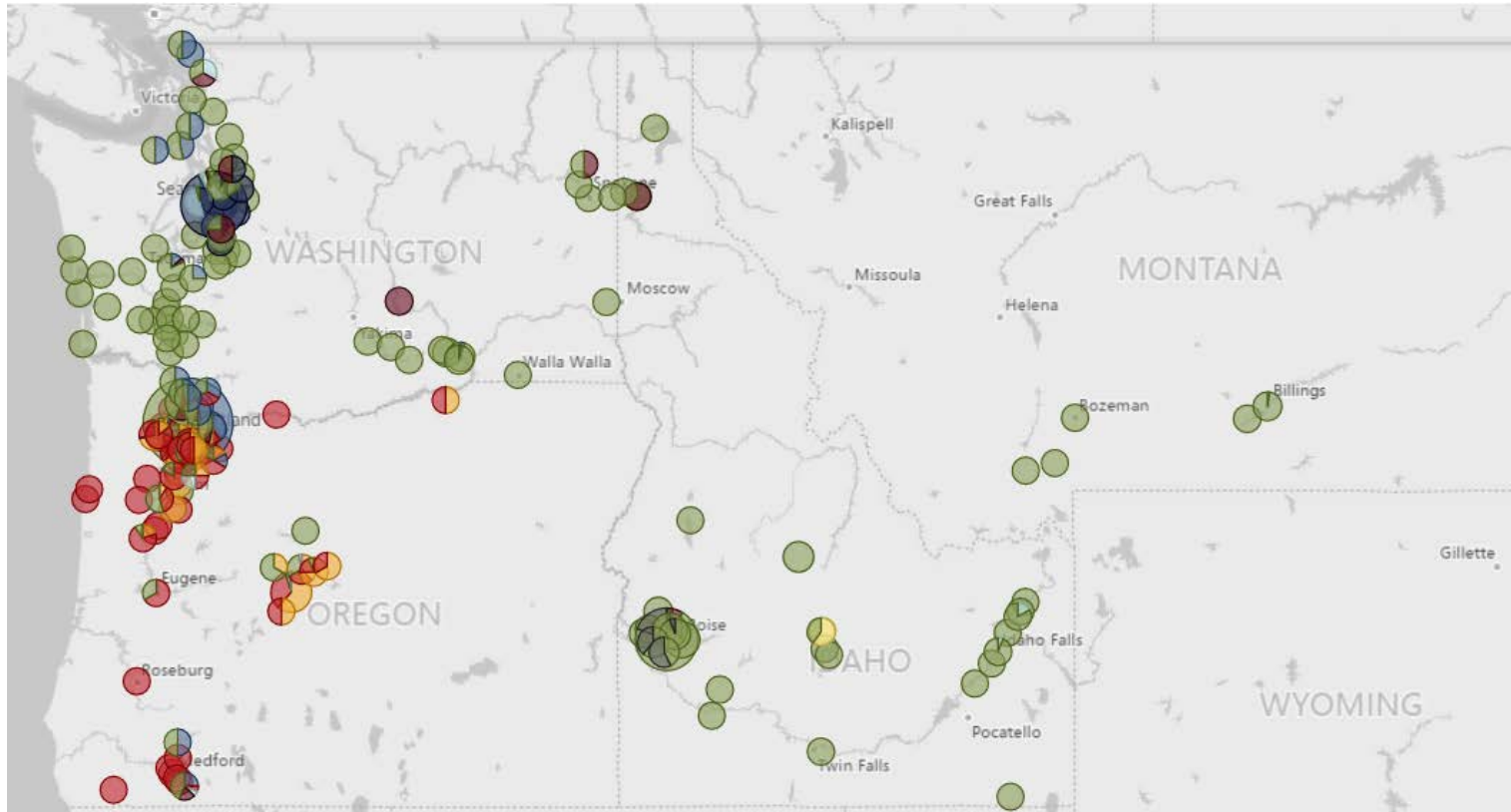


Next
Step
Homes

Utility
Incentive

Regional Activity

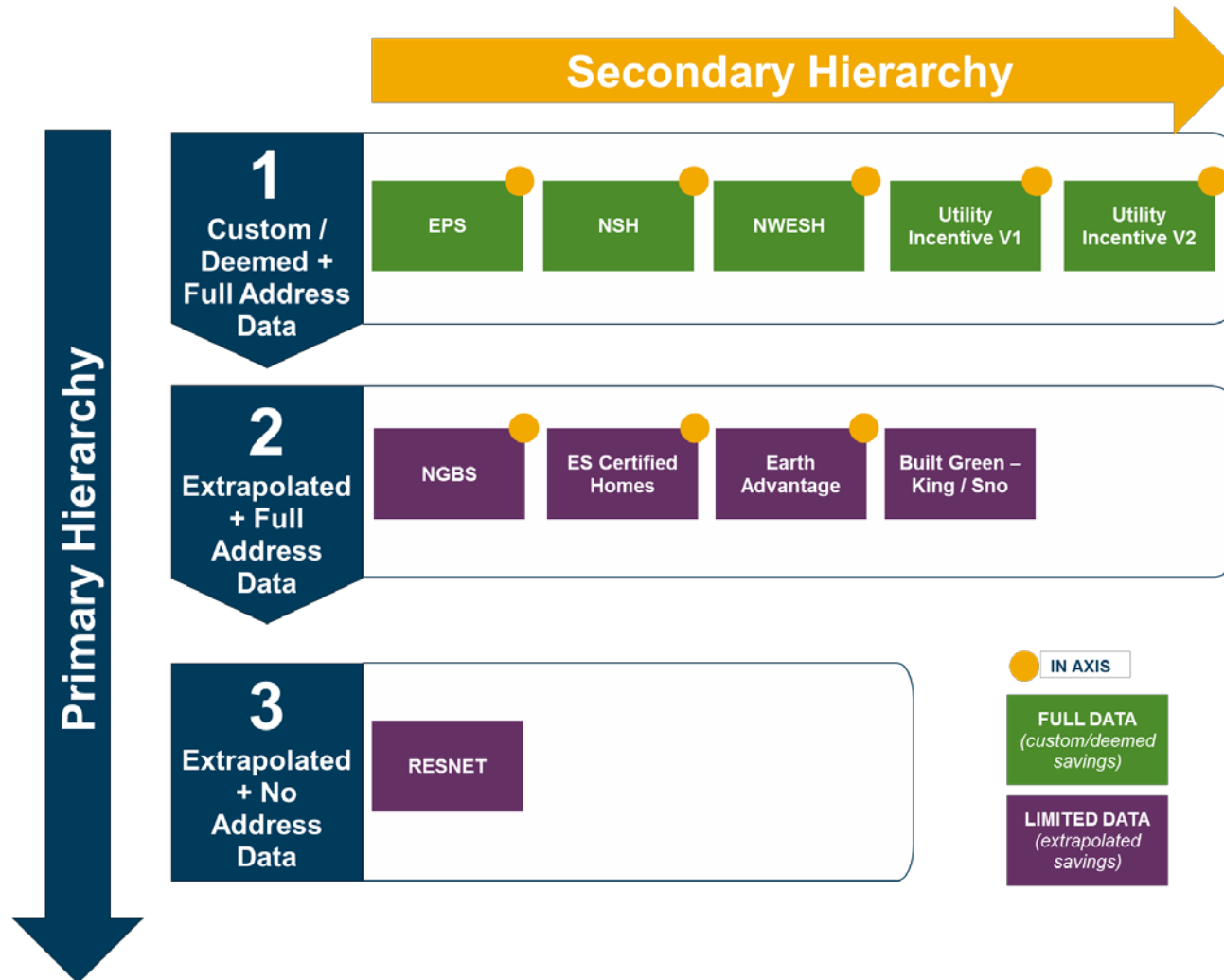
- Homes Certified in 2017 by Program



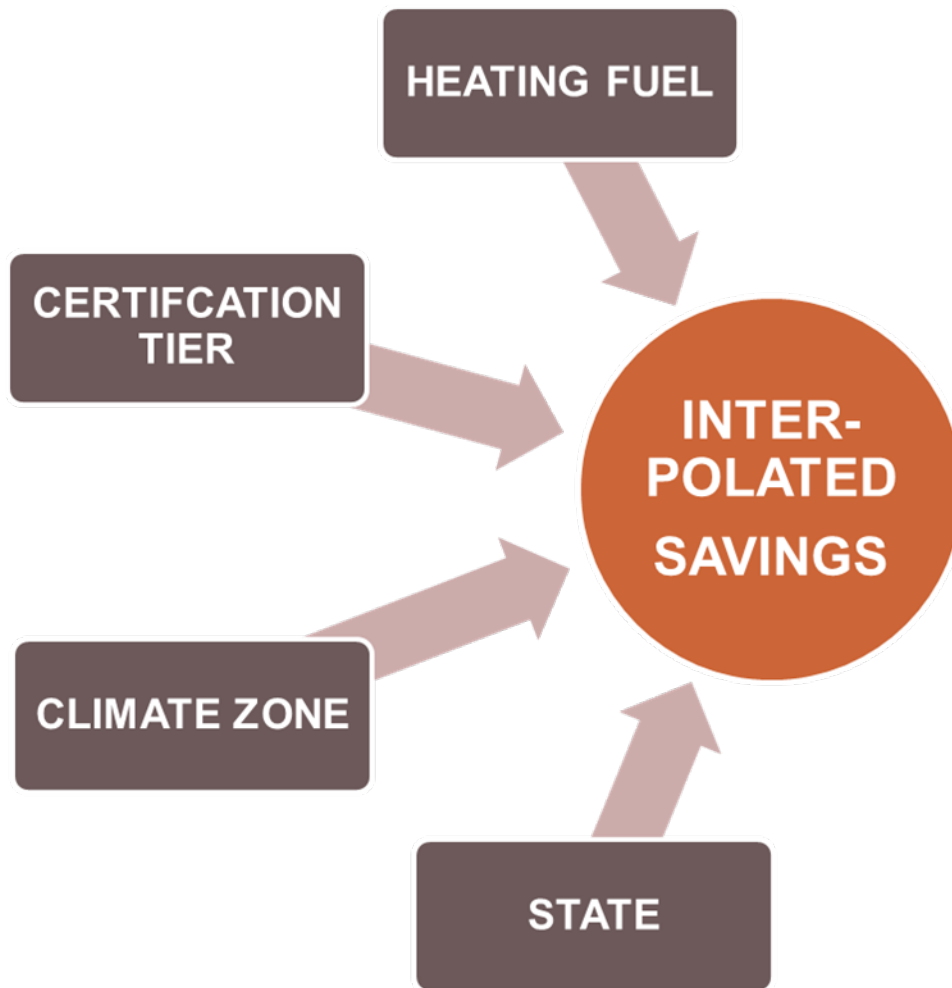
Savings Estimate Methodology



Program Overlap Netting



Savings Estimate Methodology



ORHZ1Gas	State:	OR
	Climate Zone:	HZ1
	Heating System:	Gas
Tier	Therms	kWH
Tier 5	132	334
Tier 4	108	334
Tier 3	85	261
Tier 2	61	188
Tier 1	37	115

WAHZ2Electric	State:	WA
	Climate Zone:	HZ2
	Heating System:	Electric
Tier	Therms	kWH
Tier 5	0	5944
Tier 4	0	4630
Tier 3	0	3317
Tier 2	0	2003
Tier 1	0	689

NW New Homes By the Numbers...

7,873

received



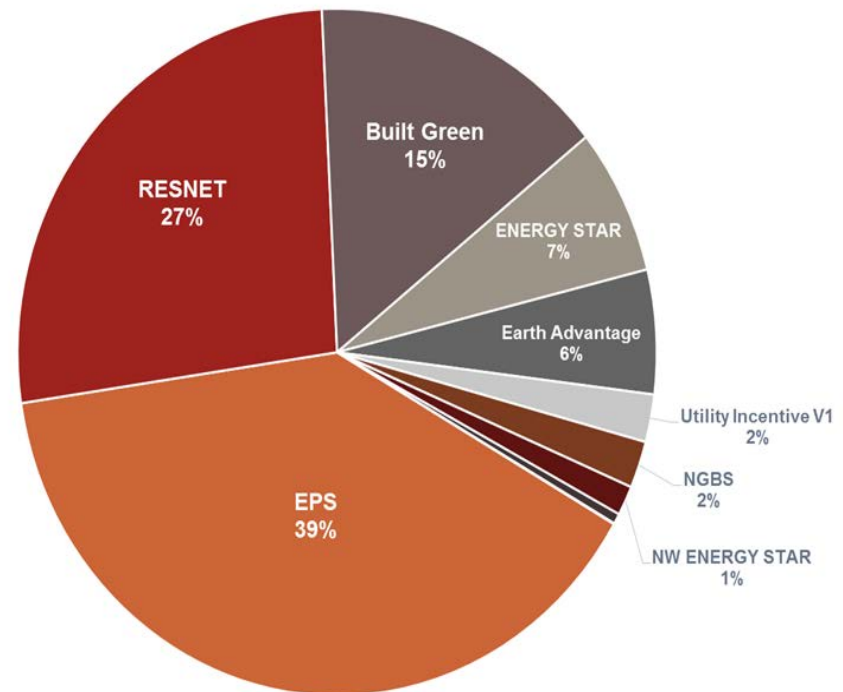
9,866

13.2 million
kWh savings



825,000
therms savings

2017 Homes Certifications by Program*



Total homes certified before netting out due to program overlaps.

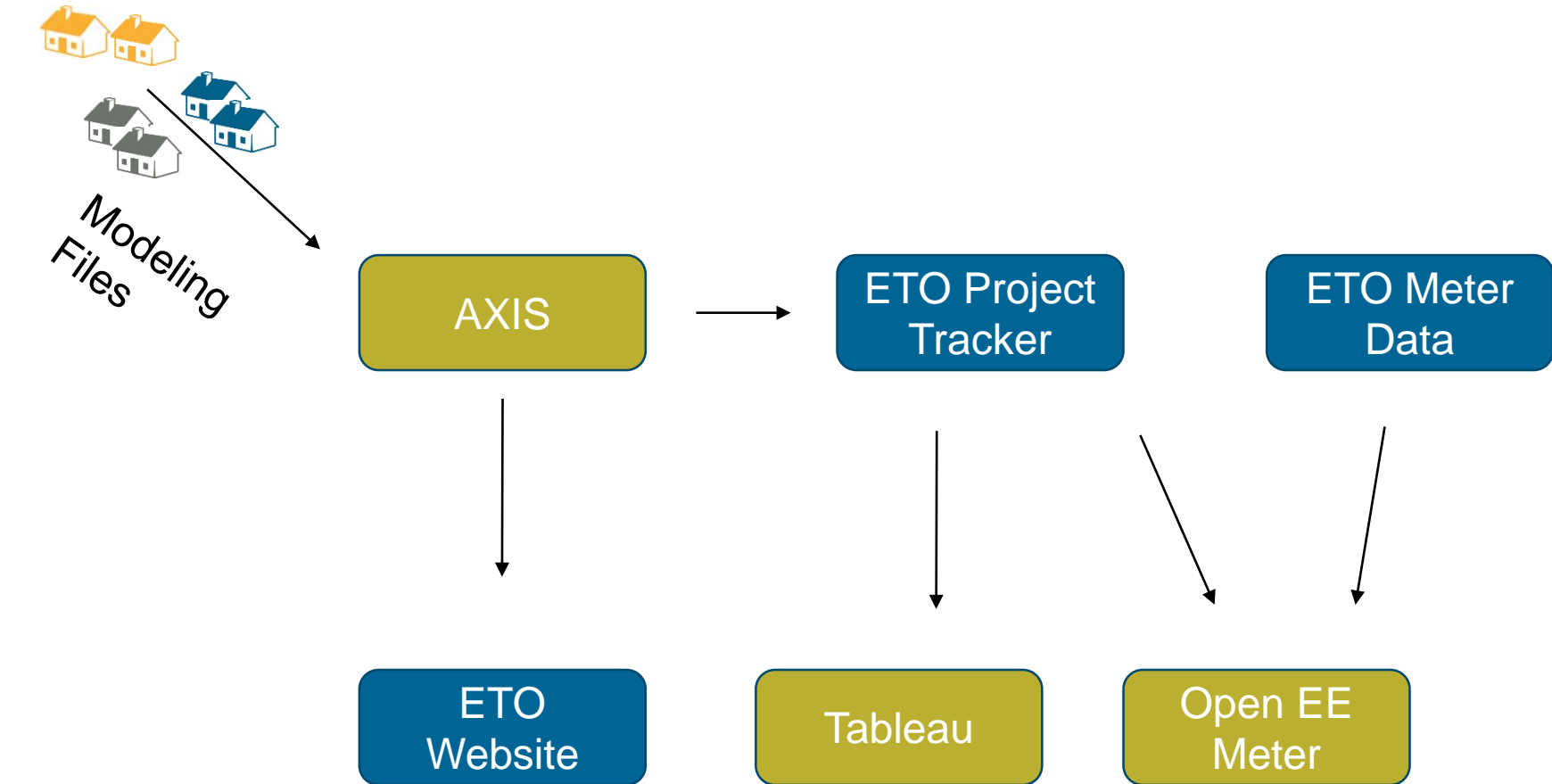
Energy Trust of Oregon



- Energy Trust New Homes overview
- Incentives – scaled based on performance above code or market baseline
- Customers – homeowners, builders
- Delivery – account managers, raters, subcontractors, quality assurance, Axis
- Marketing – EPS™, real estate professionals



Energy Trust New Construction Data Use Cases





Use Case 1: Open Energy Efficiency Meter



Modeled vs Metered Performance

- Weather normalized consumption for each site
- Trends analysis to identify common characteristics derived from modeling data
- Match to control population of code homes
- Goal is to corroborate both reference home and improved home consumption values



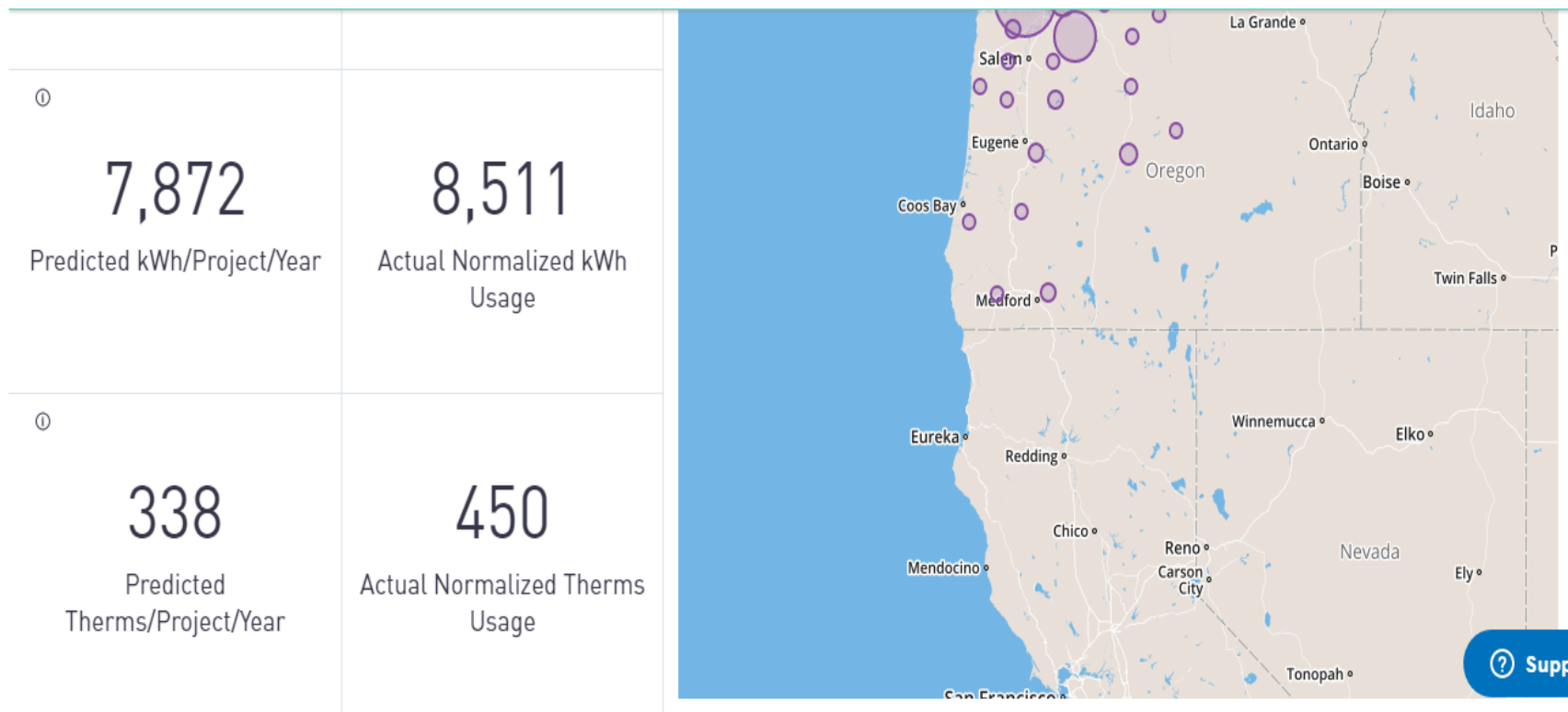
FILTERS (0) ▾ No filters selected

PrimaryHeatingEquipment	>	PrimaryHeatingFuel	>	Builder	>
WaterHeaterFuel	>	WaterHeaterType	>	PercentImprovement	>
AirConditioningSEER	>	AreaOfConditionedSpace	>	BuildingType	>
DuctsInside	>	EstimatedAnnualKwh	>	EstimatedAnnualTherms	>
FloorsOnOrAboveGrade	>	InstallYear	>	nhGasFurnaceAFUE	>
PrimaryHeatingEquipmentHSPFSet1	>	PrimaryHeatingEquipmentHSPFSet2	>	SolarReadyBuilderIncentive	>
Verifier	>	WholeHouseLeakageAirChangesPerHourACH	>	Source	>
nhGasFurnaceECM	>	WaterHeaterTypeByFuel	>		

RESET FILTERS

CANCEL

APPLY





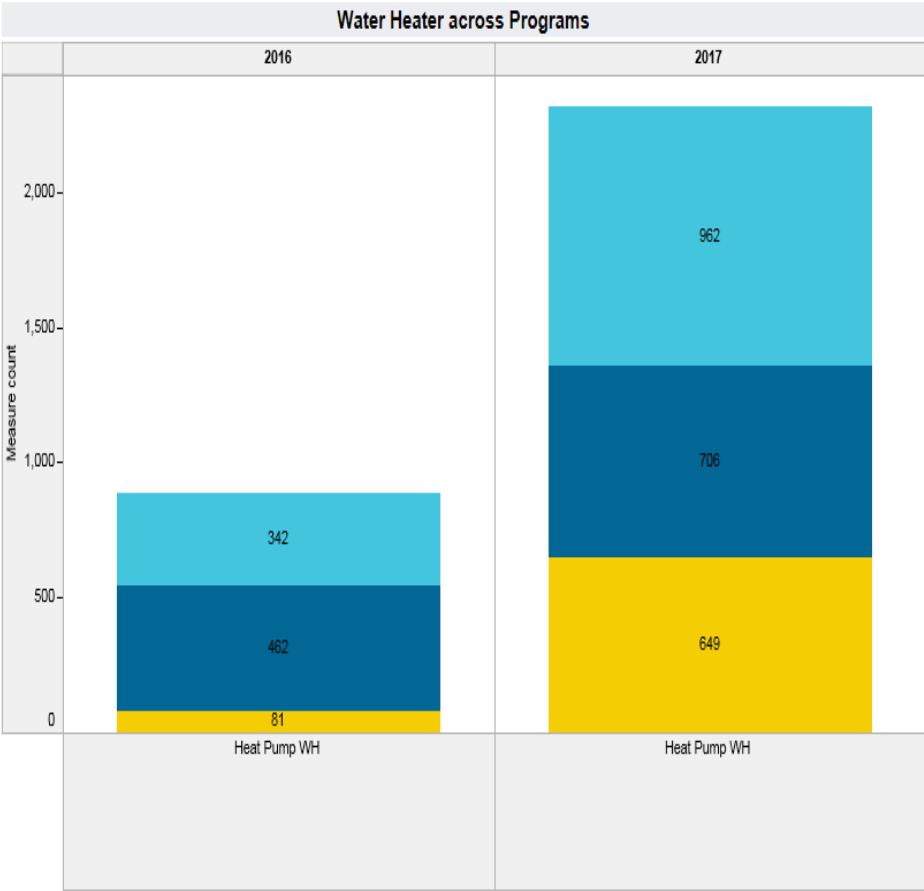
Use Case 2: Portfolio Analytics



Residential Program Portfolio

- Trends analysis across program tracks
- Budget and delivery management tool
- Energy Trust currently utilizing Tableau

Water Heater by Tier			
Type (group)	Tier	2016	2017
Heat Pump WH	Tier 1	30	7
	Tier 2	225	52
	Tier 3	630	1,796
	Unknown		462
Grand Total		885	2,317



Select Measure Group

Water... ☐ ☐

Program

(All)

Year

(Multiple values)

Month

(All)

State

(All)

Elec. Utility

(All)

Gas Utility

(All)

Type

Heat Pump WH

☐ (All)

☒ Heat Pump WH

☐ Storage

☐ Tankless

(All)

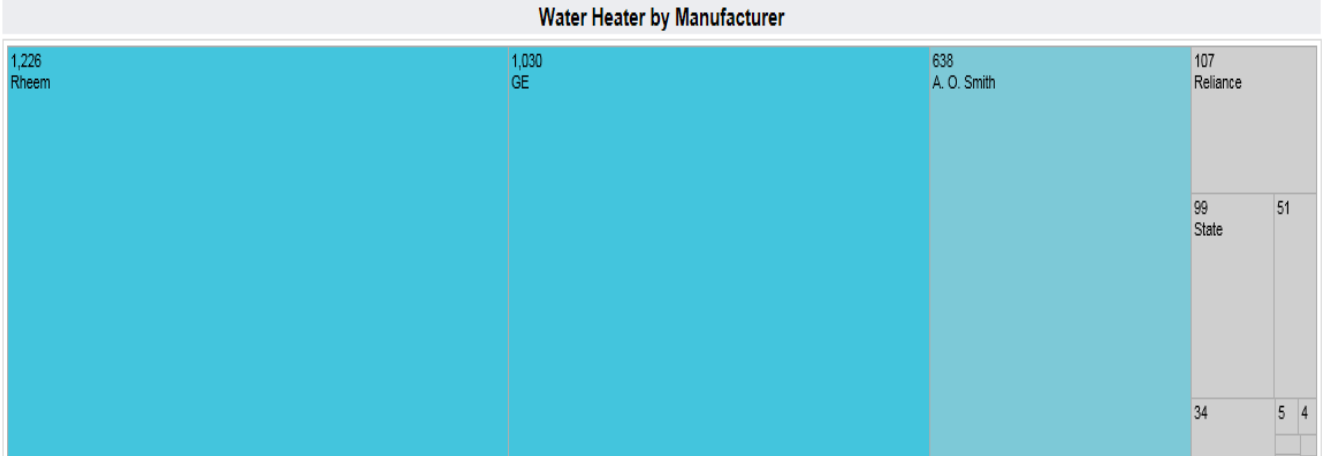
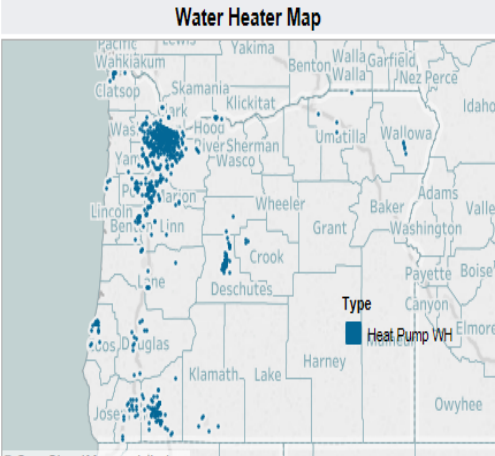
Program

☒ Existing Homes

☐ New Homes

Last Updated

January 22, 2018



2017 New Homes Configuration Dashboard





Use Case 3: Public Attribute Database

Influencing Code & Supporting Research

- Energy Trust plans to publish a database of new homes site attributes
- Can be used for market analysis
- Inform discussions on appropriate measures to include in code updates



Pivotal Energy Solutions



Leveraging Rating and Certification Data in the Real Estate Market

The Big Picture

Goals

- 1) Enable transparency for home buyers
- 2) Create a self-sustaining market for energy efficient and high-performance homes in a non-subsidized world

Today

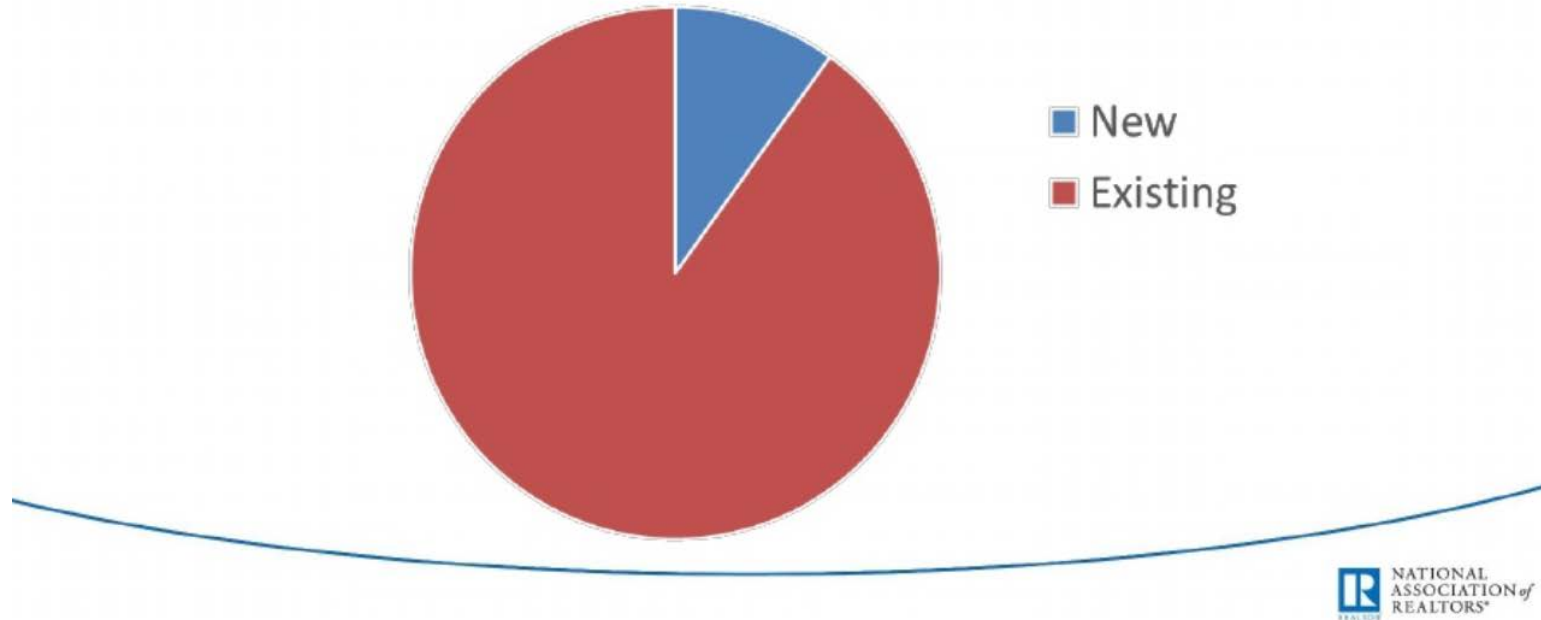
- MAYBE representative utility bills
- MAYBE “green” fields populated by Realtors (likely inaccurately) in MLS listing
- MAYBE ability to look up program certifications online

Tomorrow...

- Data, documentation, and automated processes

NAR Data: New Homes vs. Existing Homes

New Home Sales is Small Share



Yun, Lawrence (2017). National Association of REALTORS® Economic & Housing Outlook [PowerPoint slides]. Retrieved from <https://www.scribd.com/presentation/363403742/2017-11-03-Lawrence-Yun-Economic-and-Housing-Outlook-Presentation-Slides-11-03-2017>

NAR Data: Housing Forecast

Housing Forecast

	2015	2016	2017 Forecast	2018 Forecast
New Home Sales	500,000	560,000	600,000	700,000
Existing Home Sales	5.3 million	5.4 million	5.5 million	5.7 million
Median Price Growth	+ 6.8%	+5.1%	+6.0%	+5.0%
30-year Rate	3.9%	3.6%	4.0%	4.5%

*New Homes
11% of
Total Sales*

*227k HERS
Ratings in
2017*

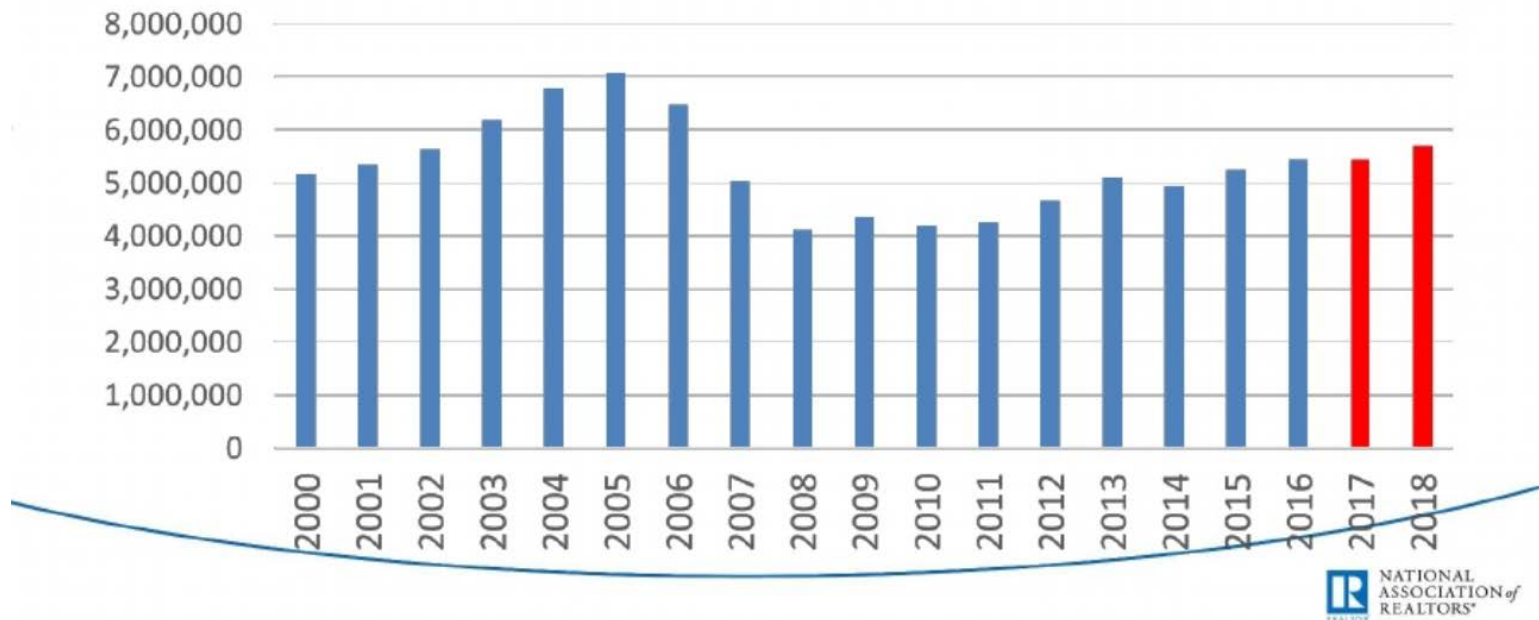
< 3.8% of market



Yun, Lawrence (2017). National Association of REALTORS® Economic & Housing Outlook [PowerPoint slides]. Retrieved from <https://www.scribd.com/presentation/363403742/2017-11-03-Lawrence-Yun-Economic-and-Housing-Outlook-Presentation-Slides-11-03-2017>

NAR Data: Home Sales Forecast

Existing Home Sales + Forecast



Yun, Lawrence (2017). National Association of REALTORS® Economic & Housing Outlook [PowerPoint slides]. Retrieved from <https://www.scribd.com/presentation/363403742/2017-11-03-Lawrence-Yun-Economic-and-Housing-Outlook-Presentation-Slides-11-03-2017>



Best Case Scenario

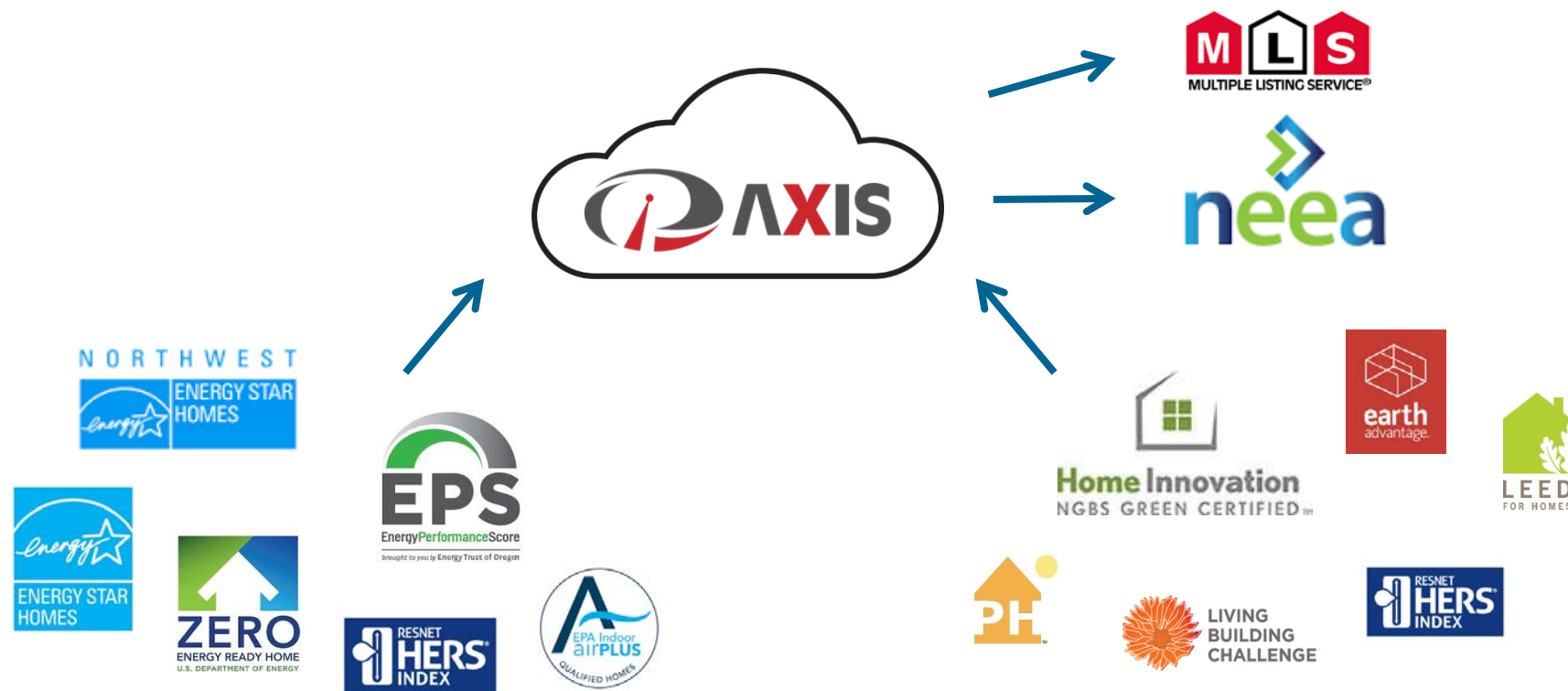
- 50% of New Homes receive Green certification
- ALL EE features documented
- ALL data is aggregated into a single repository

5% of homes sold will have energy efficiency data

NEEA's Data Consolidation Efforts

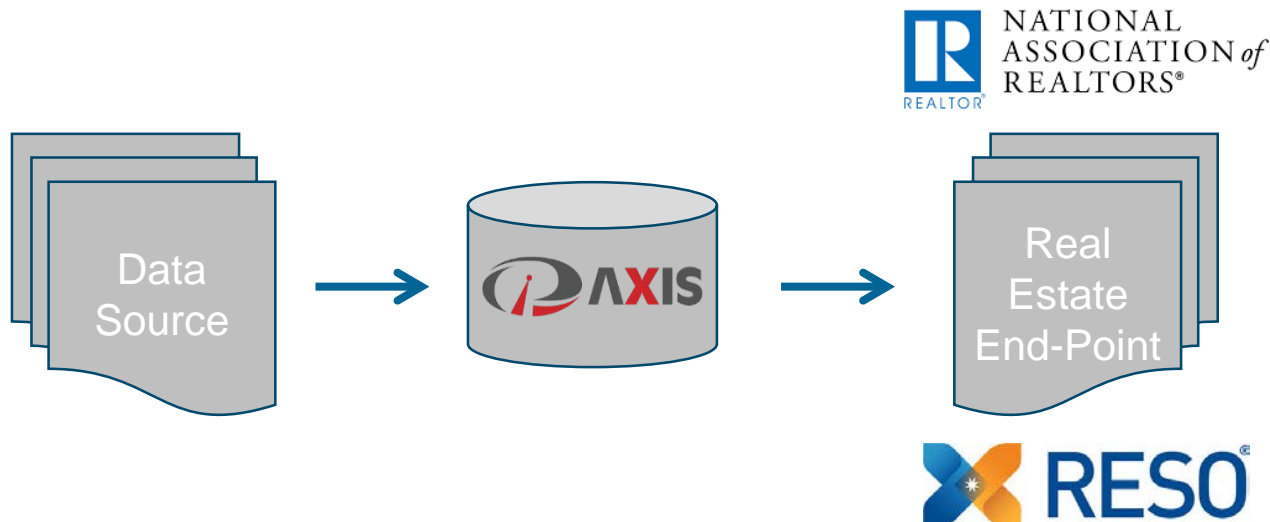
Supporting NEEA's Regional Vision

- 1) Direct use of Axis for program administration
- 2) Consolidation of data through API connections
- 3) Rater/Verifier, Provider, & Builder engagement



General Real Estate Efforts

- Documenting Green and Energy Efficient Features
 - Appraisal Institute G&EEA
 - Earth Advantage High Performance Homes Cost Data Addendum
- Data Aggregation
 - National and regional data aggregation opportunities
- Data Distribution & Auto-Population
 - RESO Data Dictionary Certification
 - “Green Home” registries and portals



Baseline Real Estate Data



BASELINE DEMO DATA

Data Field	Example(s)
<i>Green Certification Program</i>	NGBS Single-Family New Construction 2015 LEED Home Performance with ENERGY STAR
<i>Green Certification [Type] Body</i>	NGBS: Home Innovation Research Labs LEED: USGBC HPwES: U.S. Environmental Protection Agency
<i>Green Certification [Type] Year</i>	2016
<i>Green Certification [Type] Rating</i>	NGBS: Bronze, Silver, Gold, Emerald LEED: Certified, Silver, Gold, Platinum
<i>Green Certification [Type] Version</i>	NGBS: 2015 ENERGY STAR: V3.1
<i>Green Certification [Type] Source</i>	Program Sponsor Program Verifier Public Record

Beyond Certification Data...



ADDITIONAL DATA

Energy Data

Green Verification [Type] Status
Green Verification [Type] URL
Green Energy Generation
Power Production (multiple)
 Gas
 Cooling
 Heating
Fuel Expense (modeled)
Green Energy Efficient
Green Indoor Air Quality

Verified Property Data

Building Area Total
Above Grade Finished Area
Below Grade Finished Area
Foundation Area
Foundation Details
 Basement
 Roof
 Stories
Bedrooms Total
Direction Faces
New Construction (Y/N)
Builder Name
Builder Model

Barriers to Real Estate Market Penetration

Limited Data Set & Data Quality

- Ratings/certs only available for audited/rated homes
- Certification/QA requirements vary per program
- Are collaborations with AEM's the answer?

Market Confusion

- Variety of programs/metrics; HERS vs. HES vs. XYZ

Static Nature of Certifications & Modeled Data

- Data doesn't reflect occupant behavior
- Are collaborations with utilities/meter-level data sources an option?

Data Privacy Concerns

- What and how data is made publicly available

Lack of Business Model

- What is the value of this data to the real estate industry?

What's It Going To Take

*High quality, validated, and documented
EE/WE/IAQ/solar/storage data*

Program Sponsors & Utilities

- Consider sharing certification data (at a minimum)
- Get comfortable with data aggregators
- Consider this a marketing opportunity

Raters, Providers & Builders

- Get on the data train NOW!
- Document EVERYTHING in electronic format
- Get comfortable with data sharing
 - **Discuss with fellow stakeholders**
 - Have an open mind regarding the business model

Questions and Feedback

Thank You!

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