April 17, 2018

# *Residential Advisory Committee*

Q2 2018



# *Welcome!*

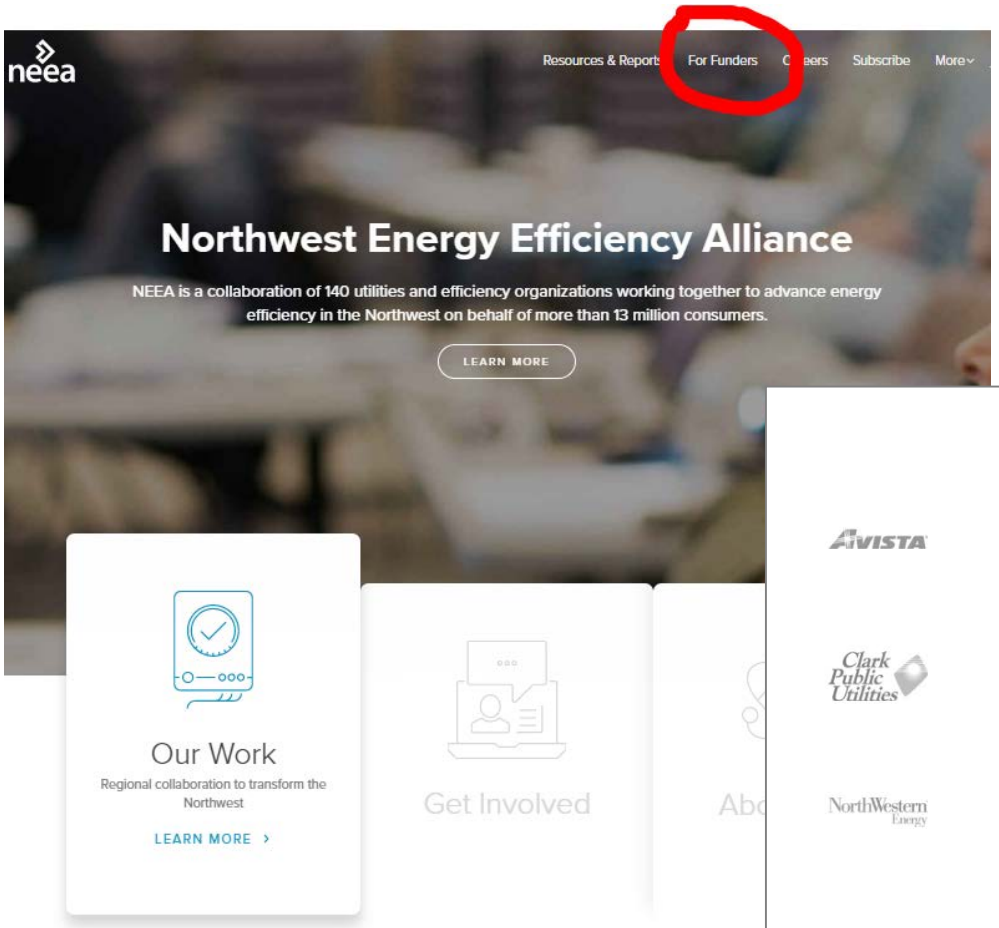
# Agenda

| Time | Topic |
|---|---|
| 9:30 – 10:00 | WELCOME AND INTRODUCTIONS |
| 10:00 – 10:30 | HOUSEKEEPING |
| 10:30 – 11:00 | HEAT PUMP WATER HEATER UPDATS |
| 11:00 – 11:05 | BREAK |
| 11:05 – 11:50 | REGIONAL TECHNICAL FORUM (RTF) 101 |
| 11:50 – 12:25 | LUNCH |
| 12:25 – 12:55 | DRYERS UNIT ENERGY SAVINGS (UES) UPDATE |
| 12:55 – 1:40 | NEXT STEP HOMES MILESTONE REVIEW |
| 1:40 – 1:55 | BREAK |
| 1:55 – 3:25 | UTILITY ROUNDTABLE |
| 3:25 – 4:00 | 2016-17 RESIDENTIAL BUILDING STOCK ASSESSMENT UPDATE |
| 4:00 – 4:05 | PUBLIC COMMENT |
| 4:05 – 4:15 | WRAP-UP/ADJOURN |

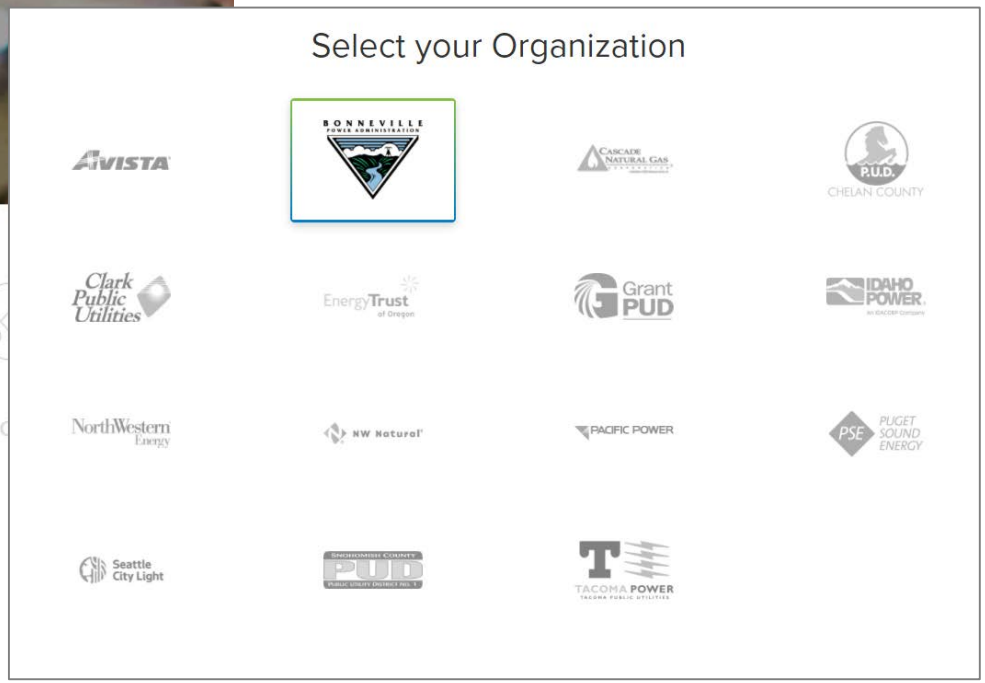
# *Housekeeping*

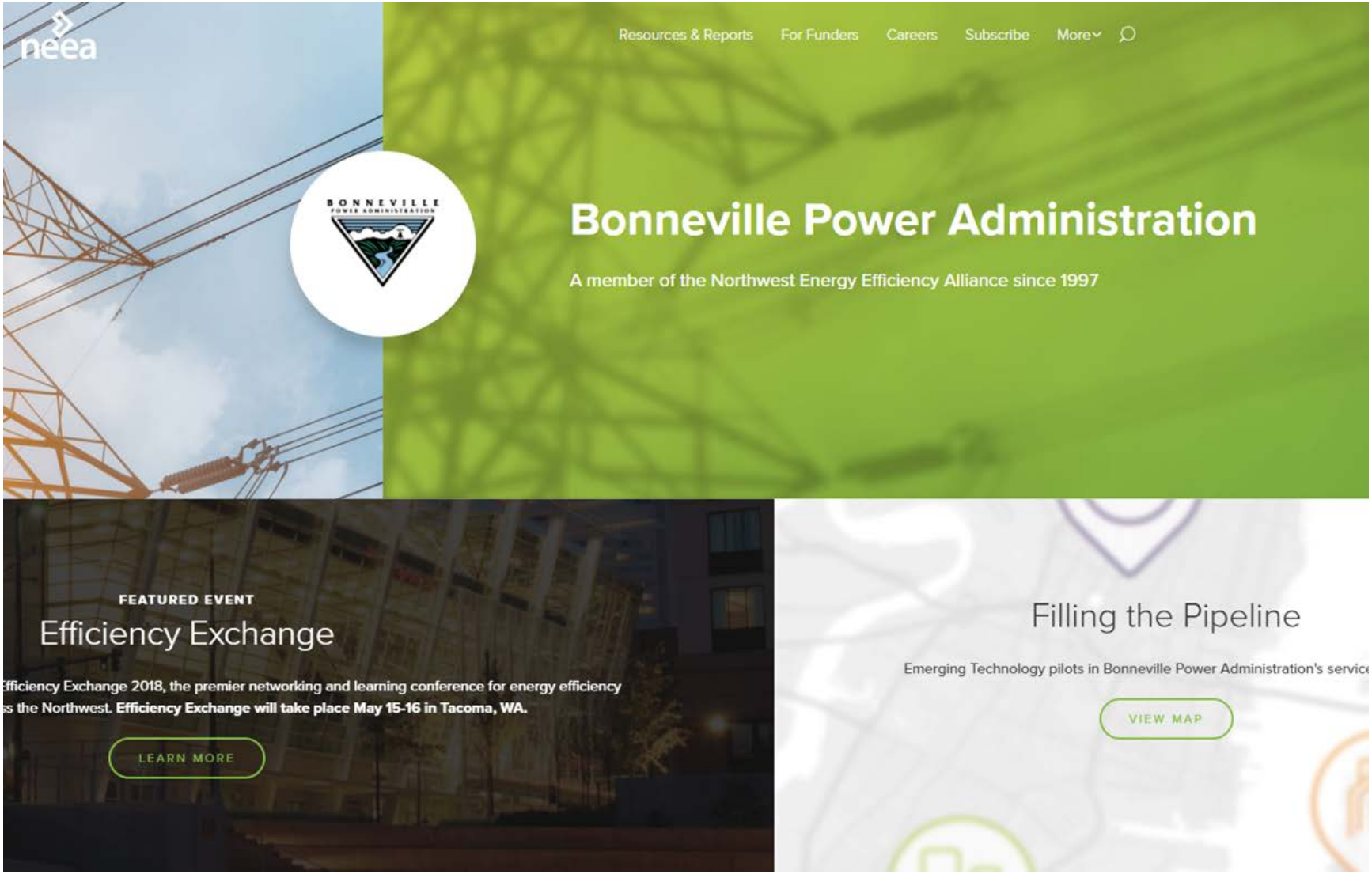
- Packet/Informational Updates
- Follow-up on action items from Q1 2018 meeting
- RAC Workplan 2018
- Efficiency Exchange ‘18 Workshops
- NEEA’s New Website

# Website update coming soon




NEW:
Individual funder landing pages




neea
Resources & Reports
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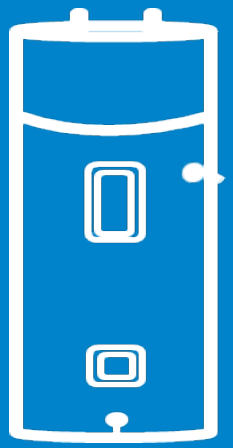
BONNEVILLE
POWER ADMINISTRATION
Bonneville Power Administration
A member of the Northwest Energy Efficiency Alliance since 1997
FEATURED EVENT
Efficiency Exchange
Efficiency Exchange 2018, the premier networking and learning conference for energy efficiency
s the Northwest. Efficiency Exchange will take place May 15-16 in Tacoma, WA.
LEARN MORE
Filling the Pipeline
Emerging Technology pilots in Bonneville Power Administration's servic
VIEW MAP

4/17/18

# *RAC Q2 2018: HPWHs*

Jill Reynolds



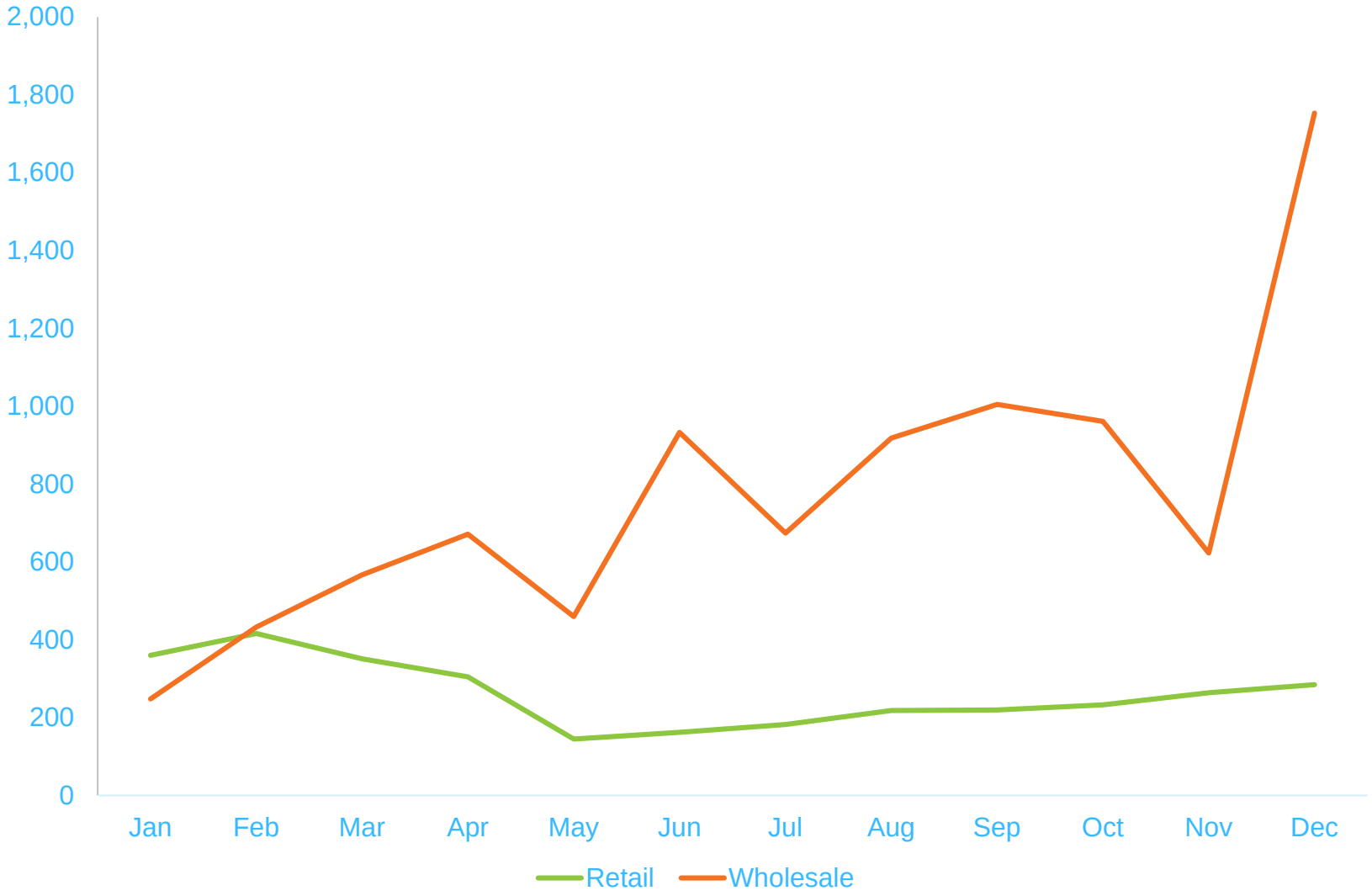



# Agenda

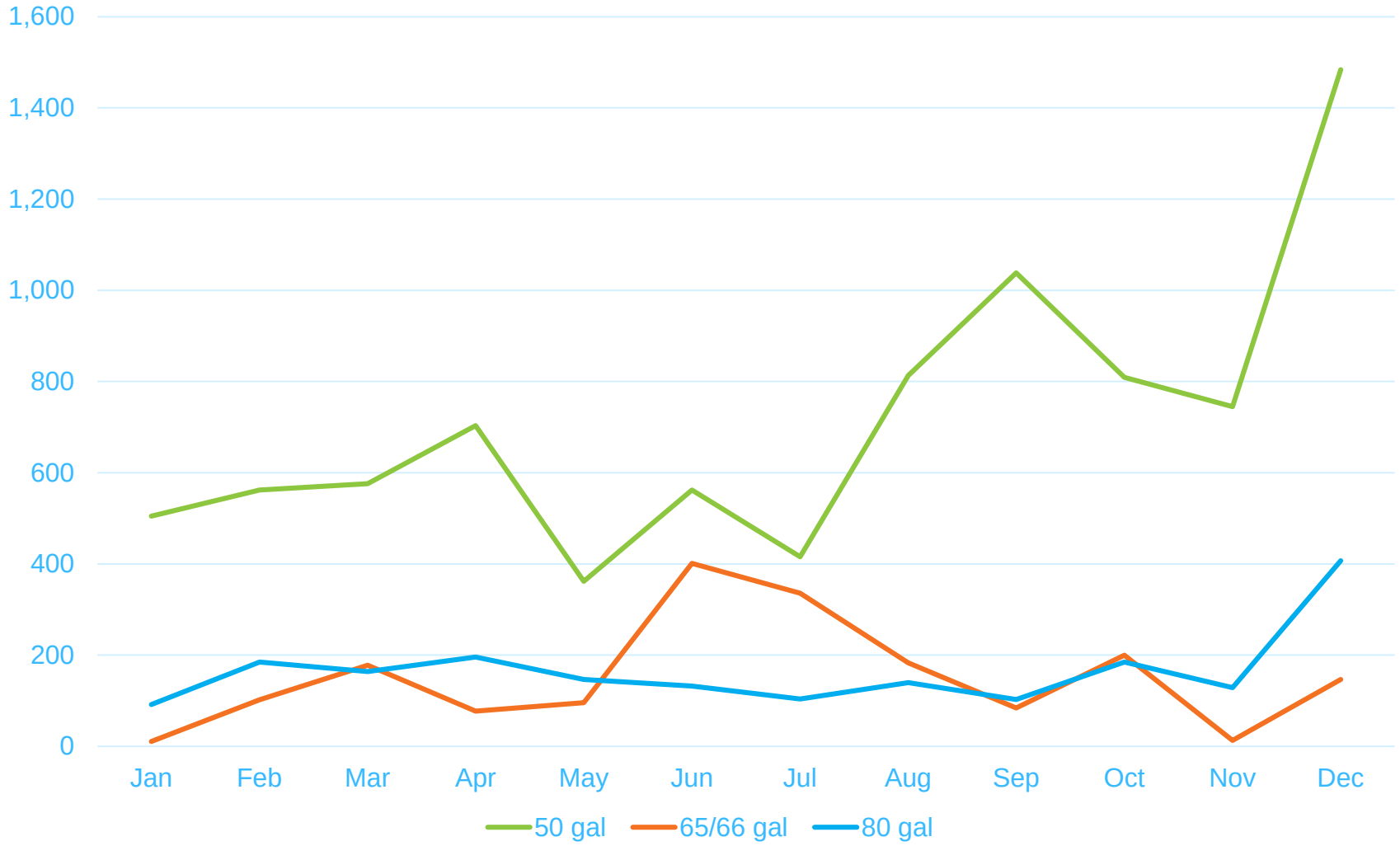
- 2017: Lookback
- 2018:
  - The Good
  - The Bad
  - The Hopeful

# *2017: The Lookback*

# 2017 Analysis – Sales by Channel



# 2017 Analysis – Sales by Tank Size



# *2018: The Good*

# Installer Pro Deal and Training

# *Installer Pro Deal and Training*

**Step 1**: Select high potential companies

**Step 2**: Interview company owner

**Step 3**: Provide participating companies free product

**Step 4**: Staff training – increase product knowledge

**Step 5**: Stay in touch!

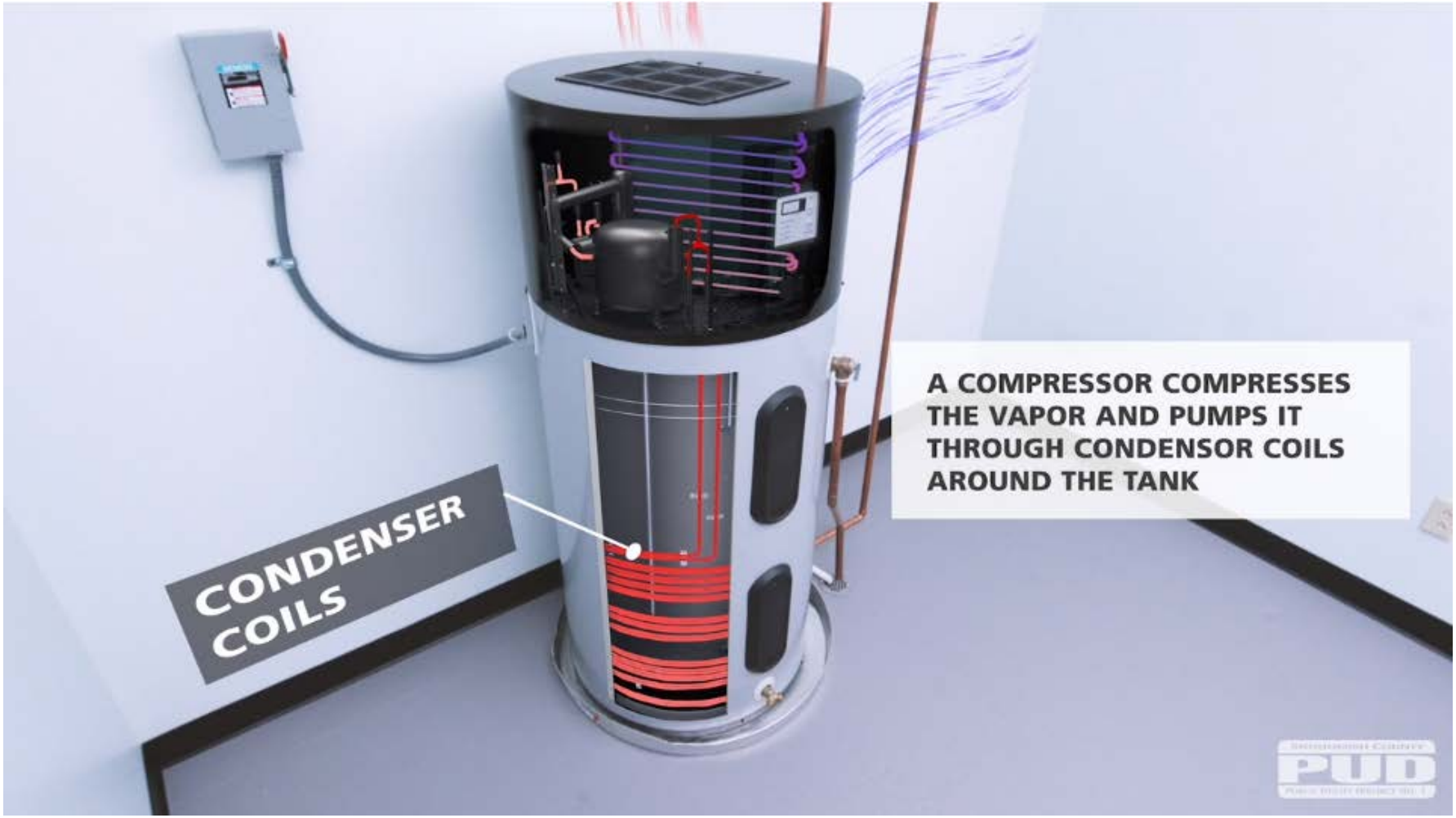
# 2018 Pro Deal Progress

- **2018 Pro Deals to date:**
  - 9 contractors (fulfillment and training underway)
    - » Firkus Plumbing – Bend, OR
    - » Sarkinen Plumbing – Vancouver, WA
    - » Kevin Cohen Plumbing – Eugene, OR
    - » Stan the Hot Water Man – Portland, OR
    - » Stutzman Services – Albany, OR
    - » Robbin, Inc. – Lincoln City, OR
    - » Fast Water Heater – OR and WA
    - » Great Northwest Installations – Portland, OR
    - » GreenSavers – Portland, OR; Bend OR
  - 20-25 completed by EOY
  - Identifying candidates and beginning expanded outreach in WA

# Upcoming Resources – Videos

1. Customer testimonials
2. Installer testimonial
3. How-to install a HPWH consumer-facing version
4. How-to install a HPWH installer version
5. How a heat pump water heater works *(courtesy of A. O. Smith)*


# Upcoming Resources – Video



# Upcoming Resources: Retail Signage

- 45 utilities opted in to retail signage!
- ***Drafts*** of signage:


# Upcoming Resources – Partner Website Updates

## Latest Updates and News

Stay up to date on the latest heat pump water heater news.

ALL | TRAINING | NEWS | EVENTS

VIEW ALL / LIST VIEW

NEWS

### Bradford White to build AeroTherm Series heat pump water heaters in Middleville, MI facility

Hot Water Solutions is working to provide top installers in all four states...

TRAINING

### March 16 Hot Water Solutions Installer Orientation

Hot Water Solutions is working to provide top installers in Oregon, Washington, Idaho and Montana with heat pump water heater installation training.

VIDEO

### Heat Pump Water Heaters. Simply a Smarter Choice.

A heat pump water heater is a smart upgrade from your standard electric water heater.

# *Contractor Feedback – Sneak Peak*

- Held a contractor workgroup 2 weeks ago
- Intent is to have contractor stakeholders support and provide input on materials
- It was a collaborative session with 11 installers

- Early results and takeaways are…

# *Contractor Feedback – Challenges*

- Top challenges from contactor perspective:
  - **Lack of consumer awareness**
    - » Makes it hard to sell in emergency replacement
  - **Lack of distributor support** and focus on the technology
    - » Need product influencers at distributor level
    - » Training, marketing. free trial product etc.
  - **Lack of product support from manufacturer**
    - » Need more technical support
    - » Easy access to parts and servicing info

# *Contractor Feedback – Training*

- Top training content preferences
  - **Marketing**
  - **Selling the value of HPWHs**
  - Technology overview
  - Technology comparison
  - Installation training

# *Contractor Feedback – Training*

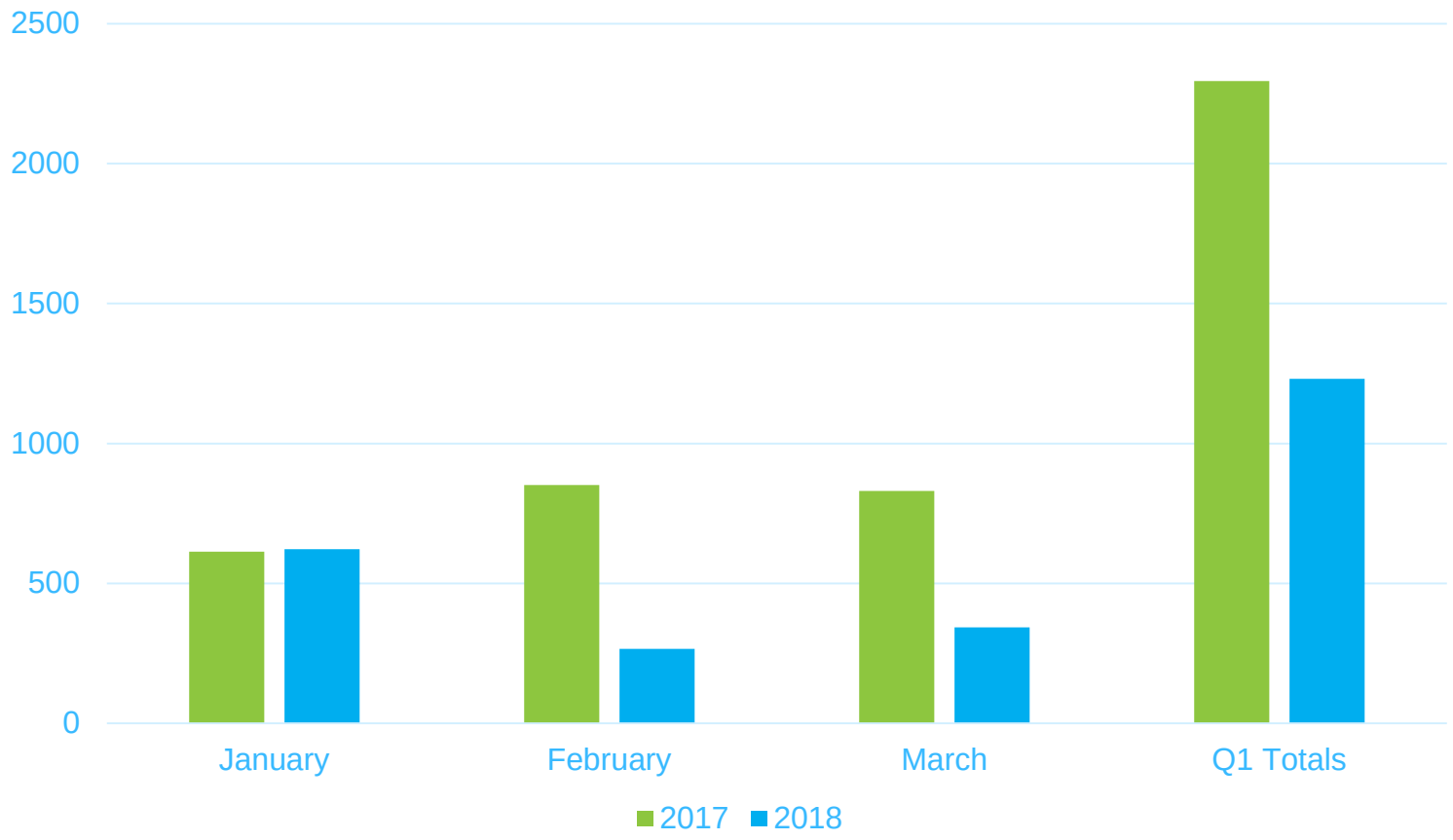
- Top training delivery preferences
  - **Longer (over an hour), in person trainings with continuing education credits (CEUs)**
  - **Product direct-to-company mentoring with free product**
  - Longer (over an hour), online training with continuing education credits
  - 30 minute online training
  - 30 minute in person training

# *Contractor Feedback – Marketing*

- Top marketing support preferences
  - **Direct mail postcard template**
  - **Social media videos**
  - **Product flyers**
  - Online ads
  - Customer testimonial videos
  - Newspaper ad
  - Radio ad
  - Sales sheet
  - Image library
  - Pocket card
  - Technical install video

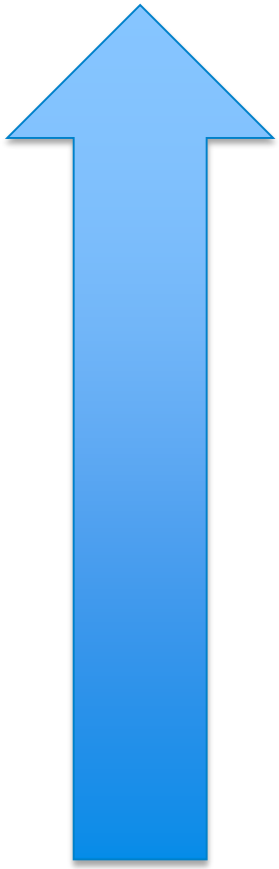
# *2018: The Bad*

# HPWH Q1 Sales: 2017 & 2018



# *HPWH Pricing*

- 2015 – 2016: $999
- 2018: $1099 - $1399




2018: The Hopeful

# 2018: The Hopeful

- Midstream utility programs
- Summer marketing campaign
- Sustainable community goals
- National HPWH numbers up

***Questions***
***&***
***Thank you***


break

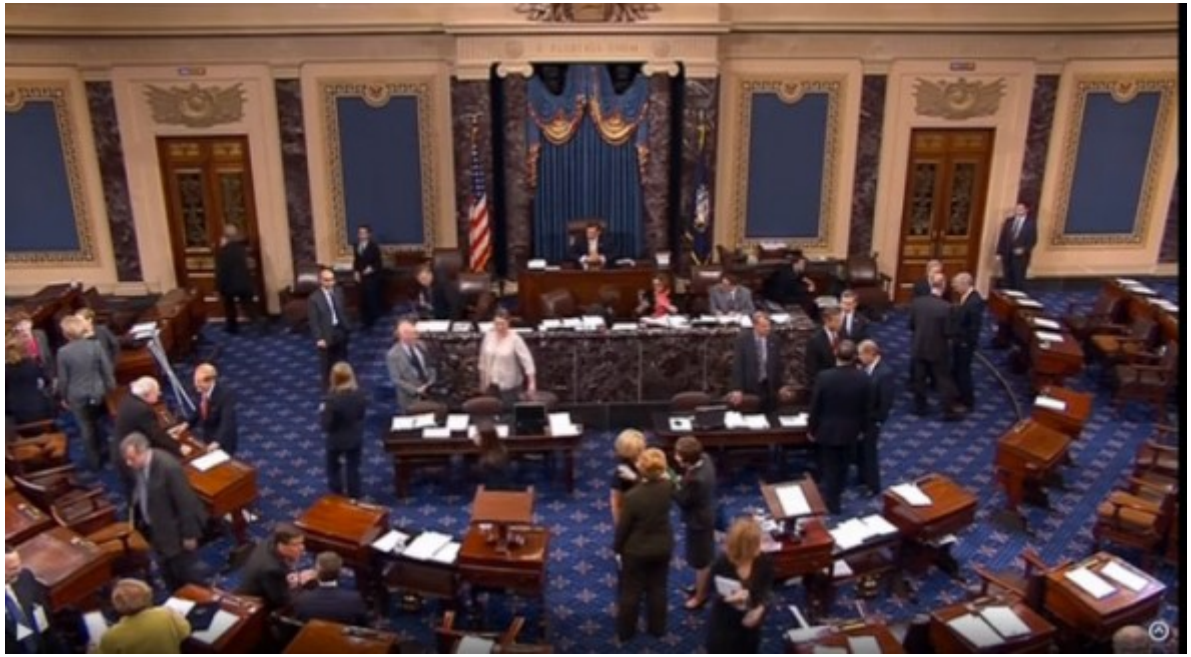
RAC April 17, 2018

# *Regional Technical Forum Overview*



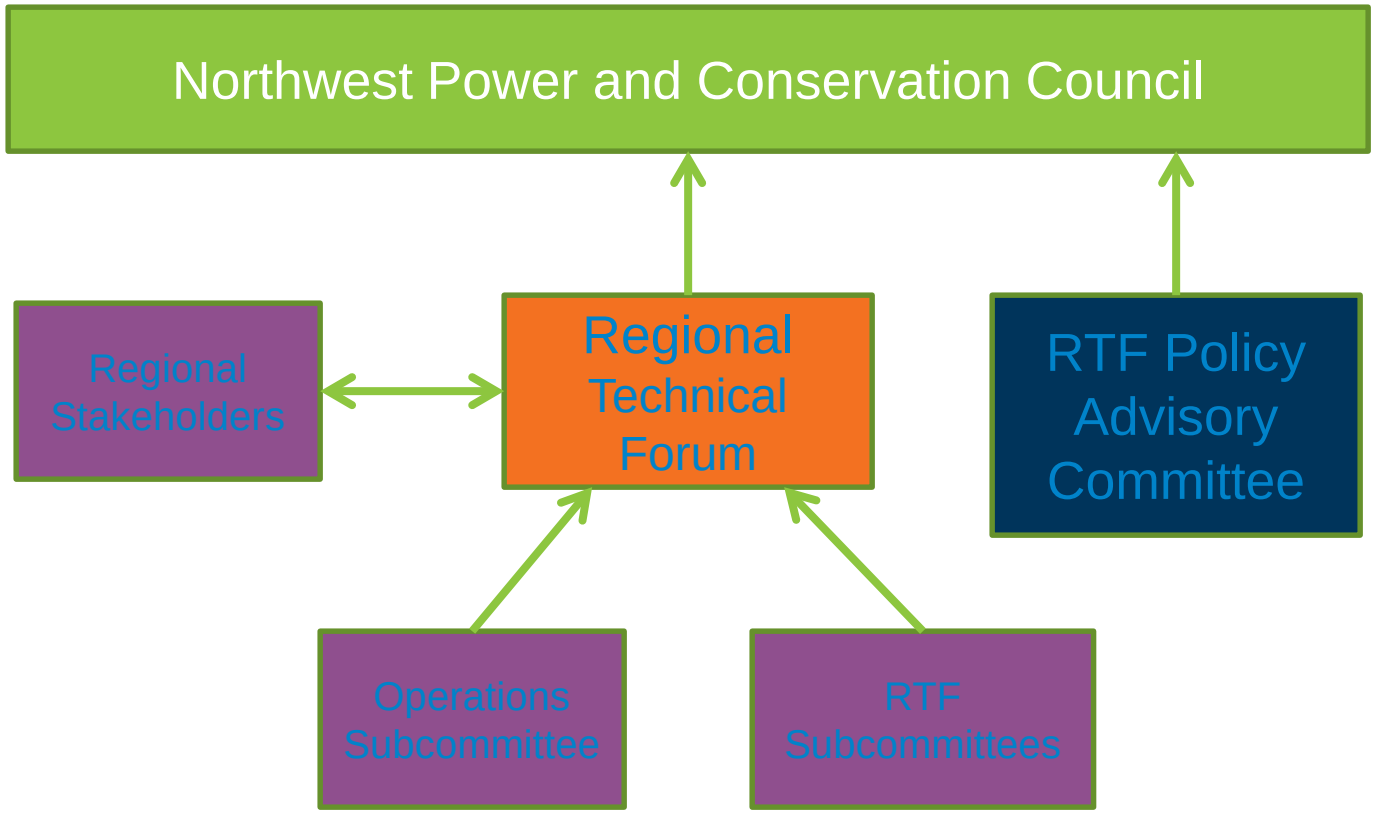
# *Origination of the RTF*

**1996:** Congress directed Bonneville and Council to convene a Regional Technical Forum

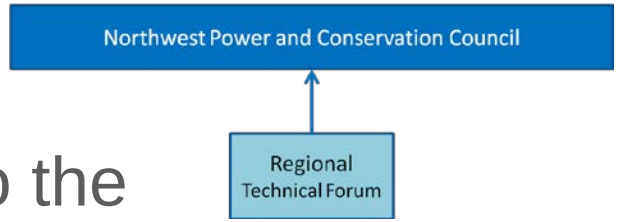


*Senate Report 104-120 – Energy and Water Development Appropriations Bill, 1996

# Organization of RTF

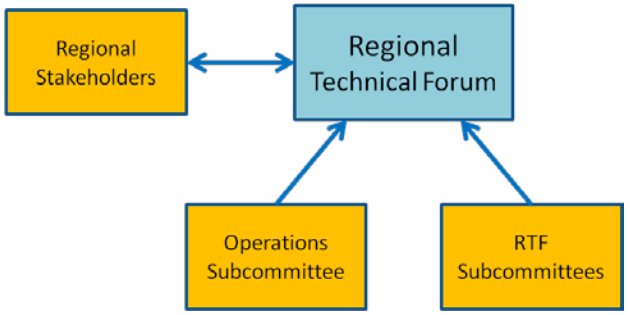


# *Connection to the Council*




- Scientific **advisory committee** to the Council
- Supports the Power Plan
- Tracks regional progress towards conservation targets

# RTF Organizational Structure




- RTF consists of 20 to 30 voting members
- RTF also includes corresponding members and other interested parties
- Works primarily through subcommittees
- Operations Subcommittee oversees business operations (agendas, contracting, etc.)
- Participation in the RTF is voluntary

# *What the RTF Does*

- Centralized, independent technical review of energy efficiency measures
- Guidance for estimating savings from custom measures and program-level savings
- Estimates for cost-effectiveness of measures
- Tracks regional progress towards efficiency goals
- Assists Council in assessing new efficiency opportunities

# *What the RTF Does Not Do*

- Direct regulatory function
- Use of specific savings estimates or protocols or restrict which measures utilities can install
- Use of specific program design
- Establish utility program reporting requirements
- Evaluate savings for ALL measures
- Establish rebate, incentive or willingness to pay levels
- Execute primary research

# *RTF Staff and Analysts*

- Council Staff
  - Jennifer Light, RTF Chair and Manager (RTF-funded)
  - Charlie Grist, RTF Co-Chair
  - Garrett Herndon, RTF Administrative Assistant
  - Other Council staff support analysis
- 2018 Contract Analysts
  - Greg Brown
  - Christian Douglass
  - Ryan Firestone
  - Josh Rushton
  - Eric Shum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Avista
Bonneville Power Administration
Cascade Natural Gas Corporation
P.U.D. Chelan County
Clark Public Utilities
Cowlitz PUD
EnergyTrust of Oregon
Grant PUD
Idaho Power An IDACORP Company
NorthWestern Energy
NW Natural
Pacific Power
PGE
Puget Sound Energy
Seattle City Light
Snohomish County PUD Public Utility District No. 1
Tacoma Power Tacoma Public Utilities

# *Lunch is being served*

April 17, 2018

# *Super-Efficient Dryers*

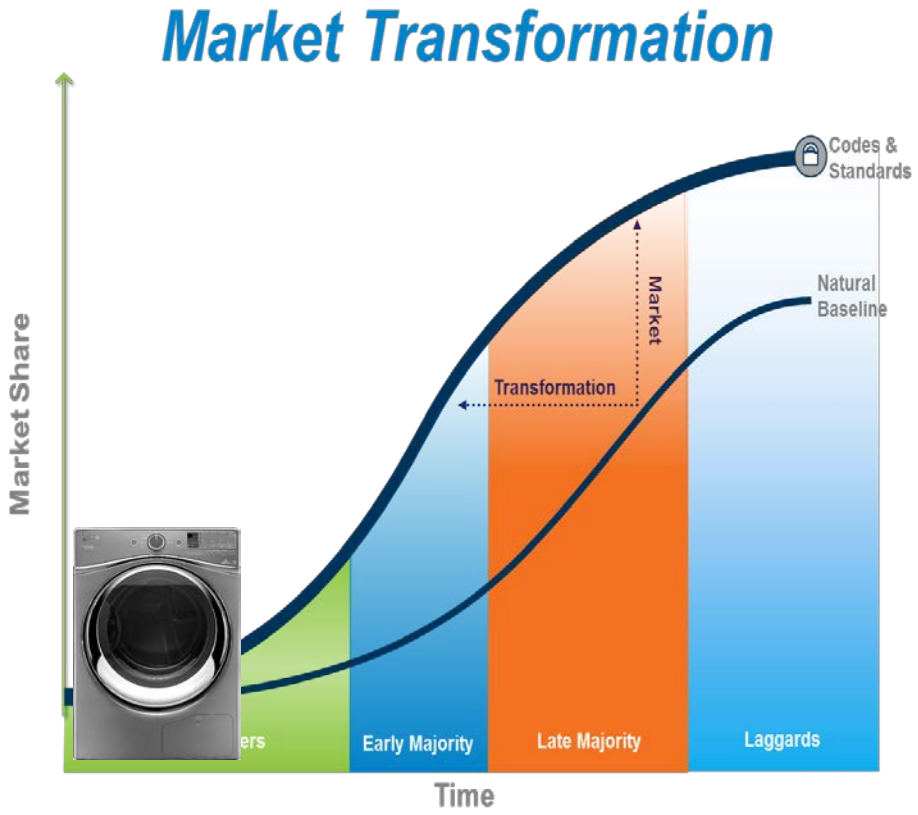
Stephanie Baker

Sr. Program Manager

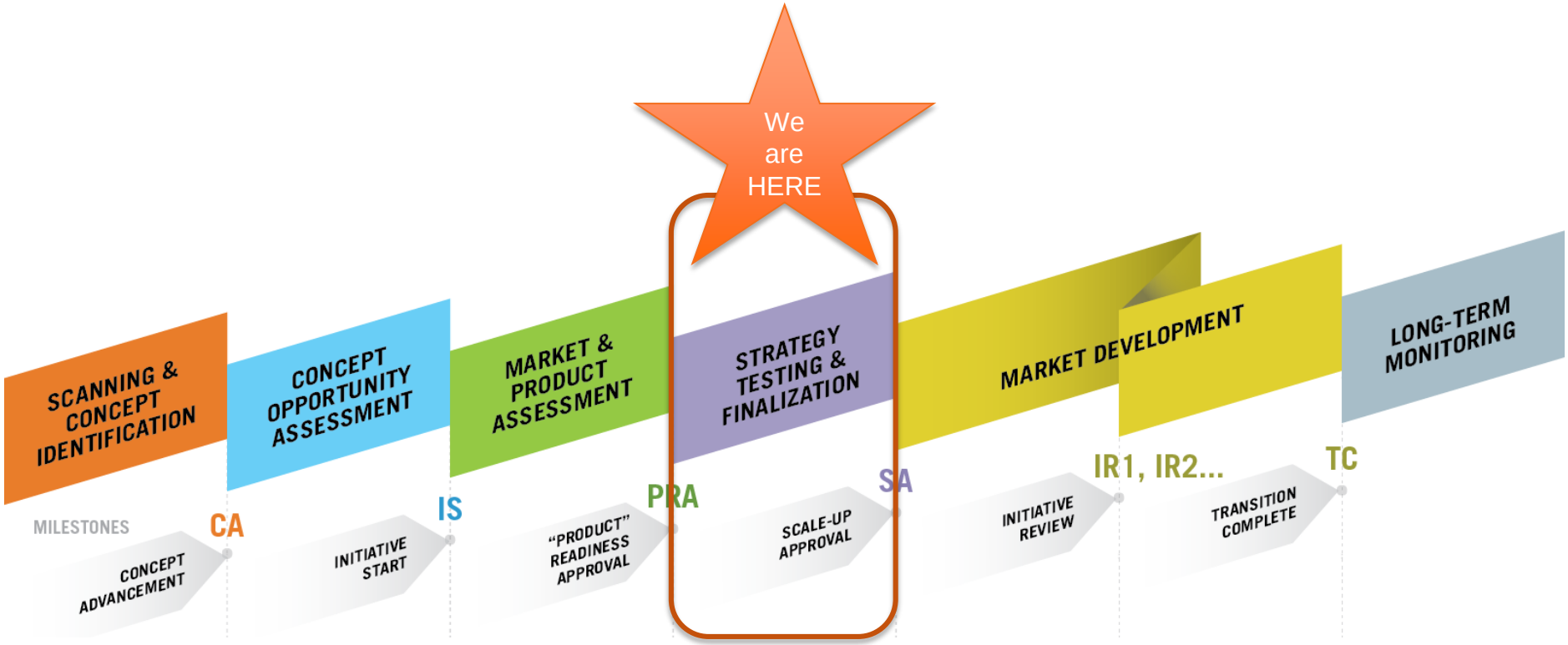


# *Initiative Theory and Status on the S-curve*

Develop a specification to influence manufacturer product development and execute strategies to overcome **high incremental cost**, **consumer awareness** and **product availability** to accelerate market adoption of super-efficient dryers and influence improved federal test protocols and enact more stringent federal efficiency standards (requiring heat pump technology) for residential clothes dryers.



# Initiative Lifecycle



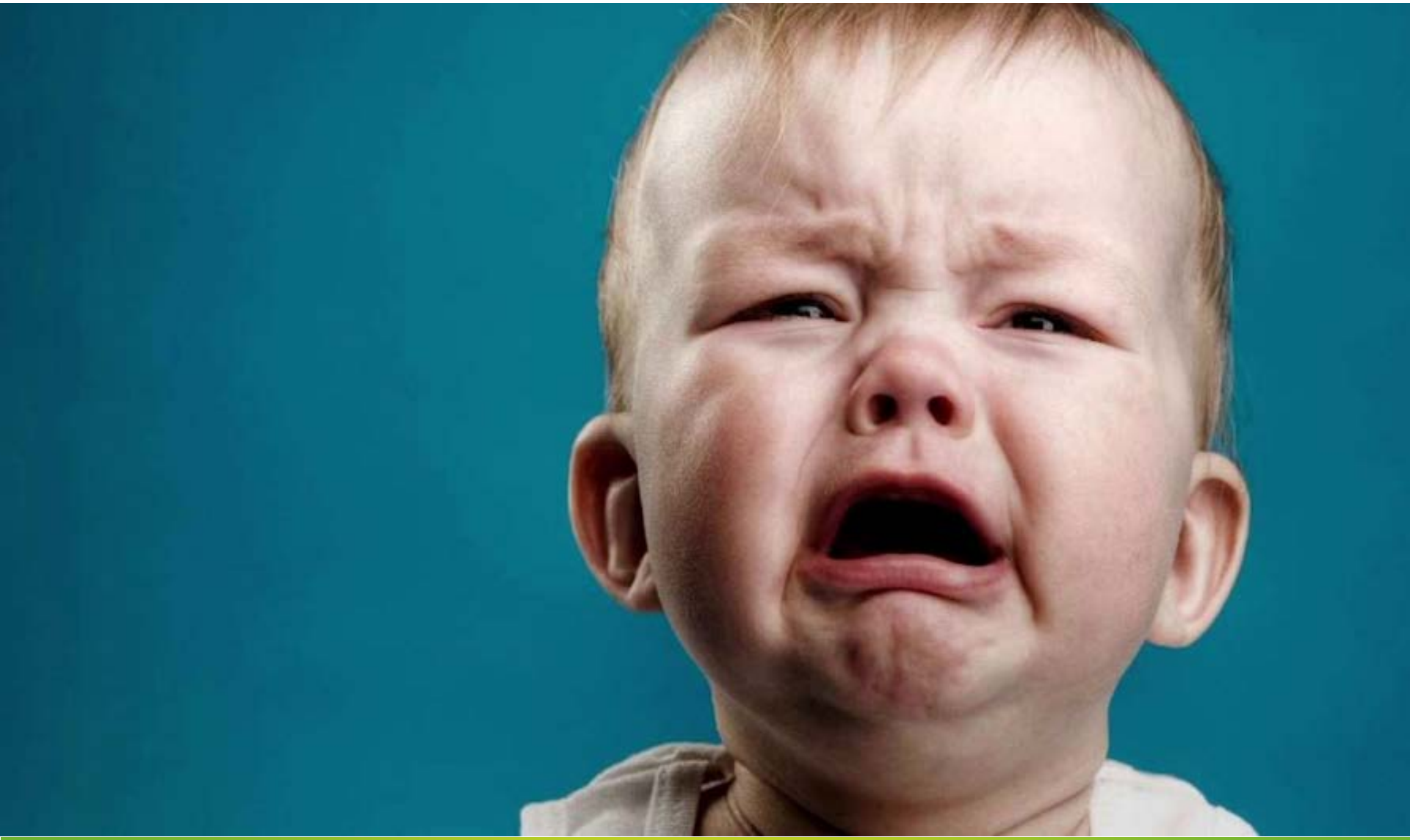
# *Desired Outcomes*

- RAC members are informed about the results of ENERGY STAR lab testing and next steps

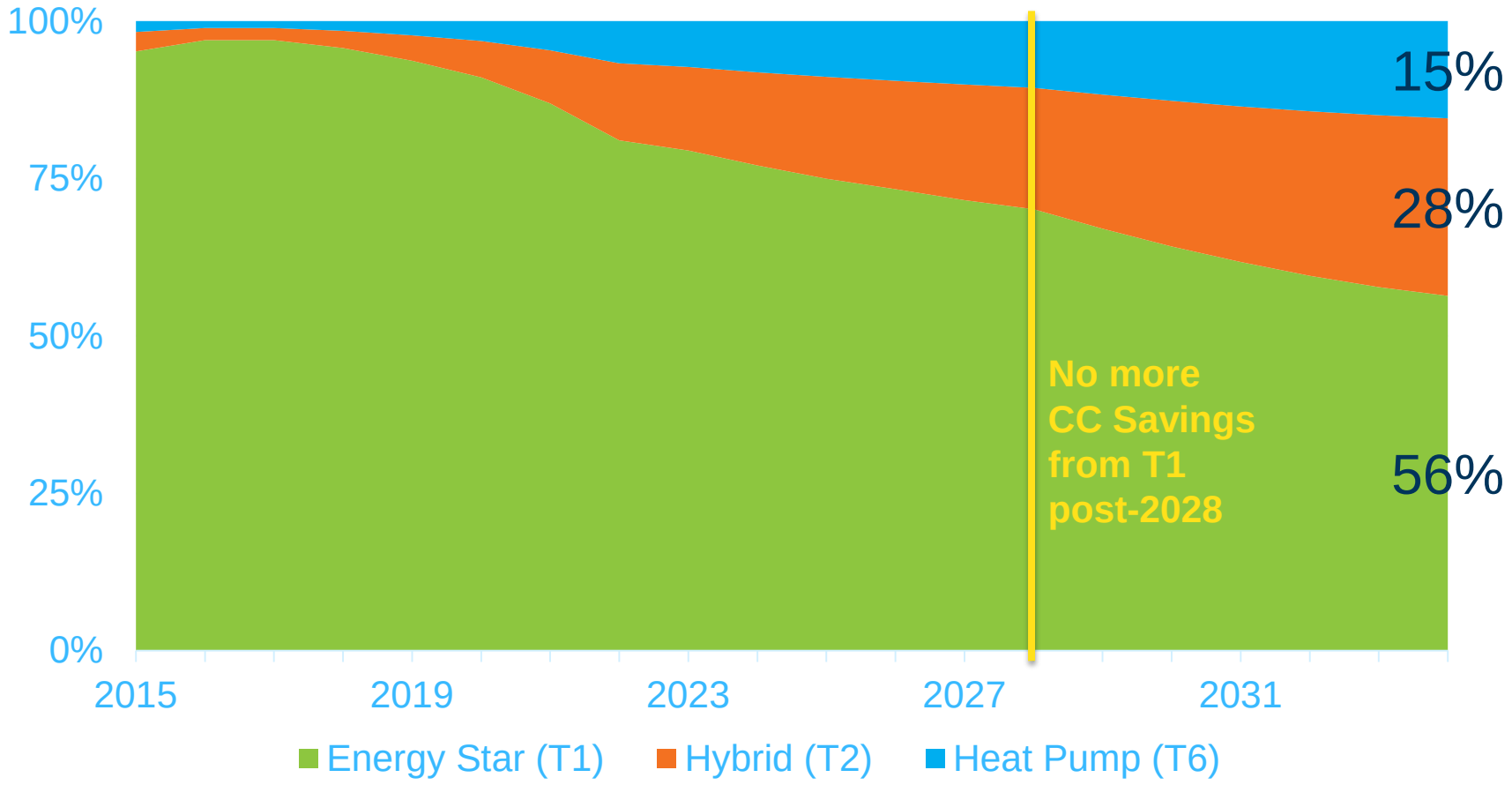
- RAC members have the opportunity to ask questions about ENERGY STAR lab test results

# *ENERGY STAR Lab Results*

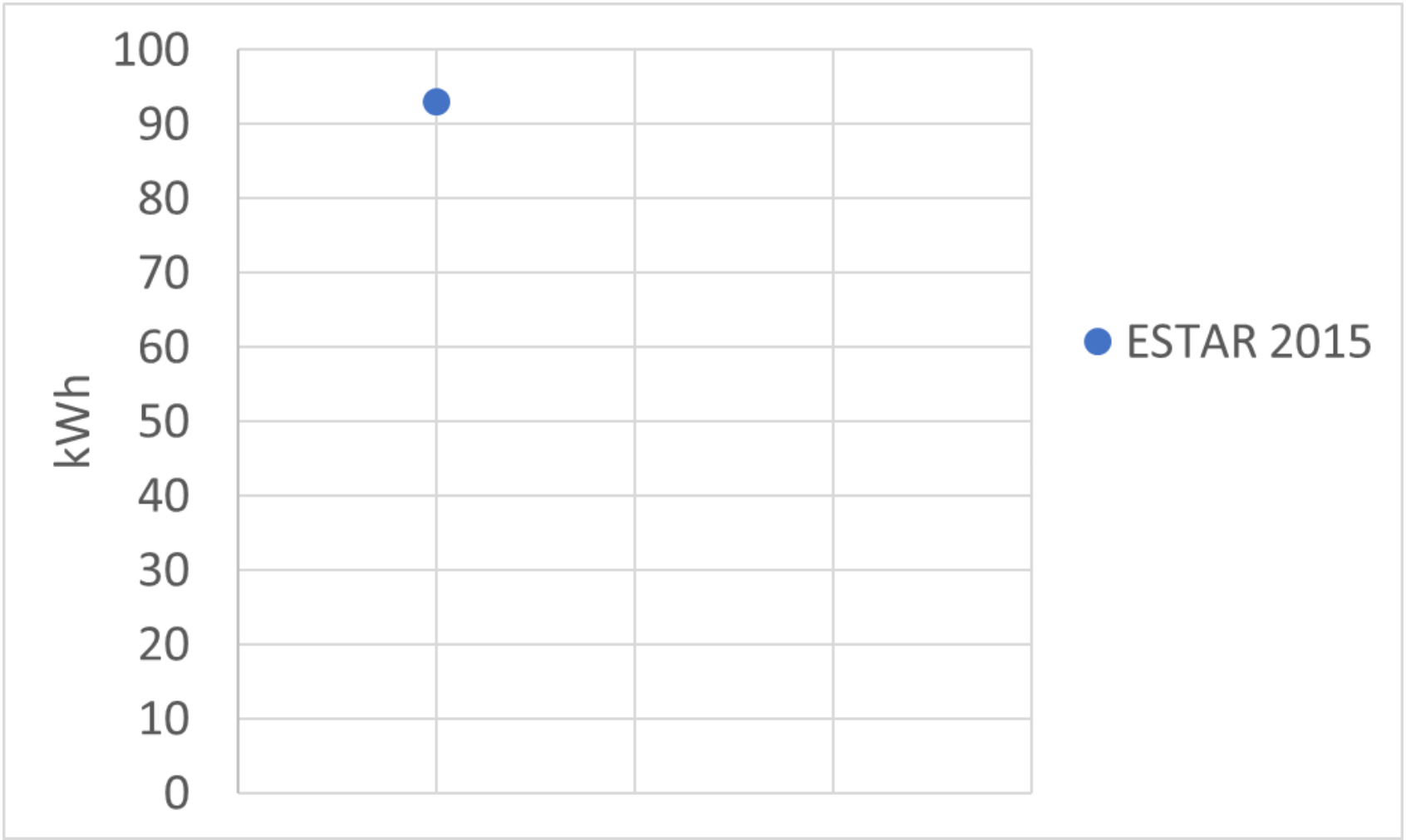
# *Remember this?*



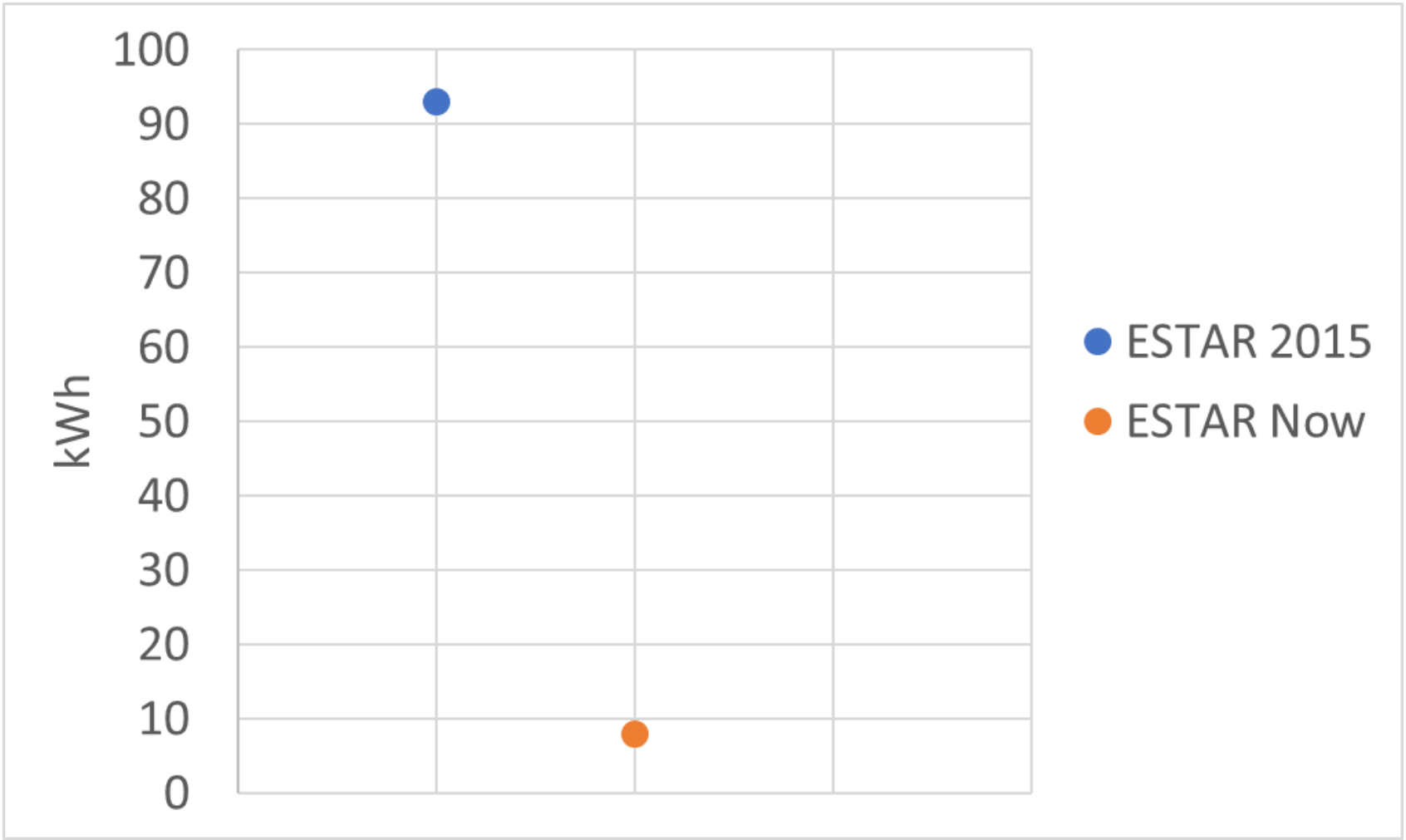
# *Proportion of Cumulative CC Savings by Tier*



# Boring Graph



# Boring Graph



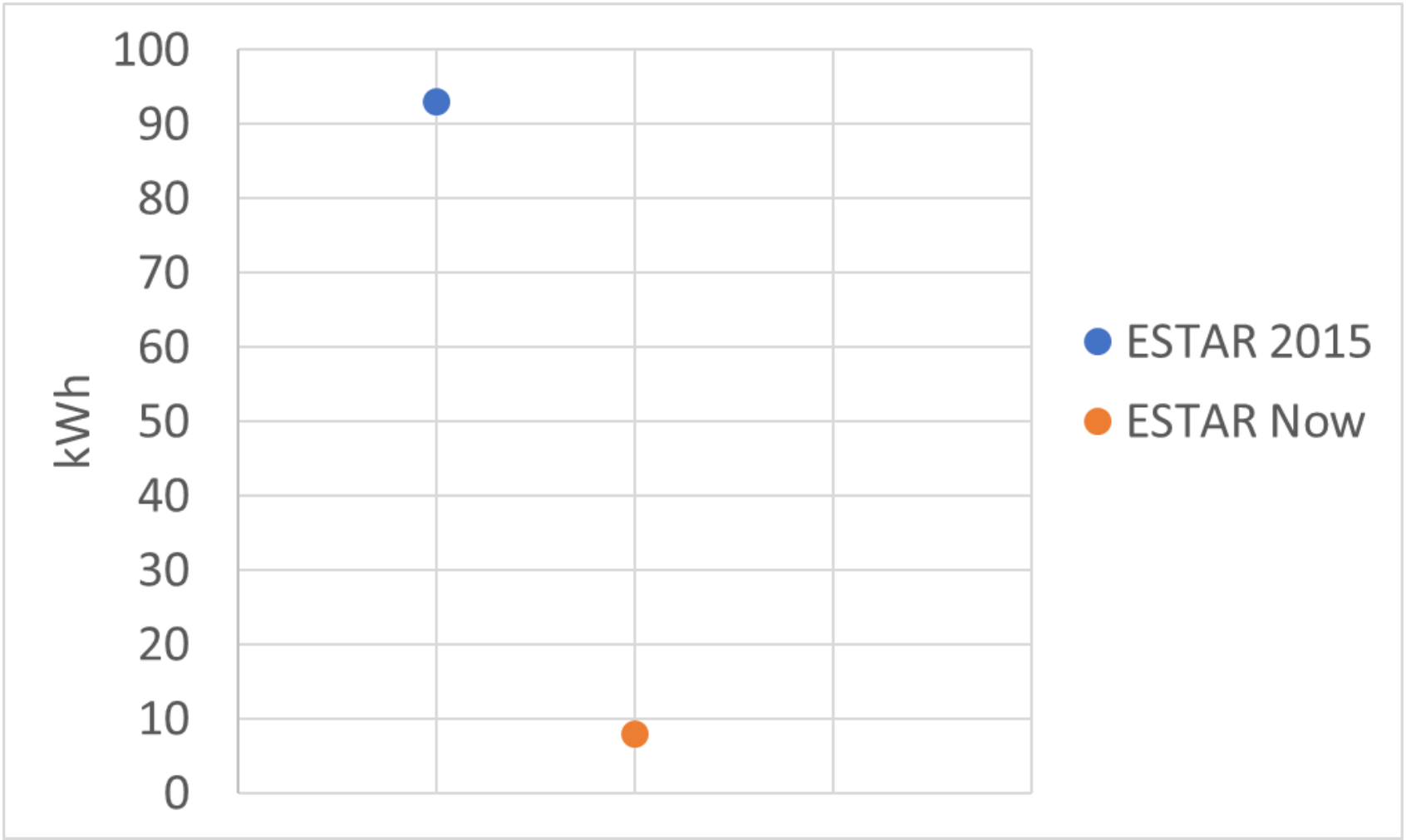
# *Research Plan*

- October 2017 - Research methods approved
  - 12 dryers
    - » 6 ENERGY STAR
    - » 6 Non-ENERGY STAR
  - RPP sales data
  - NEEA supplemental test

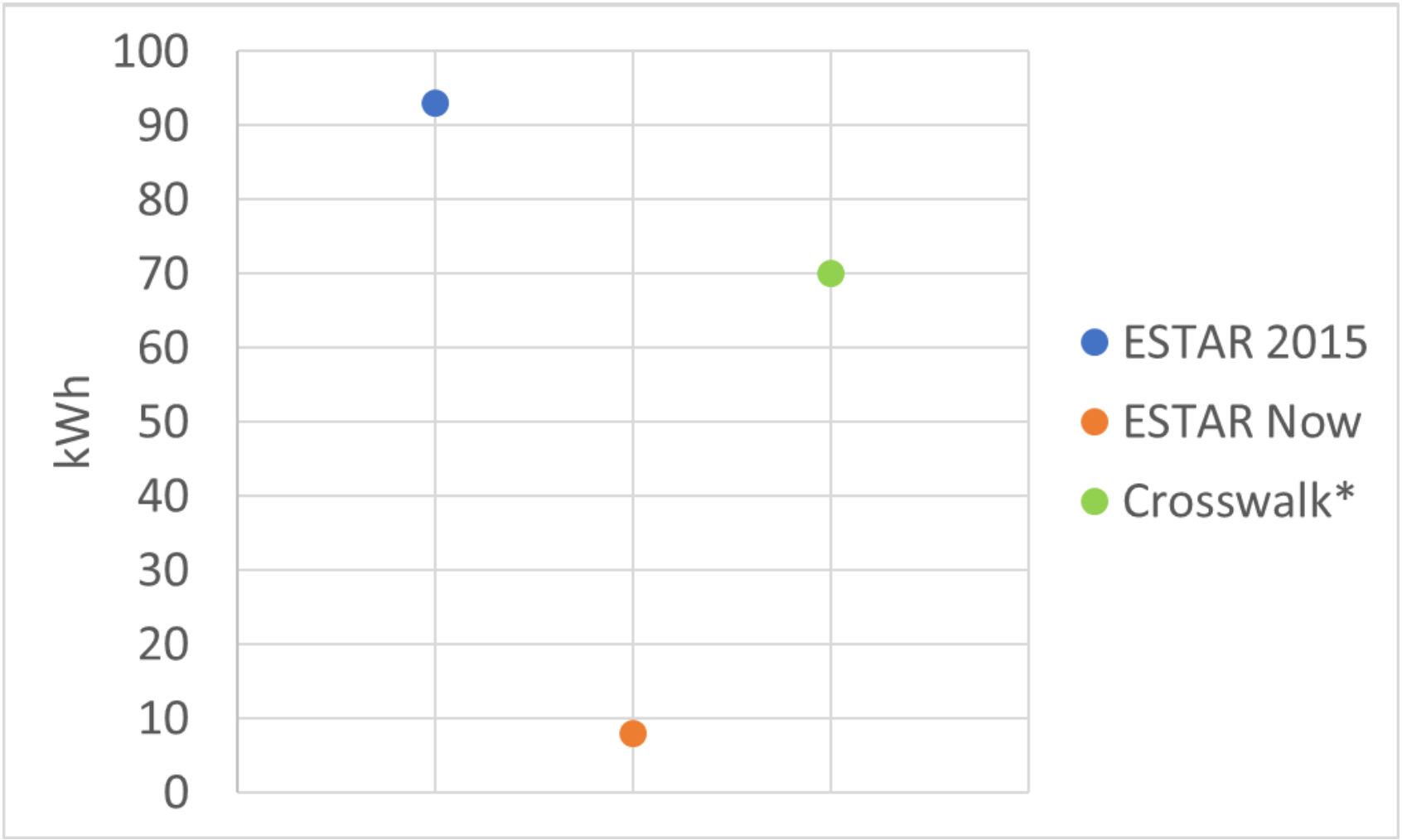
# *RPP Sales Data*

- Top selling dryers
- Controls:
  - Time on market
  - Manufacturer

# Another Boring Graph



# Another Boring Graph



# *Reminder*

| | Current RTF UCEF |
|---|---|
| Non E-STAR | 2.60 |
| ENERGY STAR | 2.65 |

# *Reminder*

| | Current RTF kWh Usage |
|---|---|
| **Non E-STAR** | 831 |
| **ENERGY STAR** | 816 |
| **ESTAR Market Share** | 30% |
| **Machine Savings** | 15 |
| **Adjusted Savings** | **8** |

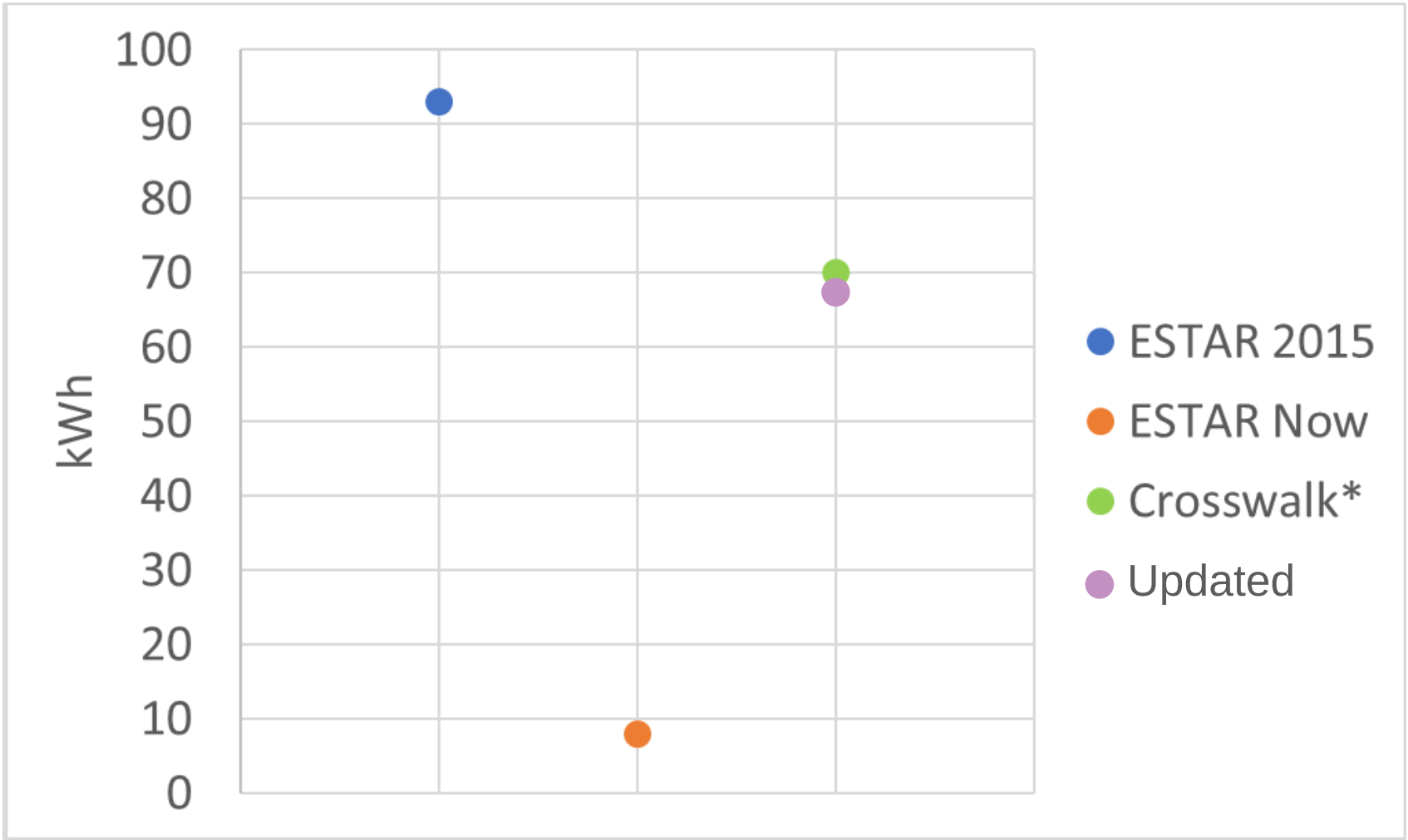
# *Test Results*

| | Current RTF UCEF |
|---|---|
| Non E-STAR | 2.60 |
| ENERGY STAR | 2.65 |

# *Savings*

| | Current RTF kWh Usage |
|---|---|
| Non E-STAR | 831 |
| ENERGY STAR | 816 |
| Machine Savings | 15 |
| ESTAR Market Share | 30% |
| **Adjusted Savings** | **8** |

# The Last Boring Graph



# *Total Regional Savings*

| | Current NEEA Assumption | Updated Savings Rate Assumption |
|---|---|---|
| **2017 Regional Savings** | 1.00 aMW | 1.35 aMW |
| **2015-2034 Regional Savings** | 26.34 aMW | 36.49 aMW |

# *Next Steps*

- April RTF prep call
- May RTF meeting
- Share data with ENERGY STAR


Think
Puppies & Rainbows

April 17, 2018

# *Thank you!*

Stephanie Baker
sbaker@neea.org

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April 17,2018

# *NEXT STEP HOMES Scale Up Review and Program Update*

Jonathon Belmont

Sr. Program Manager



# *Agenda*

- Scale up (SA) update
- Performance Path update
- Q&A

# *Desired Outcomes*

- RAC provides feedback on SA preparation and next steps
- RAC is informed on Performance Path program's progress and AXIS challenges

# *Next Step Homes Scale Up*

# *NSH Scale Up – Q4 2017 Review*

- Performance Based Programs
- Home Certification Program Coordination
- Training Development and Delivery
- Next Step Home Pilot Project
- Marketing

# *NSH Scale Up – Internal Meetings*

- Results and new challenge
  - Cost effectiveness
  - Code roadmap

# *NSH Scale Up – Addressing the Challenge*

- How we are addressing the challenge?
  - Updated model run
    - » Focus on a single state to start (WA)
    - » Define future WA code
    - » Update inputs
    - » Different outcome?
  - Roadmap

# *NSH Scale Up – Utility Input*

- Discussion
- Q&A
- Feedback

# *Performance Path*

# *Performance Path Update – Utility Programs*

Programs Launched

- Snohomish PUD
- Clark PUD
- Central Electric Co-Op
- Puget Sound Energy
- Pacific Power & Light (WA)
- Idaho Power

Programs in Progress

- Benton PUD
- Benton REA
- Franklin PUD
- City of Richland
- Chelan PUD

# *Performance Path Update – AXIS*

- AXIS database and calculators:
  - Challenges(s)
  - Resolution(s)
  - Looking forward
    - » New safeguards
    - » Enhanced testing
    - » Lessons learned

# *Performance Path – Utility Input*

- Discussion
- Q&A
- Feedback

# Feel Good Slide

April 17, 2018

# *Thank you!*

Jonathon Belmont
jbelmont@neea.org

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break

# *Round Robin Share-out*



# RESIDENTIAL BUILDING STOCK ASSESSMENT II

Report Highlights
2016-2017

# AGENDA

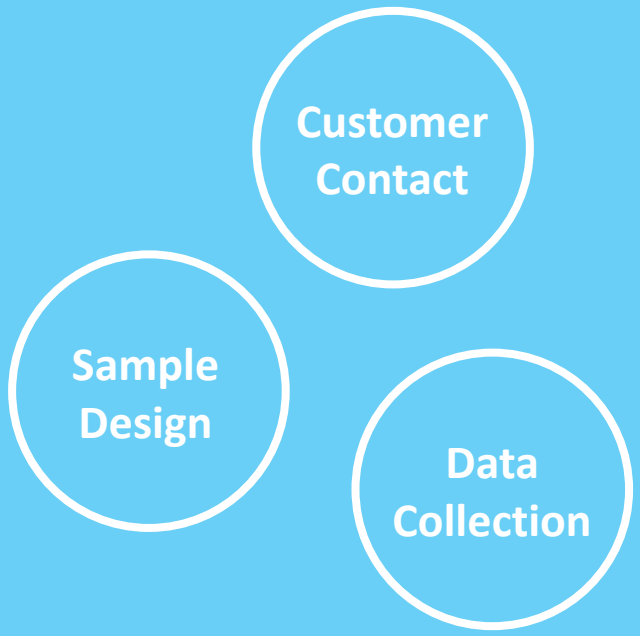
- Overview & Background
- Key Findings
- About the Reports
- About the Database
- Questions

# TODAY'S PRESENTATION

Focus is on single-family homes but with notable comparisons between other housing types

# THERE'S STRANGE STUFF OUT THERE

# Working Groups




Ten total working group sessions

Opportunity for NEEA, Cadmus and stakeholders to provide input

Developed protocol for accelerating customer questions or comments to utilities

# Data Collected

Home Characteristics

Home Tightness

Lighting

Insulation

Electronics

Appliances

…. And More

## NEEA RBSA Lighting Inventory: Protocols for Field Technicians

This document describes the protocol for field technicians of what to collect and the proper methods for collecting lighting data as part of the NEEA RBSA home surveys. The primary data points to be collected are outlined below.

Data Collected for Installed and Stored Lamps

| Category | Datapoint | Collected for Installed Lamps | Collected for Stored Lamps |
|---|---|---|---|
| Lighting | Control Type | X | |
| | Fixture Type | X | |
| | Fixture Quantity | X | |
| | Base/Socket Type | X | X |
| | Lamp Type | X | X |
| | Lamp Style | X | X |
| | Lamp length (feet) | X | X |
| | Lamp Wattage | X | X |
| | Lamp Quantity | X | |
| | Wi-Fi connected | X | |
| | Notes | X | X |

### Data Collection

The Cadmus iPad data collection tool allows field technicians to record the control type, fixture type, fixture quantity, socket type, lamp type, lamp style, lamp length, lamp wattage, and number of lamps per fixture for each room or space. Field technicians will collect this data for lighting both inside and outside the residence, including for lamps stored for future use.

Where necessary and reasonable, technicians will remove lampshades or fixture covers in order to identify the lamp characteristics. Technicians will not remove lampshades or fixture covers in instances where the fixture seems unstable or otherwise susceptible to breaking.

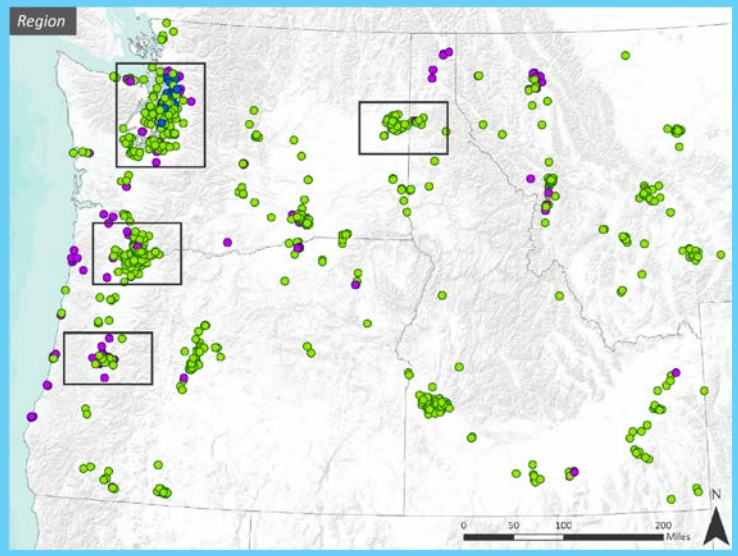
In the event that a given data point cannot be positively identified by visual inspection, field technicians will note that they gathered this information from some other source (asked the homeowner, assumed based on similar equipment in the home, or unable to identify). Possible scenarios in which this could occur include:

- Fixtures located on high ceilings or suspended fixtures that are out of the reach;
- Hardwired fixtures or fixtures that cannot be quickly taken apart; and
- Fixtures that look susceptible to breaking or unsafe to take apart.

# Sampling

| | Single-Family | Manufactured | Multifamily |
|---|---|---|---|
| Core | 761 | 341 | 276 |
| BPA Oversample | 169 | 70 | 198 |
| Utility Oversample | 170 | 0 | 49 |
| Total | 1,100 | 411 | 523 |

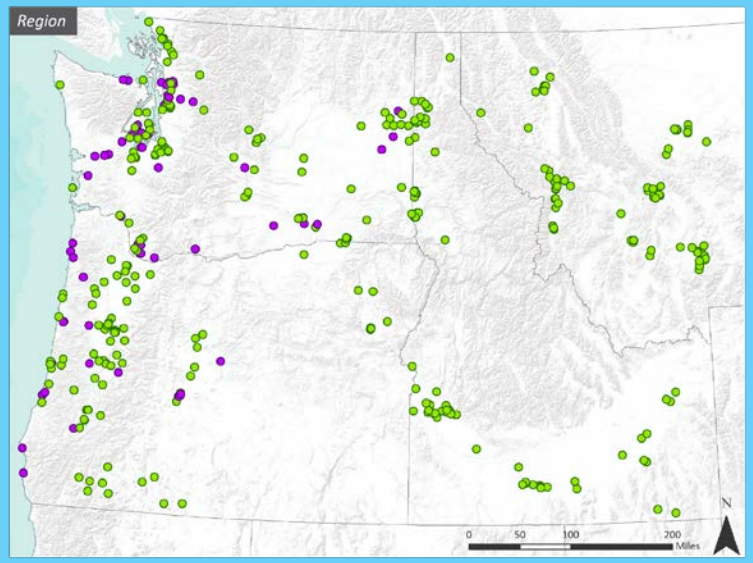
Single-Family



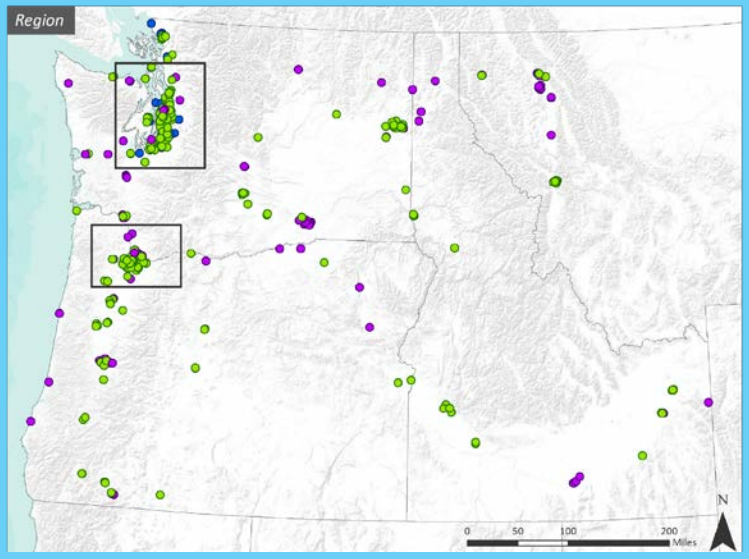

Utility Oversample | BPA Oversample | NEEA Core

# Sampling

## Manufactured



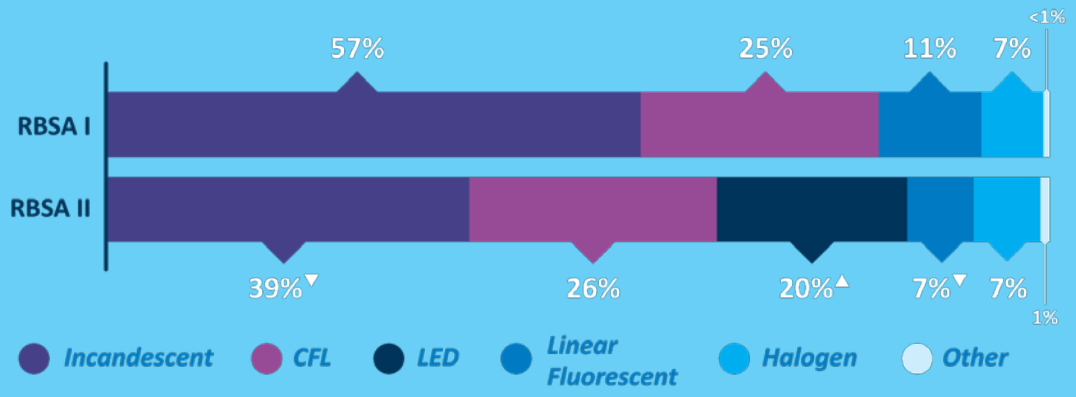

## Multifamily




Utility Oversample | BPA Oversample | NEEA Core

# RBSA II
# KEY FINDINGS

# Single-Family Lighting Findings



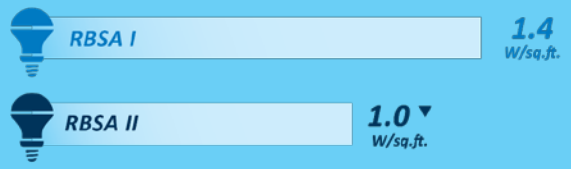

| | RBSA I | RBSA II |
|---|---|---|
| | 57% | 39% |
| | 25% | 26% |
| | 0% | 20% |

# Single-Family Lighting Findings

## Lamp Distribution by State

| | ID | MT | OR | WA | |
|---|---|---|---|---|---|
| Compact Fluorescent | 26% | 27% | 25% | 26% | 26% |
| Halogen | 6% | 10% | 6% | 8% | 7% |
| Incandescent | 42%▼ | 45%▼ | 44%▼ | 35%▼ | 39%▼ |
| Incandescent/ Halogen[1] | 1% | 0% | 0% | 0% | 0% |
| Light Emitting Diode | 17%▲ | 9%▲ | 17%▲ | 24%▲ | 20%▲ |
| Linear Fluorescent | 8% | 8% | 7%▼ | 6%▼ | 7%▼ |
| Other | 1% | 1% | 1% | 2% | 1% |
| Total | 100% | 100% | 100% | 100% | 100% |

## Home Lighting Power Density



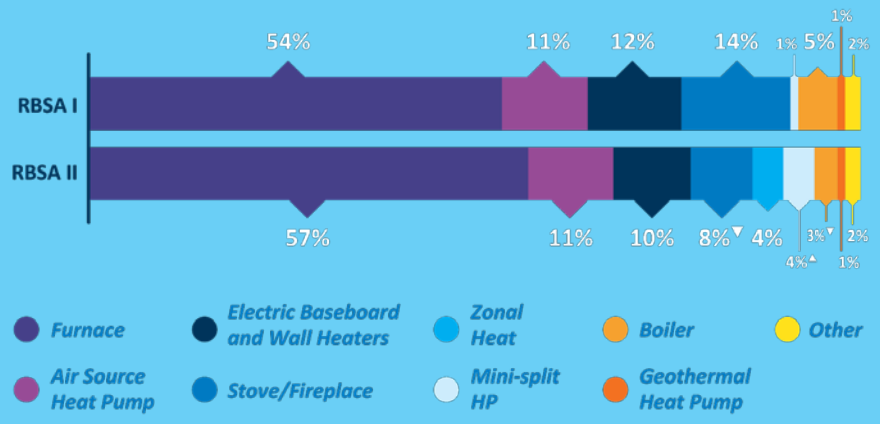

**2%** of homes have connected lighting

# Lighting Home Type Comparison

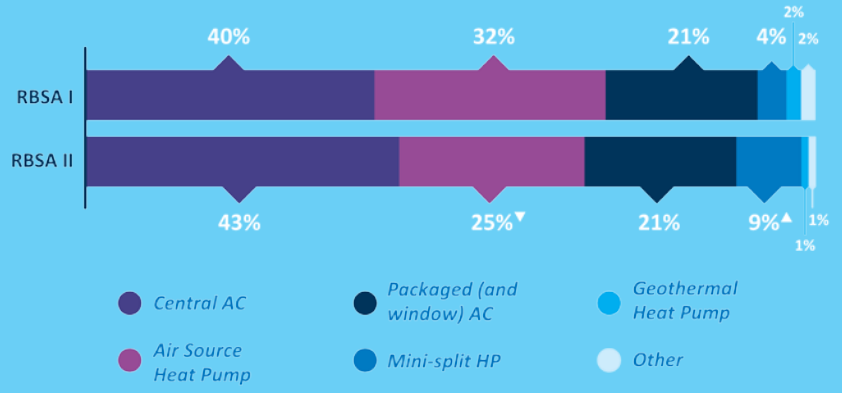
| | Single-Family | Manufactured | Multifamily |
|---|---|---|---|
|  | 39% | 39% | 37% |
|  | 26% | 27% | 30% |
|  | 20% | 18% | 16% |

# Single-Family HVAC Findings

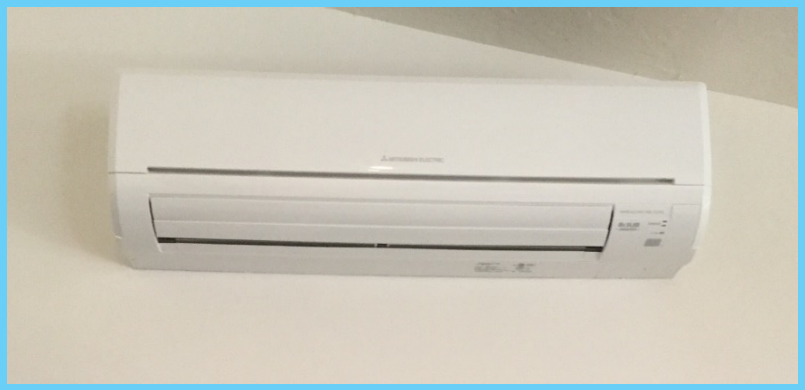
## Distribution of Primary Heating




## Distribution of Primary Cooling Systems



# Single-Family Mini-Split Details



Mini-splits are primarily going in as retrofit as opposed to new construction

The majority of mini-split systems are going into single-family detached

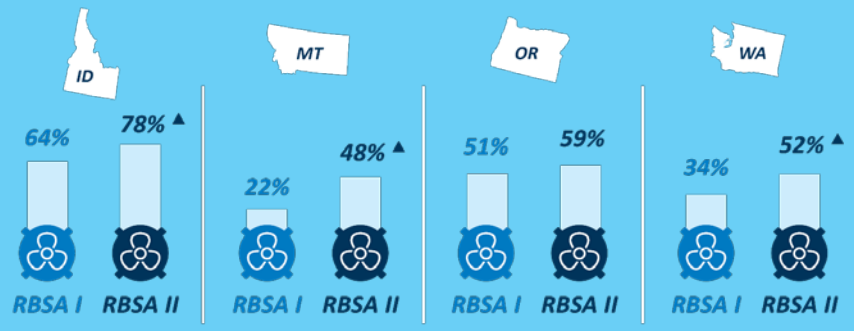
Most mini-splits are paired with other zonal heat or stove/fireplace

# Single-Family HVAC Findings

## Distribution of Fuel by Primary Heating System and State

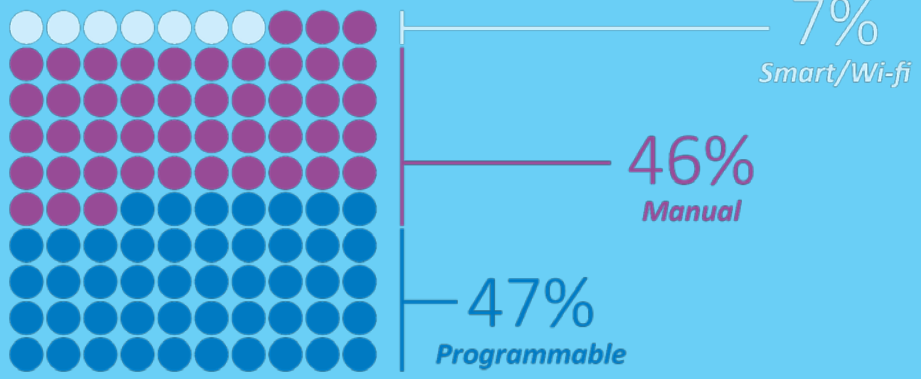
| | ID | MT | OR | WA | |
|---|---|---|---|---|---|
| Electric | 22% | 17% | 33% | 42% | 35% |
| Gas | 64% | 67% | 58%▲ | 52% | 56%▲ |
| Oil | — | — | 2%▼ | 2% | 2%▼ |
| Pellets | 1% | 1% | 2% | — | 1%▼ |
| Propane | 4% | 8% | 0%▼ | 1% | 2% |
| Wood | 9% | 7%▼ | 5%▼ | 2%▼ | 4%▼ |
| Total | 100% | 100% | 100% | 100% | 100% |

## Percent of Homes with Cooling Equipment



# Single-Family Thermostat Findings

## Distribution of Thermostat Type



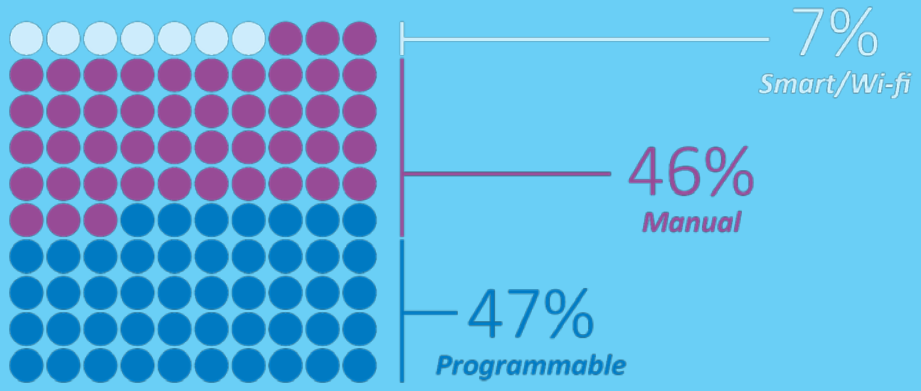

## Smart/Wi-Fi Details

Even distribution across all home vintages

Higher education (Bachelor+) and higher income

Possible trend with thermostat being installed as HVAC system is replaced

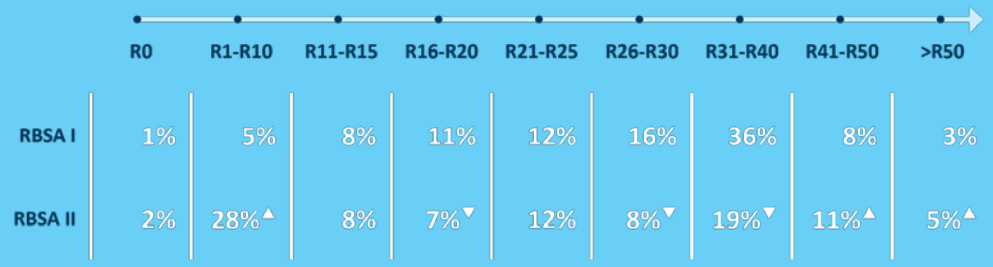
# Thermostat Home Type Comparison




| | Single-Family | Manufactured | Multifamily |
|---|---|---|---|
| Smart/Wi-fi | 7% | 3% | Less than 1% |
| Manual | 46% | 48% | 91% |
| Programmable | 47% | 48% | 9% |

# Single-Family Insulation Findings

## Distribution of Attic Insulation




## Distribution of Wall Insulation R-Value by State

| | ID | MT | OR | WA | |
|---|---|---|---|---|---|
| R0 | 12% | 12% | 11% | 7%▼ | 9%▼ |
| R1-R10 | 19%▲ | 26%▲ | 29%▲ | 18%▲ | 22%▲ |
| R11-R16 | 35% | 25%▼ | 32% | 37% | 35%▼ |
| R17-R22 | 33% | 35% | 24%▼ | 37% | 33% |
| >R22 | 0% | 2%▼ | 3% | 1% | 1% |
| Total | 100% | 100% | 100% | 100% | 100% |

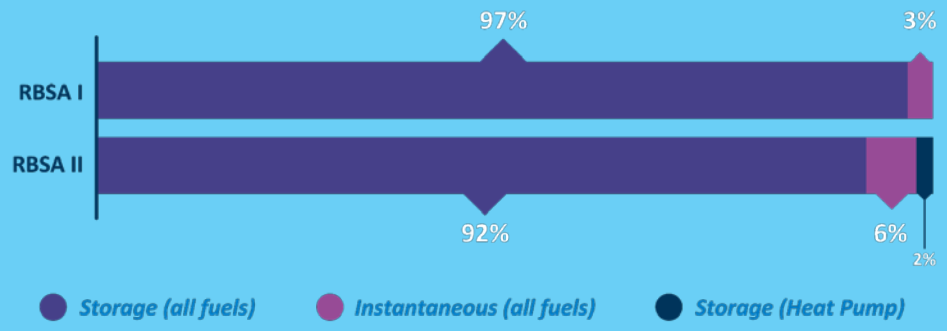
# Single-Family Clothes Washer Findings

## Distribution of Clothes Washer Types

| | ID | MT | OR | WA | |
|---|---|---|---|---|---|
| Horizontal Axis | 31% | 37% | 51%▲ | 45%▲ | 44%▲ |
| Vertical Axis (with agitator) | 65% | 47% | 35%▼ | 38%▼ | 41%▼ |
| Vertical Axis (without agitator) | 4% | 15% | 12%▲ | 16%▲ | 13%▲ |

# Single-Family Water Heater Findings

## Distribution of Water Heater Type



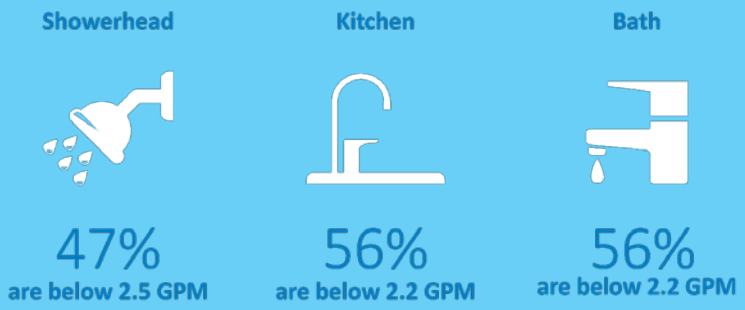

## HPWH Details

Majority installed as retrofit

All single-family detached

Installed in homes reporting higher level of Income

# Single-Family Water Fixture Findings



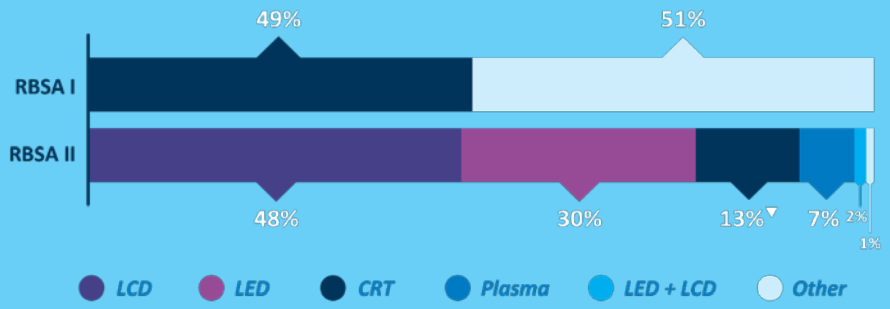

Differences in GPM from previous RBSA

Similar but maybe not exact same methods of measurement

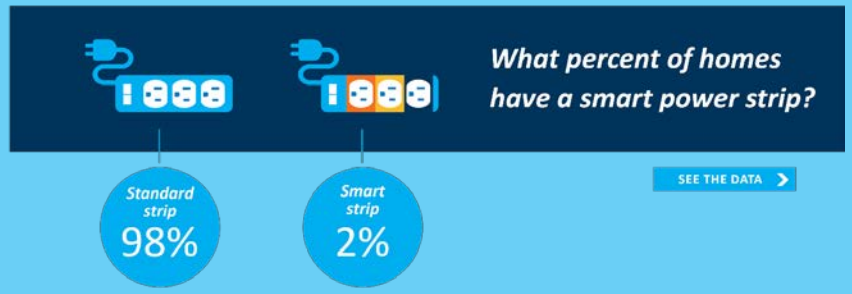
Analysis between studies is similar

# Single-Family Electronics Findings

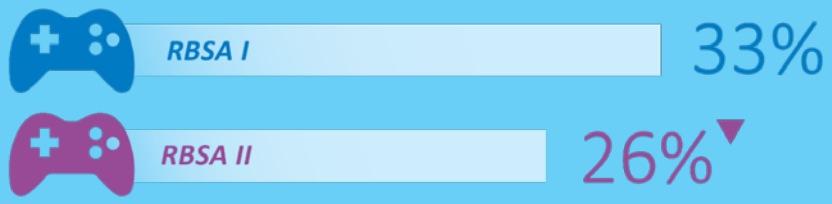
## Distribution of Television Types




## Distribution of Power Strips




## % Homes with Game Consoles

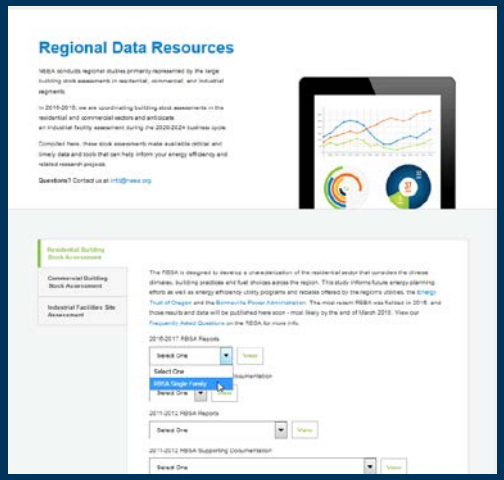



## Distribution of Set Top Boxes

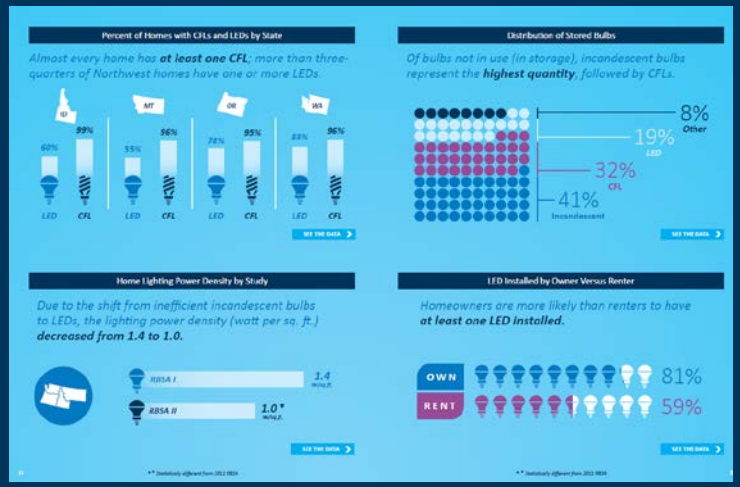
64% of homes have at least one

1.1 set-top boxes per home on average

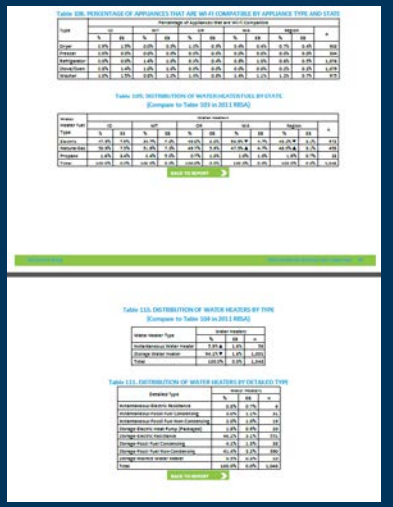
# REPORTING




NEEA.ORG

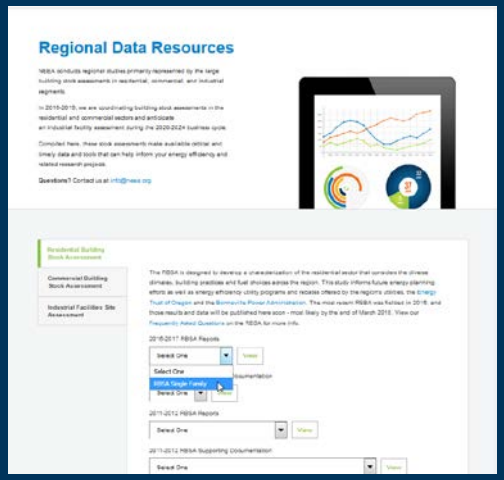



Interactive & Printable Versions

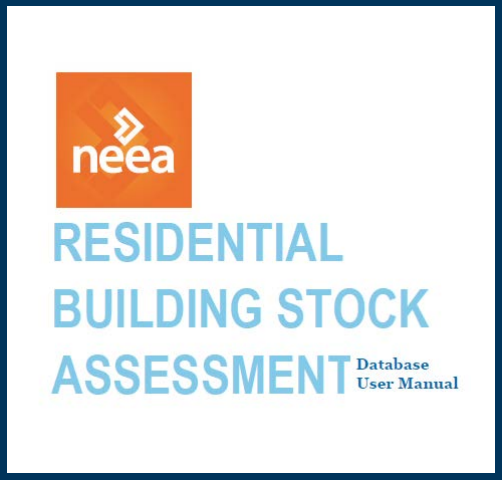


Additional Detail

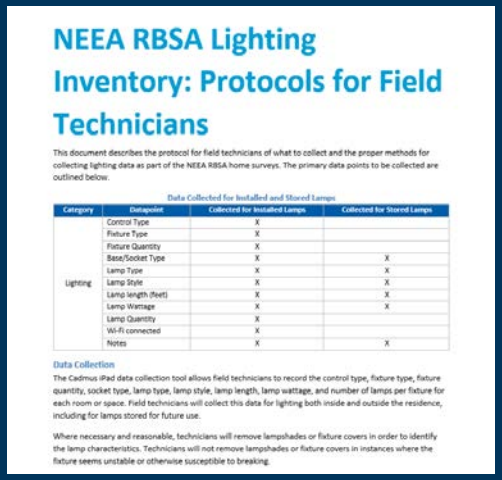
# DATABASE




NEEA.ORG




User Manual



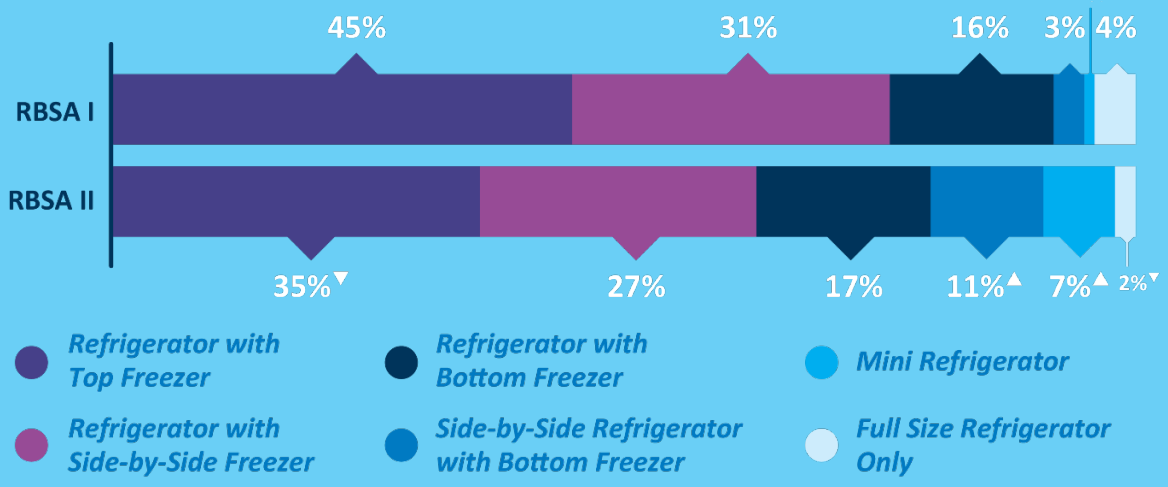

Data Collected

# Questions

RBSAinfo@neea.org

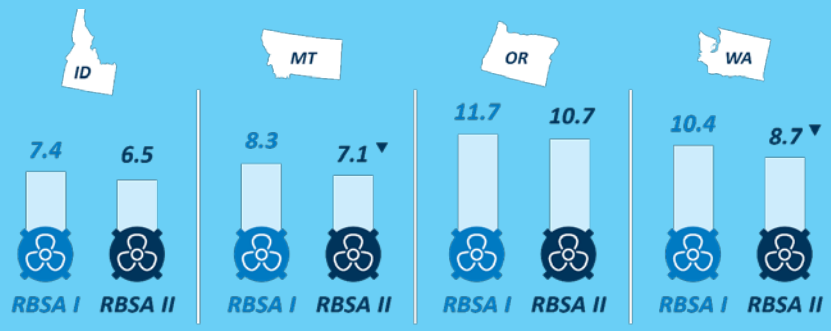
# Single-Family Refrigerator Findings

## Distribution of Refrigerator Type



# Single-Family Home Tightness Findings

## Blower Door Air Tightness (ACH50) by State




## Blower Door Air Tightness (ACH50) by Home Vintage

| | Pre 1951 | 1951-1960 | 1961-1970 | 1971-1980 | 1981-1985 | 1986-1990 | 1991-1995 | 1996-2000 | 2001-2005 | 2006-2010 | Post 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| RBSA I | 13.7 | 11.6 | 10.6 | 10.1 | 7.6 | 8.1 | 8.3 | 7.5 | 7.5 | 6.3 | 6.6 |
| RBSA II | 13.0▼ | 9.8▼ | 10.7▲ | 8.3▼ | 10.2▲ | 8.8▲ | 7.2▼ | 6.9▼ | 5.6▼ | 5.8▼ | 4.9▼ |

# Single-Family Energy Benchmarking Findings

## Average EUI by State & Fuel

| | ID | MT | OR | WA | |
|---|---|---|---|---|---|
| Electric EUI per Home (kWh/sq.ft) | 7.4 | 8.2▲ | 7.5 | 8.0 | 7.8 |
| Gas EUI per Home (therm/sq.ft) | 0.4 | 0.5 | 0.3▼ | 0.3▼ | 0.3▼ |
| Other Fuel EUI per Home (kBtu/sq.ft) | 4.6▼ | 7.1 | 4.2▼ | 2.5▼ | 3.6▼ |

## Electric EUI Quartiles

| | Conditioned Area | Electric Heat | Efficient Lighting | Air Conditioning | Electric Hot Water |
|---|---|---|---|---|---|
| EUI Quartile 1 (<3.55) | 2,488 | 5% | 47% | 58% | 17% |
| EUI Quartile 2 (3.55-5.96) | 2,179 | 19% | 43% | 62% | 30% |
| EUI Quartile 3 (5.96-9.26) | 2,014 | 39% | 44% | 72% | 57% |
| EUI Quartile 4 (>9.26) | 1,377 | 76% | 40% | 47% | 81% |

# Questions

# Q & A

TOGETHER We Are Transforming the Northwest


TOGETHER *We Are Transforming the Northwest*

Avista
Bonneville Power Administration
Cascade Natural Gas Corporation
P.U.D. Chelan County
Clark Public Utilities
Cowlitz PUD
EnergyTrust of Oregon
Grant PUD
Idaho Power An IDACORP Company
NorthWestern Energy
NW Natural
Pacific Power
PGE
Puget Sound Energy
Seattle City Light
Snohomish County PUD Public Utility District No. 1
Tacoma Power Tacoma Public Utilities

# *Public Comment & Wrap-up*

Eugene Rosolie



# *Break*

## *Please be back by 3:30 for 50001 Ready Presentation*