Bonneville Power Administration

New Multifamily Construction

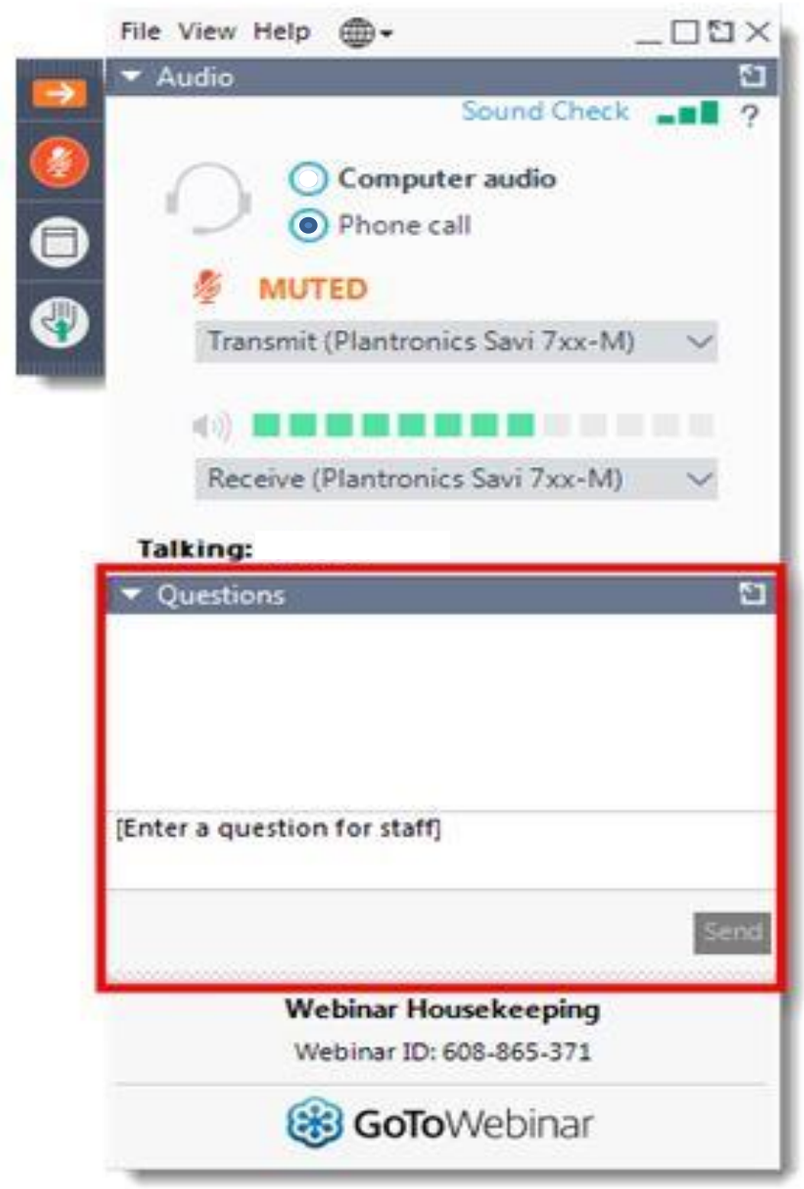
June 28, 2017

Robert Weber, Residential Technical Lead
Jess Kincaid, New and Existing Homes Program Manager

GoToWebinar Logistics

- Minimize or maximize control panel
- Phone lines are muted
- Please use question pane to ask questions at any time, or if you have any technical issues

NOTE: Today's presentation is being recorded and will be available at http://e3tnw.org/Webinars



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Presentation Roadmap

- Context for Program Redesign
- Technical Analysis
- New Multifamily Program
- Emerging Technology Integration

Bonneville Power Administration Context

- **Federal Power Marketing Administration**
  - Provide Power and High Voltage Transmission in portions of seven states
- **Promote Energy Efficiency (EE) and Technologies that support its mission**
- **Provide EE Program Options to Utility Customers who Choose Whether to Offer the Program**

Multifamily is a Big Opportunity

- **Significant Market Potential for New Construction**
  - 397,000 low rise and 89,000 high rise units by 2035
- **Current New Construction Program not Utilized**
  - Utilities are working through custom projects or emerging technologies

We Asked What Stakeholders Wanted

- **Formal and Informal Discussions**
  - Technology Advisory Group
  - Outreach to Utility Customers
  - Outreach to National and Regional Experts
  - Outreach to Builders and Developers
- **What we Heard:**
  - Make sure to design so people will actually use it
  - Make sure there is space for local utility programs/ certifications
  - Make sure that the programs can coordinate with gas utility incentive programs
  - Make program similar between residential and commercial
- **New Construction Measures are the First Outcomes**

Policy Framework

1. Acquire Additional Efficiency Above Stringent Washington Energy Codes
2. Align with Affordable and Market Rate Housing
3. Support Certification Industry Already in Use in the Region
4. Help the Market Toward the Most Energy Efficient Buildings Possible

Zero Energy Ready

The Most Efficient Building Possible

But, How Much Electricity Does it Use?

Our Initial Concept

1. Set Performance Bar

2. Test Programs Against Performance Bar

3. Add Qualified Programs to Incentive Paths

New Program

First Time We've Tried this Kind of Program

1. Rely on the Market
2. Flexibility for Utilities
   - Can use existing certifications
   - Can design a program of their own
3. We set the Standards, Certifications/ Programs Apply to be on the Qualified Programs List

BPA Energy Savings Calculations

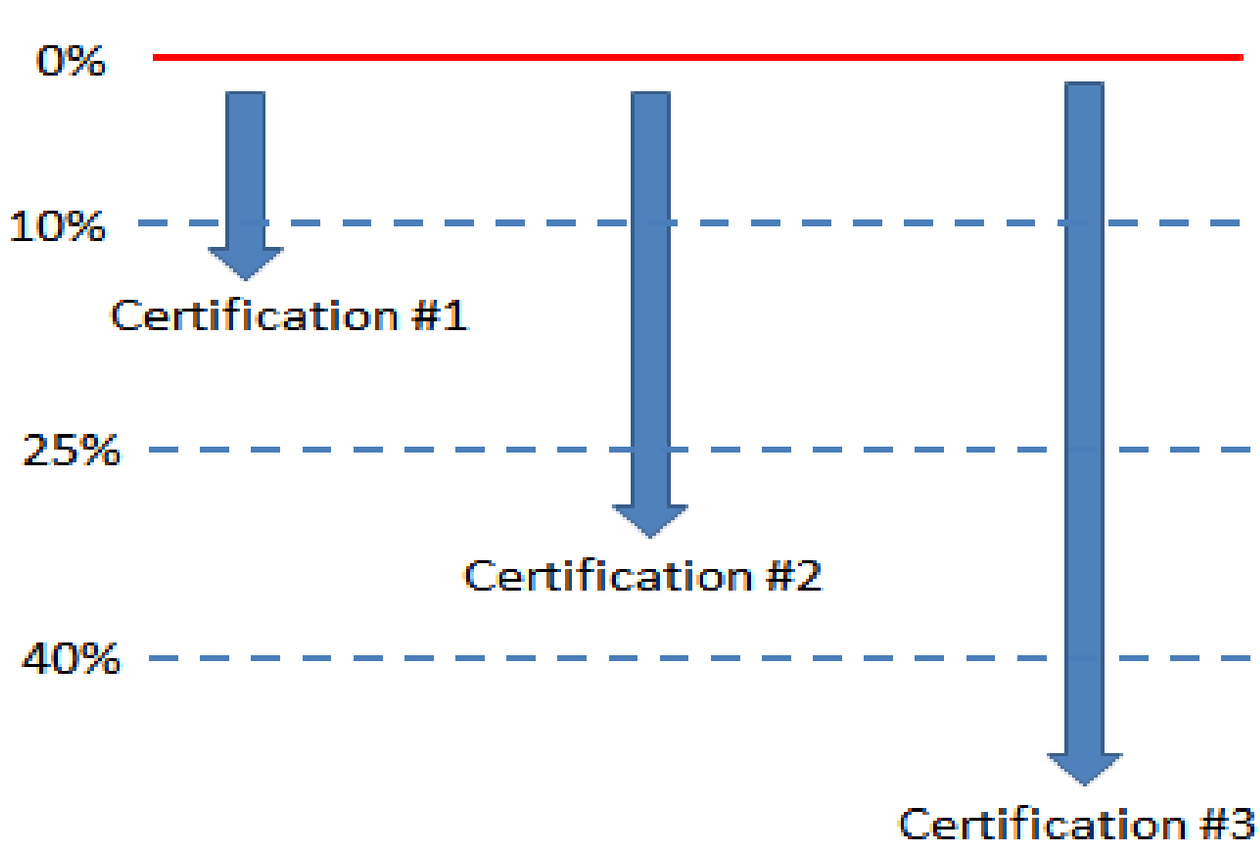
GOAL: Pay an incentive for building certifications that deliver significantly above code energy performance

To Do This

- Know the kWh savings
- Establish an EUI baseline to measure against
- Baseline is new construction code
  - ID, MT, OR, WA
  - Energy code and performance is different among these four states

BPA Energy Savings Calculations

MF Energy Use Code Baseline Example for WA State



Code Baseline-2015 Washington State Energy Code EUI (kWh/ft2)

BPA Code Baseline Energy Savings

- Establish kWh and EUI values for Multifamily New Construction under ID, MT, OR, WA Residential Energy Code
- Ecotope performed MF building modeling using the Simplified Energy Enthalpy Model (SEEM) Energy calculator
- Utilized the Regional Technical Forum (RTF) Multifamily Building Prototypes

RTF Multifamily Prototype for Baseline

Regional Technical Forum (RTF): Technical Oversight and Validation for Utility Energy Savings for the Northwest

RTF Guidelines establish a regional MF prototype. Several characteristics (not all)

- *Climate*: 3 heating zones and 3 cooling zones
- *HVAC*: Four different primary types of HVAC in MF-weighted
- *Building Type*: 952 ft^2 unit size, 2 & 3 story buildings and various foundation types

Combine all characteristics. SEEM Model runs 144 variations for each state code. Take the AVERAGE and arrive at a single EUI energy performance number.

Technical Analysis – Code Baseline

Specification	Consumption (kBtu) per Dwelling Unit	Site EUI (kBtu/ft2)
ID Code	46,584	48.9
MT Code	47,148	49.5
OR Code	36,251	38.1
WA Code	29,092	30.6

Certification Performance Bar

DOEZER is a Federal Program for Efficient New Construction

Original Concept was to use the USDOE Zero Energy Ready (DOEZER) certification as a **threshold or performance bar**. Then we would incentivize any certification program that met or exceeded DOEZER energy performance.

Technical Analysis – DOEZER

USDOE Zero Energy Ready (DOEZER)

Federal Program for Extremely Efficient New Construction

Specification	Consumption (kBtu) per Dwelling Unit	Site EUI (kBtu/ft2)	Savings above code baseline(%)
ID DOEZER	34,288	36.0	26.4%
MT DOEZER	35,628	37.4	24.4%
OR DOEZER	26,044	27.4	28.2%
WA DOEZER	25,786	27.1	11.4%

Performance Bar

Is Zero Energy Ready an EUI of 27 kBtu/ft^2 in Washington?

New Question:

- Is 2015 WA Energy Code really efficient, or
- Is there a range of EUI for zero energy ready

Proposal to Answer:

- Compare Passive House against WA Energy Code EUI

Passive House Certification

- Ecotope ran a quick analysis comparing Passive House (PH) certification to the WA 2015 Energy Code baseline
- They looked at the PH EUI performance metrics and how it compares to the newly established code EUI baseline
- PH uses source EUI, but for consistency with the code baseline we will present in “relative” site EUI values

Code Baseline Comparison to PH

Passive House

Certification Standard for Extremely Efficient New Construction

Specification	Site EUI (kBtu/ft2)	PH Savings (%) compared to code baseline
ID Code	Estimate < 23	Estimate > 60%
MT Code	Estimate < 23	Estimate > 60%
OR Code	Estimate < 20	Estimate > 45%
WA Code	Estimate < 20	Estimate > 35%

Zero Energy Ready

Zero Energy Ready is a Range

Our Final Concept

1. Set **TWO** Performance Bars

2. Test Programs Against Performance Bars

3. Add Qualified Programs to Incentive Paths

BPA Programs New Multifamily Work

PROGRAMS

Unit Energy Savings Measures

10% Above WA Code Program

25% Above WA Code Program

Program Based on WA Residential Code, but Payments and Savings are State Specific

New Program (Based on WA Res Energy Code)

10% (Energy Efficient)

- DOEZER
- + Other Interested Programs

- Available for low, mid, and high rise
- BPA will maintain a Qualified Programs List (QPL) for each tier

25% (BPA Zero Energy Ready)

- PHIUS, PHI
- + Other Interested Programs

- BPA will post requirements for inclusion on the QPLs
- Draft program language and QPL requirements will be available July 18

Evaluation Plan

This is a new approach, so the Evaluation Plan will be part of Feedback and Continuous Improvement

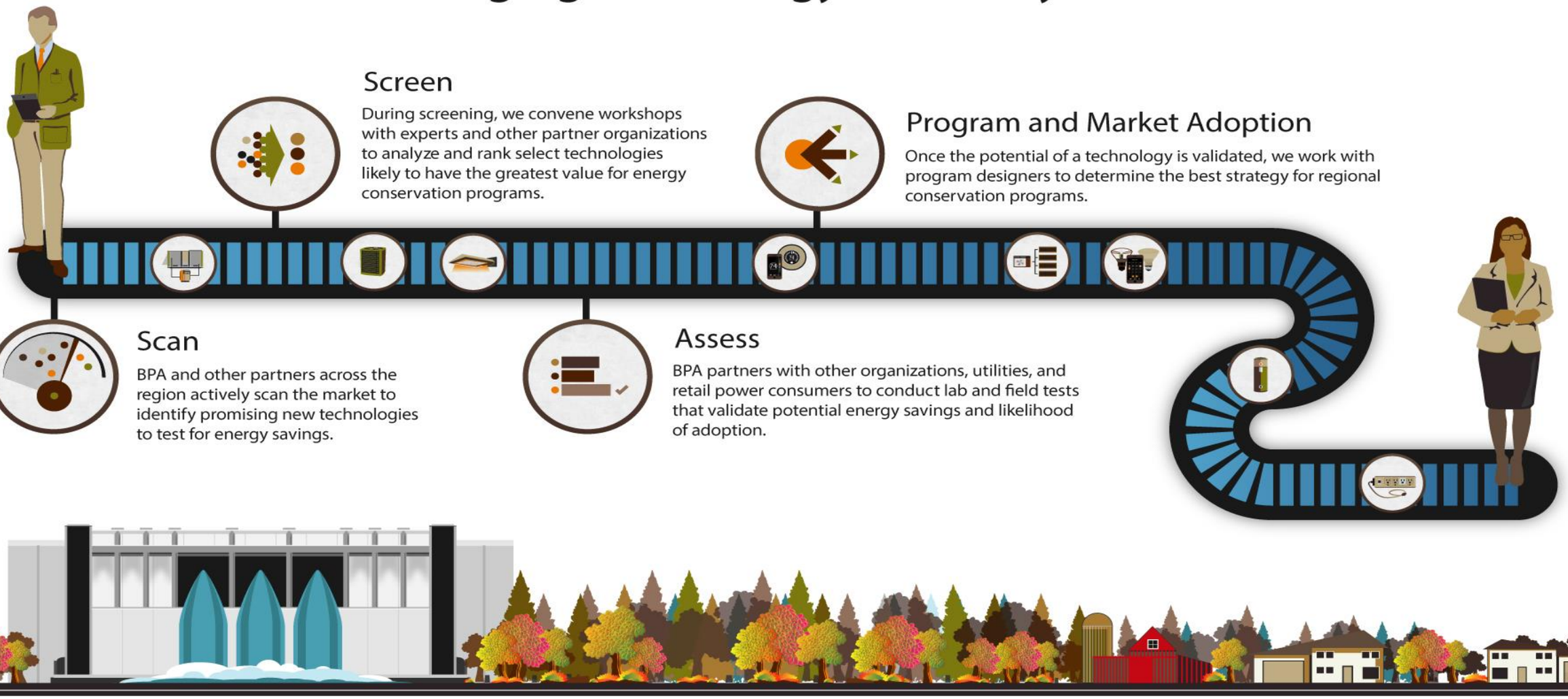
- BPA will evaluate individual certifications used and whether grouping by performance tiers works

Future Challenges

- **Code Changes:**
  - When code is updated, 10% above level is updated as well
  - Eventually even the 25% tier will be equivalent to code
- **Remain Flexible and Open to Change**

BPA Technology Development

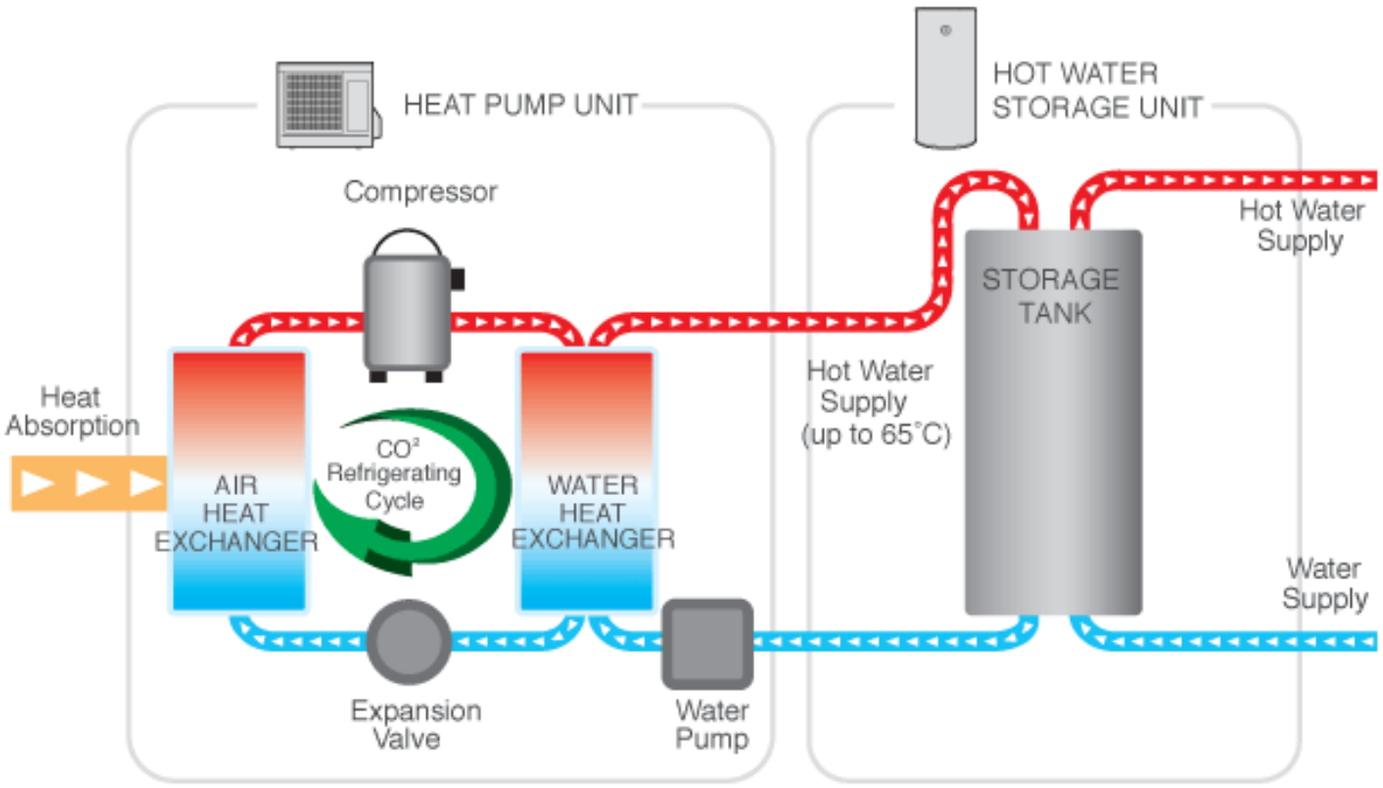
BPA's Emerging Technology Discovery Process



https://www.bpa.gov/EE/Technology/EE-emerging-technologies/Pages/default.aspx

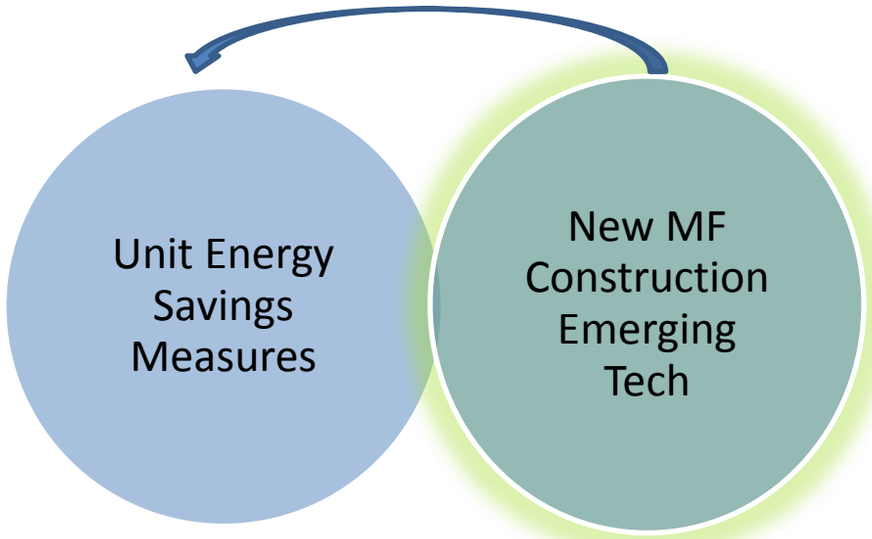
What We're Already Seeing

CO2 Heat Pump Water Heaters



- Recognized through our Technology Innovation process.
- Development support and field trials through our emerging technologies process.
- Several developers are interested in installing in zero energy ready buildings.

Program is an Emerging Tech Incubator



- High performance building energy targets require new and thoughtful approaches to design and product choices
- Let market developers, design firms, and certification providers pick their own emerging technologies
- Promote market innovation and a system design approach
- Give BPA real-world test data
    - Goal is to create new stand alone measure incentives

BPA Emerging Technology Integration

This Program will Facilitate Emerging Technology Development

- High performance building development teams are pushing the envelope on new methods and technologies
- Provides BPA exposure to a broader range of technologies than we could research alone
- Can help us develop new stand alone incentive measures
- Creates partnership opportunities with developers, utilities & design firms

BPA wants to support and determine energy savings levels for new technologies as well as any potential installation barriers

- We can provide M&V services in real world environment
- Develop use cases or design guidelines

QUESTIONS?

More Information

- Technical Analysis or Emerging Technology:
  - Robert Weber, RMWeber@BPA.Gov

- Multifamily Program or QPL **July 18 or later**:
  - Jess Kincaid, JBKincaid@BPA.Gov

Next Showcase Webinar

Strategic Energy Management (SEM) – August 1, 2017

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Webinar information and registration at www.e3tnw.org/webinars

More information about emerging technologies:

- ET Program: www.bpa.gov/EE/Technology/EE-emerging-technologies/

Thank you for attending!