Cost-effectiveness & Evaluation Advisory Committee (CEAC)



Northwest Energy Efficiency Alliance

August 27, 2025

CLASSIFICATION LEVEL: PUBLIC

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Agenda

TIME	TOPIC
8:30am	Welcome/Agenda Review
8:45am	MRE Newsletter
9:00am	Code Baseline and Key Assumption Review, Summary of IEC Recommendations and NEEA Next Steps
10:00am	BREAK
10:15am	MPER 1 for Efficient Rooftop Units
10:35am	MPER 1 for High-Performance HVAC
10:55am	Oregon Residential Code Compliance Evaluation
11:20am	Dual-Fuel Res HVAC Program
11:50am	Q2 2025 Key Assumptions Update / Accessing Documents via the new Funder Portal
12:00pm	Wrap up

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Introductions & Ice Breaker

- Name
- Organization
- Question(s) for today or tomorrow?
- Summer highlight



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LEADERSHIP IN ENERGY EFFICIENCY AWARDS

Help us honor the innovators and collaborators driving energy efficiency across the Northwest and beyond. NEEA will recognize individuals and teams for their exemplary dedication and performance in the industry during lunch on the first day of the NEEA Annual Board Meeting on December 8.

Nominations can be made in the following categories:

- **Rising Star**
- **Innovative Collaboration**
- **Lifetime Achievement**

Nominations

Aug 04
Through
Sept 19

Event

Dec 08



To nominate go to:
neea.org/leadershipawards

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Efficiency Exchange 2026



Submit Ideas for Session Topics

September 15 – October 24

neea.org/EFX

Save the Date for EFX26

May 5-6

Boise, Idaho

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Why are we here again?

CEAC Charter

Responsibilities

1. Review and advise regarding NEEA cost-effectiveness and savings information to inform annual reporting.
2. Review and advise regarding market transformation cost and savings measurement and estimation methods.
3. Review evaluation findings that affect cost and savings information to inform annual reporting.
4. Work with your organization to provide NEEA staff with relevant incentive data for regional tracking and reporting purposes.
5. Review and advise regarding new market research and evaluation methodologies.

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Market Research and Evaluation (MRE) Update

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MRE Newsletter Highlights

Zdanna King, Senior MRE Scientist

Meghan Bean, Principal MRE Scientist



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The MRE Newsletter has a new look!



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Studies at a glance

- Organized by product
- Table helps you find info quickly
- Still the best roundup of MRE studies being planned, fielded, or reported

Integrated Systems (HVAC, Lighting, Motors)

Market Progress Evaluation Report #3 — ***Zdanna King***

Program: *Luminaire Level Lighting Controls (LLLC)*

Project Stage: *REPORTING*

Description	*The third Market Progress Evaluation Report for the LLLC Program is crucial for tracking changes in the market that indicate whether the LLLC program is effective in overcoming identified market barriers.* *The contractor reviewed documents and conducted interviews and surveys with program team members, manufacturers and their sales channels, installers, designers, architects, engineers, and commercial building decision-makers to address the objectives.* *Fuel Type: Electric*
Research Objectives	• *Review and verify that the LLLC program has conducted the strategic activities described in its quarterly progress tracking documents and outlined in its logic model since the previous MPER.* • *Track identified Market Progress Indicators (MPIs) focused on measuring the reduction of identified market barriers and conduct year-over-year analyses when indicated to report progress on several program outcomes predicted by the logic model.* • *Conduct market research to describe the rationale of buyers and sellers of LLLC that include it in their initial project plans, but do not follow through with the sale.*
Top Results	• *Awareness of LLLC continued to climb, as did the number of firms that recommended LLLC and included it in their project plans.* • *Four out of five installers shared that LLLC were easier to install than other networked lighting controls.*
Timing	*This project began in Q3 2024, data were collected between Q4 2024 and Q2 2025, and a final report is anticipated in Q3 2025.*
Third-Party Contractor(s)	*Cadmus Group*
Link to Previous MPER	LINK HERE

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MRE Newsletter Highlights

Types of Studies	Planning	Fielding	Reporting
MPERs	Extended Motor Products (#2)	Advanced Heat Pumps (#1) HPWH (#8) Codes (#6)	High-Performance HVAC (#1) Efficient RTUs (#1) LLLC (#3)
Model or Key Assumption Reviews	High-Performance HVAC	LLLC RPP	Codes
Diffusion Studies			Ductless Heat Pumps (#3)

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Code Baseline and Key Assumption Review, Summary of IEc Recommendations, and NEEA Next Steps

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Code Baseline Assumption Review:

Third-Party Recommendations and Next Steps

Meghan Bean, Principal MRE Scientist

Christina Steinhoff, Principal Analyst



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Code Activities

- Identify potential code measures
- Participate in national and state code processes *Public comments; technical expertise, data, and analysis*
- Compliance support *Training, education, and resources for market actors*
- Support market readiness for code changes *Above-code programs, technology and practice research, Market Transformation programs*
- Short- and long-term influence strategies

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How do we best capture co-created influence on building energy codes in the Northwest?

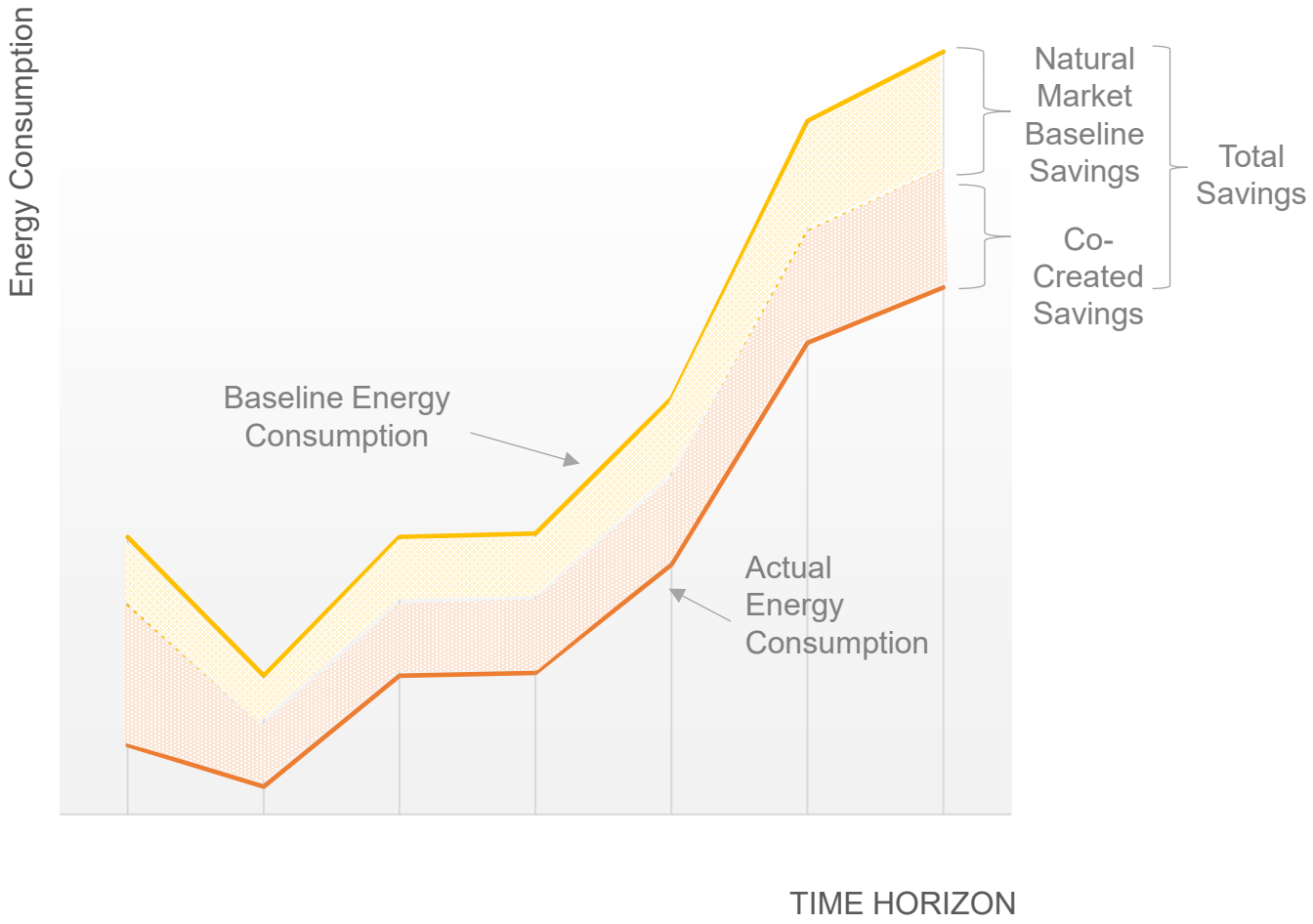
- Codes MPER #5 (ADM Associates): "…determined that developing quantitative progress indicators related to code influence activities was not possible."

- Independent Assessment of NEEA Approaches to Estimating Influence Over State Energy Codes (NMR Group): "…does not have evidence to suggest that NEEA should develop and apply a downward adjustment factor to the co-created savings it reports."

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Purpose of the Natural Market Baseline

- Establishes justification for investment
- Supports development of market intervention strategies
- Used to account for energy savings that would have occurred without market intervention



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Codes Natural Market Baseline

Why change our approach?

- The Codes landscape has changed
- Business need for improved communication of the value of Market Transformation through codes

What is affected by the recommended changes?

- Funder Reports (Net Market Effects)
- NEEA Business Plan (Co-Created Savings)

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NEEA's Current Natural Market Baseline Assumptions

- NEEA and its partners' co-created influence advances energy codes in the Northwest by 10 years (2-3 code cycles)

- NEEA and its partners' level of influence is comparable across all four Northwest states and both the residential and commercial sectors

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Evaluation Questions

- Is it still reasonable to assume that…

- NEEA and its partners' co-created influence advances energy codes in the Northwest by 10 years (2-3 code cycles)?

- NEEA and its partners' level of influence is comparable across all four Northwest states and both the residential and commercial sectors?

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Evaluation Activities

- Reviewed NEEA internal documents & evaluation
- Interviewed NEEA staff, code officials, and regional/national code actors
- Assessed code baseline development, code influence evaluation, and code savings reporting approaches used by other organizations

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Discussion of Recommendations

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Key Findings & Recommendations

- The pace of, and barriers facing, code development and adoption differ in each state and sector.

- *Recommendation #1:* Rather than apply a default baseline assumption for all states and sectors, NEEA should establish separate baseline assumptions for each energy code update, state, and sector.

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Key Findings & Recommendations

- The energy savings that NEEA calculates reflect the collective work of NEEA and its partners, so it is critical that NEEA clearly define its partners.

- *Recommendation #2:* As part of the process to establish the baseline assumptions, NEEA should more clearly define, document, and communicate the role of its partners.

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Key Findings & Recommendations

- Consistent with previous evaluations, IEc concluded that there is no clear way to derate reported savings based on a quantitative influence factor.

- *Recommendation #3:* Adjustments to NEEA's baselines should be made to reflect the amount of time it is reasonable to assume NEEA and its partners accelerated code change adoption.

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Key Findings

- Qualitative assessment of code influence and acceleration enables consideration of the wide-ranging and long-term nature of NEEA and its partners' work.

- *Recommendation #4:* NEEA should adjust code baselines to reflect the number of code cycles (one, two, or three) that NEEA and its partners' work likely accelerated code adoption based on the results of independent qualitative assessments.

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Example Assessment: Stakeholders & Activities

- NEEA documentation
  - Key barriers & associated activities *From NEEA Codes logic model*
  - Participants *NEEA partners, non-partner EE advocates, advocates for less stringent codes*
  - Related activities *Training & education, technology/practice research, above-code programs, MT programs*

- Evaluation questions
  - What were the barriers to code adoption?
  - What activities did NEEA and partners complete as planned?
  - What role did NEEA and its partners play relative to other EE advocates?

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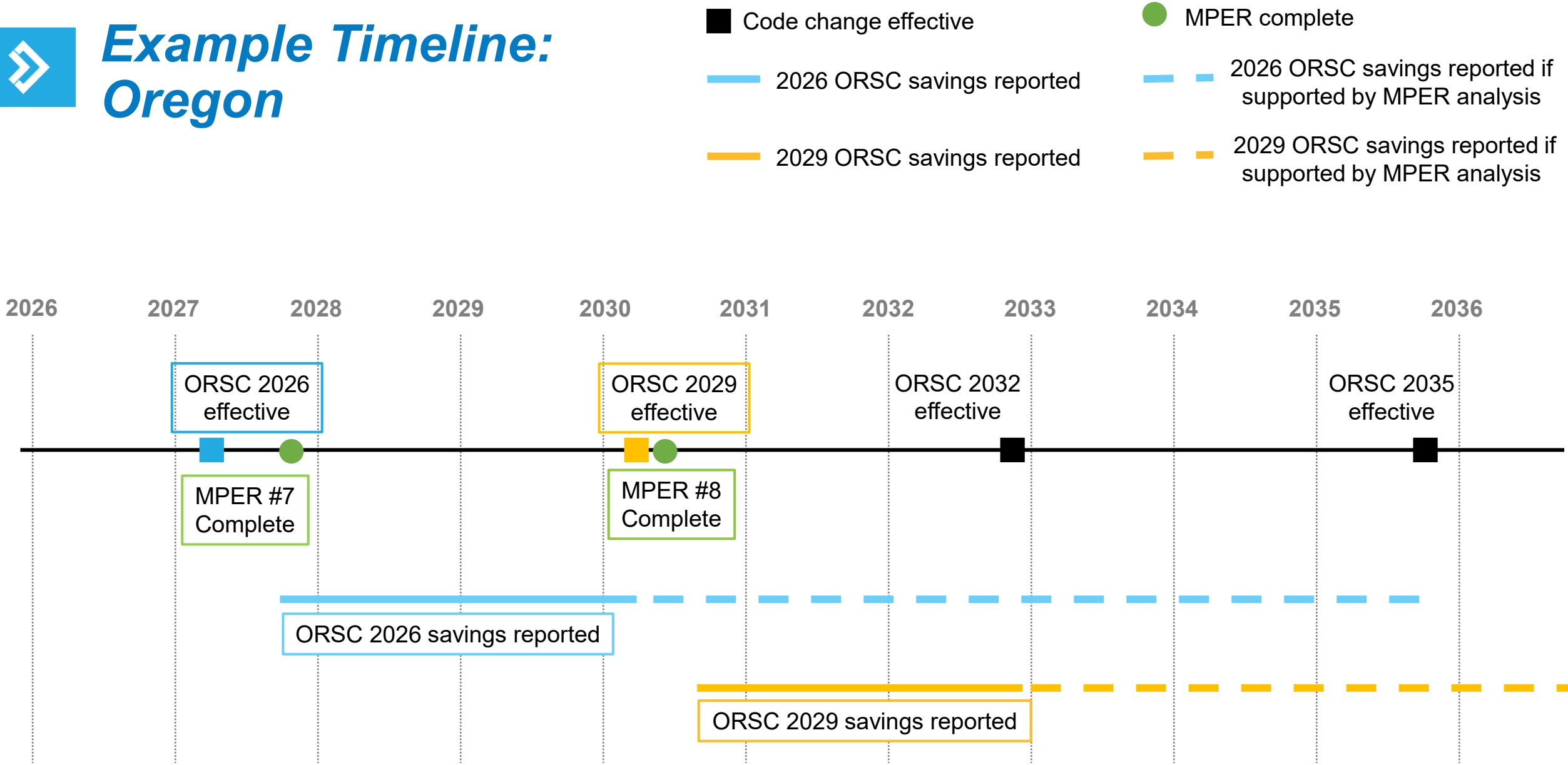
Example Assessment: Code Changes

- NEEA documentation
  - Market readiness *State energy savings goals, prior code proposals, above-code programs, high-compliance measures*
  - Proposed code changes

- Evaluation questions
  - What was the outcome of each proposed code change?
  - What was NEEA and partners' role in each adopted code change?

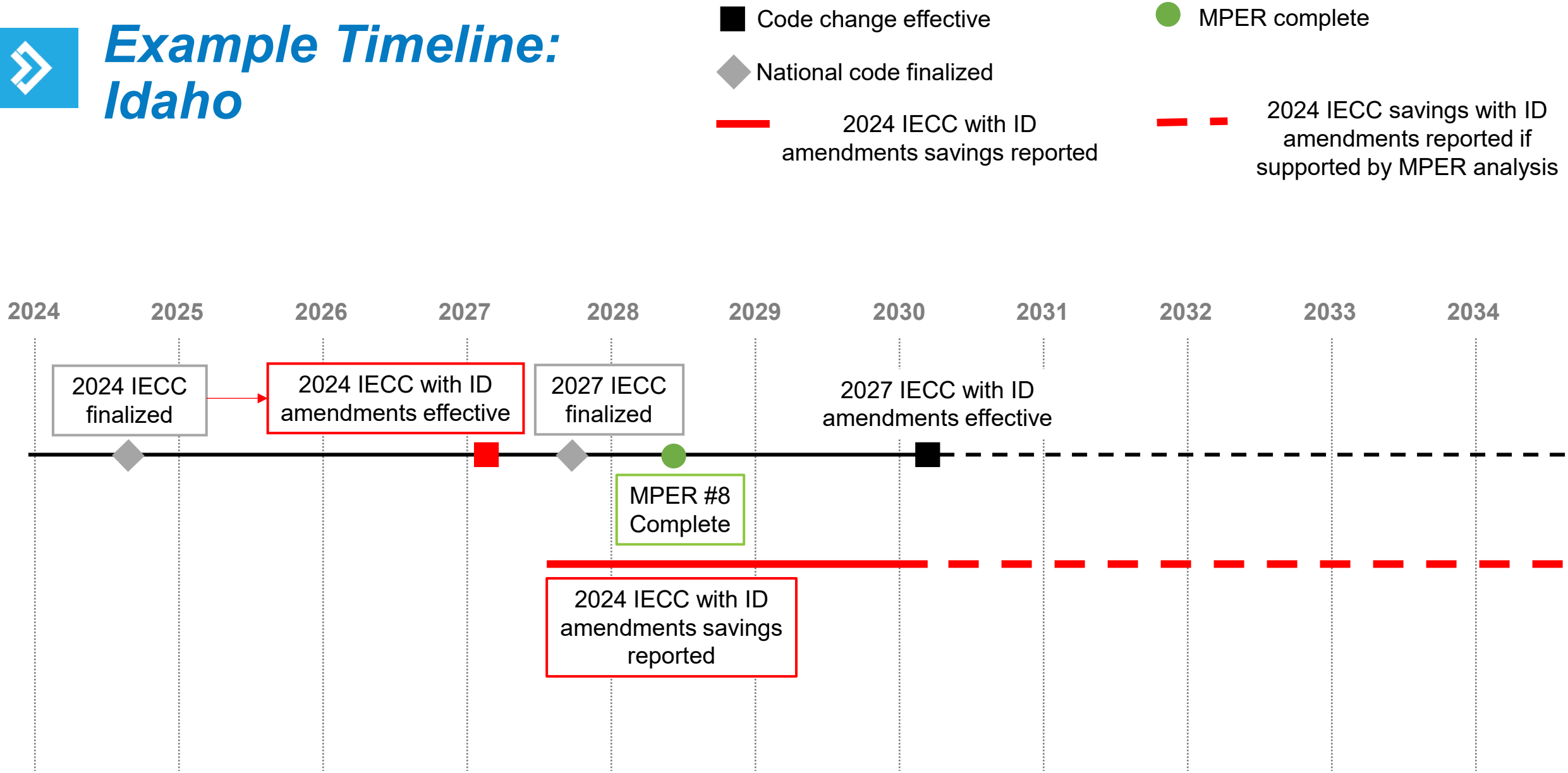
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Example Timeline: Oregon



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Example Timeline: Idaho



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Upcoming Codes Affected by the Change

State	Sector	Code	Expected Adoption
Idaho	Commercial	2024 International Energy Conservation Code	2026/2027
	Residential	2024 International Energy Conservation Code	2026/2027
Montana	Commercial	2024 International Energy Conservation Code	2027
	Residential	2024 International Energy Conservation Code	2027
Oregon	Commercial	2026 OR Energy Efficiency Specialty Code	2027
	Residential	2026 OR Residential Specialty Code	2026
Washington	Commercial	2024 Washington State Energy Code	2026
	Residential	2024 Washington State Energy Code	2026

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NEEA Response

- NEEA believes it is reasonable to accept IEc's recommendations

- This would require:
  - Increased staff time to track strategies, activities, and partners and manage evaluations of each code update and sector separately
  - Increased scope and budget for future MPERs

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Round Robin

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Thank You!

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BREAK



MPER 1 for Efficient Rooftop Units (RTUs)

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Efficient Rooftop Units Market Progress Evaluation #1

Third party evaluator: Apex



Kirstin Moreno

Market Research and Evaluation Scientist

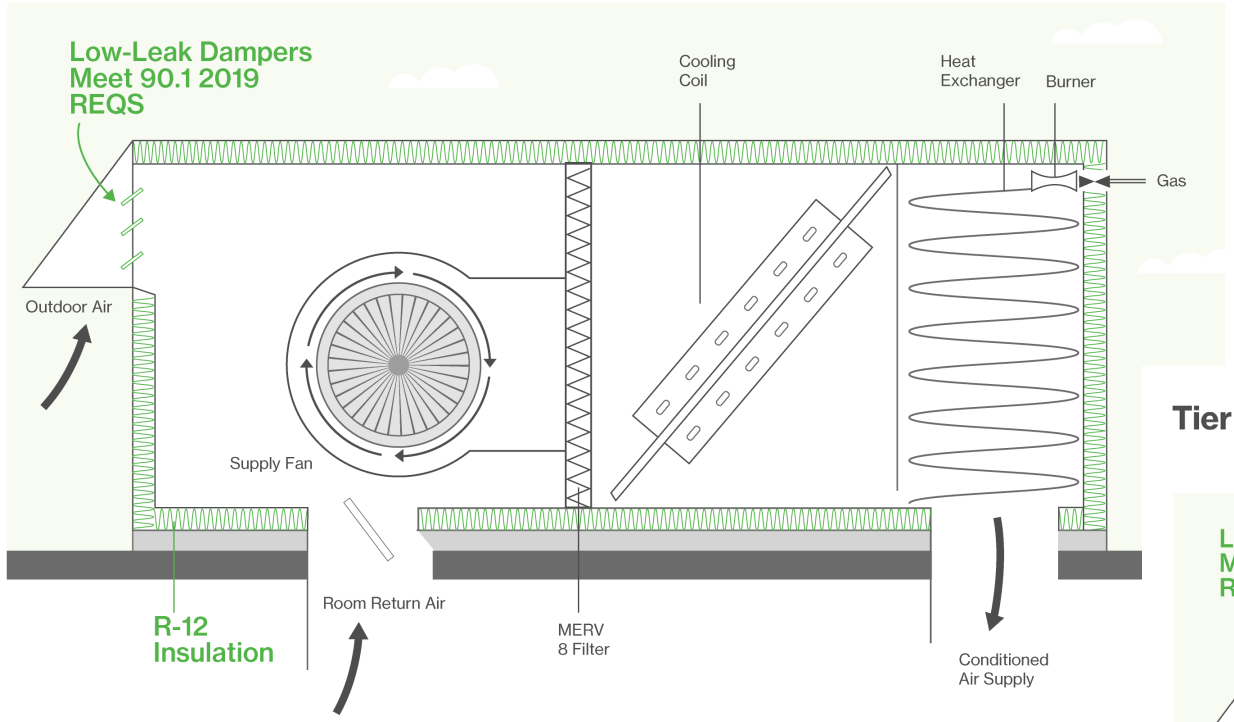
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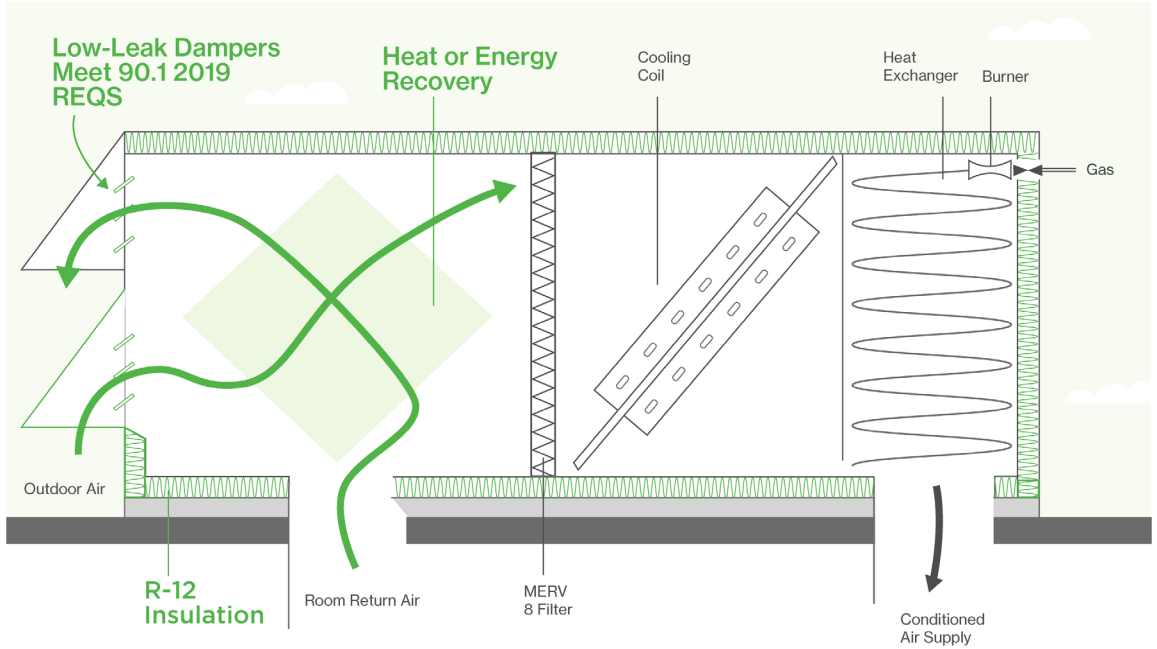
Efficient Rooftop Unit Overview

Increased insulation (R-12)
Low-Leak Dampers
At least 80% Thermal Efficiency
Tier 2: ERV/HRV

Tier 1: Efficient RTU



Tier 2a: Efficient RTU – Energy Recovery Ventilation



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Objectives for Efficient Rooftop Unit MPER #1

- Research Objective 1: Provide timely and actionable formative evaluation findings and recommendations to enable continuous improvement of the program
- Research Objective 2: Provide summative evaluation by assessing market transformation progress as measured by program MPIs
- Research Objective 3: Qualitatively assess program influence on observed market transformation.

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Key Methods

- Interviews
  - Contractors (n=10)
  - Distributors (n=6)
  - Manufacturer reps (n=9)
- Focus Groups
  - Building decision makers (2, n=9)
- Surveys
  - Contractors (n=74)
  - Distributors (n=20)
  - Building decision makers (n=52)
- Review of NEEA documentation of Efficient RTU market progress
- Output Tracking interview with Efficient RTU team

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30 Market Progress Indicators (MPIs) Assessed in this MPER

1 – Purchase Agreements and Procurement Policies

- 1a. Increasing # of maintenance **contractors** working in large commercial buildings **recommend** qualifying equipment year-over-year
- 1b. Increasing # of national and/or regional agreements and/or **procurement policy** changes year-over-year
- 1d. Increasing # of commercial building portfolio owners include **qualifying equipment** in their national and/or regional **building specifications** year-over-year

2 – Voluntary Standard and Qualified Product List

- 2a. **Voluntary standard and QPL** based on NEEA's specification are adopted by a partner/owner.
- 2b. **Standard is updated** on a regular basis by its owner.
- 2c. **QPL is updated** on a regular basis by its owner.

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30 Market Progress Indicators (MPIs) Assessed in this MPER

3 – Efficient RTU Availability

- 3a. Increasing # of the **top five manufacturers** produce at least one light commercial **Tier 1 Efficient RTU** model (performance or prescriptive path).
- 3b. Increasing # of the **top five manufacturers** produce at least one light commercial **Tier 2 Efficient RTU** model (performance or prescriptive path).
- 3c. Increasing # of **manufacturers offer bolt-on E/HRVs** compatible with light commercial RTUs
- 3d. **Distributors and/or manufacturer representatives** offer an increasing # of **Tier 2 Efficient RTU** options (models or with bolt-on E/HRV).
- 3e. **Manufacturers** produce an increasing # of light commercial **Tier 1 Efficient RTU** models.
- 3f. **Manufacturers** produce an increasing # of light commercial **Tier 2 Efficient RTU** models.
- 3g. At least one manufacturer offers a **value** Tier 1 Efficient RTU model.

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30 Market Progress Indicators (MPIs) Assessed in this MPER (continued)

4 – Awareness of Efficient RTUs and Value Proposition

- 4a. Increasing # of **distributor and/or manufacturer representative** sales managers (across branches) are **aware** of NEEA's specification and/or at least one Efficient RTU model.
- 4b. Increasing # of **distributor** sales managers (across branches) are **aware** of **whole unit efficiency** for heating.
- 4c. Increasing # of HVAC **contractors** (including maintenance contractors) are **aware** of NEEA's specification and/or at least one Efficient RTU model.
- 4d. Increasing # of HVAC **contractors** (including maintenance contractors) are **aware** of **whole unit efficiency** for heating.
- 4e. Increasing # of **distributor and/or manufacturer representative** sales managers (across branches) can **name at least one benefit** of any Efficient RTU.
- 4f. Increasing # of **commercial building decision makers** can **name at least one benefit** of any Efficient RTU.
- 4g. Increasing # of HVAC **contractors** (including maintenance contractors) can **name at least one benefit** of any Efficient RTU.
- 4h. Increasing # of HVAC **contractors** (including maintenance contractors) **perceive** of Efficient RTUs as **like-for-like replacements** for traditional Efficient RTUs.

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30 Market Progress Indicators (MPIs) Assessed in this MPER (continued)

5 – Stock, Sales, Installs

- 5a. Distributors and/or manufacturer representatives **stock** an increasing # of **Tier 1 Efficient RTU** models.
- 5b. Distributors and/or manufacturer representatives **stock** an increasing # of **Tier 2 Efficient RTU** models.
- 5c. Distributors and/or manufacturer representatives **stock** an increasing # of **bolt-on E/HRVs**.
- 5d. Increasing year-over-year **sales of Tier 1 Efficient RTUs**.
- 5e. Increasing year-over-year **sales of Tier 2 Efficient RTUs**.
- 5f. Increasing year-over-year **bolt-on E/HRV installations**.

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30 Market Progress Indicators (MPIs) Assessed in this MPER (continued)

6 – Promotion and Incentives

- 6a. An increasing number of NW **gas utility** commercial HVAC programs (NEEA and non-NEEA) include products that meet the standard in their **specifications, messaging, and/or incentives**.
- 6b. At least **80%** of NW **gas utility** commercial HVAC programs include products that meet the standard in their **specifications, messaging, and/or incentives**.
- 6c. An increasing number of priority **extra-regional gas utility** commercial HVAC programs include products that meet the standard in their **specifications, messaging, and/or incentives**.

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Status of Selected Market Progress Indicators (MPIs)

Snapshot: Awareness

Snapshot: Availability

Snapshot: Uptake

Snapshot: Program Support

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Status of Selected MPIs

Snapshot: Awareness, as of late 2024

MPI		Finding
Awareness of Distributor Sales Managers is Mixed		
4a	Awareness of specification and/or Efficient RTU model	High (model)
		Low (specification)
4e	Name at least one value proposition for Efficient RTU	Moderate

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Status of Selected MPIs

Snapshot: Awareness, as of late 2024

MPI		Finding
Awareness of HVAC Contractors is Mixed		
4c	Aware of NEEA's specifications and/or at least one Efficient RTU model	High (model)
		Low (specification)
4g	Can name at least one value proposition for any Efficient RTU	Low
4h	Perceive of Efficient RTUs as like-for-like replacements for traditional Efficient RTUs	Moderate

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Status of Selected MPIs

Snapshot: Availability, as of late 2024

MPI		Finding
Manufacturer Availability is Moderate But Increasing		
3a	Top five manufacturers produce at least one Tier 1 Efficient RTU model	Moderate
3b	Top five manufacturers produce at least Tier 2 Efficient RTU model	Moderate
3e	Manufacturers produce Tier 1 Efficient RTU models	Moderate
3f	Manufacturers produce Tier 2 Efficient RTU models	Moderate
3g	Value Tier 1 Efficient RTU model	No Progress

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Status of Selected MPIs

Snapshot: Availability, as of late 2024

MPI		Finding
Distributor Availability is Low		
5a	Stock Tier 1 Efficient RTU models	Low
5b	Stock Tier 2 Efficient RTU models	Low
5c	Stock of bolt-on E/HRVs	Low

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Status of Selected MPIs

Snapshot: Uptake, as of late 2024

MPI		Finding
Fewer than 20% of large contractors recommend Efficient RTU		
1a	Increasing # of large maintenance contractors recommend qualifying equipment year-over-year.	Low

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Status of Selected MPIs

Snapshot: Uptake, as of late 2024

MPI		Finding
Sales are Moderately Increasing		
5d	Increasing year-over-year sales of Tier 1 Efficient RTUs.	Moderate
5e	Increasing year-over-year sales of Tier 2 Efficient RTUs.	Moderate
5f	Increasing year-over-year sales of bolt-on E/HRV installations.	Low

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Status of Selected MPIs

Snapshot: Program Support, as of late 2024

MPI		Finding
Specification and Compliant Product List On Track, But Need To Be Adopted By Partner		
2a	Voluntary standard and CPL adopted by partner/owner	Low
2b	Standard is updated on a regular basis by its owner.	On track
2c	CPL is updated on a regular basis by its owner.	On track

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Status of Selected MPIs

Snapshot: Program Support, as of late 2024

MPI		Finding
Promotion of Efficient RTU Among Partners Mixed		
6b	At least 80% of NW gas utility commercial HVAC programs include products that meet the standard in their specifications, messaging, and/or incentives.	Low
6c	An increasing number of priority extra-regional gas utility commercial HVAC programs include products that meet the standard in their specifications, messaging, and/or incentives.	On Track

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Conclusions of MPER #1

1. Market actors are **largely aware of Efficient RTU product lines** but consider them **niche solutions** rather than standard RTU replacement options due to incremental costs and structural challenges

2. Efficient RTU **availability is limited**, but timeframes to receive Efficient RTUs are comparable to other special ordered equipment.

3. Efficient RTU **uptake is small**, but manufacturers' reps see demand for Efficient RTUs with integrated ERVS or HRVs in certain situations



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The program needs to better understand the true install constraints and timelines for Efficient RTUs vs RTUs

Accepted wisdom in the market says that RTUs with improved efficiency features take significantly longer than code-level RTUs that are stocked and ready to be installed, but given potential need for curb adapters, scheduling a crane, and time it takes to pull permits regardless of equipment efficiency, NEEA will explore what the *true* difference in installation timelines is in 2026.

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There are different H/ERV versions that each may require distinct intervention strategies

Bolt-on vs. integrated ERVs are more distinct from each other than NEEA originally realized. The Efficient RTU program is exploring how to understand and promote integrated vs. bolt-on ERVs in a more nuanced and market-responsive way.

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Questions?



Thank You!

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MPER 1 for HP HVAC

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High-Performance HVAC Market Progress Evaluation #1

Third Party Evaluator: NMR



Kirstin Moreno

Market Research and Evaluation Scientist, NEEA

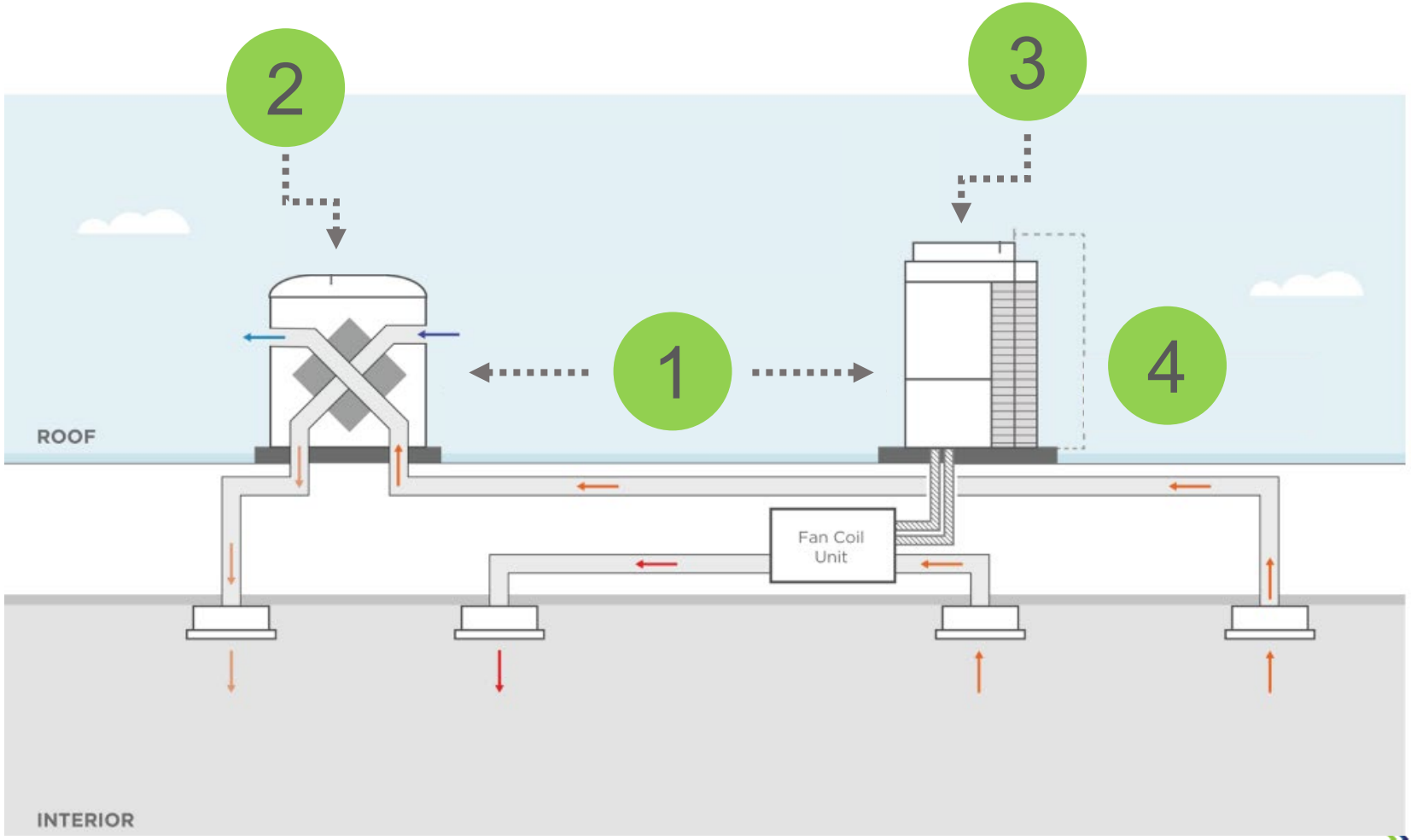
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High-Performance HVAC* Overview

***Uses the Very High Efficiency Dedicated Outside Air System (VHE DOAS) design:**

1. Ventilation fully decoupled from heating and cooling
2. High efficiency heat/energy recovery ventilator with ≥ 82% sensible effectiveness
3. High performance electric heat pump system
4. Right-sized heating and cooling system



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Objectives for High-Performance HVAC MPER #1

- Research Objective 1: Gather feedback about NEEA's VHE DOAS educational, training, and marketing materials, and about designers' perspectives on VHE DOAS.
- Research Objective 2: Measure key MPIs related to high priority market barriers and provide a starting benchmark for longitudinal tracking of market progress.
- Research Objective 3: Qualitatively assess program influence on observed market transformation.

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Key Methods

- Expert review of NEEA's VHE DOAS educational/marketing materials (n=2)
- Observation of NEEA trainings (n=4) and survey of NEEA trainees (n=14)
- Interviews with HVAC system designers (n=7)
- Survey with HVAC designers and manufacturer representatives (n=70)
- Review of web traffic and stakeholder websites for references to VHE DOAS
- Review of NEEA documentation of VHE DOAS market progress
- Output Tracking interview with NEEA team

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17 Market Progress Indicators (MPIs) Assessed in this MPER

1 - Diffusion of Education, Training, and Marketing Materials

- 1a. Increasing # of priority institutions use or reference **NEEA-developed materials** (e.g., specification, presentations, handouts, etc.) **for trainings** or certifications.
- 1b. Increasing number of priority utilities, qualifying E/HRV manufacturers and/or reps use **NEEA messaging** in their promotions.

2 - ERV/HRV Incentives Offered

- 2a. Increasing number of priority HVAC suppliers, utilities, and/or energy efficiency organizations offer **incentives** for qualifying E/HRVs.

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17 Market Progress Indicators (MPIs) Assessed in this MPER

3 - ERV/HRV Availability

- 3a. Increasing number of manufacturers **produce qualifying ERVs and/or HRVs**.
- 3b. Increasing number of **larger manufacturers** offer qualifying ERVs and/or HRVs.
- 3c. Priority manufacturers have at least one qualifying ERV and/or HRV with 500-1000 CFM and 1000-5000 CFM capacities.
- 3d. Priority manufacturers have at least one qualifying ERV and/or HRV at a **lower price point**.

4 - ASHRAE Adoption

- 4a. ASHRAE Technical Committee TC 5.5 **updates heat and energy recovery chapter** in its HVAC Systems and Equipment Handbook based on NEEA input on VHE DOAS principles.
- 4b. ASHRAE Learning Institute (ALI) **updates its Air-to-Air Energy Recovery Fundamentals seminar** based on NEEA input on VHE DOAS principles.

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17 Market Progress Indicators (MPIs) Assessed in this MPER (continued)

5 - ERV/HRV Test Procedure Drafted

5a. EXP18 E/HRV **test procedure is drafted**.

6 - Codes Incorporate VHE DOAS

6a. WSEC and CA Title 24 include DOAS in **base commercial energy codes**.

6b. WSEC and CA Title 24 **increase sensible effectiveness** of E/HRVs .

6c. WSEC base code includes more **VHE DOAS elements** until all 4 key elements are included.

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17 Market Progress Indicators (MPIs) Assessed in this MPER (continued)

7 - Awareness of VHE DOAS and Its Benefits

7a. Increasing # of commercial HVAC designers and/or manufacturer representatives can **identify at least three of the four system elements**.

7d. Increasing number of commercial HVAC designers and/or manufacturer's representatives can **name at least one value proposition** for the system.

8 - Supply Chain Audiences Design, Promote, and Install VHE DOAS

8a. Increasing # of manufacturer representatives and/or design engineers **propose the system to their clients**.

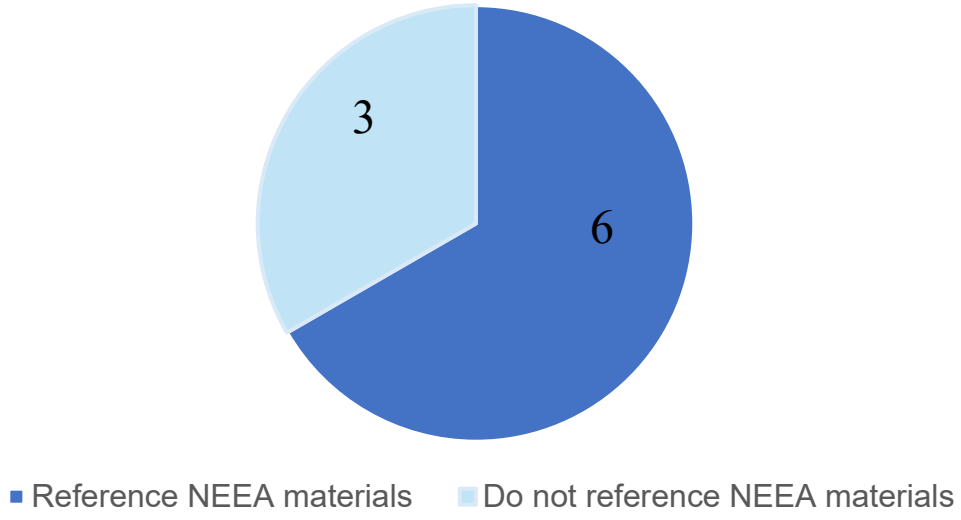
8e. Increasing number of VHE DOAS **installations**.

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Status of Selected MPIs

as of Q4 2024

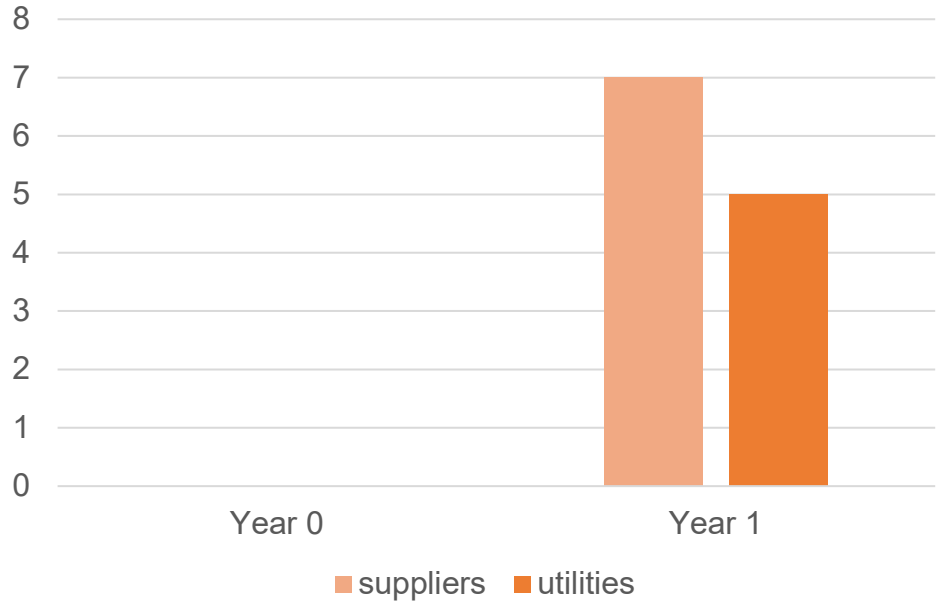
1a. 2/3 of Priority Institutions use NEEA Materials



1a. Increasing # of priority institutions use or reference NEEA-developed materials (e.g., specification, presentations, handouts, etc.) for trainings or certifications.

✓ MPI Progress: 6 of 9 priority institutions (ASHRAE, NBI, NECC, PHIUS, UW IDL, WSEC)

2a. Increasing Incentives for Qualifying E/HRVs



2a. Increasing number of priority HVAC suppliers, utilities, and/or energy efficiency organizations offer incentives for qualifying E/HRVs.

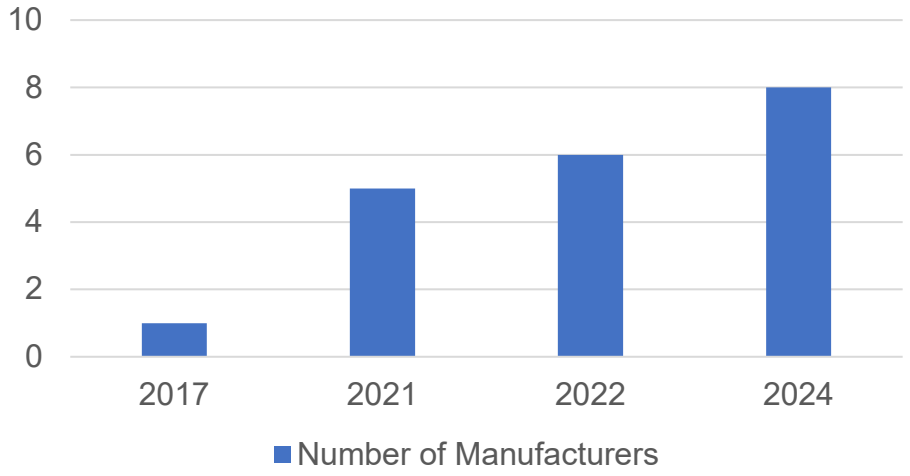
✓ MPI Progress: 0 reps and 0 utilities in 2017; 7 reps (JBI, JBO, MSI, AirTreatment, AirReps, CMS, Dorse) and 5 utilities (NYSERDA, Seattle City Light, SnoPUD, PSE, Boneville Power Administration) in 2024

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Status of Selected MPIs

as of Q4 2024

3a. Increasing Number of Manufacturers Producing Qualifying ERV/HRV



3a. Increasing number of manufacturers produce qualifying ERVs and/or HRVs

✓ MPI Progress: 2017: Ventacity; 2021: add Greenheck, Oxygen8, Tempeff, Swegon; 2022: add SEMCO; 2024: add RenewAire, Valent

3b. 1 out of 4 Large Manufacturers Offering Qualifying E/HRVs



3b. Increasing number of larger manufacturers offer qualifying ERVs and/or HRVs

✓ MPI Progress: 2024: RenewAire

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Status of Selected MPIs

as of Q4 2024

4a. ASHRAE TC 5.5 H/ERV Handbook Chapter Update Nearly Complete



4a. ASHRAE Technical Committee TC 5.5 updates heat and energy recovery chapter in its HVAC Systems and Equipment Handbook based on NEEA input on VHE DOAS principles.

✓ MPI Progress: Nearly complete

5a. Test procedure drafted



5a. EXP18 E/HRV test procedure is drafted.

✓ MPI Progress: Complete

6c. WSEC includes all 4 elements of VHE DOAS

In-Progress

6c. WSEC base code includes more VHE DOAS elements until all 4 key elements are included.

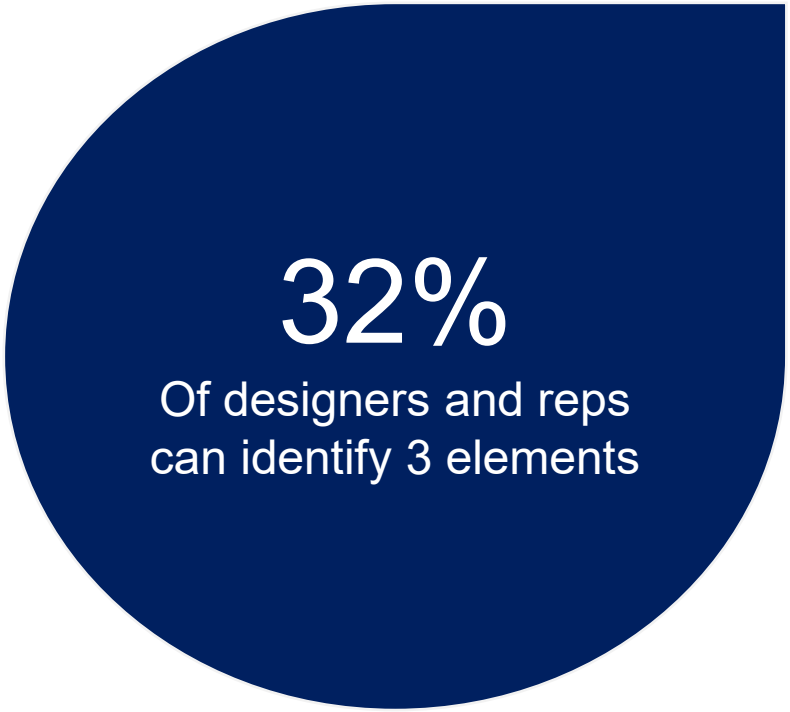
✓ MPI Progress: In-progress; WSEC includes many requirements or optional compliance packages that are similar to VHE DOAS.

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Status of Selected MPIs

as of Q4 2024

7a. Identification of VHE DOAS elements



7a. Increasing # of commercial HVAC designers and/or manufacturer representatives can identify at least three of the four system elements.

✓ MPI Progress: 32% can name at least 3 of the 4 elements of VHE DOAS, 15% identify all four

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Conclusions of MPER #1

1. **HVAC system designers recognize the VHE DOAS approach as compatible with best practices**, even if they are unfamiliar with the term “VHE DOAS.”

2. Despite high awareness of VHE DOAS, **adoption is limited by market barriers**, including:
   - Upfront costs
   - Concerns re: reliability
   - Skepticism of energy savings
   - Skepticism of ability to provide sufficient comfort



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Conclusions of MPER #1

3

VHE DOAS is gaining traction, but adoption is difficult to measure.

Differing interpretations of VHE DOAS may lead some designers to overestimate the number of fully compliant projects, but even a growing number of near-VHE DOAS projects is a positive sign.

4

Designers who work in Washington are more likely to include VHE DOAS in their HVAC designs than those working in other NW states.

This is likely a function of VHE DOAS elements being incorporated into Washington energy code, which is itself due in part to NEEA's code influence efforts.



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Conclusions of MPER #1

5 **NEEA's trainings are a valuable resource for spreading awareness, addressing questions, and encouraging deeper engagement with VHE DOAS.**

In fact, designers appear much more likely to propose VHE DOAS after attending a NEEA training.

6 **NEEA's training, educational, and marketing materials serve as a valuable resource for spreading awareness of VHE DOAS.**



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The program should emphasize promoting the broader set of VHE DOAS benefits beyond energy savings

The high cost of installing a complex system like VHE DOAS is a significant barrier. The team is undertaking a variety of activities to reframe simple payback and better understand the full value proposition of VHE DOAS. This includes:

- Indoor air quality
- Occupant comfort
- Compliance with current or upcoming building performance standards requirements (when applicable)

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More partners and stakeholders could promote NEEA VHE DOAS materials

The program team will focus on expanding VHE DOAS promotion with targeted regional and national partnerships

As of late 2024:

- 17 partners using VHE DOAS materials
- 17 partners not using VHE DOAS materials

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The momentum generated in Washington can influence designers throughout region

Through advancements in Washington code, VHE DOAS can now be seen as an established best practice. This presents an opportunity to influence designers working beyond Washington with real world examples.

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Questions?



Thank You!

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Market Research and Evaluation Scientist, NEEA

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Oregon Residential Code Compliance Evaluation

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Oregon Residential Code Compliance Evaluation Findings



Meghan Bean

Principal Market Research & Evaluation Scientist

August 27, 2025

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NEEA Code Compliance Evaluations

- Conducted at least once per 5-year business cycle per state
- Measure compliance with the most recent code(s)
- Answer other key questions, including but not limited to:
  - Inform savings reporting
  - Gather information about market response to the code
  - Compare results across jurisdiction types of interest

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Oregon Residential Code

- The 2021 Oregon Residential Specialty Code (ORSC) went into effect April 2021
- Compared to the 2017 ORSC…
  - Stringency increased for envelope tightness and fenestration U-factor
  - Requirements were added for duct location, heating location, and whole-home ventilation
- ORSC requires selection of an additional efficiency measure

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Research Questions

- What proportion of homes built under the 2021 ORSC comply with the code?
- What proportion of builders are choosing each of the additional measures?
- What proportion of homes have above-code measures?
- What are the greatest opportunities for energy savings if compliance is increased?
- What proportion of homes have gas vs. electric primary space and water heating?

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Methods

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Data Sources

- Collected data on 254 in-progress and recently-completed new construction homes built under the 2021 ORSC from multiple data sources
  - On-site audits (78 homes)
  - Surveys with residents (93 homes)
  - AXIS data on above-code homes (20 homes)
  - Permits, plan sets, and installer invoices (63 homes)

- Interviewed five home builders

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Calculating Compliance

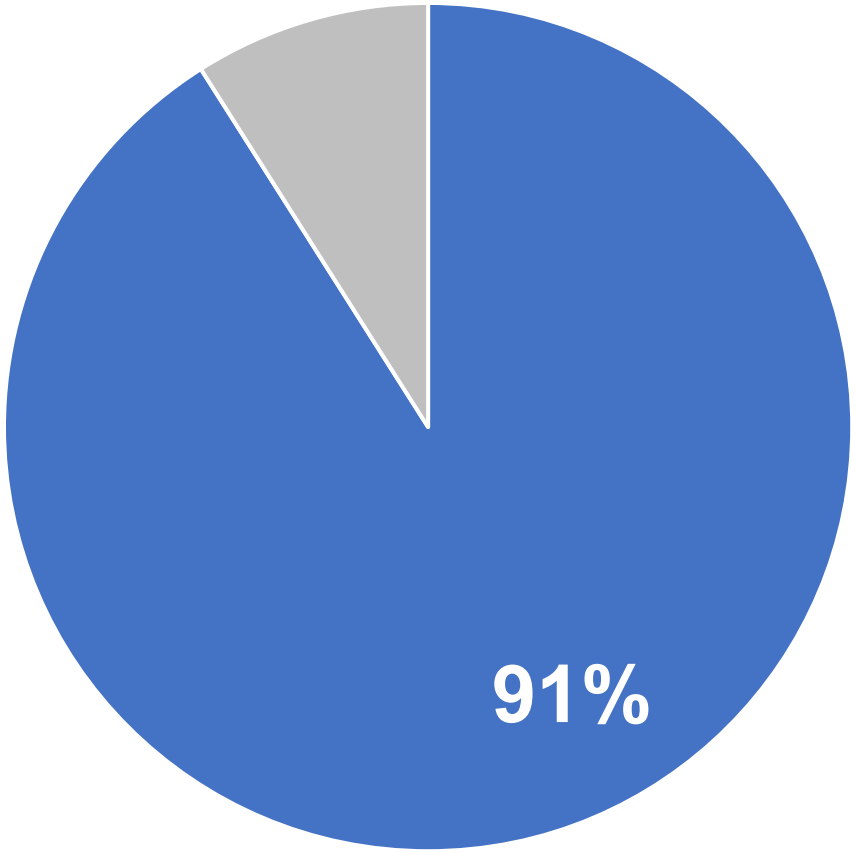
- Compare average energy use intensity (EUI) of observed homes to the EUI of a home that exactly meets code
- Large-scale Monte Carlo analysis
- Simulate a representative sample of potential measure combinations

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Key Findings

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Statewide Compliance under the 2021 ORSC



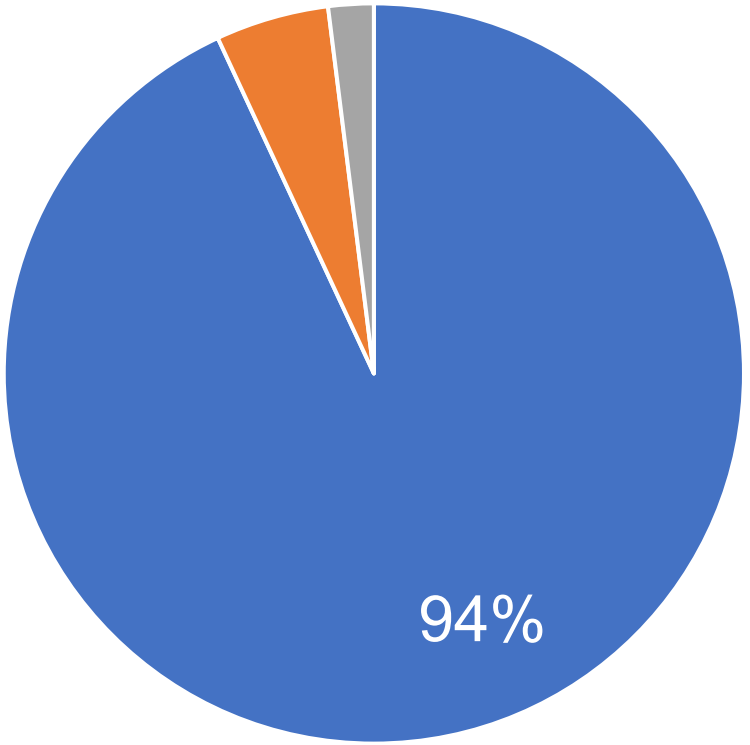
Compared to the 2017 ORSC,
statewide compliance remained stable

Compliance **decreased** for:
- Envelope tightness
- Window U-factor
- Ceiling U-factor

Compliance **increased** for:
- Wall insulation U-factor
- Floor insulation U-factor
- Slab R-value

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Additional Measure Selection



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Above-Code Measures (40% or Greater)

Measure	% Observations
Lighting	98%
Envelope Tightness	57%
Floor insulation R-value	47%
Floor insulation U-factor	44%

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Opportunities to Increase Energy Saving

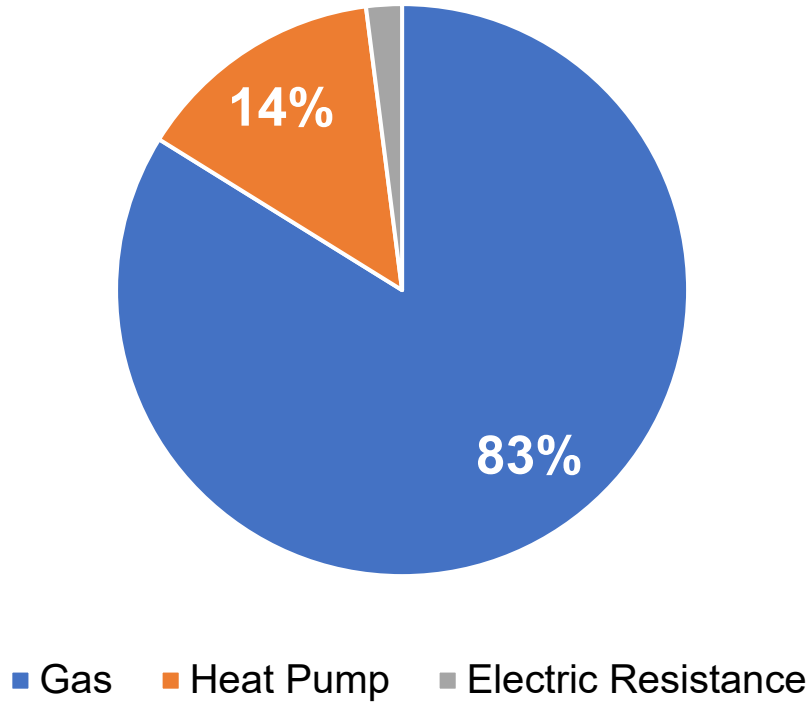
- Envelope leakage and insulation represent over 86% of potential savings

- Findings from site inspections and interviews suggest an opportunity for training around envelope tightness and insulation installation quality (IIQ)

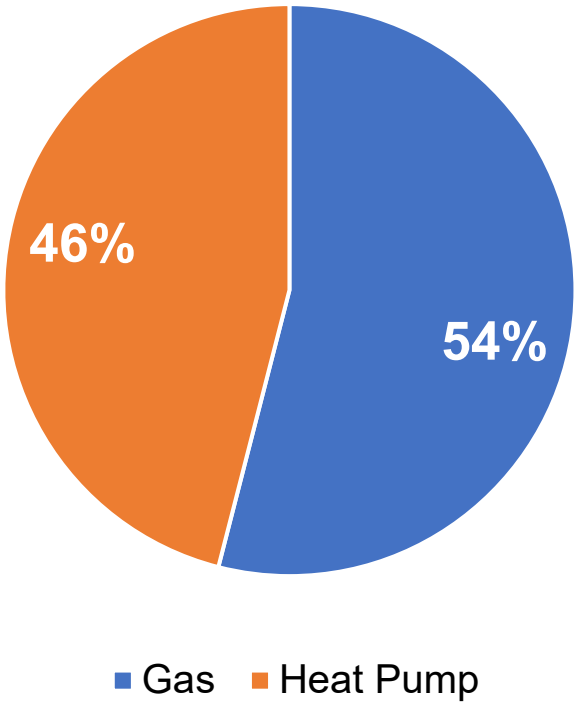
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Primary Space Heating Fuel

2017 ORSC



2021 ORSC

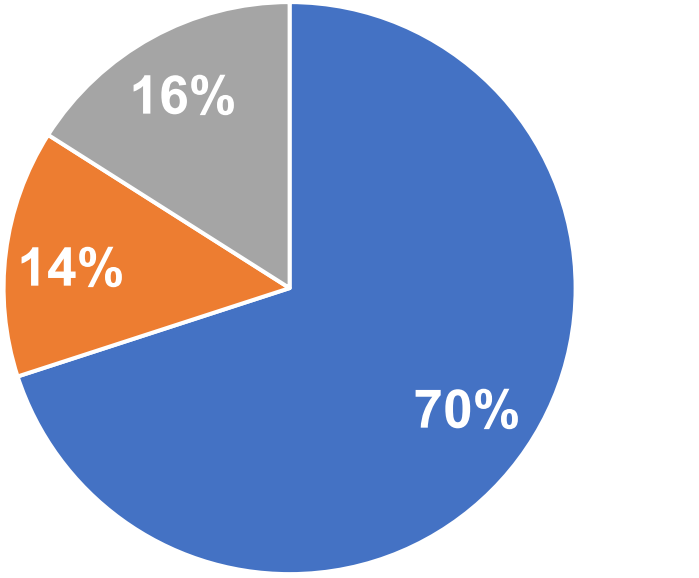


PNNL evaluation of the 2017 ORSC

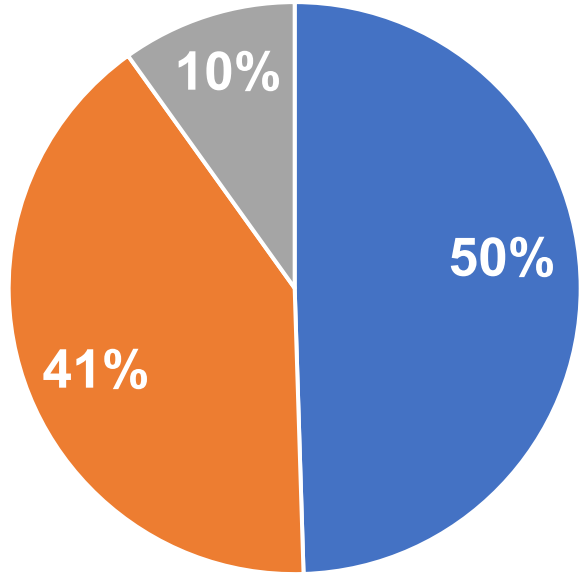
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Water Heating Fuel

2017 ORSC



2021 ORSC



PNNL evaluation of the 2017 ORSC

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Questions?

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Residential Code Compliance Evaluations



In Progress/Recently Completed

- Washington (Washington State Energy Code 2018)
- Idaho (IECC 2018 with Idaho Amendments)
- Montana (IECC 2018 and 2021 with Montana Amendments)
- Oregon (2021 Oregon Residential Specialty Code)
  Report available Q3 2025

Kicking off late 2025

- Oregon (2023 Oregon Residential Specialty Code)
- Washington (Washington State Energy Code 2021)

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Thank You!

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Dual-Fuel Residential HVAC Concept Advancement Milestone

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Overview

- **Objective:** To inform CEAC members about the Dual-Fuel Residential HVAC Program and surface any critical questions or feedback

- **Outline:**
  - Concept Advancement Milestone
  - Program Overview
  - Key inputs and preliminary results

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Concept Advancement Milestone

Initiative Lifecycle



- First voting milestone
- Preliminary confidence that a concept has “legs” and warrants a deeper look - but there’s a lot we don’t know and that’s ok
- We considered low, medium, and high scenarios, but today's focus will be on the medium case
- Intent is to convey concisely to Natural Gas Advisory Committee and Regional Portfolio Advisory Committee what is known, what we need to learn, and NEEA’s plan for learning more
- The Program Development phase that comes next is all about learning

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Background – Why Dual-Fuel? Why Now?

- Dual-fuel systems pair a centrally-ducted air source heat pump with a centrally-ducted gas furnace
- Dual-fuel systems offer customers affordable cooling options while increasing heating efficiency with proper design and installation
- More Northwest residents are seeking year-round comfort as number of days above 90º F increases
  - Adds an opportunity for people to install dual-fuel systems
- NEEA can help build awareness for **ensuring optimal dual-fuel design and installation** to increase efficiency without loss of comfort

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Dual-Fuel Residential HVAC Theory of Change

Market: Existing gas customers choosing to add or update a dual-fuel system (heat pump paired with a gas furnace)	
Barriers	**Strategies**
Lack of awareness of design and installation choices that influence optimal operation →	NEEA will partner with key market actors to communicate value proposition of optimally designed and installed dual-fuel systems
Lack of product features and communication protocols to realize grid flexibility →	Support market in development and specification of the best performing systems including grid-enabled controls benefits

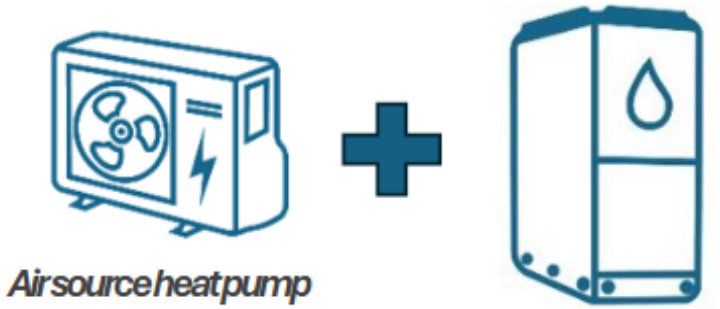
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Technical Achievable Potential - 1

- 1.49 million single-family homes with centrally-ducted gas furnaces
  - HVAC systems are replaced about every 15 years
- ~2 million HVAC system replaced in 20 years
- We estimate **375,000** optimally configured dual-fuel systems will be installed

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Technical Achievable Potential - 2



- HP sized for cooling with optimal balance point (30°F)
- Switchover temperature set to 35°F

- Changing the switchover temperature from 40°F to 35°F
- Larson Energy Research Group Analysis conducted on behalf of NEEA
  - Modeled different dual-fuel systems
  - Energy use, emissions, operating cost
- Unit savings:
  - Heating Zone 1: 155 therms/year
  - Heating Zone 2/3: 203 therms/year

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Technical Achievable Potential - 3

- **60 Million Therms over 20 years**
- 375,000 optimally configured dual fuel systems
- Heating Zone 1: 155 therms/year
  88% of homes
- Heating Zone 2/3: 203 therms/year
  12% of homes

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Incremental Cost

- Incremental cost for equipment: $0
- Incremental cost for labor: $149
  - From Regional Technical Forum (RTF) labor rates for HVAC installers
  - Assumes 1 hour of labor
  - Will be refined
- Total incremental cost is **$149**

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Benefit Cost Ratios

- We use RTF's ProCost tool to determine benefit cost ratios
  - Aligns with CEAC Dual-Fuel Measurement Workgroup operation guidelines
- Benefit cost ratios, Regional gas measure perspective:

  2.95 for heating zone 1

  3.25 for heating zone 2/3

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Next Steps

- Areas that we need to learn more about:
  - Market size and rate of adoption
  - Impact on the electrical load
  - Load shapes will be different than single fuel HVAC systems

- NEEA staff will continue to keep CEAC informed

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Thank You!

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Q3 2025 Key Assumptions Update & New Funder Portal Access

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Input Development and Review process



Develop Inputs

NEEA staff develops Key Assumptions in alignment with the region through:

- Internal analysis,
- External studies,
- Regional Technical Forum



Validate Assumptions

NEEA staff commissions 3rd party evaluations for new Key Assumptions and for changes to Key Assumptions used in the reporting of savings.



Report Key Assumptions

NEEA staff reviews new and updated Key Assumptions with CEAC every quarter. Additionally, NEEA staff will highlight any Key Assumptions that may warrant updating and solicit input from the committee for better data to inform a Key Assumption.



Post Key Assumptions

Full set of regional key assumptions used for reporting is made available on NEEA Funder Portal.

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Q3 2025 Key Assumptions Updates



In the meeting packet:

- Residential New Construction
  - 2021 ORSC compliance rate
- Commercial New Construction
  - MT 2021 IECC amendments
- Standards
  - Battery Charger, Portable AC and Air Compressors standards withdrawn

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Funder Portal now on NEEA SharePoint!

Funder Portal *NEEA SharePoint*
Operational Guidelines
Overview on energy savings & cost effectiveness calculations
Estimation Approaches & Data Sources
List of approaches and data sources NEEA uses to estimate savings & cost effectiveness
Methodology Documentation
Report on energy consumption calculations, data sources and technical assumptions

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To Access NEEA's Funder Portal

Make sure to bookmark the link!

If you already have an account

- NEEA will email the URL to NEEA's Funder Portal
- Click the link and log in using your email address and password

If you do not have an account

- NEEA will email a Systems Use Agreement (SUA) via DocuSign
- After the SUA has been signed, you will receive an invitation email with a link to NEEA's Funder Portal.
- Click the link, follow the prompt to enter your email address and the email's password

Trouble logging in?

- Copy/paste the URL into an incognito/InPrivate browsing session
- Contact NEEA IT Support: DSalvatore@neea.org

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Thank You!

Kathryn Bae

Principal Market Analyst

kbae@neea.org



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Wrap-up

How was your experience?

- Public Comment?
- Upcoming Meetings:
  - Q4 CEAC Meeting is October 29, 2025
- Feedback:
  - Overall
  - Agenda
  - Packet Materials
  - What went well?
  - What needs work?

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