



Cost-effectiveness & Evaluation Advisory Committee Meeting

Northwest Energy Efficiency Alliance

August 28, 2024

CLASSIFICATION LEVEL: PUBLIC





Introductions & Ice Breaker

- Name
- Organization
- Where are you from?





Agenda

| | |
|---------------------------|--|
| 9:00am | Welcome/Agenda Review |
| 9:15 | Idaho Residential Code Compliance Evaluation |
| 9:35 | State Energy Codes Evaluation Approach (Continued) |
| 10:20 | BREAK |
| 10:30 | Key Inputs and Assumption Updates |
| 10:50 10:55 | Peak Value for Portfolio Management in Cycle 7 (2025-29) |
| 11:10 11:25 | MRE Update |
| 11:40 | Charter Review |
| 12:10 | Wrap Up |

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 5.

Nominations can be made in the following categories:

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

Nominations

Aug 05
Through
Sept 13

Event

Dec 05



To nominate go to:
nea.org/leadershipawards



Draft 2025 CEAC Meeting Dates

- Q1 – February 26th
- Q2 – April 30th
- Q3 – August 27th
- Q4 – October 30th

Give these dates a look over to make sure they don't conflict with any major events, and we will confirm dates at the Q4 CEAC Meeting.



Idaho Residential Code Compliance Evaluation



Idaho Residential Code Compliance Evaluation

Meghan Bean

Principal Lead, Market Research & Evaluation

August 28, 2024





NEEA Code Compliance Evaluations

- Conducted at least once per 5-year business cycle for each state
- Measure compliance with the most recent code
- 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



Idaho Residential Code

- International Energy Conservation Code (IECC) 2018 with Idaho amendments went into effect in July 2021
- More stringent requirements for:
 - Envelope tightness
 - Wall insulation
 - Basement and crawlspace wall insulation
 - Window U-factor
 - Lighting



Research Questions

IEC



- What proportion of homes built under IECC 2018 with Idaho amendments comply with the code?
- What proportion of homes have above-code measures?
- Where are the greatest opportunities for energy savings if compliance is increased?
- Does envelope tightness compliance differ across rural and urban areas?
- What proportion of homes have gas versus electric primary space and water heating?



Methods



Data Sources

- Collected data on in-progress new construction homes built under IECC 2018 with Idaho amendments
- On-site audits
 - 164 audits across 18 counties
 - Followed DOE's sampling approach
- Permits
 - 70 from urban areas across 9 jurisdictions, 70 from rural areas across 4 jurisdictions



Data Source for Each Measure

| Measure | Data Source for Code Compliance |
|--------------------------------------|---------------------------------|
| Envelope tightness | Onsite audit data |
| Window U-factor | Permit data |
| Window SHGC | Permit data |
| Wood-framed wall R-value | Onsite audit data |
| Mass wall R-value | Onsite audit data |
| Ceiling R-value | Permit data |
| Lighting equipment | Onsite audit data |
| Floor R-value | Onsite audit data |
| Basement wall R-value | Onsite audit data |
| Crawlspace wall R-value | Onsite audit data |
| Slab R-value and depth | Onsite audit data |
| Duct insulation | Onsite audit data |
| Duct leakage | Onsite audit data |
| Duct insulation in conditioned space | Onsite audit data |



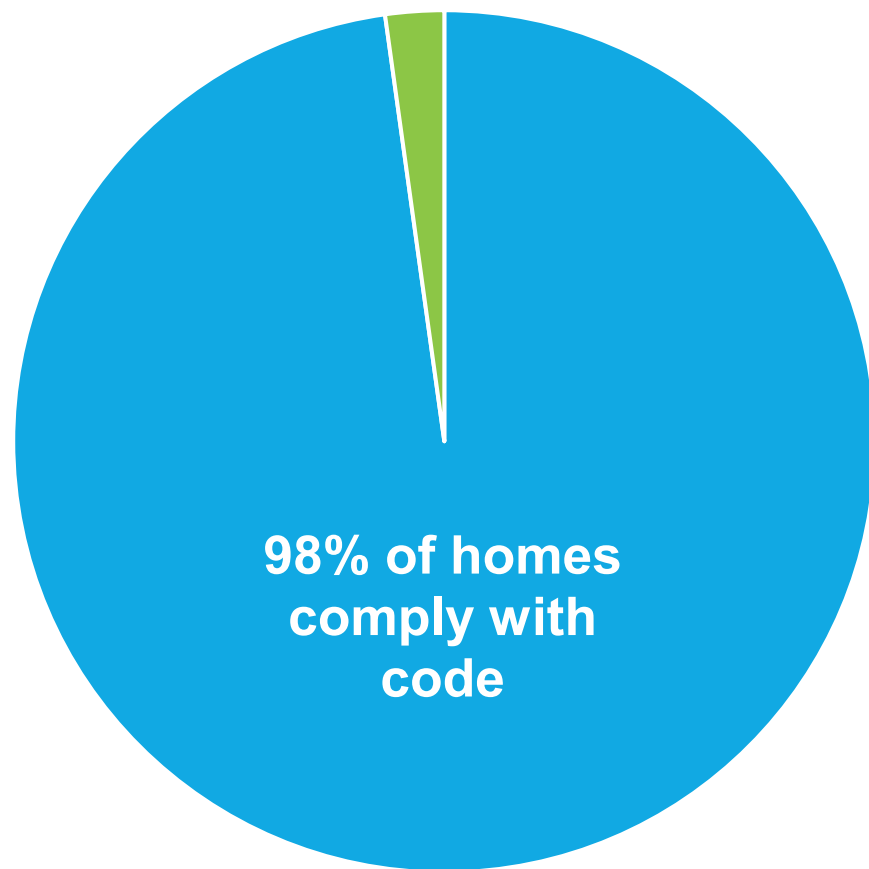
Calculating Compliance

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



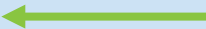
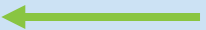
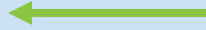
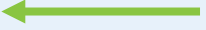
Key Findings

Statewide Compliance



The average home uses **8%** less energy than a home that exactly meets code due to above code measures used in some homes

Above-Code Measures

| Measure | % of Above-Code Observations |
|-----------------------------|---|
| Envelope tightness | 95%  |
| Window U-factor | 44% |
| External wall R-value | 84%  |
| External wall U-factor | 19% |
| Ceiling R-value | 28% |
| Ceiling U-factor | 0% |
| High-efficiency lighting | 100%  |
| Floor R-value & U-factor | 0% |
| Basement R-value & U-factor | 50% |
| Crawlspace R-value | 17% |
| Crawlspace U-factor | 0% |
| Adjusted duct tightness | 92%  |



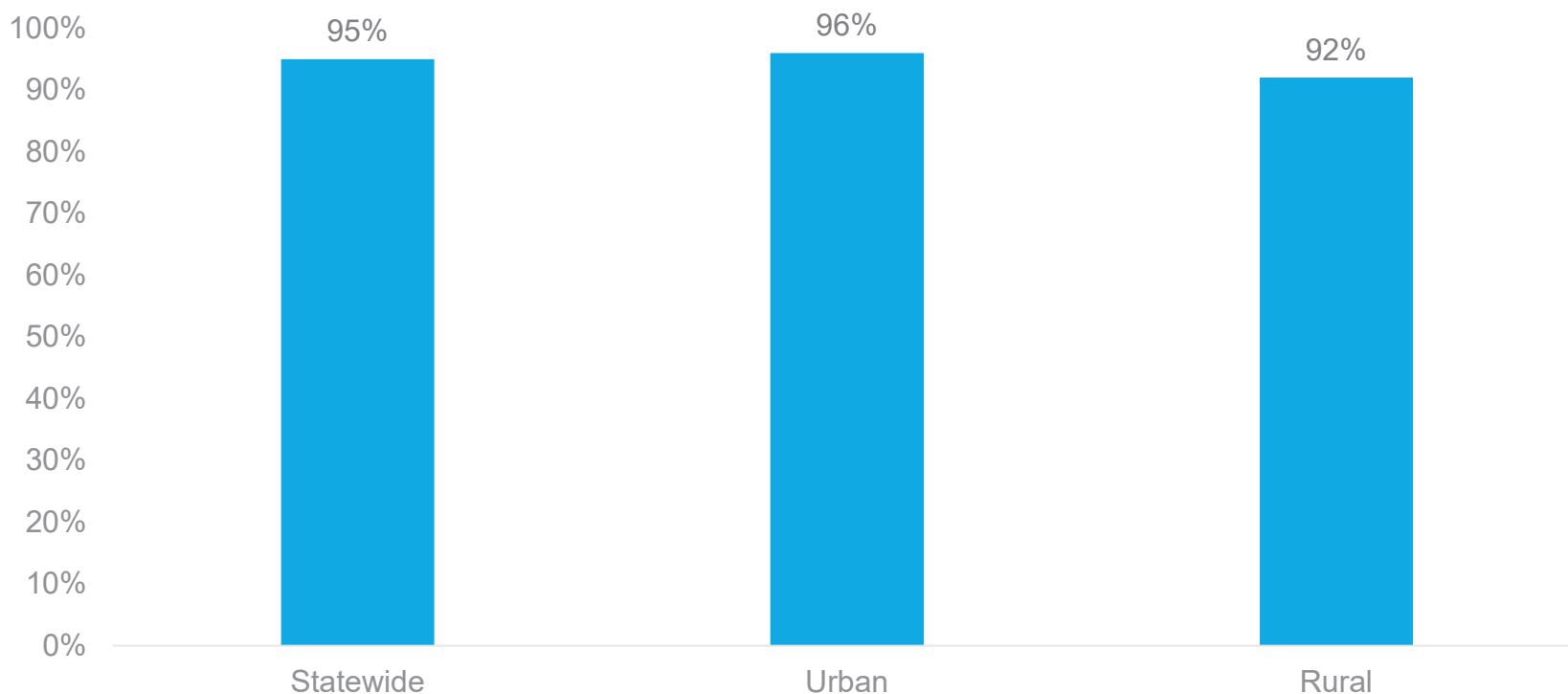
Opportunities to Increase Energy Savings

- External wall insulation has the lowest rate of compliance (52% statewide) and the greatest opportunity to increase savings
- Opportunities for training and education
 - Insulation installation quality (statewide)
 - Insulation R-value (climate zone 6)



Urban vs. Rural Envelope Tightness Compliance

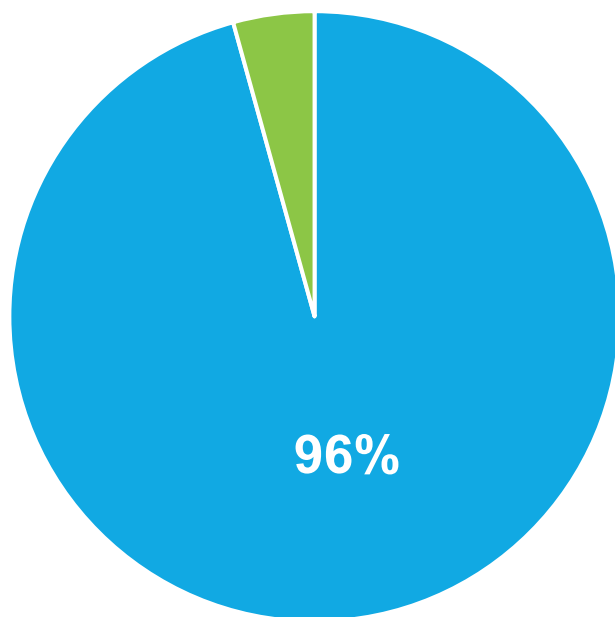
There is no statistically significant difference in envelope tightness compliance across rural and urban areas





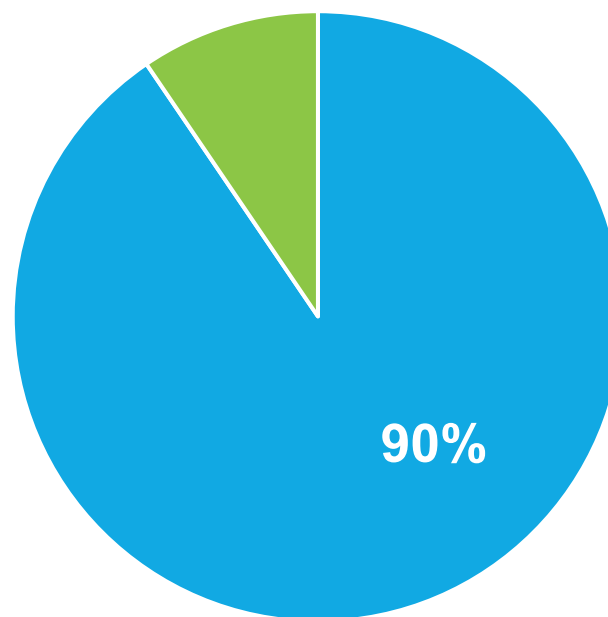
Primary Space and Water Heating Fuel

Space Heating



■ Gas ■ Electric

Water Heating



■ Gas ■ Electric



What's Next for Residential Code Compliance Evaluation



Residential Code Compliance Evaluations

Recently Completed

- [Idaho \(*IECC 2018 with Idaho Amendments*\)](#)
- [Washington \(*Washington State Energy Code 2018*\)](#)

In-Progress (Reports Available Late 2024/Early 2025)

- Montana (*IECC 2018 and IECC 2021 with Montana Amendments*)
- Oregon (*2021 Oregon Residential Specialty Code*)

Planned (Kick Off Late 2025)

- Oregon (*2023 Oregon Residential Specialty Code*)
- Washington (*Washington State Energy Code 2018*)



Questions?

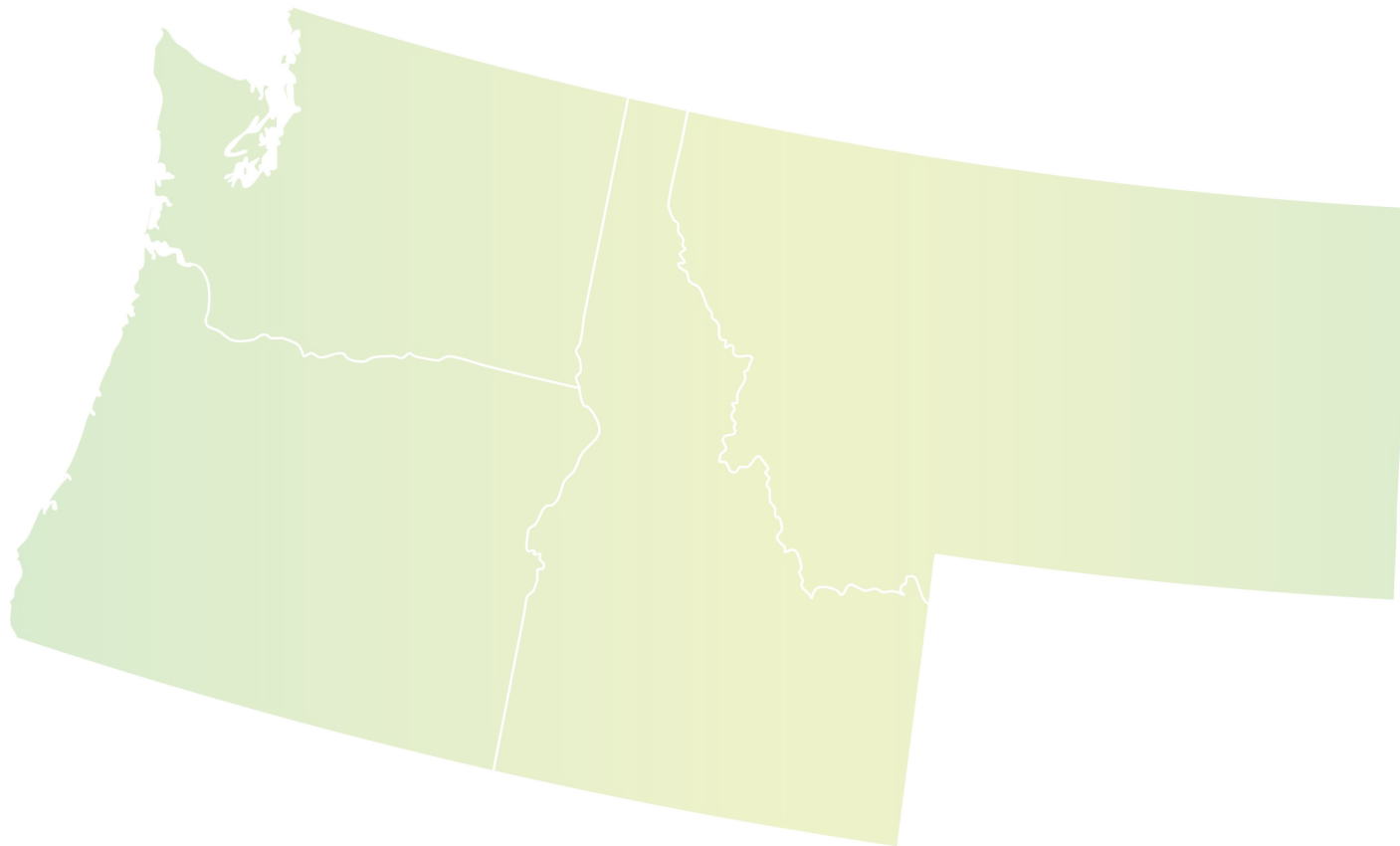


Meghan Bean

Principal Lead

Market Research & Evaluation

mbean@neea.org





State Energy Code Evaluation Approach (Continued)

NEEA's Approach to Evaluating Influence on State Energy Codes

Staff Proposed Responses to 3rd-Party Evaluator Recommendations

CEAC

August 28, 2024

Chris Cardiel, Sr. Market Research & Evaluation Scientist





Outcomes & Objectives to Address Recommendation #9

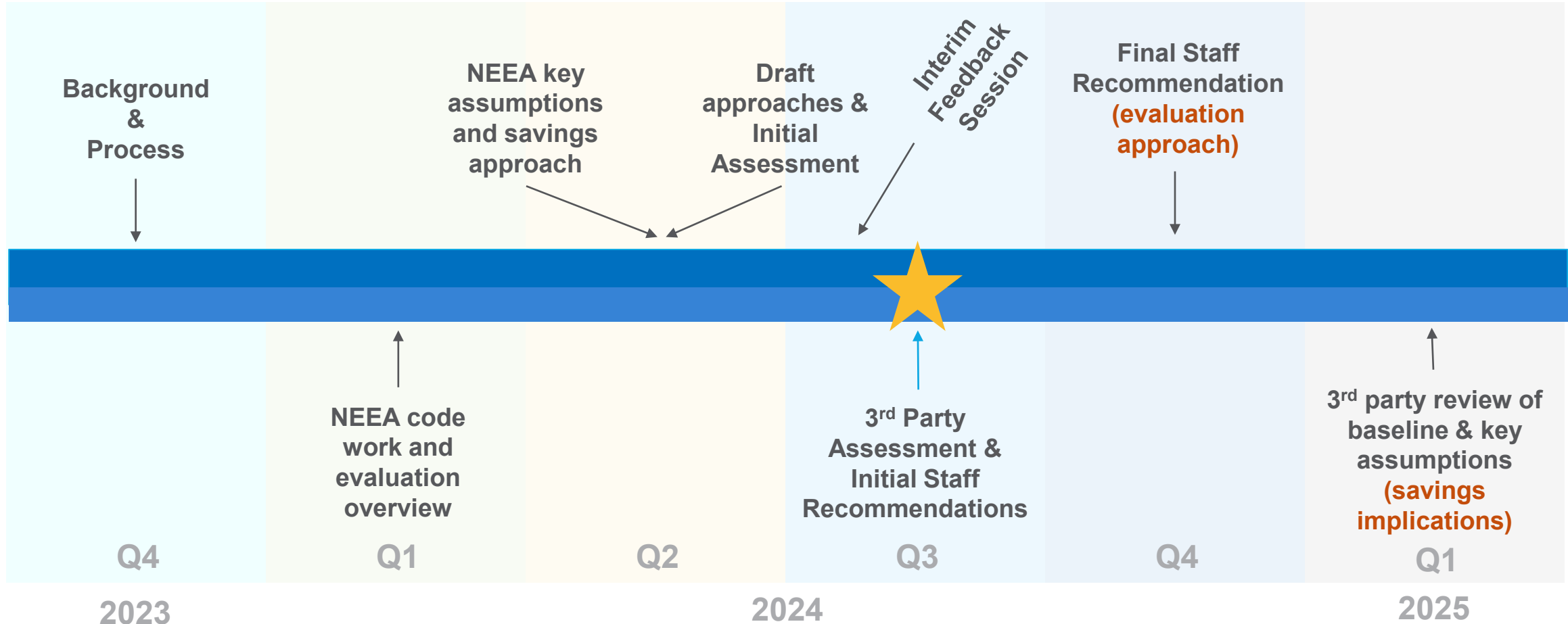
Recommendation #9: Complete influence evaluations for each code update to estimate NEEA's qualitative and quantitative influence towards the code update, or, alternatively, incorporating a quantitative method for isolating incremental savings due to NEEA-specific efforts approved by a third-party evaluator.

The highlighted text was added as part of the June 15th addendum.

- Outcome:
 - Develop a recommendation for a framework for evaluating state energy codes that is most applicable to Market Transformation and NEEA's current framework for reporting energy savings.
- Objectives:
 - Assess the current evaluation approach to state energy codes.
 - Explore alternative frameworks for evaluating and reporting energy savings associated with state energy codes.



State Energy Code Evaluation Assessment Process & Timing





Today's Agenda

- Briefly review NMR Group's recommendations related to NEEA's approach to evaluating influence on state energy code
- Present initial NEEA staff proposed responses to NMR Group recommendations
- Note projected resourcing implications of recommended NEEA responses

Third-Party Evaluator Recommendations and NEEA Staff Proposed Responses



NMR Group Overall Recommendation

In Market Progress Evaluation Reports (MPERs), **conduct deeper, state-specific qualitative research** to describe NEEA's work and its collaborations with partners to improve code outcomes.

NEEA Staff Recommendation: **Accept in Full**

- Incorporate methodologies in MPERs supporting deeper qualitative assessment of NEEA's collaborative code influence
- Implement beginning with Codes MPER #6 (kickoff Q4 2024)



NMR Group Supporting Recommendation #1

Given the limited scope of this evaluation, the NMR team does **not have evidence at this point to suggest that NEEA should develop and apply a downward adjustment factor** to the co-created savings it reports from its work with partners to influence code update cycles, though future evaluation research could suggest such an adjustment.

NEEA Staff Recommendation: **Accept in Full**

- No adjustment established, but remain open to changing dynamics
- Continue to decrement savings based on estimated compliance
- Continue conducting regular third-party baseline/assumption reviews



NMR Group Supporting Recommendation #2

Create strategy plans for each state and code cycle as recommended in Codes MPER #5 and integrate their development and execution into the Codes Program Theory and Logic Model (PTLM).

NEEA Staff Recommendation: **Accept in Full**

- NEEA Codes team has already begun development of Strategy Plans
- NEEA MRE will include Strategy Plans as key resources for program evaluation, ideally beginning with Codes MPER #6



NMR Group Supporting Recommendation #3

Use MPERs to document and highlight the story of NEEA's codes work, including historical context, collaborative approaches with co-created savings, and the rationales for NEEA's chosen codes activities, in public-facing documents or reports.

NEEA Staff Recommendation: **Accept in Full**

- NEEA MRE will leverage future Codes MPERs as a platform for rich qualitative documentation of collaborative influence
- Codes MPERs will include qualitative data collection with NEEA staff and regional and national partners as a necessary study component



Summary of NEEA Staff Recommended Response

- Codes MPERs, beginning with MPER #6, will include a qualitative influence study objective
 - Codes MPERs will also include sample and methods focused on collecting qualitative data from NEEA and partners
 - NEEA Codes team will continue ongoing development of state- and cycle-specific Strategy Plans
- Default savings adjustment factor not currently recommended; however, NEEA will continue conducting third-party assessment of code savings baseline and modeling assumptions
 - Upcoming (Q4 2024–Q1 2025) review including: 2-cycle/10-year baseline assumption, 1-year start-to-build timeline assumption, and commercial building category mapping schema assumption



Anticipated Resourcing Implications

- Programmatic and evaluative adjustments are well-aligned with existing NEEA MT approach and largely leverage existing structures
 - No significant incremental costs are anticipated to implement
 - NEEA is committed to continuing to field methodologically rigorous MPERs on regular cadence
- NEEA is likewise committed to continuing standard practice of seeking third-party review of codes savings baseline and assumptions on regular cadence
 - NEEA acknowledges the potential that further opportunities for refinement of methodology may be identified and intends to respond to such opportunities as they are identified

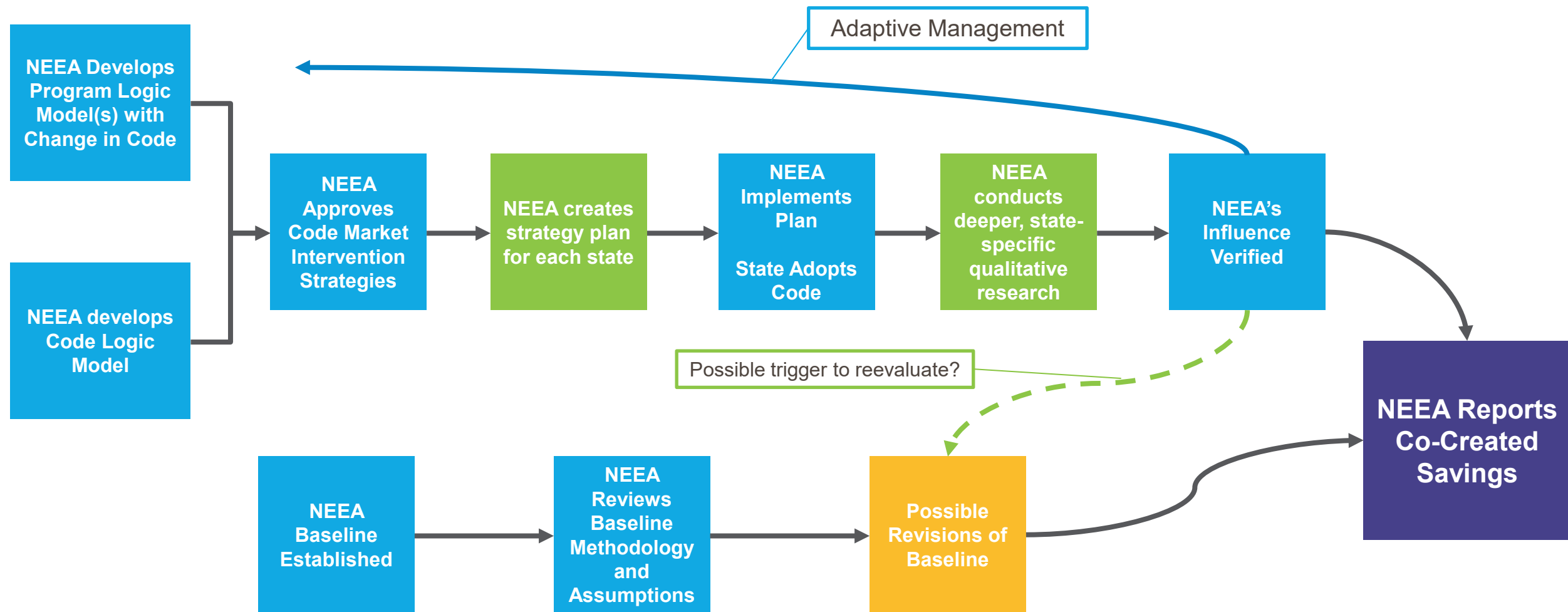


For Discussion

- Clarifying questions on concerns?
- Do NEEA's staff recommendations align with NMR recommendations and feedback from committee members?

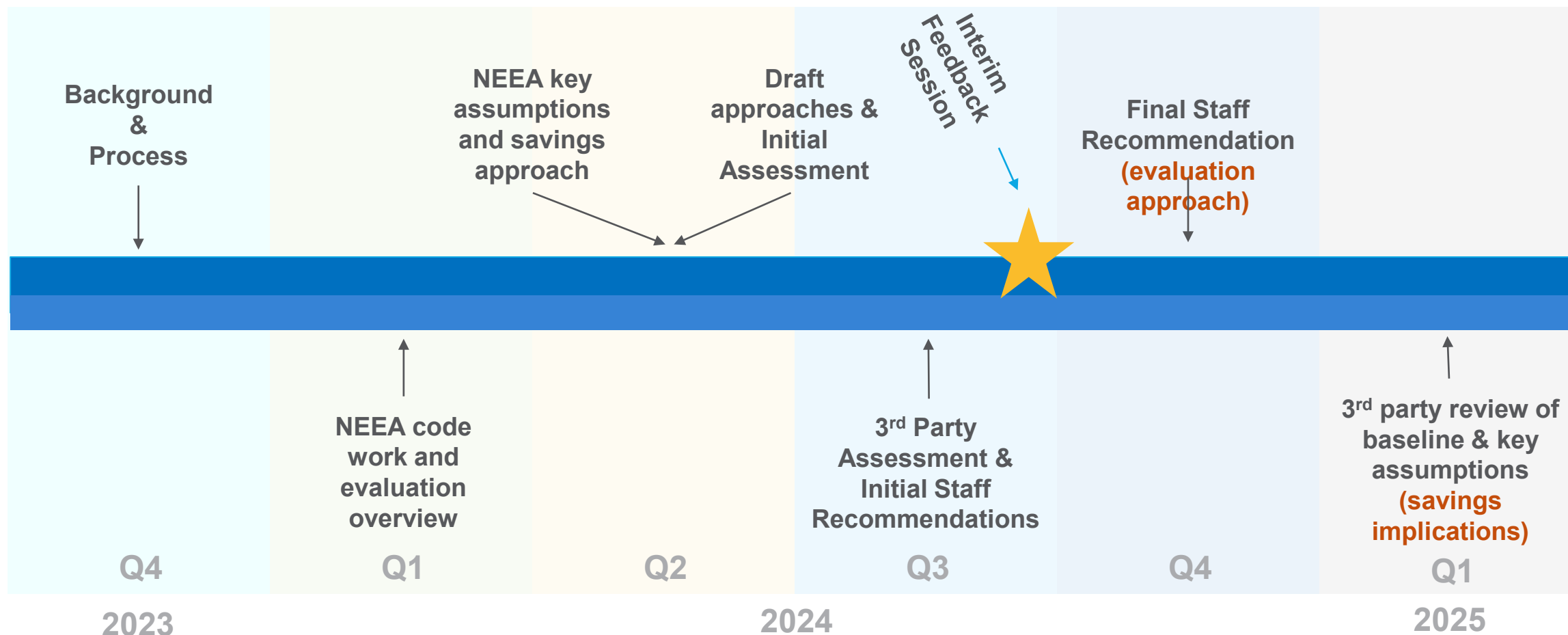


Draft Updates to Process for Estimating Co-Created Savings





Process Update





Next Steps

Q4 – November 4, 2024

Staff provides final recommendation with implications.

Staff will also address if this recommendation would need to be tested before full implementation.

Q1 – TBD, 2025

Executive Director shares decision with NEEA's Board of Directors

3rd party review of state energy codes baseline methodology and key assumptions used in estimating and reporting energy savings



» Thank You





BREAK



Inputs and Assumption Updates



Objective

- Don't have updates today
- Discussing continuous improvement of process
- Key questions:
 - What information do you need?
 - What format is most effective?





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.



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 Inputs and 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 Inputs and Assumptions

Full set of regional key assumptions used for reporting is made available on [NEEA Funder Portal](#)



System of Documentation Available

Funder Portal

neea.org

Updated in April

Data Sources

List of data sources NEEA uses to estimate savings & cost effectiveness and explanation of approach

Cost Effectiveness Table

ProCost Inputs for programs in Market Development

Methodology Documentation

Report on energy consumption calculations, data sources and technical assumptions

Operational Guidelines

Overview on energy savings & cost effectiveness calcs



Supporting Documentation on neea.org

Documentation is available at:

<https://neea.org/portal/sign-in>



Login



Savings Reports

Reporting Resources

Data Sources and Estimation Approaches —

- [2023 Annual Report Cost Effectiveness Inputs - Electric and Natural Gas](#)
- [2023 Annual Report Data Sources and Estimation Approaches - Market Transformation - Electric](#)
- [2023 Annual Report Data Sources and Estimation Approaches - 2021 Power Plan - Electric](#)
- [2023 Annual Report Data Sources and Estimation Approaches - Market Transformation - Natural Gas](#)



Discussion Questions

- What information will allow you to review and advise on inputs and methods?

Inputs

- Standardized set of inputs across all models such as:
 - savings rate
 - market size
 - incremental cost

Assumptions

- Product-specific components that build up the Inputs such as:
 - Hours of Use
 - Interaction factors
 - Remaining moisture content

Estimation Methods

- Written description of method used for each input
- Summary length or complete methodology documentation

Sources

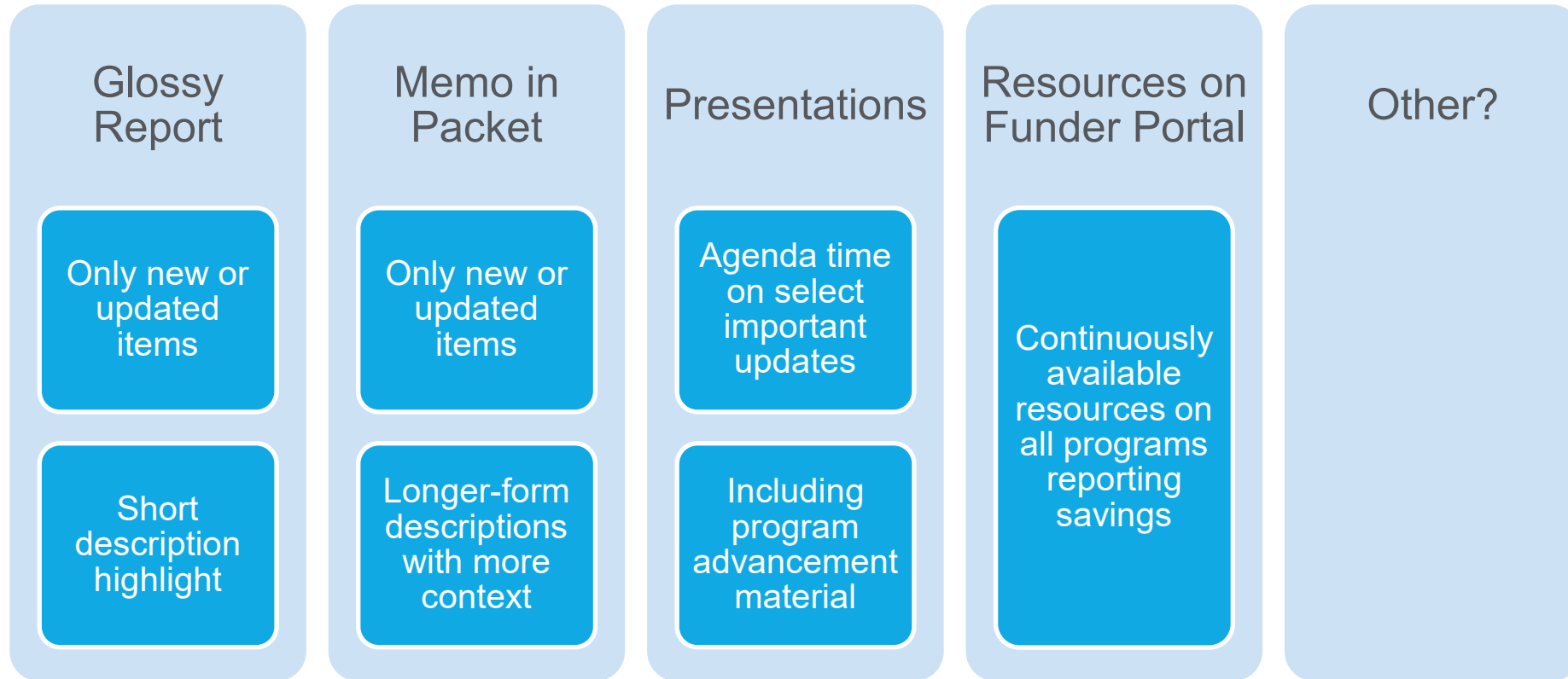
- Citations

Other?



Discussion Questions

- What format, layout and features would allow you to best engage?





System of Documentation Available

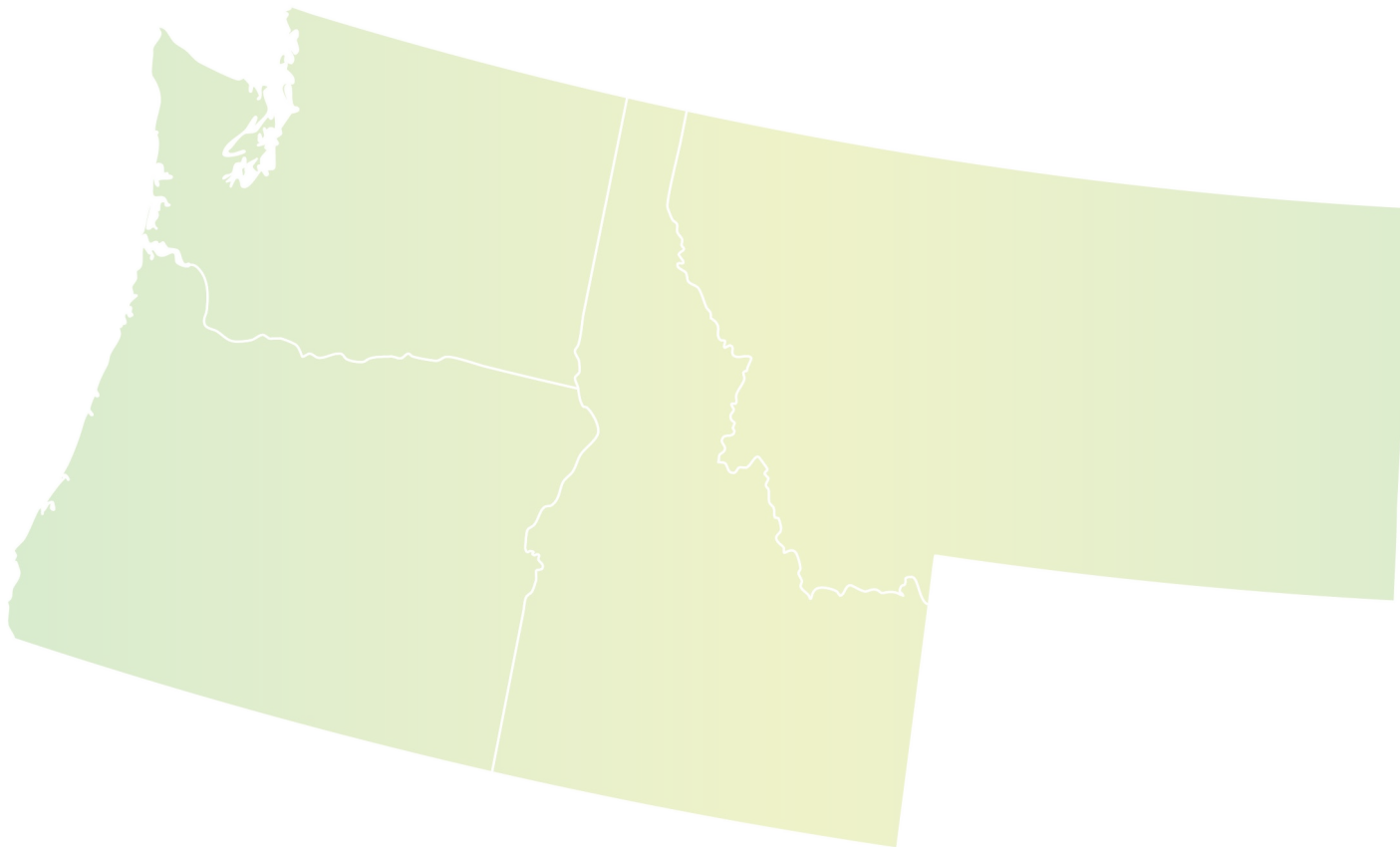
| Funder Portal neea.org <i>Updated in April</i> | Funder Reports Emailed Directly <i>Updated Q1/Q2, upon request</i> | CEAC Meeting Materials Emailed in Packet <i>Updated Quarterly</i> |
|--|--|--|
| Data Sources List of data sources NEEA uses to estimate savings & cost effectiveness and explanation of approach | Annual Report Memo summarizing annual savings results and market updates | Annual Summary Memo summarizing portfolio savings & cost effectiveness results as well as program updates. |
| Cost Effectiveness Table ProCost Inputs for programs in Market Development | Customized Workbook Workbook with annual savings values, variance summaries, methodology descriptions, measure-level units and other key assumptions specific to the individual funder requests. | Key Assumptions Update Updates to key assumptions (baselines, savings rates, units estimates, etc.), along with contact information for follow-up questions. |
| Methodology Documentation Report on energy consumption calculations, data sources and technical assumptions | | Presentations Slides describing results & updates to inputs used in NEEA's savings and cost effectiveness analyses. |
| Operational Guidelines Overview on energy savings & cost effectiveness calcs | | |



Thank you CEAC!

Ryan Brown

RBrown@neea.org





Peak Value for Portfolio Management in Cycle 7 (2025-29)

Ryan Brown

Manager – Planning & Analysis

August 28, 2024





Key Takeaway

- As new concepts and programs are brought for advancement decisions, we will include a program-level peak value for consideration





Strategic Goals for 2025-2029

MISSION:

NEEA catalyzes the most efficient use of energy for a thriving Northwest.

1

Transform Markets for **Energy Efficiency**

2

Accelerate the adoption of **Grid-Enabled End-Use Technologies** through Market Transformation

3

Advance strategies to **Reduce Greenhouse Gas Emissions** through Market Transformation

4

Advance the **Equitable Delivery of Energy Efficiency Benefits** to Northwest consumers through Market Transformation



2025-2029 Business Plan Focus Area:

“Prioritizing energy savings at **peak demand** to ensure NEEA’s energy efficiency Market Transformation activities are delivering the highest value to the region.”



Electric Portfolio Carrying into Cycle 7

Forecast for 2025



50+ Emerging Markets and Technologies



Room Heat Pumps



Efficient Drives



Commercial Heat Pump Water Heaters



Central Heat Pump Water Heaters



Dual Fuel HVAC systems

Funding for 2-3 new programs to advance (2025-2029)



Efficient Fans



Heat Pump Water Heaters



Retail Products Portfolio



Luminaire Level Lighting Controls



Extended Motor Products - Pumps



High-Performance HVAC



Advanced Heat Pumps

Manufactured Homes

Ductless Heat Pumps

Reduced Watt Lamp Replacement

Strategic Energy Management

New Construction Codes, Federal and State Product Standards

concept development

program development

market transformation

SCANNING

CONCEPT ASSESSMENT



PROGRAM DEVELOPMENT



MARKET DEVELOPMENT

LONG-TERM MONITORING & TRACKING

Key factors and decisions:

Managing resources to select the best new and expansion opportunities

Building leverage in dual fuel areas

Meeting new criteria of Cycle 7 Plan



Portfolio Criteria

Energy
Savings
Potential

Cost
Effectiveness

Risk Profile

Regional
Distribution of
Potential

Strategic
Market
Considerations

new Peak
Impact

TBD Equity, Load
Flexibility &
Decarbonization



Proposed Approach – Passive Peak Impact

Ratio of MW peak reduction per aMW

- Methodology
 - **Source:** [RTF Load and Savings Shapes](#)
 - **Tool:** [ProCost v5](#)
 - **Peak definition:**
 - **Winter** – 6pm on weekdays in Dec, Jan, Feb
 - **Summer** – 6pm on weekdays in July and Aug





Current Preliminary Values

| Program | DRAFT Winter Peak Ratio (MW/aMW) | DRAFT Summer Peak Ratio (MW/aMW) |
|-----------------------------------|--|--|
| | | |
| Ductless Heat Pumps | 3.22 | -0.20 |
| Heat Pump Water Heaters | 1.83 | 2.11 |
| High-Performance HVAC | 2.37 | 0.64 |
| Luminaire Level Lighting Controls | 1.64 | 1.32 |
| Manufactured Homes | 4.15 | 0.36 |
| Commercial New Construction | 2.25 | 1.59 |
| Residential New Construction | 2.57 | 1.68 |
| Retail Product Portfolio | 1.58 | 1.66 |
| Advanced Heat Pumps | 2.61 | 2.85 |
| Extended Motor Products - Pumps | 1.92 | 0.89 |

Poll for the committee:

- How much does this resonate with you as a regional portfolio metric? (on a scale of 1-5)

Discussion Questions



How do you do this at your organization?

Metric used?
How valued?
Data sources/tools?



What other recommendations do you have for NEEA's portfolio management on peak?



Key Takeaway

- As new concepts and programs are brought for advancement decisions, we will include a program-level peak value for consideration

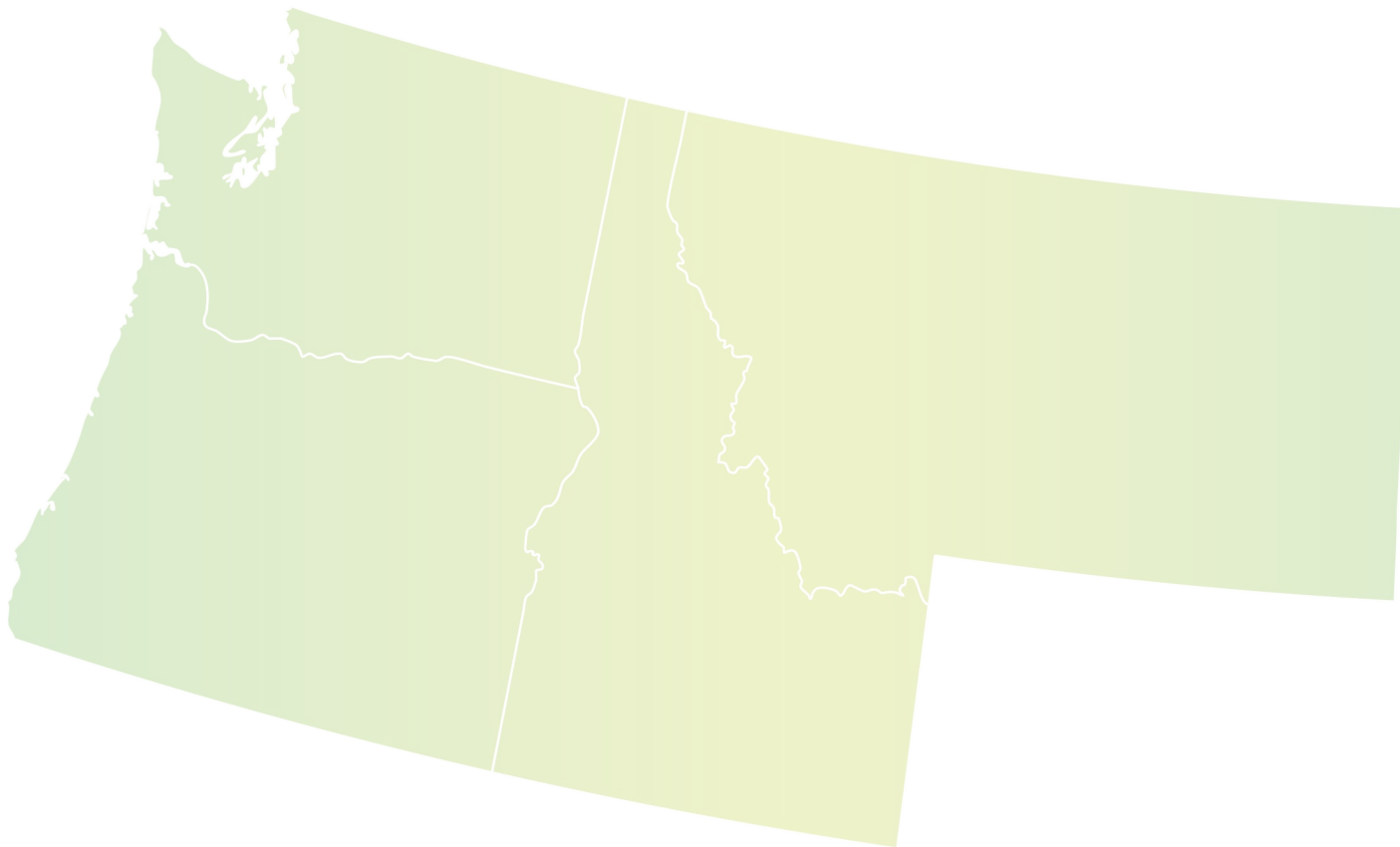




Thank you CEAC!

Ryan Brown

RBrown@neea.org





MRE Update



2024

Q2

Market Research & Evaluation Quarterly Newsletter

WHAT'S NEW:



Hello there!

The slightly slower pace and sunny days of summer are almost here. While NEEA's Market Research and Evaluation (MRE) team has a lot of work to carry out through the warm months, things are slowing just a bit. This is evidenced by the slightly shorter than typical list of projects highlighted in this quarter's newsletter. The team has several ongoing evaluations in the field, including three market progress evaluations (for High-Performance HVAC, Efficient Rooftop Units and Extended Motor Products programs) as well as four state energy code compliance evaluations that are designed to estimate the rate of compliance with updated state building codes.

It is also worth mentioning several interesting market research efforts that are underway. Two studies have just launched to support gas water heating program opportunities. Another study will explore consumers' use and attitudes associated with connected consumer products. Additionally, there will be a slight change to the way that Market Progress Evaluation Reports are numbered for NEEA's Codes program, see [page 11](#) for more details.

Lots on the horizon. Enjoy this newsletter and please reach out with any questions or suggestions.

~ Amy Webb, Sr. Manager, Market Research & Evaluation ~

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At a Glance

MARKET RESEARCH & EVALUATION PROJECTS

Integrated Systems



Efficient Rooftop Units: *Market Progress Evaluation Report #1*

High-Performance HVAC: *Market Progress Evaluation Report #1*

Extended Motor Products: *Market Progress Evaluation Report #1*

Extended Motor Products: *Agricultural Pumps Market Research*

BetterBricks: *Commercial Building Decision Maker Market Research*



Products

Efficient Gas Water Heaters: *Condensing Gas Water Heater Qualitative Market Research*

Efficient Gas Water Heaters: *Existing Water Heaters in Select Commercial Buildings Market Research*

High-Performance Windows: *Residential Market Share Study*

Retail Product Portfolio: *Connected Consumer Products Market Research*

Retail Product Portfolio: *Retailer and Manufacturer Sustainability Goal Literature Review*

PLANNING* FIELDING* REPORTING*



DUAL FUEL (Electric & Natural Gas) PROJECTS:



NATURAL GAS PROJECTS:



*PLANNING: MRE projects from inception through proposal selection

*FIELDING: MRE projects from kick-off through the completion of field work

*REPORTING: MRE projects in the analysis/synthesis stage through report posting



At a Glance

MARKET RESEARCH & EVALUATION PROJECTS

Codes, Standards, New Construction



| | PLANNING* | FIELDING* | REPORTING* |
|---|-----------|-----------|------------|
| Codes: <i>Assessment of Alternative Approaches to Estimating NEEA's State Energy Codes Influence</i> | | ✓ | |
| Codes: <i>Market Progress Evaluation Report #5</i> | | | ✓ |
| Codes: <i>Market Progress Evaluation Report #6</i> | | ✓ | |
| Codes: <i>Home Energy Raters Market Research</i> | | ✓ | |
| Residential Codes: <i>Idaho Residential Code Compliance Evaluation</i>  /  | | | ✓ |
| Residential Codes: <i>Montana Residential Code Compliance Evaluation</i> | | ✓ | |
| Residential Codes: <i>Oregon Residential Code Compliance Evaluation</i>  /  | | ✓ | |
| Commercial Codes: <i>Idaho Commercial New Construction Code Compliance Evaluation</i>  /  | | ✓ | |
| Commercial Codes: <i>Montana Commercial New Construction Code Compliance Evaluation</i> | | ✓ | |
| Standards: <i>Battery Chargers Standard Evaluation</i> | | ✓ | |
| Standards: <i>Non-Weatherized Gas Furnaces and Mobile Home Furnaces Standard Evaluation</i>  | | | ✓ |

DUAL FUEL (Electric & Natural Gas) PROJECTS:



NATURAL GAS PROJECTS:



*PLANNING: MRE projects from inception through proposal selection

*FIELDING: MRE projects from kick-off through the completion of field work

*REPORTING: MRE projects in the analysis/synthesis stage through report posting



Charter Review



Review Process

Every cycle (and as needed):

- NEEA Staff Review
- Committee Review (today)
- Board Review (Q4 Board Meeting)





Questions

1. Does this document accurately reflect the purpose and activities of this committee?
2. What, if any, additional components of CEAC's work that should be included as part of the charter?
3. What, if any, roles for CEAC within the existing charter are not being fulfilled adequately?



Wrap Up



Meeting Wrap-up

- Public Comment?
- Upcoming Meetings:
 - November 4th, 2024
- Feedback:
 - Overall
 - Agenda
 - Packet Materials
 - What went well?
 - What needs work?

