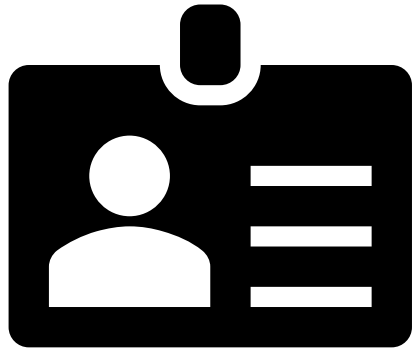
Cost-effectiveness & Evaluation Advisory Committee Meeting

Northwest Energy Efficiency Alliance

March 6, 2024

CLASSIFICATION LEVEL: PUBLIC

Introductions & Ice Breaker



- Name
- Organization
- Question(s) for today?
- What was your first job?

Agenda

10:00AM	Welcome/Agenda Review
10:15	MRE Update
10:30	Market Progress Evaluation Report Recap
11:10	BREAK
11:20	Key Inputs and Assumption Updates
12:00PM	LUNCH
1:00	NEEA Codes and Standards Introduction
2:15	BREAK
2:25	NEEA's Current Evaluation Approach (for Codes and Standards)
3:25	Wrap Up

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.

Efficiency Exchange 2024 – Registration Opens Feb. 15

EFX24 Early Bird Registration

February 15 – April 12

neea.org/EFX

EFX24 Hybrid Conference
May 14-15 in Coeur d'Alene
In-person + Virtual

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2023 Annual Reporting Timeline

Q4

- Review recent key assumption and data source updates

Today

- Review updates to key assumptions for savings reporting

Apr. 30th

- Review additional updates to key assumptions
- Overview of Market Transformation Savings Accounting and Reporting
- Review prior year energy savings
- Review portfolio cost effectiveness
- Review key market trends and new findings
- Discuss adjustments to savings forecast and progress to Business Cycle goals

Local Program Data Collection

Individual Funder Reporting

Market Research and Evaluation (MRE) Update

Objectives

- Committee awareness of market research and evaluation activities

2023 Q4 Market Research & Evaluation Quarterly Newsletter

WHAT'S NEW:

Happy greetings, everyone!

NEEA's Market Research and Evaluation (MRE) team is pleased to share with you the latest research and evaluation project news. Enclosed are important details related to current studies, as well as those that will commence in the first quarter of 2024. There will be a host of studies in the field between now and the end of the first quarter. Several programs are in the midst of their first market progress evaluation report (MPER), including the Commercial HVAC programs (High-Performance HVAC and gas Efficient Rooftop Units) and the Extended Motor Products program. These evaluations will bring increased understanding of the market opportunity for these measures, as well as NEEA's progress toward its Market Transformation goals. There are also several state energy code compliance and standard influence evaluations in the field. In addition, lots of studies are wrapping up, so stay tuned for reports to hit your inbox over the next few weeks. 2023 has been an exciting year with many opportunities to connect in-person, share new ideas, and tackle big challenges. It's been an eventful twelve months, and the MRE team looks forward to what the year ahead brings.

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

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At a Glance

MARKET RESEARCH & EVALUATION PROJECTS

		PLANNING*	FIELDING*	REPORTING*
Integrated Systems	BetterBricks: *Commercial Building Market Research*		✓	
	Efficient Rooftop Units: *Market Progress Evaluation Report #1*		✓	
	High-Performance HVAC: *Market Progress Evaluation Report #1*		✓	
	Luminaire Level Lighting Controls: *Market Sizing*			✓
	Luminaire Level Lighting Controls: *Key Assumptions Review*			✓
	Luminaire Level Lighting Controls: *Market Progress Evaluation #2*			✓
	High-Performance Windows: *Market Influence Study*	✓		
Products	Extended Motor Products: *Agricultural Pumps Market Research*	✓		
	Extended Motor Products: *Market Progress Evaluation Report #1*		✓	
	Efficient Fans: *Fan System Market Characterization*			✓
	Retail Product Portfolio: *Connected Consumer Products Market Research*	✓		
	Retail Product Portfolio: *Retailer and Manufacturer Sustainability Goal Literature Review*			✓
	Heat Pump Water Heaters: *Market Progress Evaluation Report #7*			✓
	Heat Pump Water Heaters: *Benefit/Cost Model Review*			✓

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*
Standards: *Non-Weatherized Gas Furnaces and Mobile Home Furnaces Standard Evaluation*		✓	
Standards: *Battery Chargers Standard Evaluation*		✓	
Commercial Codes: *Idaho Commercial New Construction Code Evaluation*		✓	
Commercial Codes: *Montana Commercial New Construction Code Evaluation*		✓	
Residential Codes: *Montana Residential Code Compliance Evaluation*		✓	
Residential Codes: *Oregon Residential Code Compliance Evaluation*		✓	
Residential Codes: *Idaho Residential Code Compliance Evaluation*			✓
Codes: *Market Progress Evaluation Report #2*			✓
Manufactured Homes: *Transition Market Progress Evaluation Report*			✓
Residential New Construction: *Bridger View Housing Development Market Research Project*			✓

Today!

DUAL FUEL (Electric & Natural Gas) PROJECTS:

NATURAL GAS PROJECTS:

***PLANNING:** MRE projects from inception through proposal selection

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ANNUAL MARKET PROGRESS EVALUATION REPORTS

PURPOSE AND SCOPE

TRACK MARKET PROGRESS

To track market progress indicators and assess program effectiveness at overcoming barriers

REVIEW LOGIC

To review the program logic model and theory of change

ADAPTIVE MANAGEMENT

To provide current market intelligence for program adaptive management

TRANSITION MARKET PROGRESS EVALUATION REPORTS

PURPOSE AND SCOPE

TRACK MARKET PROGRESS

To track market progress indicators and assess program effectiveness at overcoming barriers

DOCUMENT PROGRAM HISTORY

Tell the history of the initiative from beginning to end, including key activities and any changes in the market.

DEVELOP AN EVALUATION PLAN FOR LTMT

Propose a high-level and realistic evaluation plan, including diffusion indicators.

Manufactured Homes Transition MPER

Anu Teja

Sr. MRE Scientist

03/06/2024

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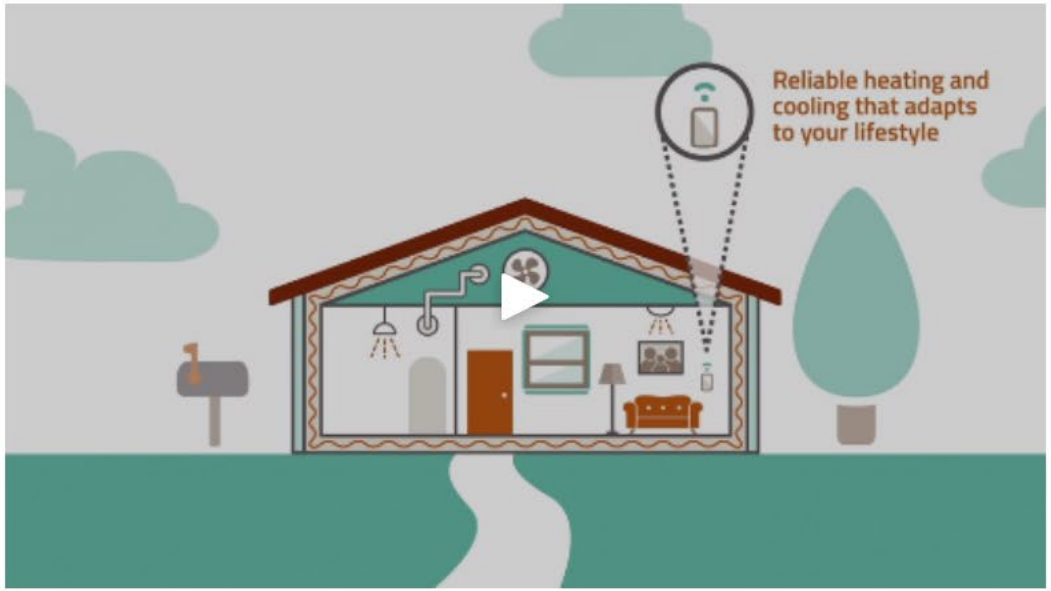
What is a NEEM+ Home?

MAKE YOUR MANUFACTURED HOME THE MOST ENERGY EFFICIENT YOU CAN BUY.



WHAT MAKES THESE ENERGY SAVING HOMES DIFFERENT? HERE ARE A FEW OF THEIR INNOVATIVE FEATURES:

- Careful sealing of all connections
- Added floor, ceiling, and wall insulation
- High-performing upgraded windows
- LED bulbs in every fixture
- Ultra-efficient, silent ventilation system
- Flashing and house-wrap
- Smart Thermostat for cooling/heating control

NEEA's Manufactured Homes Program

The program has supported the Northwest Energy Efficient Manufactured Housing Program (NEEM)+ specification, developed by Northwest Energy Works since 2014.

2016
Program starts up

2019
RPAC decides to continue for another year before making any decisions to exit market & MPER #1 results

2021-2022
MPER #1 highlights programs achievements, downsizing of program

2023
T- MPER launches
Lens on achievements
potential MPIs to track LTMT

2024
Results posted
With recommendations

MPER #1 & T-MPER completed by Apex Analytics, LLC

The Role of a T-MPER in the Initiative Life Cycle?

Research Objectives

Research Objectives

- Confirm that NEEM Program remains viable without NEEA's intervention
- Summarize the programs Narrative from inception to the present day.
- Track key Market Progress Indicators (MPIs)
- Recommend viable approaches for conducting Long Term Monitoring and Tracking (LTMT) efforts

Research Approach

Activity	# of Respondents	Details
Staff interviews & document review	5	• Current NEEA staff • Former NEEA staff • Northwest Energy Works staff
Regional program administrator interviews	4	• Efficiency program administrators in the Northwest offering end-user and/or retailer incentives for NEEM+
Manufacturer Interviews	5	• NEEM+ manufacturers (3) • Others in regional familar but not building (2)
Retailer interviews	18	• Retailers selling NEEM+ homes (15) • Retailers not selling NEEM+ homes (3)

Research Findings

Key Takeaways

What did we learn?

- NEEM+ market share is low, but stable
  - Retailers & manufacturers see it as a niche offering
  - They don’t plan to reduce or eliminate NEEM+ offerings
  - But unlikely to significantly increase its production

Program successfully met assessed MPIs

MPI	Status	Detail
Manufacturers can build to NEEM+ specification	Met	No technical challenges cited among the 3 manufacturers offered NEEM+ homes
Incented incremental cost of NEEM+ homes is less than 5% over comparable homes	Met	On average the incremental cost homes ranged from $1,200-$6,000. Estimated this to be 2-4% of the total cost of the home.
MH retailers increase sales of NEEM+ homes	Met	Most retailers that offered NEEM+ homes (six respondents) report increase in sales.
Factory trainings in NEEM+ home construction are held & test homes are built	Met	Northwest Energy Works staff still providing advice & training, that manufacturers value.

Future Diffusion Indicators: Meaningful Efficiency Specifications

Proposed Indicator

Manufacturers & retailers offer homes meeting efficiency specification that provide whole home energy savings of at least 10% over current practice in the region

Rationale

- Goal is to drive home efficiency by differentiating the most efficient homes
- To get here, the spec must be a meaningful improvement over the less efficient alternative
- Currently energy benefits of NEEM+, ENERGY STAR V3, & ZERH are not immediately clear

Approach

Need to determine:
What is the less efficient alternative and how does energy use compare to homes meeting efficiency specs?

Future Diffusion Indicators: Viability of Specifications

Proposed Indicator

- Market share of qualified homes remains steady or increases
- At least 3 manufacturers offer qualified homes
- Sales of qualified homes is geographically distributed

Rationale

- Indicates consumer demand & likelihood that mfrs will continue to offer them
- Reduces the reliance on just a single mfr so there is availability of homes
- Demonstrates broader demand for qualified homes, not driven by codes and/or rebates

Approach

Gather data on home sales from various sources:

- Northwest Energy Works EPA
- Sawtooth Mountain Research
- State data
- MHI

Conclusions & Recommendations

Conclusion #1: NEEM program position is stable in the near term.

- NEEA should continue to monitor the MH market as ENERGY STAR specification takes effect in 2026, and Federal standard in 2025.

Conclusion #2: Revising ENERGY STAR V3 specification to allow NEEM+ homes to participate w/out additional major upgrades outside the factory can enable NEEM more visibility.

- NEEA & Energy Works Northwest continues to w/EPA to support ENERGY STAR V3 specification allowing NEEM+ to participate w/out heat pump installation.

Conclusions & Recommendations

- **Conclusion #3: Need further research to determine extent to which specifications drives manufactured homes efficiency in the region.**
  - Take the opportunity to partner w/ RTF to conduct an analysis to assess the relative energy savings between NEEM+ homes & less efficient homes.
  - Also consider assessing typical installation practices.

The Road Ahead

- Waiting on ENERGY STAR V3 & Federal Standard.
- Further discussion at next RPAC meeting in Q2 2024.
- Preparing Program's response to T-MPER.

Codes Market Progress Evaluation Report (MPER) #2

Meghan Bean, Sr. Market Research & Evaluation Scientist

NEEA Cost Effectiveness & Evaluation Advisory Committee

March 6, 2024

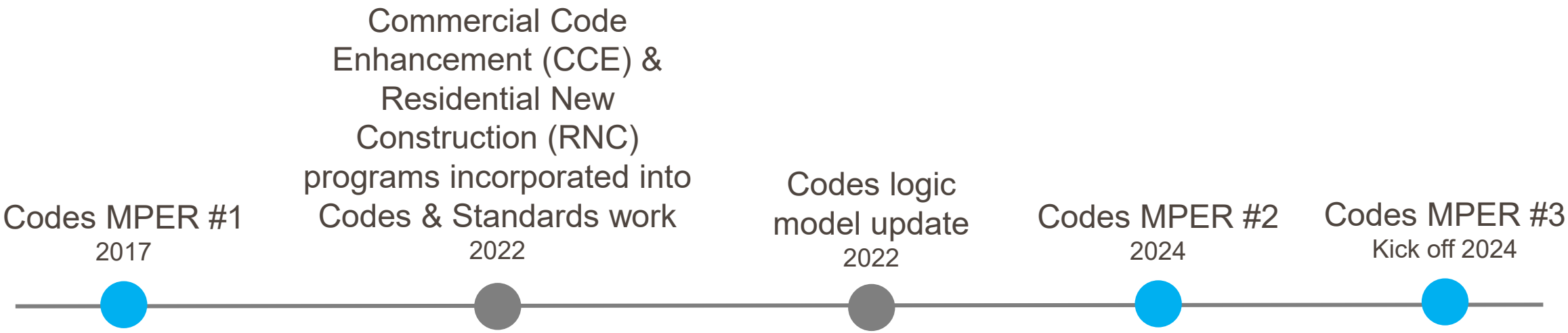
NEEA's Codes Team

- NEEA's codes work advances building efficiency in the Northwest and is a key strategy of NEEA MT programs to "locks in" savings

- The Codes team supports regional stakeholders through:
  - Energy code development and adoption
  - Training and education
  - Implementation support

- The Codes team's work follows a logic model, but operates differently from a traditional NEEA market transformation program

NEEA Codes MPER Timeline



Codes MPER #2 Research Objectives

ADM ENERGY RESEARCH AND EVALUATION

Johnson Consulting Group
Analysis That Makes Sense

- Propose and assess progress indicators for NEEA's code development and adoption influence work
- Propose and assess progress indicators for NEEA's code training & education work
- Assess logic, clarity, and evaluability of updated Codes logic model

Code Development and Adoption Influence Assessment Findings

Recent NEEA Code Activities by State

- **International Energy Conservation Code (IECC):** Participation on code committees, code proposals
- **Idaho**: Support for Association of Idaho Cities and Integrated Design Lab, IECC work
- **Montana:** Outreach and compliance support efforts, IECC work
- **Oregon:** Stakeholder engagement, code proposals, technical assistance to market actors
- **Washington:** Participation on code committees, code proposals, technical assistance to market actors, financial support for others' research and proposals, IECC work

Code Influence Assessment Methodology

- Review of program documents
- NEEA staff interviews (4)
- Market actor interviews (19)

Code Influence Assessment Findings

- NEEA adapts its strategy to each state's code landscape and the individual code cycle
- NEEA's activities and influence vary by state
- Region-wide, quantitative progress indicators will not adequately capture NEEA's influence

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Code Influence Assessment Findings

- NEEA's proposals and the proposals it funds have notable influence on energy codes in the region
- NEEA successfully engages in each state's public process to increase or maintain stringency of energy codes
- NEEA's work fills gaps not met by other organizations

Barriers to Advancing Stringency of Energy Codes

- Energy codes are complex and will become more so over time – more stringent codes requires more complex code

- Code processes are increasingly contentious across all Northwest states and at the national level
  - Less consensus
  - More participants representing more different interests

Code Influence Conclusion & Recommendations

- **Conclusion:** NEEA is: 1) filling gaps in each state's energy code process, and 2) contributing to a more robust energy code regionally and nationally by:
  - Funding and disseminating nationally respected data and research
  - Participating in and contributing to energy code groups and organizations
  - Cross-pollinating energy code change ideas across the region and at the national level

- **Recommendations:** Continue to…
  - Look for ways to fill gaps within each state's energy code process
  - Develop and support energy code proposals
  - Develop, support, and share data-driven and vetted research

Training & Education Assessment Findings

NEEA-Supported Training & Education Activities

- Trainings
- Technical assistance hotlines
- Circuit rider
- Washington compliance web tool
- BetterBuiltNW & BetterBricks

Training & Education Assessment Methodology

- Review of program documents
- NEEA staff interviews (5)
- Trainer/implementer interviews (15)
- Trainee survey (205)

Training & Education Assessment Findings

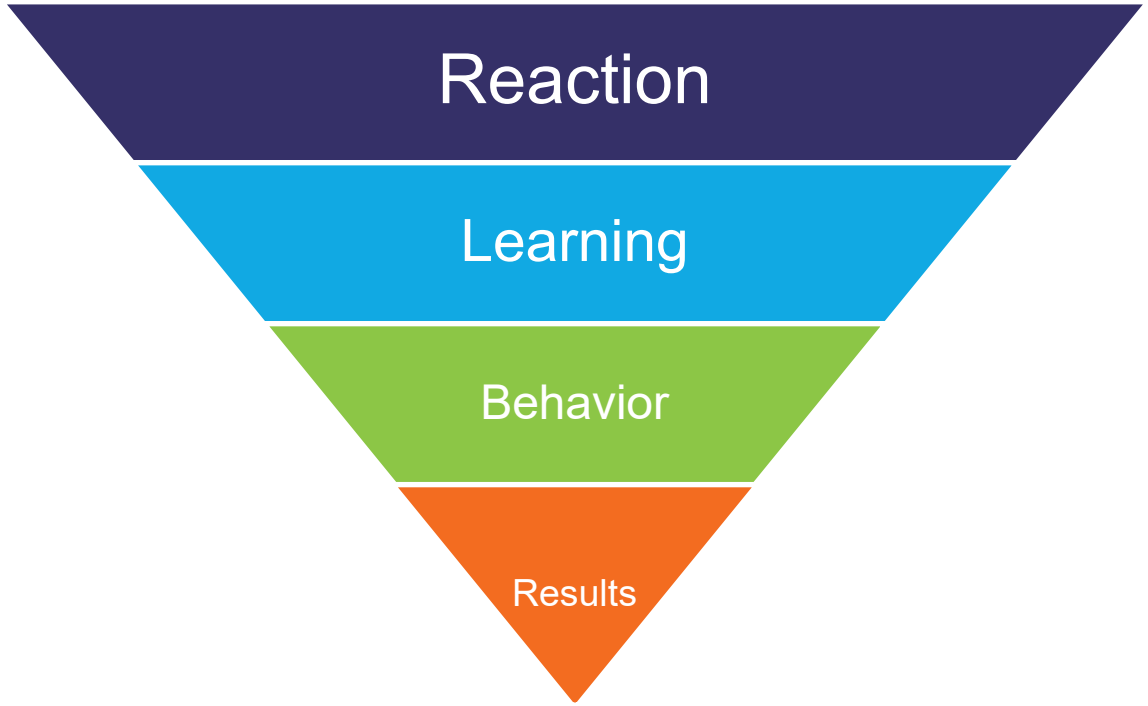
The training components of the logic model can be assessed using progress indicators

Example Progress Indicators

Logic Model Outcome	Progress Indicators
Market actors (builders, manufacturers, supply chain) understand code requirements	% of market actors indicating NEEA-supported trainings **increased understanding** of code requirements
	% of market actors indicating NEEA-supported trainings helped them **implement new strategies** for working with energy code
	% of market actors indicating they are **sharing information** from NEEA-supported trainings with colleagues

Training Assessment Findings

- Most training participants are experienced with energy code, with over half having been in the field for over 10 years
- 30% of trainees report that trainings increased their **understanding** of code
- 70% report **sharing information** with colleagues and **advocating for energy savings policies**



The Kirkpatrick Model for Training Evaluation

Education Assessment Findings

- NEEA education tools both support the market and provide valuable insight to NEEA
- Technical assistance hotlines
  - Support market actors by providing reliable information about codes
  - Inform code influence activities by identifying code elements that are confusing/complex
- Washington compliance web tool
  - Helps commercial builders comply with code
  - Informs NEEA about adoption of new products and provides insight into the market's response to code
- NEEA research and resources, including code compliance evaluations, filter out to code officials, building councils, and partners to support compliance and the development of new codes

Training & Education Assessment Conclusions

- Trainees generally reported high satisfaction with NEEA-supported trainings, and most trainees reported that training influenced at least one aspect of their knowledge, behavior, and/or attitudes

- NEEA would benefit from more regular feedback on trainings

- Data from technical assistance hotlines could be used to inform NEEA about training topics to deploy, code language that could be improved, and general understanding of code among market actors

Training & Education Assessment Recommendations

- Develop a standardized post-training survey that provides more regular feedback on:
  - The influence of the training on trainee attitudes and behavior
  - Trainee satisfaction
  - Additional topics of interest to trainees

- Develop more in-person trainings that would enable opportunities for market actors to interact with and learn from peers and trainers

- Develop a more systematic approach for logging data from technical assistance hotlines

Logic Model Assessment Findings

Logic Model Assessment Findings & Recommendations

- The logic model captures NEEA's activities, outputs, and outcomes for training & education efforts

  Minor edits recommended

- The logic model does not fully capture NEEA's logic for or outcomes of energy code development work

  Recommend updates to better capture NEEA's adaptability in the face of:

  - *Policy differences by state*
  - *Process differences by state*
  - *Code cycle differences*
  - *Ability to identify and fill gaps*

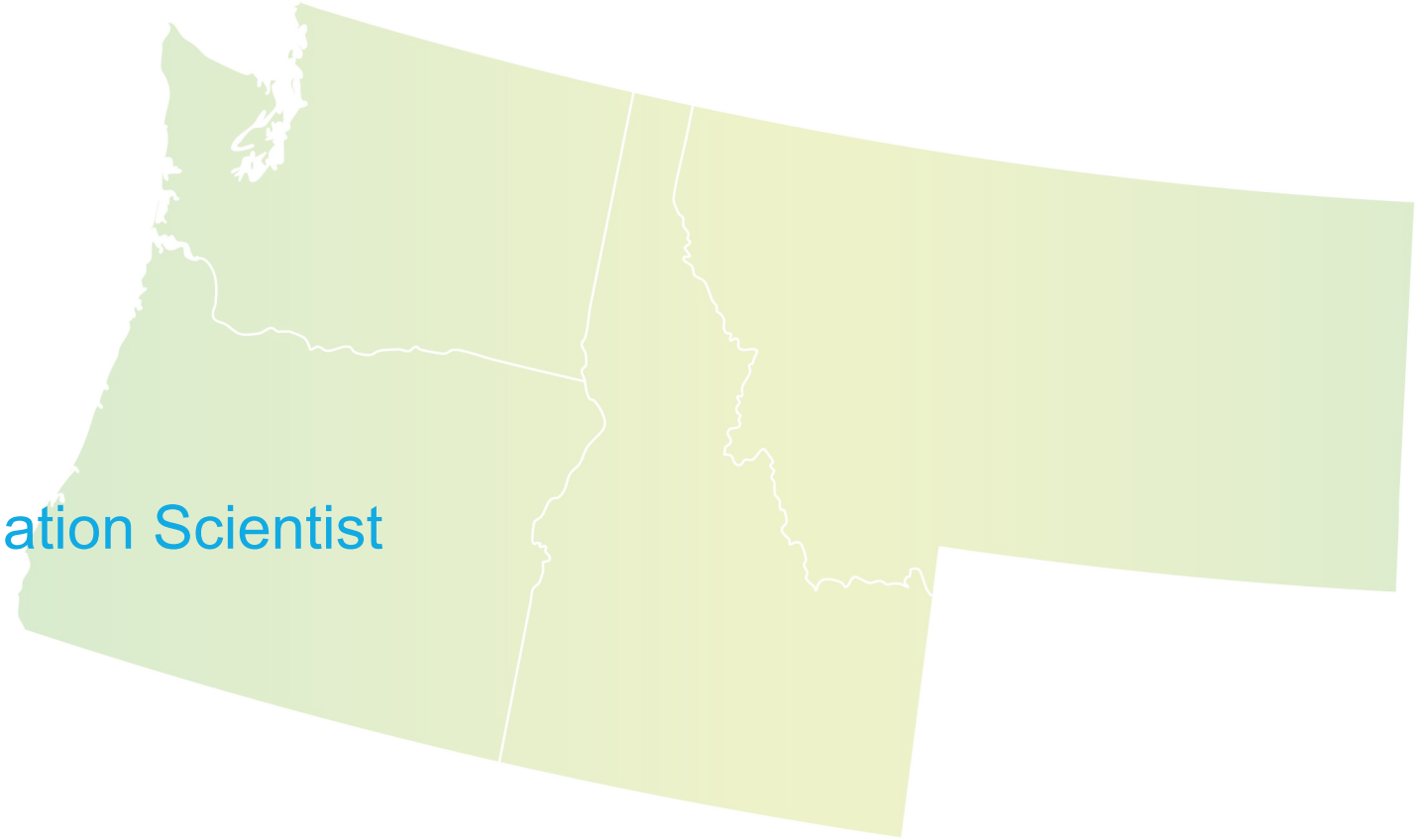
Next Steps

Next Steps

- Codes MPER #2 report publicly available late Q1 2024
- Codes MPER #3 kick off Q3 2024

Meghan Bean

Sr. Market Research & Evaluation Scientist
mbean@neea.org



BREAK

Key Inputs and Assumption Updates

Key Assumptions and Inputs Updates

- **CEAC Charter Responsibility to Review and Advise Regarding:**
  - NEEA **cost-effectiveness and savings information** to inform annual reporting
  - Market transformation **cost and savings measurement and estimation methods**
- **Intention of Quarterly Updates:**
  - Facilitate a focused review of items that are new or changing
  - Implementing improvements in 2024 to improve committee experience
- **Q1 Topics:**
  - Carbon values for gas avoided costs
  - Efficient RTUs – various updates

System of Documentation

Funder Portal on NEEA.org (updated annually or as needed)

Data sources and estimation approaches
- All key inputs for programs reporting savings
- Savings rate, market size, incremental cost, measure life, baseline, tracked units, etc.

Cost effectiveness inputs
- All ProCost inputs for programs in Mkt Dev

UEC Methodology Documents
- Detailed description of energy consumption calculations for all measures
- Includes formulas, data sources, and technical assumptions)

Other
- Operational Guidelines
- Codes and standards evaluations

Individual Funder Reports (1-2x per year, customized)

Memo
- Summary of results and variances from prior reports
- Other important portfolio and market progress updates

Spreadsheet
- Customized, but all contain in some format:
  - Savings value and variance summary
  - Methodology descriptions
  - Measure-level units and savings values (funder share or service territory portion)
  - Measure-level assumptions and sources specific to that report

CEAC Meeting Materials (Quarterly)

Quarterly Key Assumption Update
- Summary for each program with material updates that impact key model input categories
- Contact information of analyst

Memos as needed
- For more involved methodology changes and areas where we are specifically engaging the committee for input

Natural Gas Avoided Carbon Emissions Update

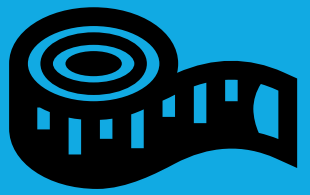
Evan Hatteberg

Market Analyst, NEEA

March 6th, 2024

Background

- To more accurately evaluate the cost-effectiveness of NEEA's natural gas portfolio, we are adding emissions benefits to ProCost Natural Gas Calculations.
- This is consistent with our cost-effectiveness guidelines presented to CEAC in March 2023.
- Council staff provided review and input on NEEA's modifications to the ProCost tool for our regional cost-effectiveness.



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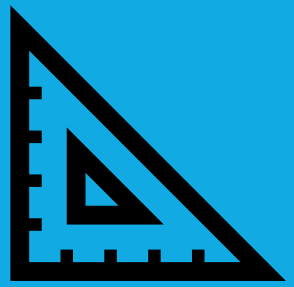
Emissions Benefit Components

- Avoided Costs ($/ton of CO_2e)
  - Social Cost of Carbon from 2021 Power Plan
- Emission Factors (lbs/therm saved)
  - CO_2 from combustion
  - CO_2e from upstream methane (CH_4) losses



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Emissions Factors

- CO_2 From Combustion
  - **11.7** lbs per Therm (EPA Estimate)
- CO_2e from upstream CH_4 losses
  - 0.055 lbs of CH_4 lost per Therm (NWPCC loss rate)
  - 29.8 100-year Global Warming Potential of CH_4 (IPCC)
  - **1.65** lbs CO_2e from upstream losses per Therm
- Total CO_2e per Therm
  - **13.34** pounds per Therm

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Efficient Gas Rooftop Units: Key Input Updates

Aaron Ingle

Sr. Market Analyst, NEEA

March 6, 2024

Efficient RTUs Program

Aims to transform the **commercial HVAC** market through improving the efficiency of **gas**-fired rooftop units (RTUs), by

1) making efficient options available in the competitive **replacement market**, and

2) with a **federal standard** that requires at least 20% more efficient RTUs than the 2020 market average.

Efficient RTU System Requirements

Tier	Prescriptive Path	Performance Path
Tier 1	Shell measures (2” insulation and low-leakage dampers)	0.65 >= $TCOP_{HS}$ (Thermal Coefficient of Performance – Heating Season)
Tier 2 CGF	A condensing gas furnace (CGF) together with Tier 1 measures	0.80 >= $TCOP_{HS}$ (Thermal Coefficient of Performance – Heating Season)
Tier 2 ERV	An energy recovery ventilator (ERV) together with Tier 1 measures	

For details see: https://betterbricks.com/resources/efficient-gas-rtus-system-requirements-compliant-equipment

Background

Program Review to Date:

- Third-party review of Natural Market Baseline and Key Assumptions* completed in Q3 2022
- Last presented to CEAC in Q3 2022
- Program entered Market Development in Q4 2022

This Review:

- Updates key inputs affecting **savings rates** and **cost-effectiveness**
- Does not change methodology or key assumptions reviewed in 2022.

*Cadmus Group (2022). https://neea.org/img/documents/Review-of-Baseline-and-Key-Assumptions-for-Efficient-RTUs.pdf

Key Input Updates

Update	Rationale	Impact to UESs?	Impact to BCRs?
Addition of 1-Floor Medium Office model to portfolio	Improves model portfolio representation of the applicable building stock	☑	☑
Correction of ERV fan electricity use in all models	Improves model representation of technology	☑	☑
Updates to climate zone weights	Improves representation of NEEA's gas funding territory	☑	☑
Updates to tier weights	Reflects program's current expectations of relative contributions of tiers to 20-year (forecast) total program savings		☑
Updated incremental cost inputs based on updated input data and calculations	Reflects updated incremental cost estimates and calculations		☑
Used updated ProCost including updates to gas calculations for avoided cost of carbon	Reflects NEEA's cost effectiveness policy		☑

Savings Rate Update

Unit energy savings (UES) relative to a gas RTU meeting federal minimum efficiency standards:

	Previous Savings Rate (Therms/sqft)	Updated Savings Rate (Therms/sqft)	Change (%)
Tier 1	0.016	0.016	**0%**
Tier 2 CGF	0.055	0.053	**-3%**
Tier 2 ERV	0.119	0.110	**-8%**

Updated Benefit-cost ratio results

Total Program BCR: 1.1
Previous estimate: 1.0

	Component	BCR
Tier	Tier 1	1.1
	Tier 2 (CGF / ERV)	1.2
Modeled Building Type	Grocery	1.2
	Retail	1.0
	Strip Mall	1.5
	1 Floor Medium Office	1.3
Heating Zone	Heating Zone 1	1.1
	Heating Zone 2	1.5
	Heating Zone 3	1.9

Note: NEEA uses the Total Resource Cost (TRC) perspective for cost-effectiveness analysis

Next Steps and Tracking Update

- Cost-Effectiveness
  - Performance path - what equipment meets spec in practice?
  - Additional incremental cost data points throughout
- Market Tracking Update
  - **In short term, program has limited visibility to efficient RTU sales**
  - Primary strategy for identifying efficient rooftop units is through HVAC sales data collection
    - **Distributor** HVAC sales data to date haven't provided visibility to efficient RTU sales
    - Also note that the distributor sales data are on a lag, so 2023 data aren't available until after Q1 savings reports
  - Recent early success with **manufacturer's reps** – currently the main channel for efficient RTUs
  - Working on a **commercial HVAC tracking system** to identify efficient installations through construction and building permit records – to supplement sales data

Questions?

State Energy Code Assessment Introduction to Codes and Standards at NEEA

NEEA's approach to influencing state energy codes and standards and the current approach of evaluating of market transformation programs

CEAC

March 6, 2024

Mark Rehley, Meghan Bean and Susan Hermenet

Recommendations with minimal impact on NEEA operational costs

Rec. #	Description	NEEA Response
#1	Request NEEA to report annual savings via service territory methodology.	Standard offering since 2010, at the request of a funder.
#2	Request that annual savings reports include estimates of administrative costs, incentive costs, and non-incentive costs by service territory.	Impact on labor cost to produce cost estimates specific to Idaho.
#4	Track progress for each code change relative to administrative dollars spent towards state level codes and associated energy savings accrued by each state-level code.	Impact on labor cost to produce report specific to Idaho.
#5	Detail measure-level values as accurately as possible, and that each field is completed in the workbook to allow for year-over-year tracking of regional units, baseline units, retirement units and unit energy savings over time.	This is NEEA's current practice.
#6	~~NEEA to distribute naturally occurring baseline units more equitably between local program units and total regional units. (Evaluator rescinded in June addendum)~~	This is NEEA's current practice.
#8	Complete third-party influence evaluations for all federal standards claimed by NEEA, as well as any future standards in which NEEA hopes to claim savings for the future. Using quantitative estimate of influence calculate a naturally occurring baseline for each standard.	This is NEEA's current practice.

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.

CEAC Process & Timeline

Date	Topics
Q4 2023 Nov. 30.	Provide background and process. COMPLETE
Q1 2024 March 6	**Provide an overview of the work NEEA does to influence state energy codes, including how it compares to its work in influencing federal standards.** **Provide current state of evaluation approaches used to evaluate state energy codes, federal appliance standards work, and other federal standards work.**
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Today's Agenda

- Outcome:
  - Provide context of the current state of evaluation approaches NEEA utilizes for CEAC members individually and collectively to understand the situation and background. This provides the foundation from which any potential changes would be made.

NEEA Codes and Standards Introduction

- Provide an overview of the work that NEEA does to influence state energy codes and compare to its work in influencing federal standards.
- Objective: For information purposes.

Mark Rehley

Codes & Standards Overview

Codes and Standards

Codes = Buildings

Standards = Appliances / Equipment

What do codes and standards cover?

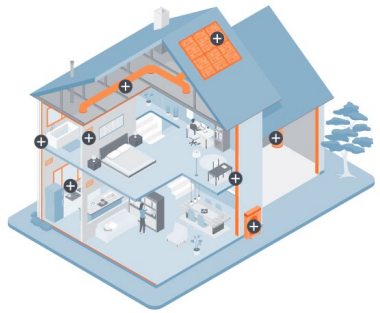
Codes

- Envelope
- Mechanical Systems
- Service Water Heating
- Power and Lighting

Standards

- Consumer Products
- Commercial and Industrial Products
- Lighting Products
- Plumbing Products
- Other

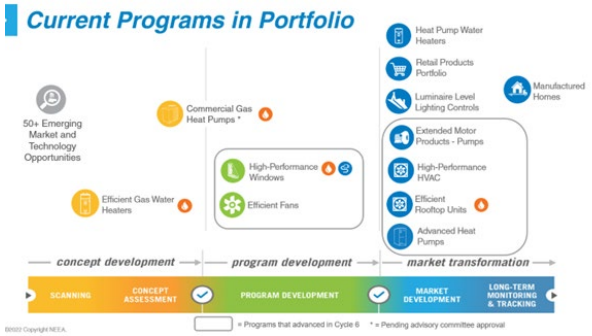
Market Transformation with Codes and Standards



Market Transformation Programs

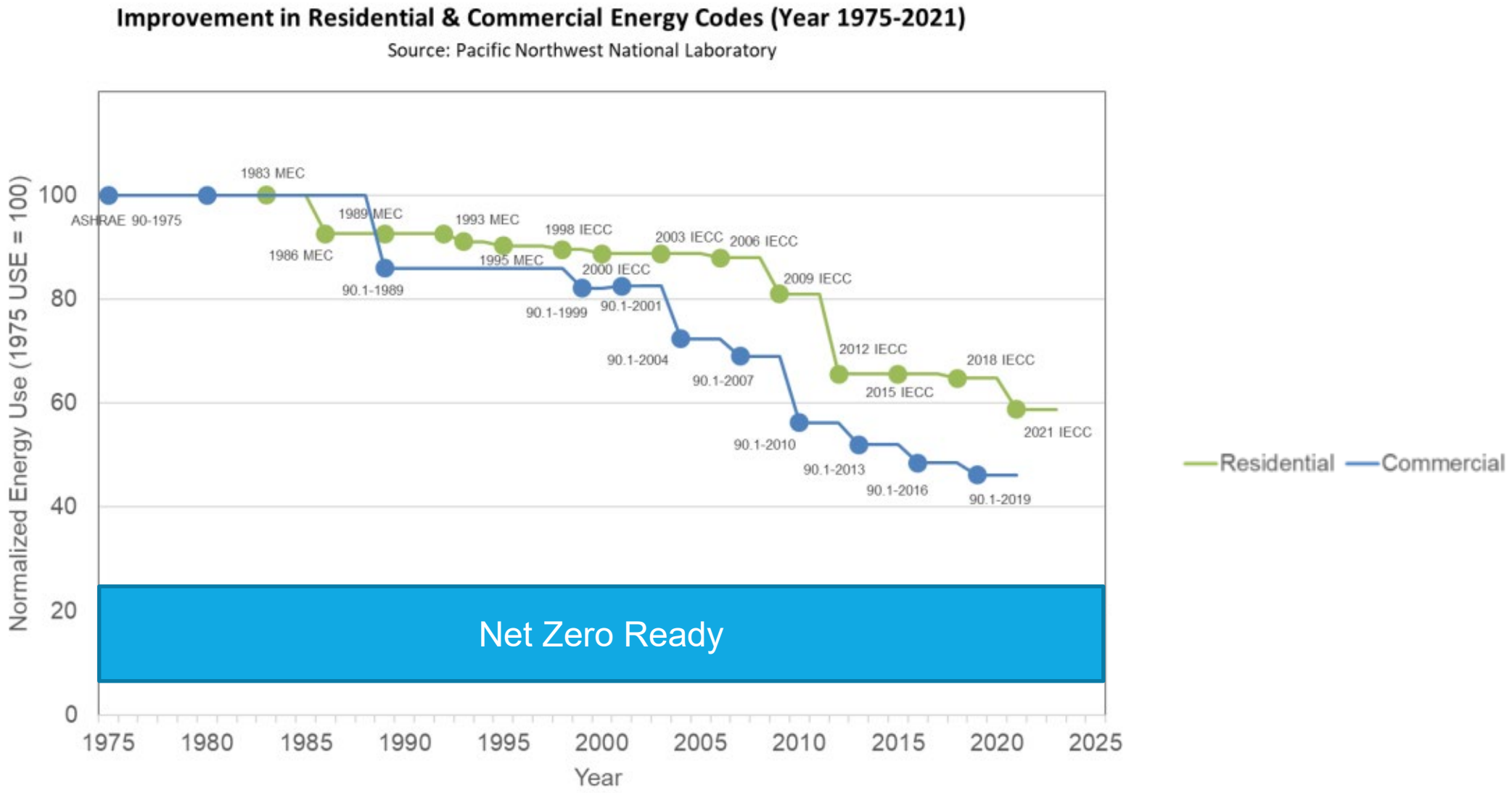
Training & Tracking

Rulemaking Process

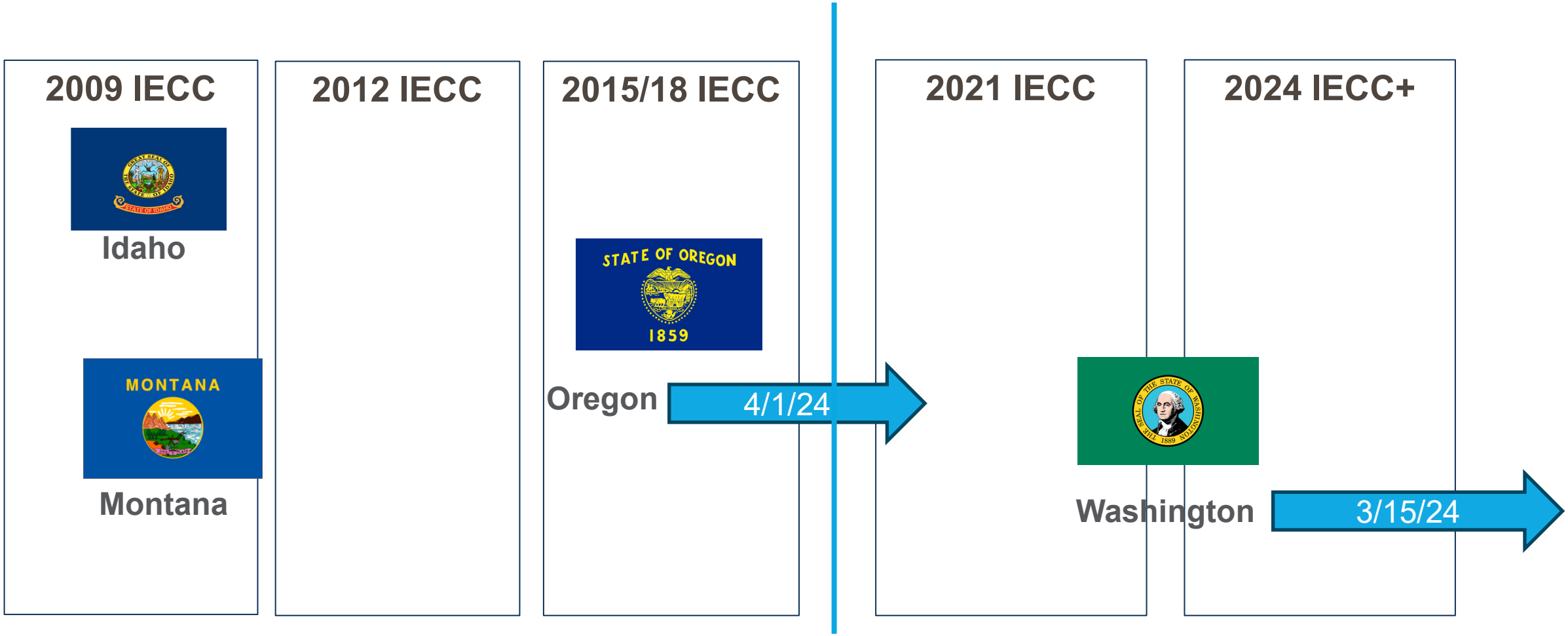


Current Codes

History of National Energy Code



Residential Energy Code: Relative Efficiency of Current and Future Codes



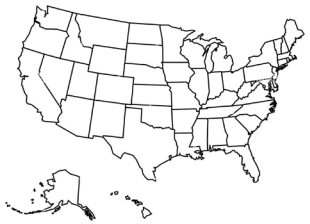
Based on DOE analysis of International Energy Conservation Code (IECC) and state codes with amendments

Commercial Energy Code: Relative Efficiency of Current and Future Codes

2012 IECC (90.1-2010)	2015 IECC (90.1-2013)	2018 IECC (90.1-2016)	2021 IECC (90.1-2019)	2024 IECC+ (90.1-2022+)
	Idaho		Montana Oregon	7/1/24 Washington 3/15/24

Based on DOE analysis of International Energy Conservation Code (IECC) and state codes with amendments

Levels of Government Regulation



Federal

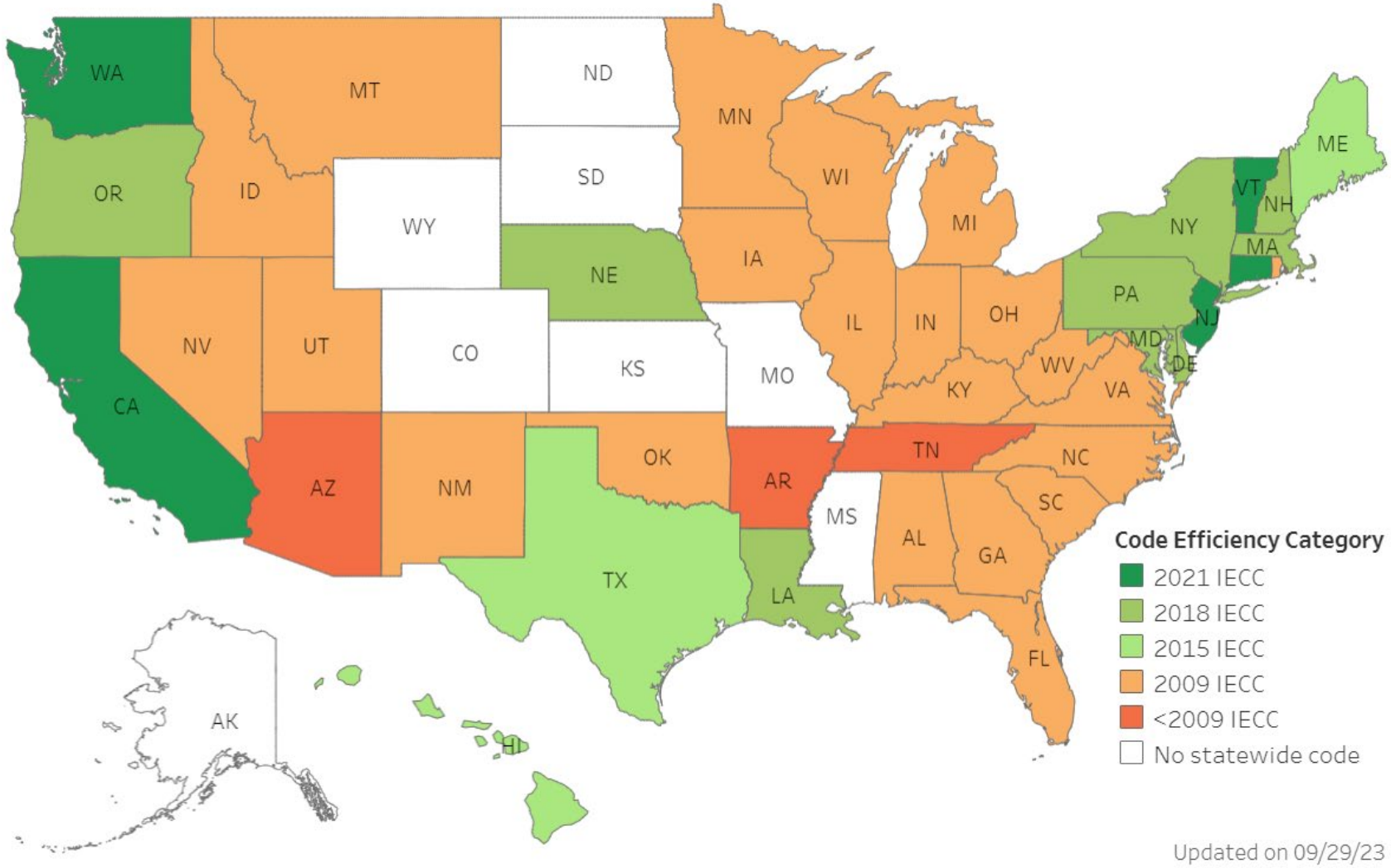
State

City of Seattle

Local

Code	IECC – A Member of the International Code Family	SBCC Washington State Building Code Council	Seattle Building Code
Standards	Department of Energy – United States of America	Washington State Department of Commerce	

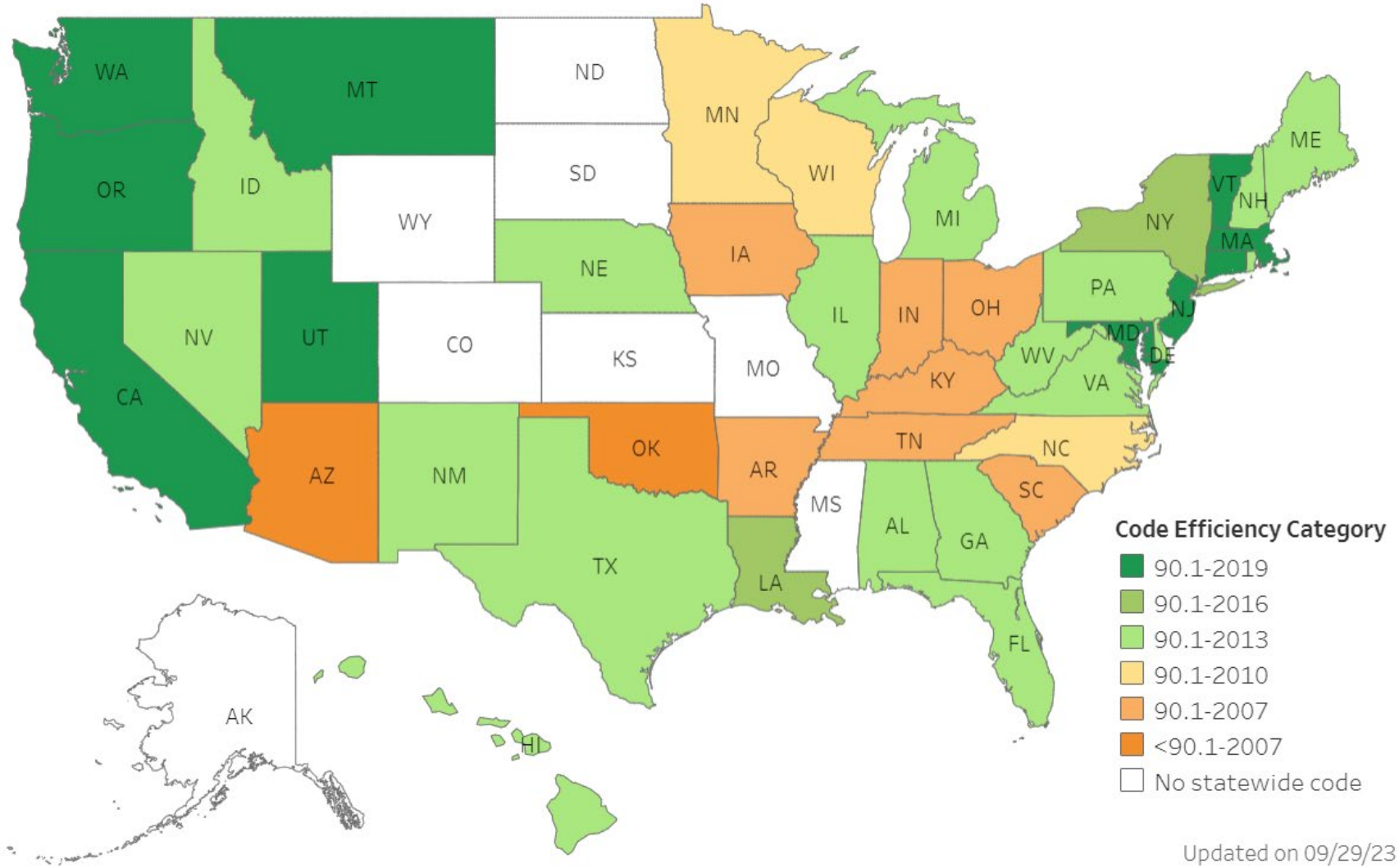
Residential State Codes



https://www.energycodes.gov/state-portal

 |

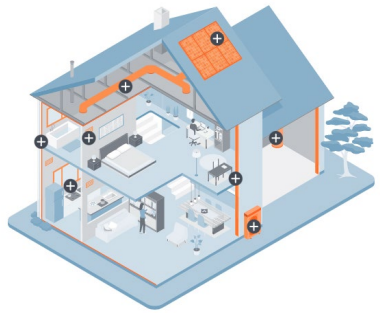
Commercial State Codes



https://www.energycodes.gov/state-portal

Code Process

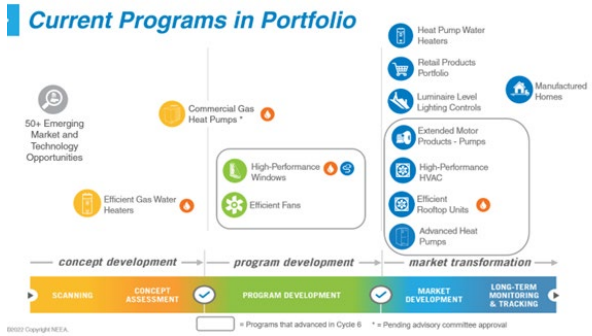
Codes, Standards, and Market Transformation



Market Development Programs

Rulemaking Process

Training & Tracking



Market Development & Data Collection

Market Development

50+ Emerging Market and Technology Opportunities

Efficient Gas Water Heaters

Commercial Gas Heat Pumps

High-Performance Windows

Efficient Fans

Heat Pump Water Heaters

Retail Products Portfolio

Luminaire Level Lighting Controls

Extended Motor Products - Pumps

High-Performance HVAC

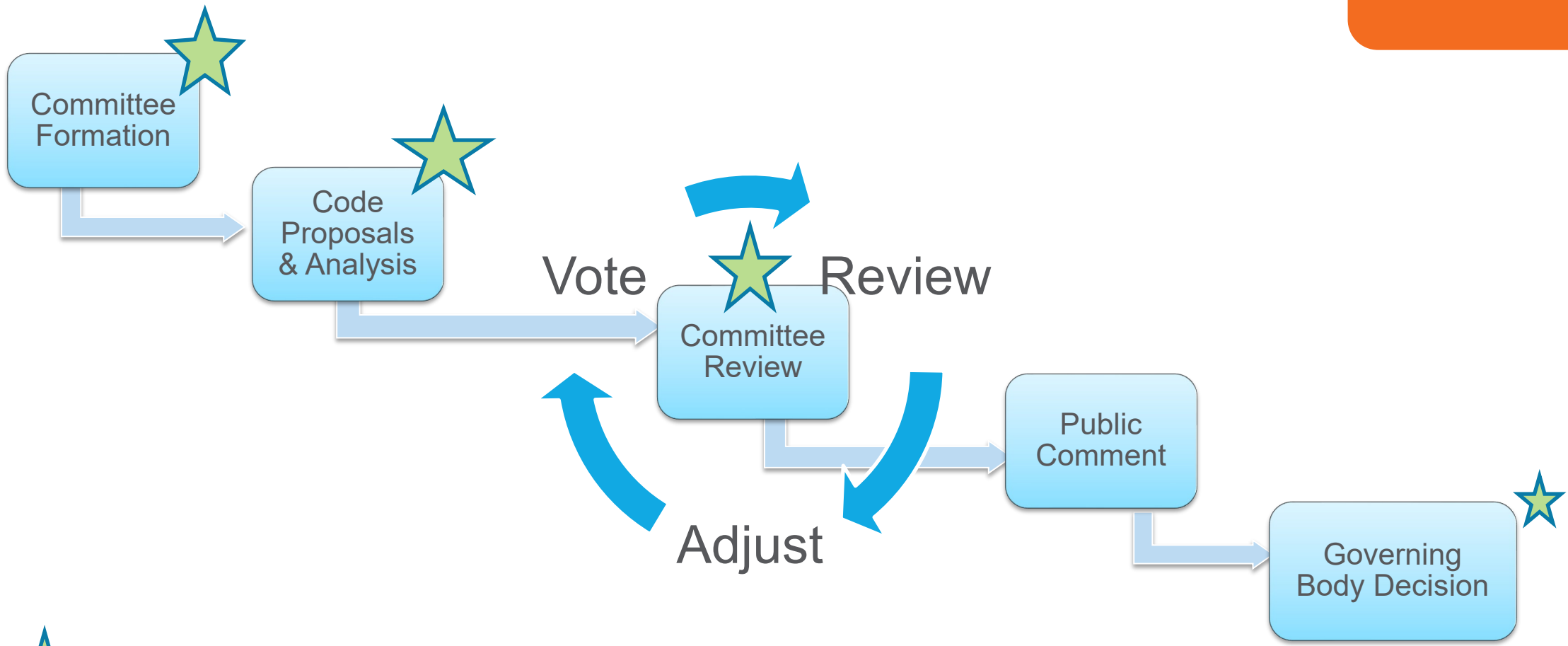
Efficient Rooftop Units

Advanced Heat Pumps

Manufactured Homes

Basic Code Development Process

Rulemaking Process



Areas NEEA works to influence

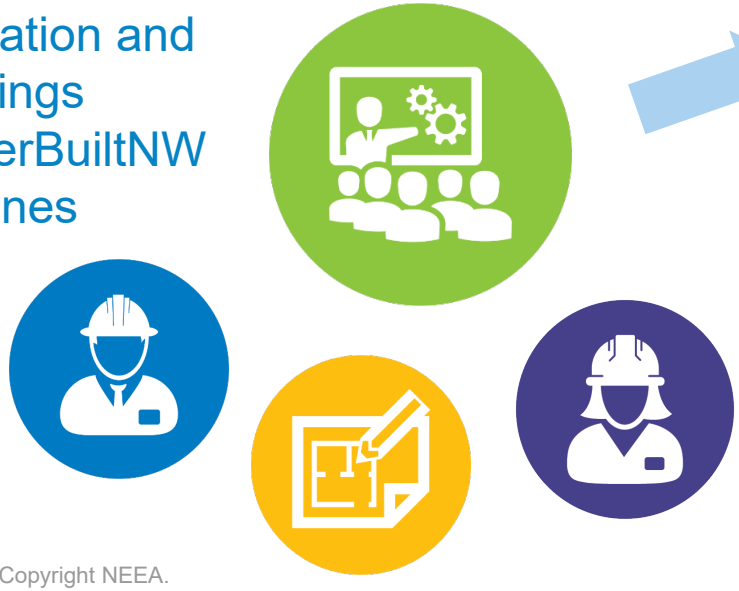
Market Support – Training and Tracking

Training & Tracking

Code Evaluations and Market Research

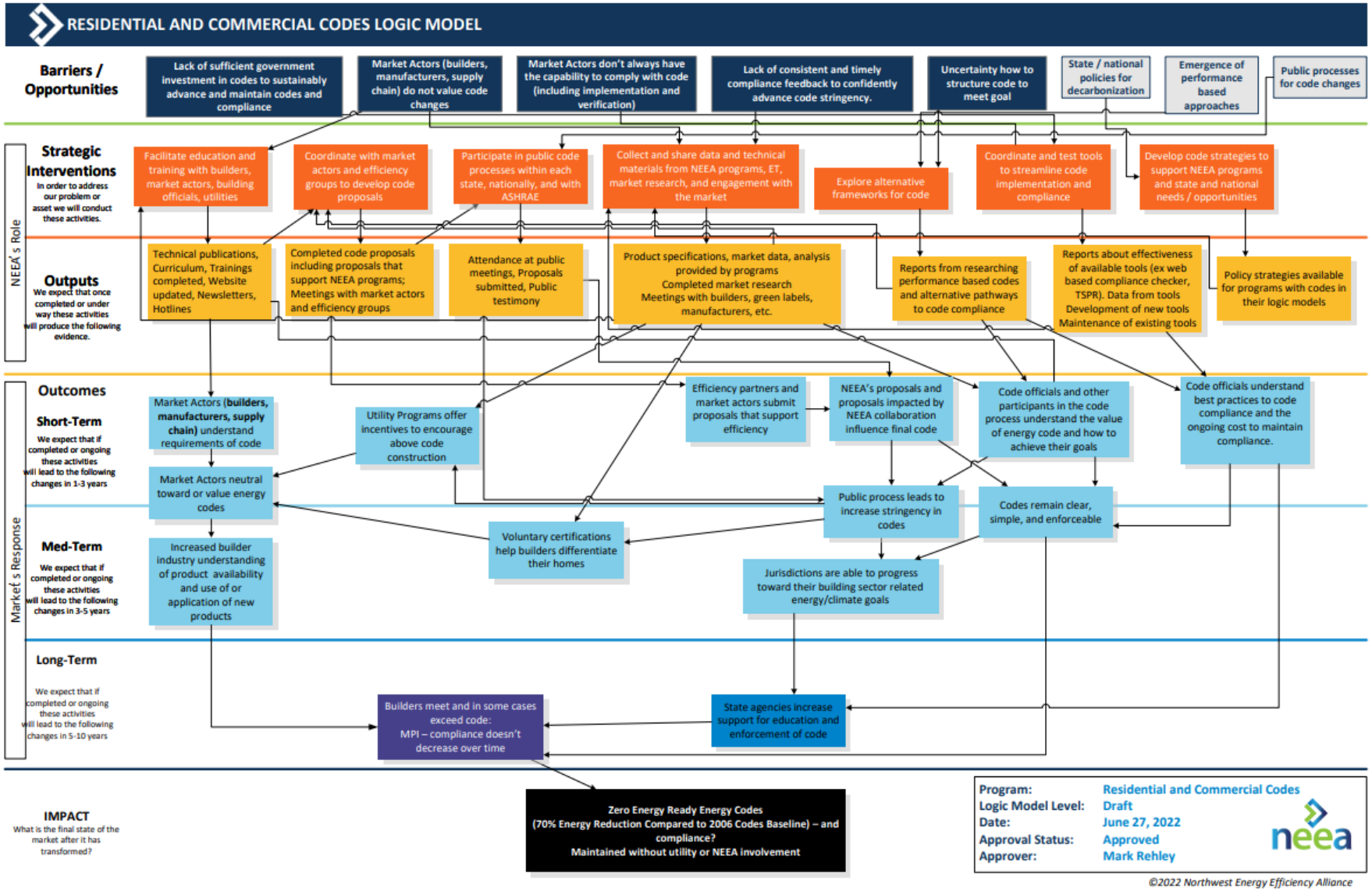
Certification, Compliance tools and Databases

Education and Trainings
-BetterBuiltNW
-Hotlines



Code and technology support

Codes Logic Model

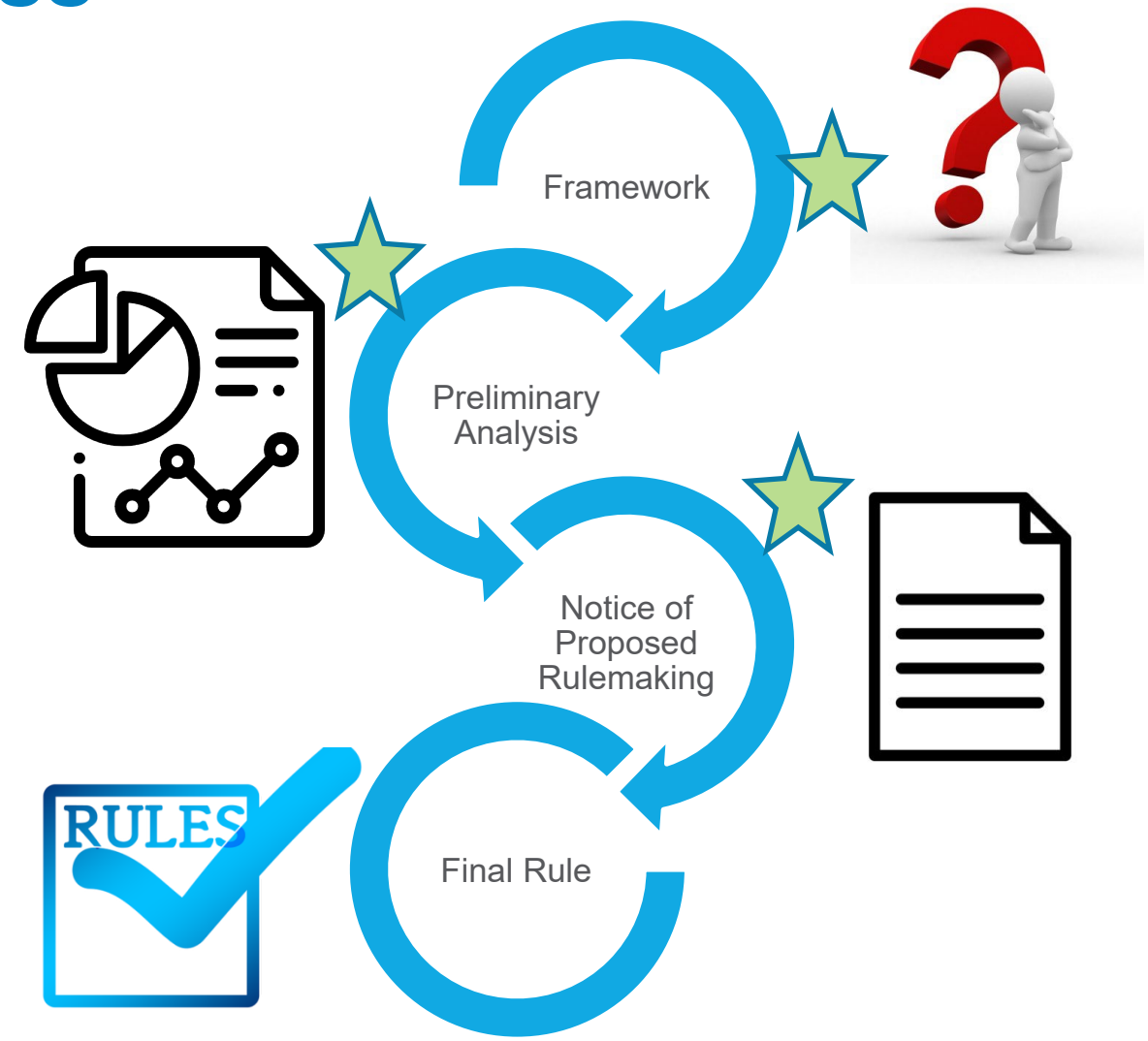


Standards Process

Federal Standards Process

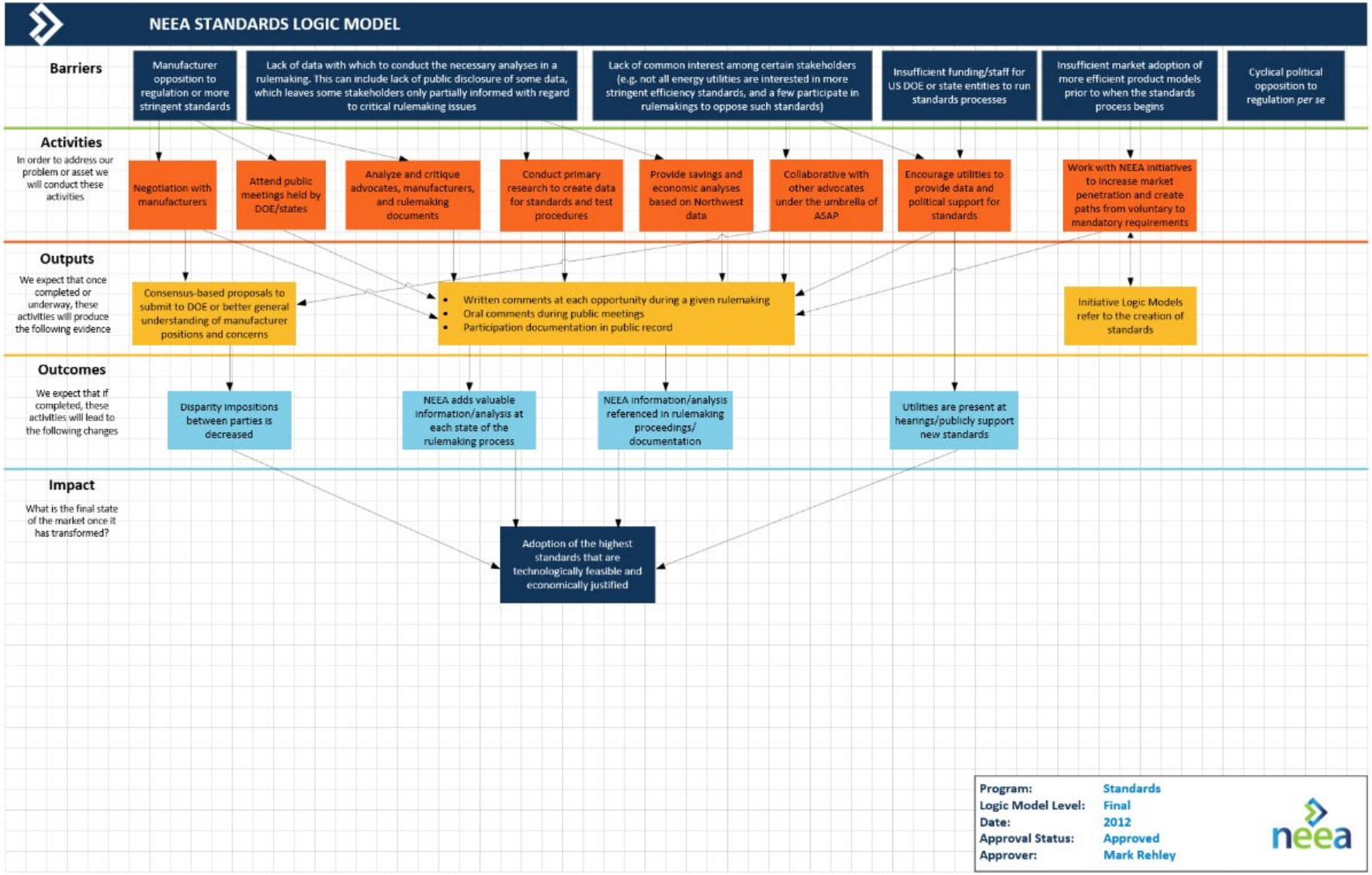
Rulemaking Process

- Four Phase Process
- Components
  - Test Methods
  - Energy Conservation Standards



Areas NEEA works to influence

Standards Logic Model



Examples

Product Examples

Standards

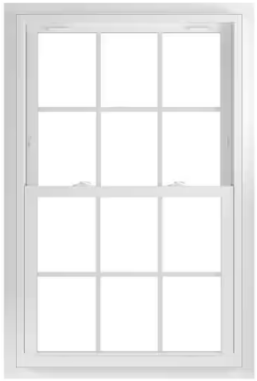
- Stand alone products

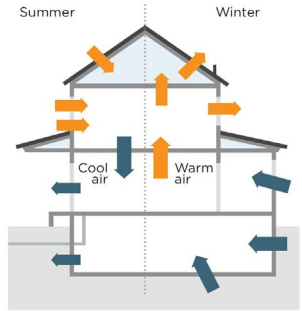
Codes and Standards

- Controls
- Sizing
- Installation Practices

Codes

- System performance
- Installation Practices





Portfolio

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Efficient Fans

Heat Pump Water Heaters

Retail Products Portfolio

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Manufactured Homes

Extended Motor Products - Pumps

High-Performance HVAC

Efficient Rooftop Units

Advanced Heat Pumps

Provide current state of evaluation approaches used to evaluate state energy codes, federal appliance standards work, and other federal standards work, including rationale, cadence and estimated costs.

For Information Purposes

Meghan Bean and Susan Hermenet

Definitions

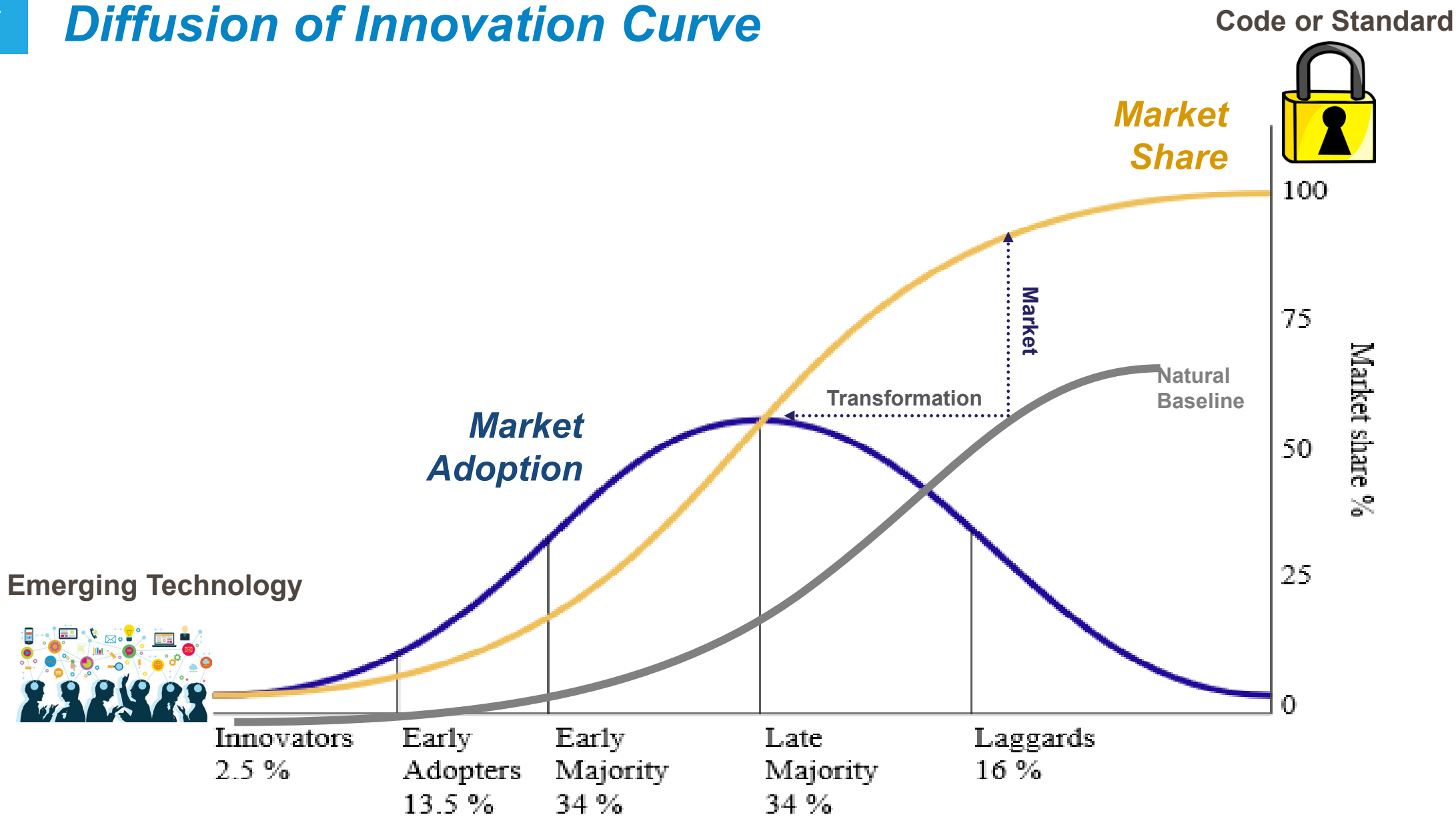
Market Transformation

The strategic process of intervening in a market to create lasting change in market behavior by removing identified barriers and/or exploiting opportunities to accelerate the adoption of all cost-effective energy efficiency as a matter of standard practice.

Diffusion of Innovation Theory

Theory to describe the process through which an innovation diffuses in a market over time.

Diffusion of Innovation Curve



Purpose of Evaluation at NEEA

- Independently and objectively manage third-party evaluations of market transformation programs to
  - Evaluate whether or not the program is influencing the market and making the expected market progress leading to sustained market change in the way hypothesized;
  - Evaluate critical assumptions used in the cost/benefit analysis and value metrics reporting;
  - Formally document the market transformation program over its life; and
  - Provide actionable insight for adaptive management of the program.

- 6-9% of total NEEAs budget

Evaluation Approach for Market Transformation

- Approaches
  - Theory-based Evaluation (Weiss 1995, 2000)
  - Theory-driven Evaluation (Chen 1990)
- Need a theory of change
- Primary focus: verify the extent to which the theory matches what is observed in the market
  - Seek a preponderance of evidence over time
  - Qualitative and Quantitative methods

Critical Components for Theory-Based Approach

- Logic model
- Pre-intervention market conditions (baseline)
- Market Progress Indicators (MPIs)
- Market data

Logic Model

An organized and visual way (road map) to display how a market transformation program is hypothesized to work and result in a sustained market change.

Components:

- Market Barriers and Opportunities
- Strategic Interventions (Activities)
- Outputs
- Outcomes
- Impacts

Market Transformation Program Life Cycle and Key Evaluation Deliverables

1 Market Characterization

2 Baseline Review

3 Market Test Assessment

4 Market Progress Evaluation Report (MPER)

5 Long-term Monitoring & Tracking (LTMT)

State Energy Code Evaluation

NEEA Codes and Standards Evaluation Objectives

- Third-party documentation and assessment of NEEA and our partners' influence

- Provide inputs for estimating net market effects

State Energy Code Evaluation

- NEEA's code influence work:
  - Is tailored to each state and code cycle
  - Can occur over multiple code cycles
  - Often involves multiple measures
  - Is a key component of NEEA MT programs that seek to "lock in" savings through code

- Evaluations provide:
  - **Qualitative** assessment of NEEA influence (Market Progress Evaluations)
  - **Quantitative** assessment of the market's response to a code change (Code Compliance Evaluations)

Codes Market Progress Evaluation Reports

- Conducted every 1-2 years
- Cover commercial and residential codes and all states + IECC work

- Driven by NEEA Codes logic model
- Tell the story of NEEA and our partners' influence (theory-based evaluation)
- Assess the status of key progress indicators
- Provide recommendations for NEEA strategy & adaptive management

Code Compliance Evaluations

- Conducted separately for commercial and residential codes
- Conducted at least once per state per NEEA business cycle

- Assess how the market is responding to code changes
- Estimate compliance
- Collect information on measure mix and fuel mix
- Inform NEEA strategy for the next code cycle

Appliance Standard Evaluation

State & Federal Appliance Standard Evaluation

- Our evaluation approach varies as a function of whether appliance standard influence occurs:
  - As part of a NEEA MT program
  - Independently from any NEEA MT programs ("Other Standards")

- Regardless, the evaluation process provides both **qualitative** assessment of influence and informs **quantitative** estimation of savings

Evaluation of Standards Influence Occurring as Part of an MT Program

- For these products we have:
  - A market influence theory
  - An established baseline
  - Access to market data

- Market Progress Evaluations provide a **qualitative** assessment of influence

- Key Assumption Evaluations provide a **quantitative** review of baseline updates

Evaluation of "Other Standards"

- For these products we do **not** have:
  - A market influence theory
  - An established baseline
  - Access to market data

- Stand-alone evaluation guided by the NEEA Standards logic model
  - **Qualitative** assessment of NEEA and our partners' influence
  - **Quantitative** assessment of share of savings resulting from NEEA and our partners' work

- "Other Standards" are only evaluated when the likely savings justify the cost of developing a savings model and evaluating influence

Questions?

CEAC Process & Timeline

Date	Topics
Q4 2023 Nov. 30.	Provide background and process. COMPLETE
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neea

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

Upcoming Meeting Topics

Q2 – April 30, 2024

- Savings and Cost-effectiveness Overview
- Annual Reporting
- Update: State Energy Code Assessment
- Key Assumption Updates

Topic Requests?

How was your experience?

Meeting Wrap-up

- Public Comment?
- Upcoming Meetings:
  - April 30th, 2024
- Feedback:
  - Overall
  - Agenda
  - Packet Materials
  - What went well?
  - What needs work?