NW Natural 2025 IRP- Technical Working Group

TWG # 5

Avoided Costs and Demand-Side Resources

January 21, 2025

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Forward Looking Statement

This and other presentations made by NW Natural from time to time, may contain forward-looking statements within the meaning of the U.S. Private Securities Litigation Reform Act of 1995. Forward-looking statements can be identified by words such as “anticipates,” “intends,” “plans,” “seeks,” “believes,” “estimates,” “expects” and similar references to future periods. Examples of forward-looking statements include, but are not limited to, statements regarding the following: including regional third-party projects, storage, pipeline and other infrastructure investments, commodity costs, competitive advantage, customer service, customer and business growth, conversion potential, multifamily development, business risk, efficiency of business operations, regulatory recovery, business development and new business initiatives, environmental remediation recoveries, gas storage markets and business opportunities, gas storage development, costs, timing or returns related thereto, financial positions and performance, economic and housing market trends and performance shareholder return and value, capital expenditures, liquidity, strategic goals, greenhouse gas emissions, carbon savings, renewable natural gas, hydrogen, gas reserves and investments and regulatory recoveries related thereto, hedge efficacy, cash flows and adequacy thereof, return on equity, capital structure, return on invested capital, revenues and earnings and timing thereof, margins, operations and maintenance expense, dividends, credit ratings and profile, the regulatory environment, effects of regulatory disallowance, timing or effects of future regulatory proceedings or future regulatory approvals, regulatory prudence reviews, effects of regulatory mechanisms, including, but not limited to, SRRM and the Company’s infrastructure investments, effects of legislation, including but not limited to bonus depreciation and PHMSA regulations, and other statements that are other than statements of historical facts.

Forward-looking statements are based on our current expectations and assumptions regarding our business, the economy and other future conditions. Because forward-looking statements relate to the future, they are subject to inherent uncertainties, risks and changes in circumstances that are difficult to predict. Our actual results may differ materially from those contemplated by the forward-looking statements, so we caution you against relying on any of these forward-looking statements. They are neither statements of historical fact nor guarantees or assurances of future performance. Important factors that could cause actual results to differ materially from those in the forward-looking statements are discussed by reference to the factors described in Part I, Item 1A “Risk Factors,” and Part II, Item 7 and Item 7A “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” and “Quantitative and Qualitative Disclosure about Market Risk” in the Company’s most recent Annual Report on Form 10-K, and in Part I, Items 2 and 3 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and “Quantitative and Qualitative Disclosures About Market Risk”, and Part II, Item 1A, “Risk Factors”, in the Company’s quarterly reports filed thereafter.

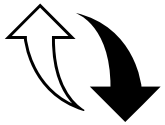
All forward-looking statements made in this presentation and all subsequent forward-looking statements, whether written or oral and whether made by or on behalf of the Company, are expressly qualified by these cautionary statements. Any forward-looking statement speaks only as of the date on which such statement is made, and we undertake no obligation to publicly update any forward-looking statement, whether as a result of new information, future developments or otherwise, except as may be required by law.

Today's Agenda

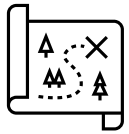
- Logistics
- Recap of previous TWG & Objectives
- Demand-side Resources Background
- Demand Response Overview
- Avoided Costs
- Break
- Washington Sales Energy Efficiency/ Conservation Potential Assessment (CPA)
- Oregon Sales Energy Efficiency
- Low Income Energy Efficiency Programs
- Transportation Customer Energy Efficiency

Facilitator Requests

Engage constructively and courteously towards all participants



Take space and make space



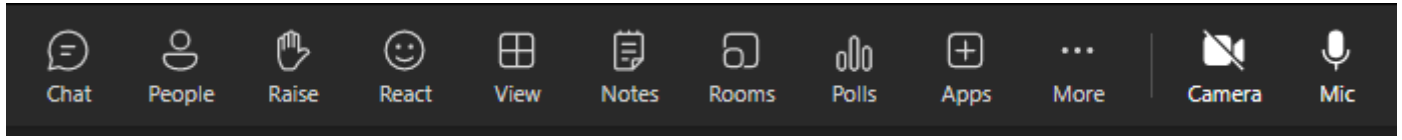
Respect the role of the facilitator to guide the group process

Avoid use of acronyms and help each other understand

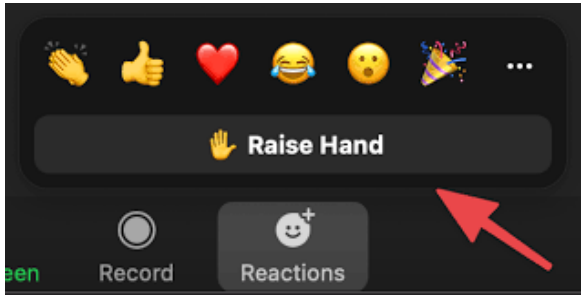
Aim to focus on the meeting topic

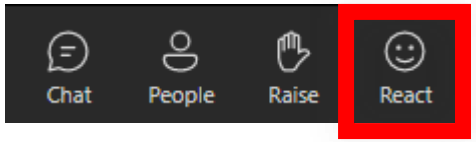
How to Interact in a Teams Meeting

- Participant Controls are at the top or bottom of your screen

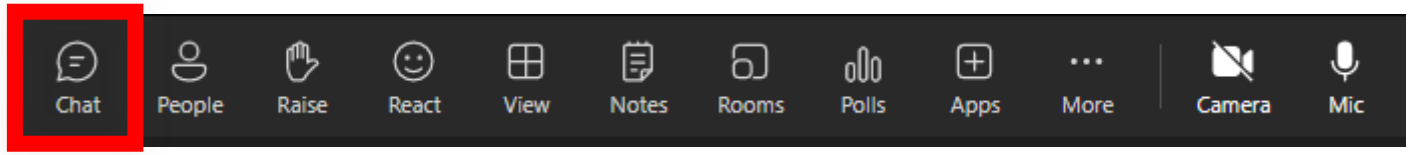


- Ask a question or comment at any time using the “raised hand”





- You may also use the chat box



A member of the IRP team will monitor the chat, and participant list for raised hands during the meeting.

Meeting Best Practices – virtual spaces

To maintain an engaged and productive space, please:

Mute your mic unless asking a question and/or providing comment

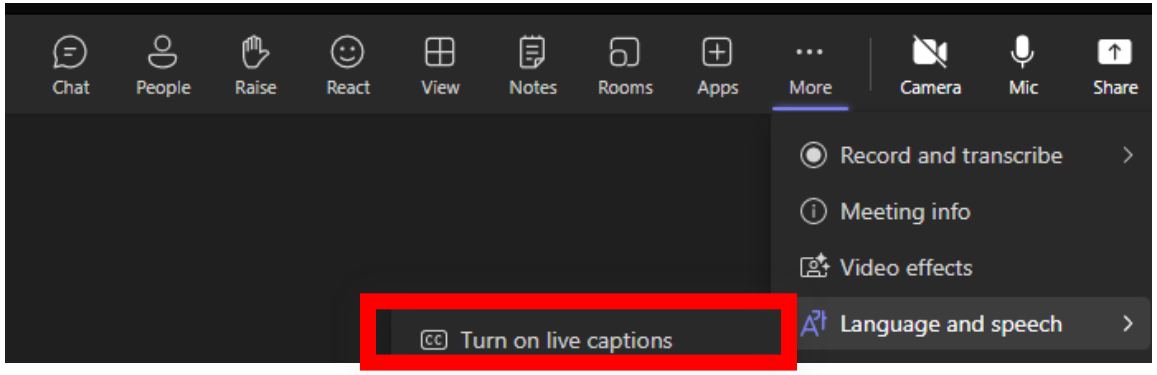
Turn your camera on when speaking (if you are comfortable and your bandwidth allows)

Limit side conversations in the chat

Make efforts to adhere to the meeting schedule

Teams Meeting – Accessibility Functions

- Live Captions - real-time auto-generated text of what is said in a meeting. They appear a few lines at a time for a user who has turned them on, and aren't saved



- Reducing Distractions and Customizing Views:
  - Microsoft Teams has a variety of features to support different learning styles, please find reference material for:
    - Turn on live captions during meetings
    - Customize your meeting view
    - Change background effects in Teams meetings
    - Reduce background noise in Teams meetings
    - 5 tips for using Teams when you're deaf or hard of hearing
- Meeting Recordings:
  - NW Natural will record IRP virtual meetings and will post them to the NW Natural website on the resource planning webpage

Take 2 Minutes for Safety: Replacing furnace & heat pump filters

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- Regularly changing your furnace/ heat pump filter is one of the best and easiest ways to maintain your home's comfort and energy efficiency
- The longer you leave your filter in, the dirtier it gets, restricting airflow and causing your furnace to overwork
- Dirty filters can negatively impact air quality and contribute to health-related issues

- Learn where filters are located on your equipment
- Change filters or clean reusable filters regularly
  - Operate your appliance in accordance with manufacturers' instructions, including filter size/type
  - Check the filter for recommended replacement/cleaning schedule
- Turn off your system (heat/cooling) before removing/ cleaning your filter
- Maintaining heat pumps can be more involved than furnaces – ensure you prioritize safety when doing so
  - Check out https://www.energytrust.org/tips/ for more information

Recap December 17, 2024 TWG ▷ ▶ Today's objectives

- Shared information about customer counts for IRP and load forecasting for reference case
- Addressed clarifying questions and collected feedback on load forecasting information
- Heard questions about:
  - Types of models used in forecasts
  - Variables that affect modeling results such as population, cost, and greenhouse gas compliance
  - Policy and method to identify peak demand
  - Demand response forecast

- Gain a shared understanding of avoided cost and demand-side resources
- Address clarifying questions about meeting topics
- Introduce a new component of avoided costs related to the risk reduction value associated with the uncertainty of Greenhouse Gas (GHG) compliance costs

Current Technical Working Group Schedule

TWG No.	Date	Type & Purpose of Engagement
TWG#1	Oct 22, 2024	Planning Environment
TWG#2	Nov 1, 2024	Scenarios
TWG#3	Nov 21, 2024	Scenarios Cont. and Climate
TWG#4	Dec 17, 2024	Load Forecast
TWG#5	Jan 21, 2025	Avoided Costs & Demand-Side Resource
TWG#6	Jan 28, 2025	Supply-Side & Compliance Resources
TWG#7	Apr 1, 2025	TBA
TWG#8	Apr 8, 2025	Distribution System Planning
TWG#9	Apr 29, 2025	Resource Optimization Planning Model
TWG#10	May 6, 2025	Portfolio Results and Action Plan
File Draft	Jun 13, 2025	Comments due by July 7th
File 2025 IRP	**Aug 2, 2025**	**Beginning of formal process**

- All TWGs will be facilitated and virtual
- Dates and topics are tentative and subject to change
- Please refer to website for most up to date information: IRP Website
- Feedback form direct link: Feedback Form
- Email us at IRP@nwnatural.com

Other Public Engagement Opportunities

Public Engagement Opportunity & Topic	Date	Type & Purpose of Engagement
Energy Resource (IRP) Fair #1:	November 16, 2024	**In-Person Only. Opportunity to learn and engage on IRPs and Energy Services & Programs. Event to be held in collaboration with community partners.** ***Parkrose High School from 11:00am to 2:00pm***
Public Engagement Webinar #1:	TBD	**Opportunity to learn and engage on an IRP and key topics previously presented and related to resource planning and utility energy services.**
Energy Resource (IRP) Fair #2:	May 10, 2025	**In-Person Only. Opportunity to learn about IRPs and Energy Services & Programs & Proposed Action Plan and engage. Event to be held in collaboration with community partners.**
Public Engagement Webinar #2:	TBD	**Opportunity to learn and engage on an IRP and key topics previously presented and related to resource planning and utility energy services.**

- Please check our dedicated IRP website for the most current information:

IRP Website

Demand-Side Resources Background

What Are Demand-Side Resources?

- Demand-side resources are utility programs or tools for reducing load which in turn reduces the need for additional capacity and supply.
- The primary demand-side resources are energy efficiency and load management/demand response programs.
- Energy efficiency is achieved by upgrading a process or piece of equipment to use less energy to achieve the same result.
- Demand response programs encourage consumers to reduce their energy usage during periods of high demand.

Oregon Energy Efficiency Programs

1) Energy Trust of Oregon Programs
   - Residential
   - Commercial
   - Industrial Sales
   - Transportation
     - Offering launched in 2024 and is currently being revised for 2025

2) Oregon Low-Income Energy Efficiency
   - Community Action Program
   - Open Solicitation Program

Washington Energy Efficiency Programs

1. Energy Trust of Oregon Programs
   - Residential
   - Commercial
2. Bidgely - Home Energy Reports
   - 3-year Behavioral EE Trial Program
3. Washington Low-Income Energy Efficiency
4. Developing an Industrial/Transportation EE offering in 2025

Demand Response (DR) Programs Overview

Demand Response (DR) Programs

- Interruptible load program
  - Number of industrial and transport customers currently enrolled: 178
  - Estimated peak day load savings: 1.25 million therms
  - Interruptible load is excluded in the peak day load forecast
- NW Natural Thermostat Rewards program
  - Bring your own thermostat (BYOT) DR program in nature
  - Launched on December 9, 2024, first gas DR program of the kind in the Pacific Northwest
  - Number of smart thermostats enrolled as of Jan 17, 2025: 4,950
  - Enrollment targets: 10K devices by end of 2025, 20K by 2026, and 30K by 2027
- Geographically targeted DR program
  - Under planning for 3 distribution capacity constrained areas
  - Discussed potential GeoDR program with AWEC; conversation ongoing

Avoided Costs

What are Avoided Costs?

- Avoided costs provide the framework to evaluate demand-side resources in compliance with IRP guidelines to equally compare demand-side to supply-side resources
- Avoided costs are the cost an energy utility would incur to deliver energy to customers if the energy were not saved (avoided) by an alternative resource such as energy efficiency
- How do we calculate avoided costs:
  - Guidance and recommendations from OR and WA regulators (e.g.: OPUC Order No. 94-590, OPUC Order No. 24-119, WA HB 1257, etc.)
- Examples where avoided cost values are used in cost-effectiveness evaluations in DSM:
  - Energy efficiency/Conservation Potential Assessment (CPA)
  - Demand response

DSM Savings Projection Process

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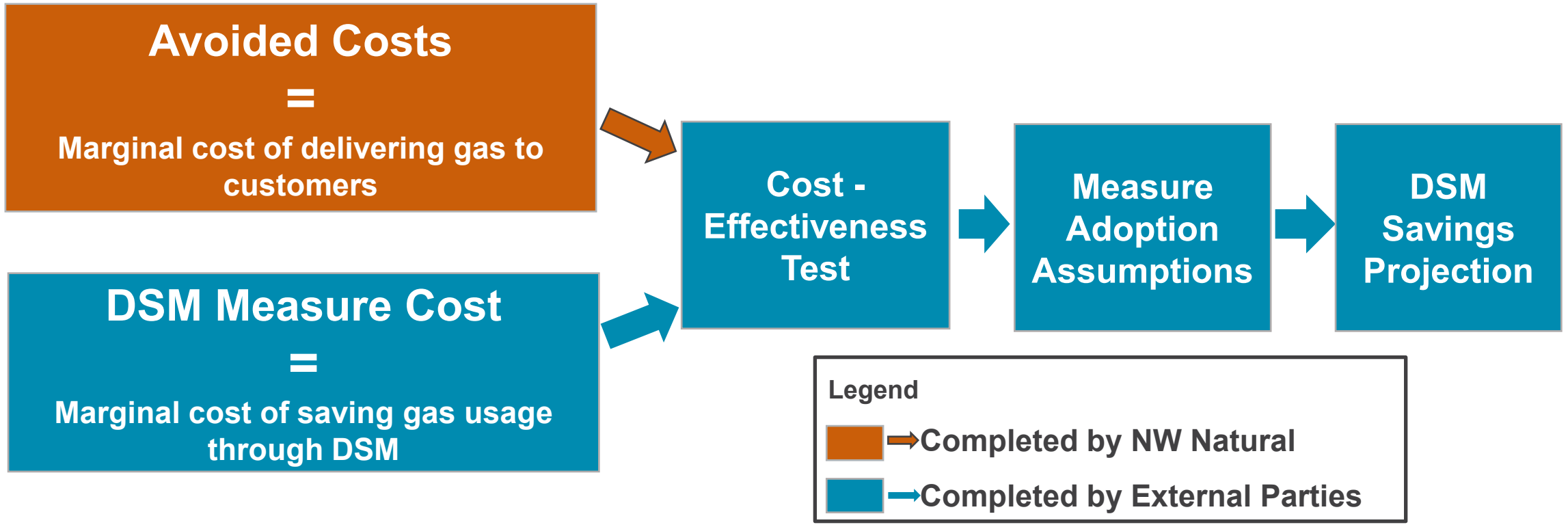
For Each Measure:



Avoided Costs Components

Avoided Cost Components			
Category	**Component**	**Varies by End Use?**	**Varies by State?**
Energy Related Costs	**Natural Gas Purchase and Delivery Costs**	**Yes**	**No**
	Greenhouse Gas Costs	**No**	**Yes**
	Risk Reduction Values	**No**	**No**
Infrastructure Related Costs (Capacity Deferral)	**Supply Capacity Costs**	**Yes**	**No**
	Distribution Capacity Costs	**Yes**	**Yes**
Conservation Adder	**10% Power Act Credit**	**Yes**	**No**

- Since we plan our system to meet peak load, savings from end uses that contribute more to peak load help avoid more costs
- Energy-related costs are avoided from savings throughout the year, but savings achieved in winter do have higher avoided costs because gas costs are typically higher during winter months

Avoided Cost Component Applications

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Costs Avoided		Resource Options		
		Demand-Side Resources		
		Energy Efficiency	Demand Response	
			Interruptible Schedules	Other DR
Energy Related Avoided Costs	Natural Gas Purchase and Delivery Costs	✓	Depends	Depends
	Greenhouse Gas Costs	✓	Depends	Depends
	Risk Reduction Values	✓	Depends	Depends
Infrastructure Related Avoided Costs	Supply Capacity Costs	✓	✓	✓
	Distribution Capacity Costs	✓	✓	✓
Unquantified Conservation Costs	10% Northwest Power & Conservation Council Credit	✓	✓	✓

Teaser: 2022 IRP Avoided Costs

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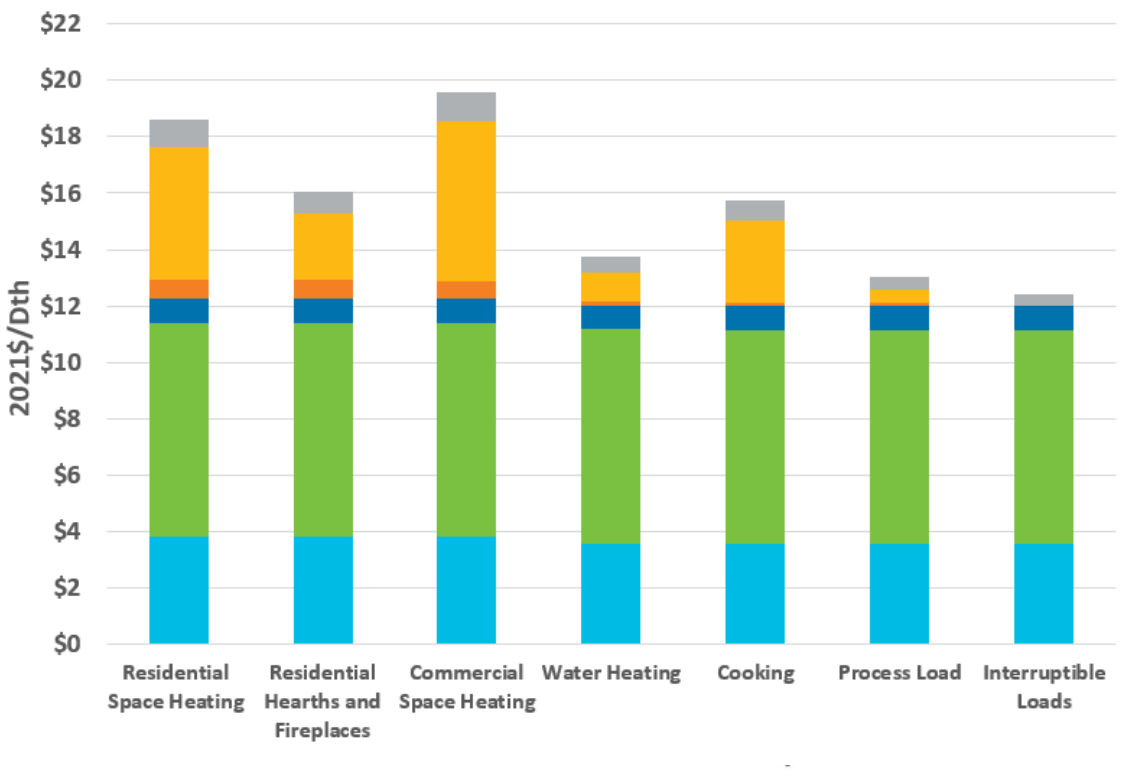
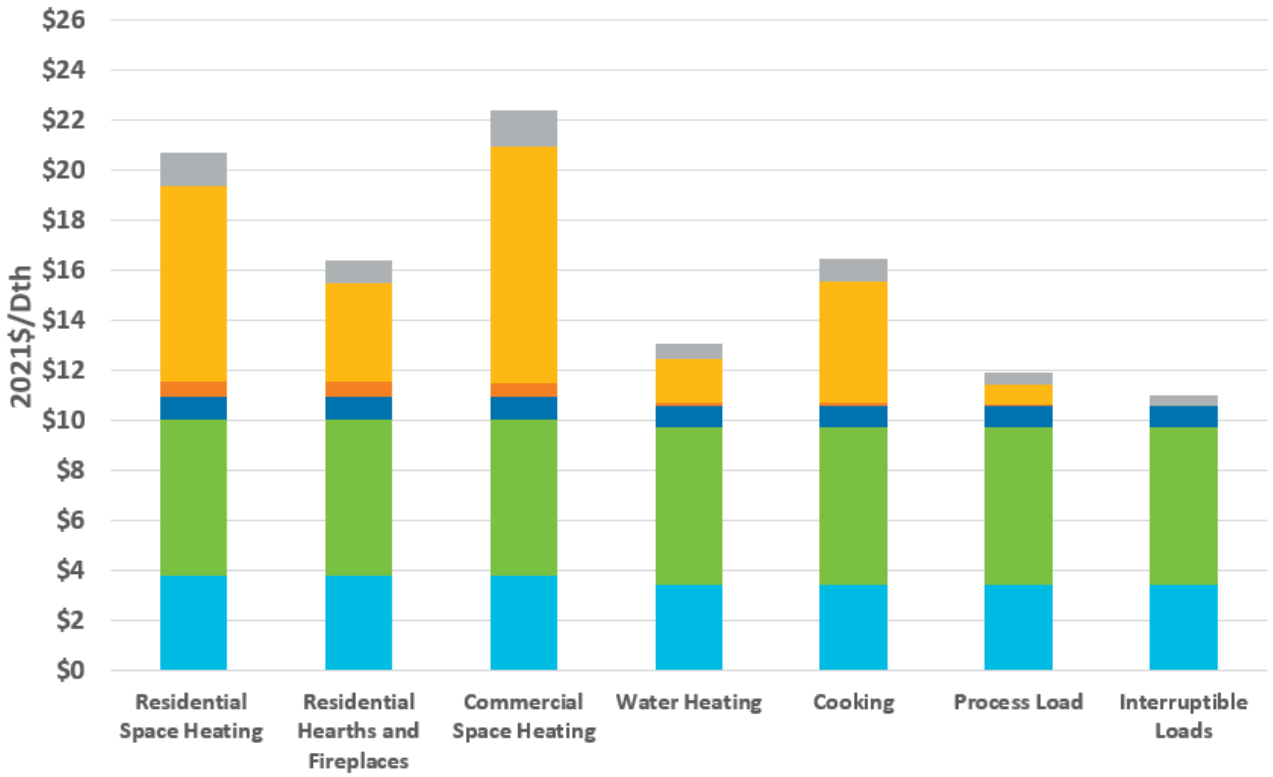
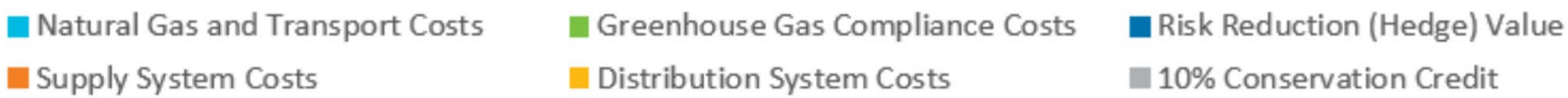
Oregon 30-year Levelized Avoided Costs by End Use



Washington 30-year Levelized Avoided Costs by End Use





Prepared for IRP TWG - Not to be used for investment purposes.

Avoided Cost Components			
Category	**Component**	**Varies by End Use?**	**Varies by State?**
Energy Related Costs	**Natural Gas Purchase and Delivery Costs**	**Yes**	**No**
	Greenhouse Gas Costs	No	Yes
	Risk Reduction Values	No	No
Infrastructure Related Costs Capacity Deferral)	Supply Capacity Costs	Yes	No
	Distribution Capacity Costs	Yes	Yes
Conservation Adder	10% Power Act Credit	Yes	No

Natural Gas Purchase and Delivery Costs

Gas Purchase and Delivery Costs Avoided

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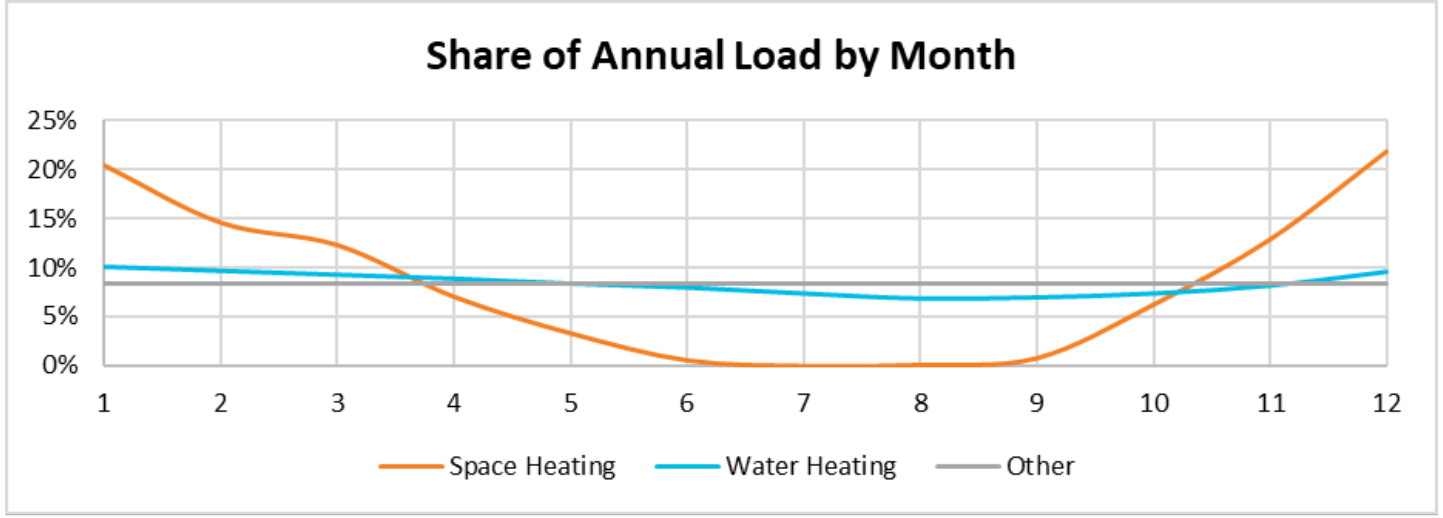
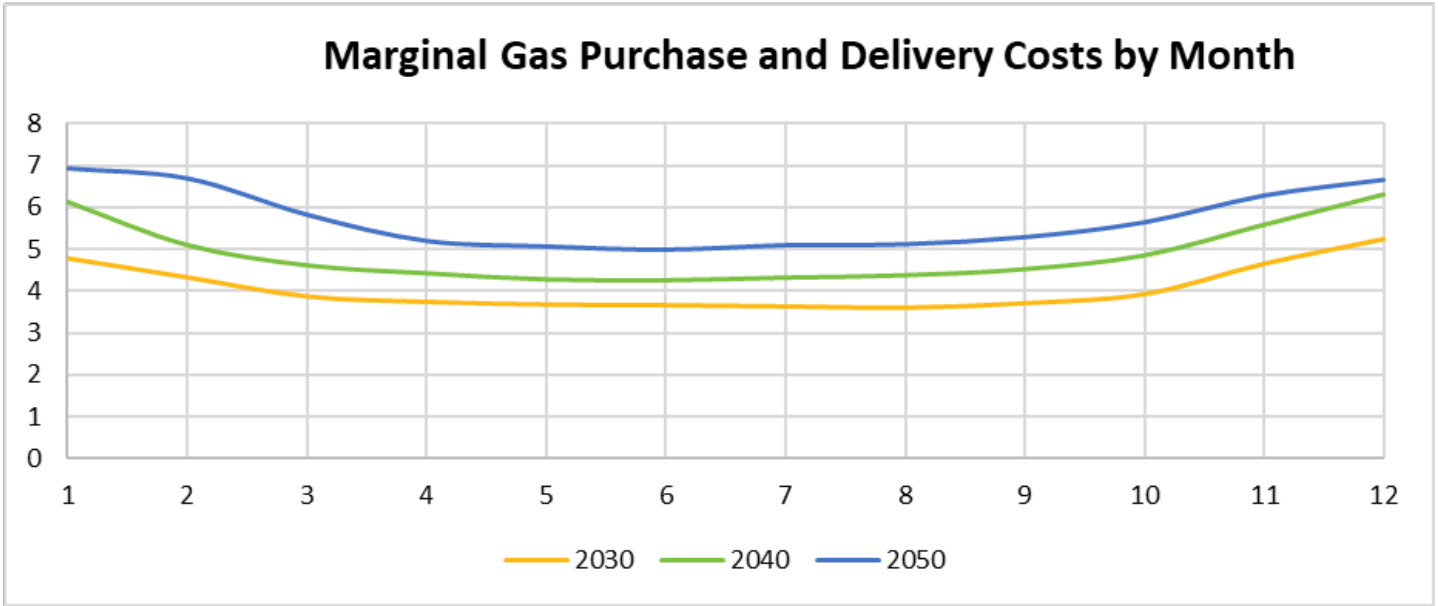
Question: ***Given its resource portfolio, if NW Natural needed to purchase one less unit of energy for any given day, how much commodity related costs would be avoided?***

- Each day natural gas is purchased/scheduled from different basins to serve demand or fill storage for winter needs
- Gas price forecasts are input into our resource optimization model (PLEXOS) to determine the forecasted daily marginal cost of natural gas inclusive of delivery costs
- This daily figure is aggregated to a monthly basis and then combined with the savings profile of each end use to determine the avoided commodity costs by end use, *U*, and by year, *Y*:

$$Gas\ and\ Delivery\ Avoided\ Costs_{U,Y} = \sum_{i=1}^{12} Monthly\ gas\ and\ delivery\ costs_{Y,i} * Monthly\ share\ of\ annual\ savings_{U,i}$$

End Use Energy and Delivery Costs





- Among the illustrative end uses, space heating has the highest avoided gas purchase and delivery costs
- Gas purchase and delivery costs change across months and increase over time in general
- Gas prices are typically higher during winter months, therefore, gas savings achieved during winter provide a higher value to customers

Avoided Cost Components			
Category	**Component**	**Varies by End Use?**	**Varies by State?**
Energy Related Costs	Natural Gas Purchase and Delivery Costs	Yes	No
	Greenhouse Gas Costs	**No**	**Yes**
	Risk Reduction Values	No	No
Infrastructure Related Costs (Capacity Deferral)	Supply Capacity Costs	Yes	No
	Distribution Capacity Costs	Yes	Yes
Conservation Adder	10% Power Act Credit	Yes	No

Greenhouse Gas (GHG) Avoided Costs

GHG Avoided Costs

Question: ***Given its resource portfolio, if NW Natural could purchase one less unit of energy for any given day, how much GHG costs would be avoided?***

There are two sources of emissions in the supply chain for delivering natural gas:

1. Combustion emissions by end use customers (Direct Use)
2. Gas supply chain emissions

Avoided costs accounts for both sources, however; state GHG policies (CPP and CCA) apply to only combustion of natural gas by customers

GHG Avoided Costs

Question: ***Given its resource portfolio, if NW Natural could purchase one less unit of energy for any given day, how much GHG costs would be avoided?***

1. Combustion emissions by end use customers (Direct Use)

$$\underline{\boldsymbol{Calculation}}:$$

$$\boldsymbol{Avoided\ Costs}\left(\frac{\$}{\boldsymbol{Dth}}\right) = \boldsymbol{Maximum\ of\ either}:$$

a.) $\boldsymbol{Social\ Cost\ of\ Carbon}\left(\frac{\$}{\boldsymbol{MT}}\right) * \boldsymbol{Emission\ Intensity\ of\ Combustion}\left(\frac{\boldsymbol{MT}}{\boldsymbol{Dth}}\right)$

b.) $\boldsymbol{GHG\ Policy\ Compliance\ Cost}\left(\frac{\$}{\boldsymbol{Dth}}\right)$

Social Cost of Carbon

- Interagency Working Group on Social Cost of Greenhouse Gases, United States Government, August 2016
  - WA HB 1257 on SCC resulting from natural gas
  - OPUC Order No. 24-119
  - 2021 Northwest Power Plan
  - 2022 NW Natural IRP

Year	Adjusted Social Cost of Carbon (using 2.5% discount rate in 2022$/metric ton CO2)	SCC applied to the Emissions from Natural Gas Combustion (2022$/Dth)
2010	$71	$3.77
2015	$79	$4.20
2020	$88	$4.67
2025	$96	$5.10
2030	$103	$5.47
2035	$110	$5.84
2040	$119	$6.32
2045	$126	$6.69
2050	$135	$7.17

Source: WUTC: Social Cost of Carbon (wa.gov)

Marginal compliance resources for GHG compliance identified in 2022 IRP

Year	Oregon	Washington
2025	Community Climate Investments (CCIs)	Purchased Carbon Allowance
2030	Incremental Renewable Natural Gas (RNG)	Purchased Carbon Allowance
2035	Incremental Renewable Natural Gas (H2)	Purchased Carbon Allowance
2040	Incremental Renewable Natural Gas (Syn Methane)	Purchased Carbon Allowance
2045	Incremental Renewable Natural Gas (Syn Methane)	Purchased Carbon Allowance
2050	Incremental Renewable Natural Gas (Syn Methane)	Incremental Renewable Natural Gas (Syn Methane)

- The marginal compliance resource for CPP or CCA is used for avoided costs
- RNG acquired under SB98 and HB1257 is voluntary RNG and therefore does not set the marginal resource for CPP and CCA compliance

GHG Avoided Costs

Question: ***Given its resource portfolio, if NW Natural could purchase one less unit of energy for any given day, how much GHG costs would be avoided?***

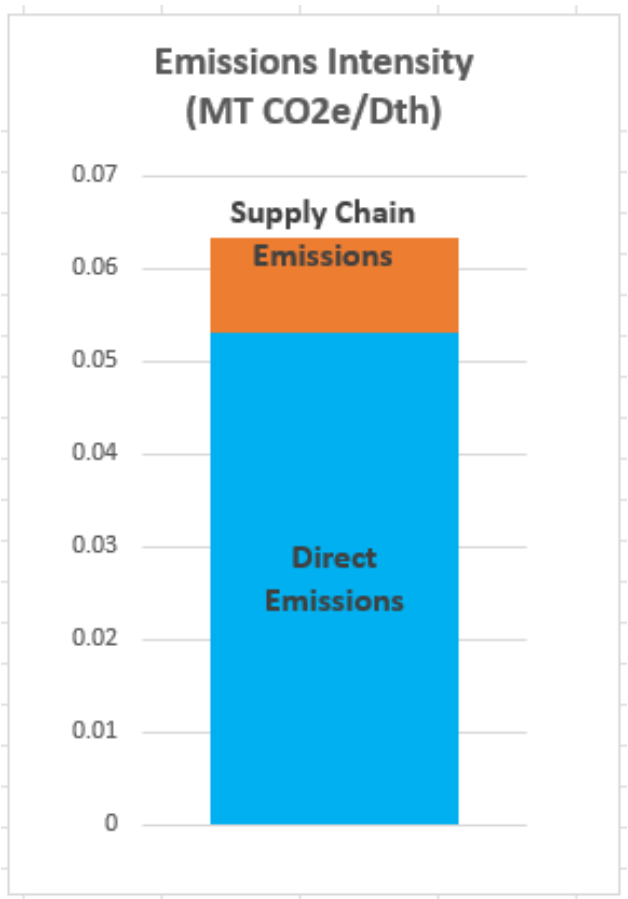
2. Gas supply chain emissions

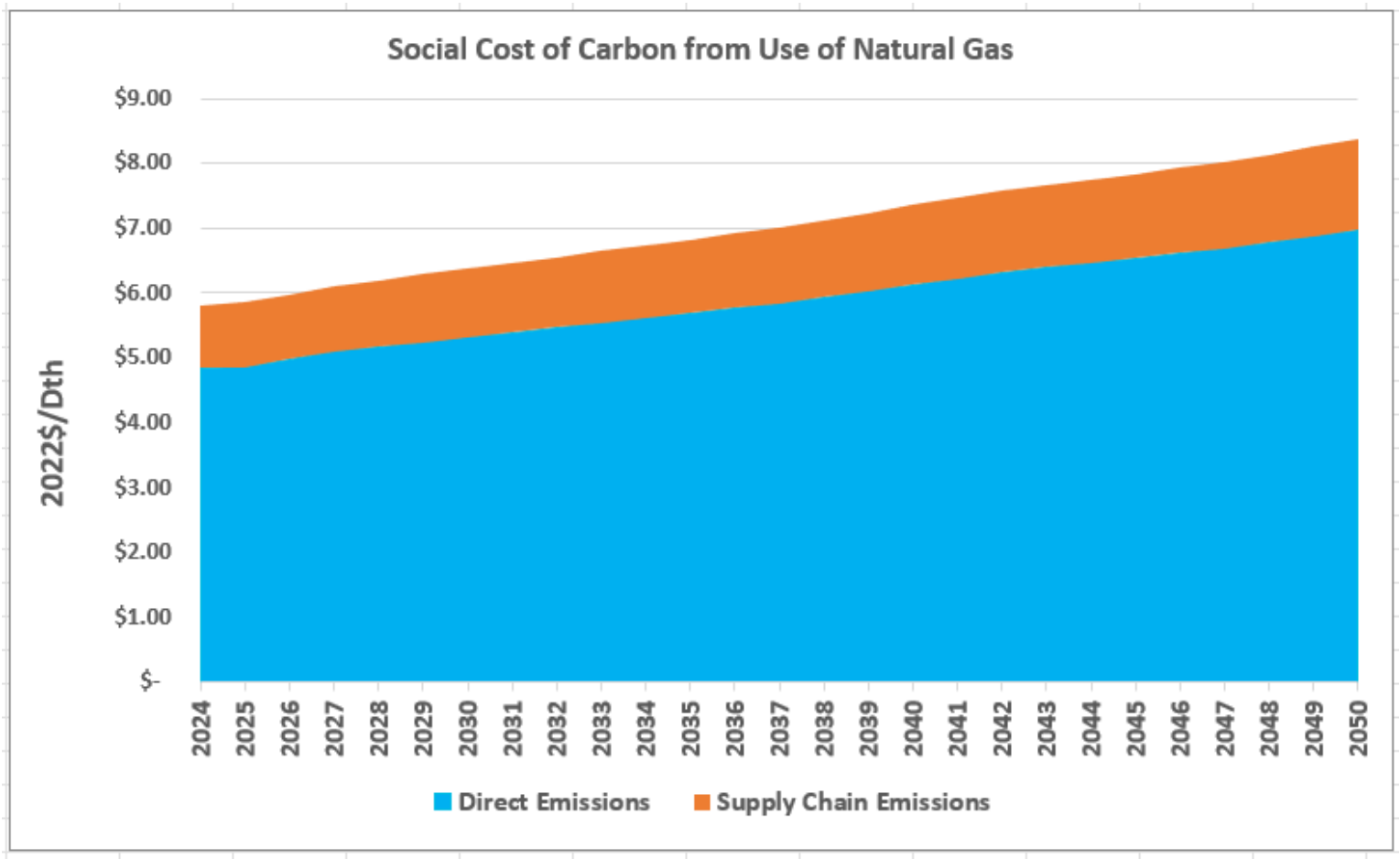
Calculation:

$$\textit{Avoided Costs}\left(\frac{\$}{Dth}\right) = \textit{Social Cost of Carbon}\left(\frac{\$}{MT}\right) * \textit{Emission Intensity}\left(\frac{MT}{Dth}\right)$$

Note:
1. Lifecyle system leakage in the form of CH_4. Converted to CO_2e by most recent IPCC report 100-year Global Warming Potential Factor for CH_4 of 28 on a weight basis (noting when one ton of CH_4 is combusted the result is roughly 3 tons of CO_2).
2. Life cycle emissions used data sources including EPA Subpart W, GREET Model, and GHGenius.

GHG Avoided Costs If Social Cost of Carbon is used for both source categories





Note: Social cost of carbon per Dth as illustrated in the graph represents the lower bound of the GHG avoided costs of natural gas.

Avoided Cost Components			
Category	**Component**	**Varies by End Use?**	**Varies by State?**
Energy Related Costs	Natural Gas Purchase and Delivery Costs	Yes	No
	Greenhouse Gas Costs	No	Yes
	Risk Reduction Values	**No**	**No**
Infrastructure Related Costs (Capacity Deferral)	Supply Capacity Costs	Yes	No
	Distribution Capacity Costs	Yes	Yes
Conservation Adder	10% Power Act Credit	Yes	No

Risk Reduction Values

Commodity Price Risk Reduction Value

Question: ***Given its resource portfolio, if NW Natural could purchase one less unit of energy for any given day, what value can be associated with reduced risk of potential higher prices?***

- This avoided cost refers to the benefit that can be obtained from DSM programs to mitigate the potential losses caused by fluctuations in natural gas prices.

Risk adjusted cost of gas = 75%*Base Case Price + 25%* 95th Percentile Stochastic Price

Risk Reduction Value = Risk adjusted cost of gas – mean price

- The PLEXOS model-based Monte Carlo simulation of gas prices is used for measuring the price risk reduction and the averages over 2025-2050 are as follows:

Component	$/Dth
Average Present Value Prices	$4.71
Average Present Value Price of the 95th Percentile	$9.82
Risk Adjusted Price	$5.99
Risk Reduction Value	**$1.28**

Compliance Cost Risk Reduction Value for Discussion

- In 2025 IRP, NW Natural proposes the use of the approach to estimate risk reduction values for compliance costs given the uncertainty in environmental compliance costs; results will be available following the PLEXOS modeling:

Risk adjusted cost of compliance = 75%*Base Case Compliance Cost + 25%* 95th Percentile Compliance Cost

Compliance Risk Reduction Value = Risk adjusted cost of compliance – mean price

Avoided Cost Components			
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	Distribution Capacity Costs	**Yes**	**Yes**
Conservation Adder	10% Power Act Credit	Yes	No

Infrastructure Capacity Avoided Costs

Infrastructure Capacity Costs Avoided with Peak Saving

Question: ***Given its resource portfolio, if NW Natural could purchase one less unit of energy for any given day, how much incremental infrastructure costs can be avoided?***

- Two types of infrastructure capacity resources;
  - Supply capacity resources (storages such as Mist recall): procured to meet peak day load needs
  - Distribution capacity resources (distribution pipelines): built to meet peak hour load needs
- Infrastructure capacity costs are avoided if peak day and peak hour loads are reduced:

$$\textit{Capacity costs avoided}(\$)$$

$$= \textit{cost to serve additional peak load}\left(\frac{\$}{\textit{Dth of Peak Load}}\right)$$

$$* \textit{amount of peak load saved}(\textit{Dth})$$

More on Capacity Avoided Cost Calculation

1. The costs of serving an additional therm of peak day and peak hour load by year of the planning horizon are separately estimated:
   - Supply resource costs are estimated at the entire system level and obtained from the 2025 IRP process
   - Distribution system costs are estimated by state and reflecting the costs of serving additional peak hour load in OR and WA over the past 10 years
2. These costs are further calculated for each end use based on their design peak day and peak hour factors
   - Peak day factor is for supply resource costs avoided
   - Peak hour factor is for distribution system costs avoided (hourly load shape applied to peak day usage)

How much does the marginal unit of peak load cost to serve as filed in 2022 IRP?

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- For supply resource at system level:

	System
Incremental Revenue Requirement per Incremental Therm of Peak Day Load (2021$/Therm)	$3.25
Supply Capacity Avoided Costs (2021$/Therm/Day)	$0.089

- For distribution system by state:

	Oregon	Washington
Incremental Revenue Requirement per Incremental Therm of Peak Hour Load (2023$/Therm)	$410.45	$679.75
Distribution System Avoided Costs (2023$/Therm/Hour)	$0.469	$0.776

Note: average costs to serve incremental peak hour load over the last decade are assumed to remain constant in real terms going forward.

Peak Day and Hour Factors in 2022 IRP

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Peak **DAY** Usage to Normal Weather Annual Usage Factors for **SUPPLY** Costs		Source of Information
Residential Space Heating (Including Hearths and Fireplaces)	0.0198	NW Natural Regressions
Commercial Space Heating	0.0177	NW Natural Regressions
Water Heating	0.0033	NW Natural Regressions and NEAA Water Heater Study
Cooking	0.0036	Analysis of ODOE RECS data
Process Load	0.0027	Annual/365

Peak **HOUR** Usage to Normal Weather Annual Usage Factors for **DISTRIBUTION** Costs		Source of Information
Residential Space Heating	0.00115	NWN System Hourly Flows & EPRI Load Shape
Hearths and Fireplaces	0.00058	EPRI Load Shape
Commercial Space Heating	0.00139	NWN System Hourly Flows & EPRI Load Shapes
Water Heating	0.00026	NWN System Hourly Flows & Ecotope water heating study and
Cooking	0.00071	EPRI Load Shape
Process Load	0.00011	Daily/24

Note: figures in the tables are in absolute terms.

Avoided Cost Components			
Category	**Component**	**Varies by End Use?**	**Varies by State?**
Energy Related Costs	Natural Gas Purchase and Delivery Costs	Yes	No
	Greenhouse Gas Costs	No	Yes
	Risk Reduction Values	No	No
Infrastructure Related Costs (Capacity Deferral)	Supply Capacity Costs	Yes	No
	Distribution Capacity Costs	Yes	Yes
Conservation Adder	**10% Power Act Credit**	**Yes**	**No**

10% Conservation Adder

10% Conservation Adder

- NW Natural includes region's longstanding convention from the Northwest Power and Conservation Council of applying a 10% conservation credit to avoided costs to account for the unquantified benefits of conservation
- NW Natural has adopted OPUC Order No. 24-119's recommendation of applying the 10% credit to **all components of avoided costs** including risk reduction values and carbon costs
- While the 10% credit is applied consistently across all end uses the variation in avoided costs by end use results in this value varying by end use

Break

Washington Conservation Potential Assessment (CPA)

Washington CPA Background

- In 2019, HB 1257 was passed which included a formal provision for gas companies to establish conservation targets.
- RCW 80.28.380:
  - "Each company must establish an acquisition target every two years and must demonstrate that the target will result in the acquisition of all resources identified as available and cost-effective.
  - "The target must be based on a conservation potential assessment prepared by an independent third party and approved by the commission."
- NW Natural conducted a competitive bid process to select a CPA vendor in 2021. Applied Energy Group (AEG) was selected to complete the first CPA which was filed in 2021. AEG was directly contracted again to provide an update that was filed in 2023.
- The 2025 CPA will not be available for this IRP, so the 2023 CPA will be used.

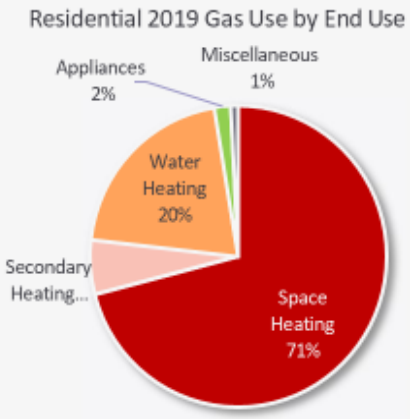
AEG Modeling Approach

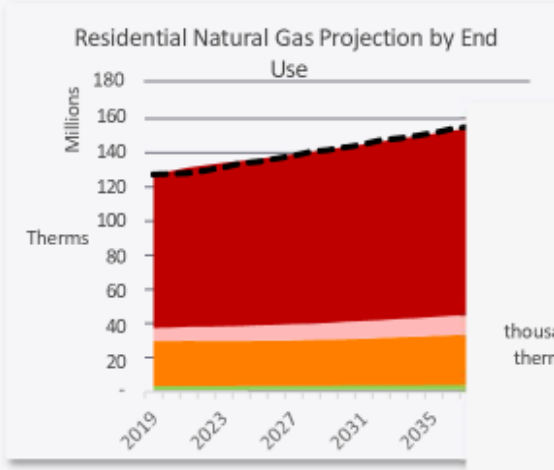
Market Characterization
- Baseline studies
- Utility data
- Secondary data

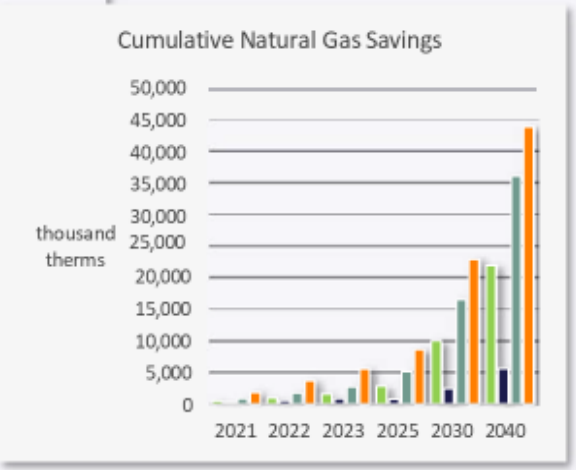
Identify Demand-Side Resources
- EE equipment
- EE measures
- Emerging tech.

Baseline Projection
- Utility forecasts
- Standards and building codes

Potential Estimation
- Technical
- Achievable Tech.
- Economic Achiev.







Important!

2023 CPA retains robust market characterization from 2021 CPA

- *Updated NW Natural customer forecasts, consumption, and avoided costs.*
- *Base year of the study remains 2019 and AEG recalibrated 2021 & 2022 with actuals and updated forecast*

Baseline Projection

The baseline projection is an independent end-use forecast of natural gas consumption at the same level of detail as the market profile.

How much natural gas would customers use in the future if NW Natural stopped running energy efficiency programs now and in the absence of naturally occurring efficiency?"

- The baseline projection answers this question

Includes

- To the extent possible, the same forecast drivers used in the official load forecast, particularly customer growth, normal weather, etc.
- Trends in appliance saturations
- Efficiency options available for each technology, with share of purchases reflecting codes and standards
- Expected impact of building codes, as reflected in market profiles for new construction

Excludes

- Impacts of current and future demand-side management programs
- Potential future codes and standards not currently enacted

Cumulative Cost-Effective Potential

NW Natural®

Washington Cumulative Savings (therms)

Sector	2025	2026	2030	2035	2040	2045	2050
Residential	193,883	409,706	1,589,480	3,648,716	5,678,106	6,753,714	6,757,821
Commercial	151,038	308,016	998,543	1,859,902	2,569,792	2,978,296	3,041,081
Industrial	14,997	102,388	458,982	877,387	1,192,233	1,387,925	1,387,227
Total	**359,918**	**820,109**	**3,047,004**	**6,386,005**	**9,440,131**	**11,119,936**	**11,186,128**

Washington Cumulative Peak Day Savings (therms)

	2025	2026	2030	2035	2040	2045	2050
Residential	2,709	5,541	18,938	42,427	68,881	84,544	83,342
Commercial	2,449	4,917	15,142	26,588	34,619	38,217	37,593
Industrial	98	196	605	1,119	1,481	1,578	1,526
Total	**5,256**	**10,653**	**34,685**	**70,135**	**104,981**	**124,339**	**122,460**

Energy Efficiency Resource Assessment

NW Natural 2025 IRP

January 21, 2025

Energy Trust of Oregon

Agenda

- About Energy Trust
- Resource Assessment Model Overview
- Draft NW Natural 2025 Resource Assessment Results and Deployment Forecast

About us

Independent nonprofit

Serving 2.4 million customers of Portland General Electric, Pacific Power, NW Natural, Cascade Natural Gas and Avista

Providing access to affordable energy

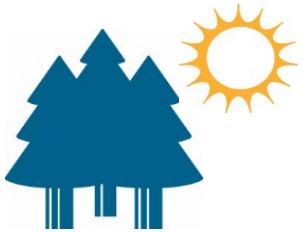
Generating homegrown, renewable power

Building a stronger Oregon and SW Washington

Clean and affordable energy since 2002

From Energy Trust's investment of $2.8 billion in utility customer funds:

825,000 sites transformed into energy efficient, healthy, comfortable and productive homes and businesses



30,000 clean energy systems generating renewable power from the sun, wind, water, geothermal heat and biopower

$13.5 billion in savings over time on participant utility bills from their energy-efficiency and solar investments

42.9 million metric tons of carbon dioxide emissions kept out of our air, equal to removing 11.2 million cars from our roads for a year

Energy Trust Resource Assessment Model Overview

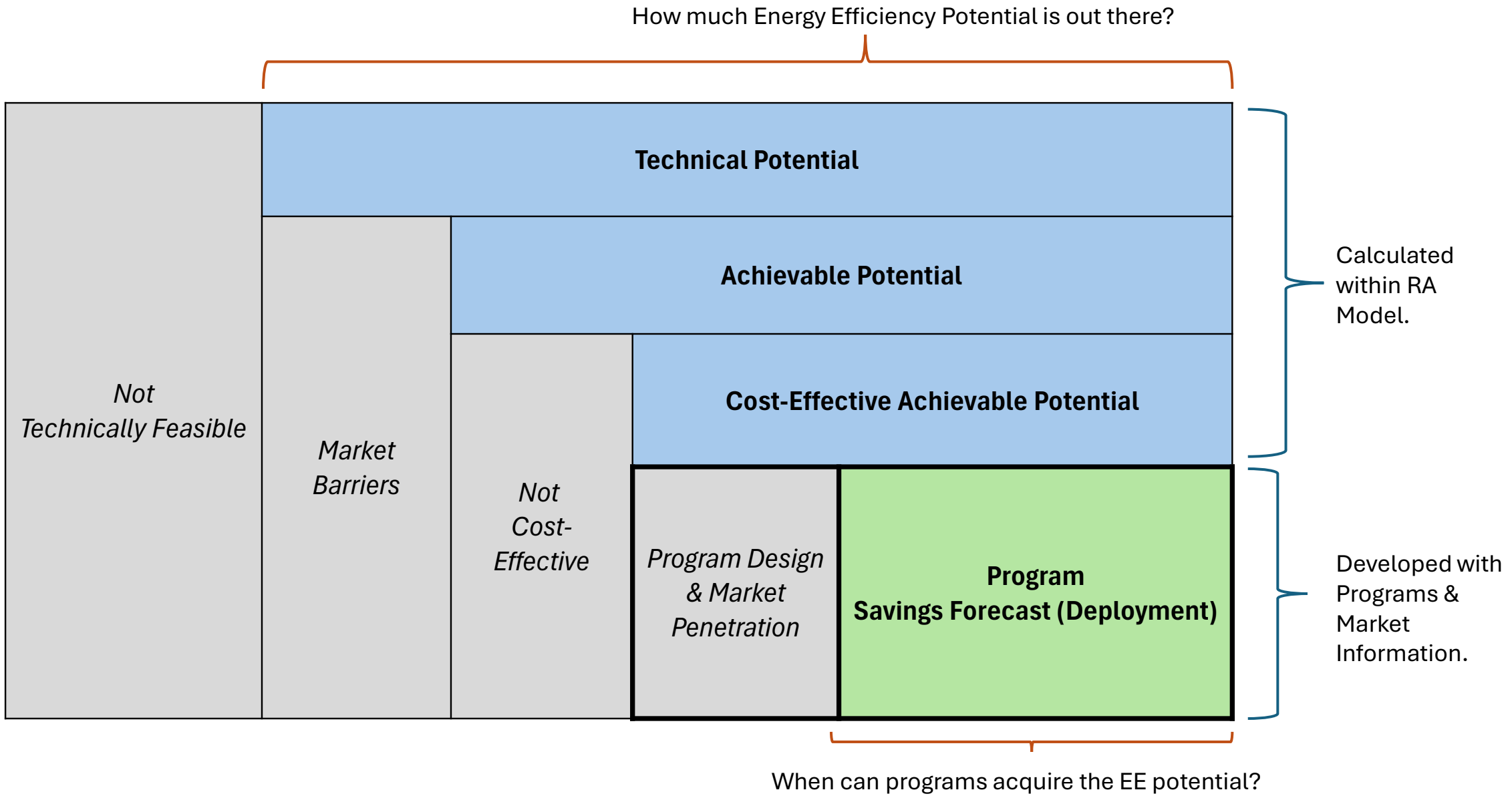
Resource Assessment (RA) Model Background

- Estimate of 20-year energy efficiency potential
- “Bottom-up” modeling approach
  - Measure level inputs are scaled to utility level
- Measure inputs
  - Baseline and efficient equipment
  - Measure savings
  - Incremental cost
  - Market data
- Utility inputs
  - Load and customer count/building stock forecast
  - Customer stock demographics
  - Avoided costs

Modeling Updates

- Measure updates
  - Measure savings, incremental cost
  - New measures
  - Emerging technologies
- 2022 Residential Building Stock Assessment (Northwest Energy Efficiency Alliance - NEEA)
  - Total measure density, technical suitability and baseline initial saturation
  - Heating fuel, water heating fuel splits

Forecasted Potential Types



Cost-Effectiveness Screen

- RA model utilizes the Total Resource Cost (TRC) test to screen measures for cost-effectiveness

$$TRC = \frac{Measure\ Benefits}{Total\ Measure\ Cost}$$

- Measure benefits
  - Net Present Value (NPV) avoided costs per first-year Therm
  - Quantifiable non-energy benefits
- Measure costs
  - The customer cost of installing an efficiency measure (full cost for retrofits, incremental over baseline cost for replacement)
- Cost-Effectiveness Override
  - Measures under an OPUC exception

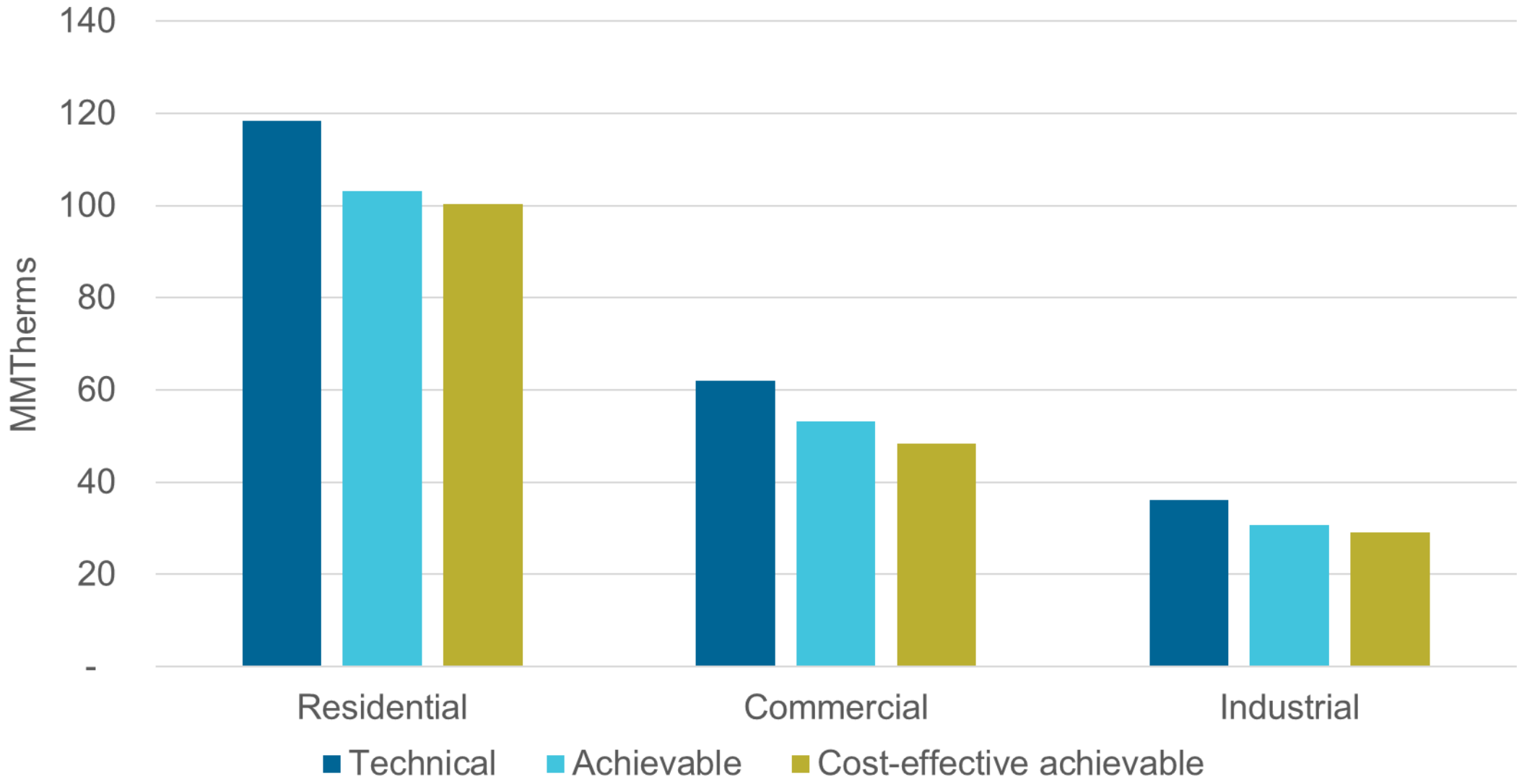
Draft Resource Assessment Results
NW Natural 2025 IRP

Modeling Scenarios

1. Reference Case
    1. Reference Load and Stock forecasts
    2. NW Natural Avoided Costs

2. High Social Cost of Carbon (SCC)
    1. Reference Load and Stock forecasts
    2. EPA Report on the Social Cost of Greenhouse Gases substituted for the Environmental Compliance Cost in the avoided cost stack

Draft Potential by Sector and Type (first-year savings)



Draft Potential by End Use (first-year savings)

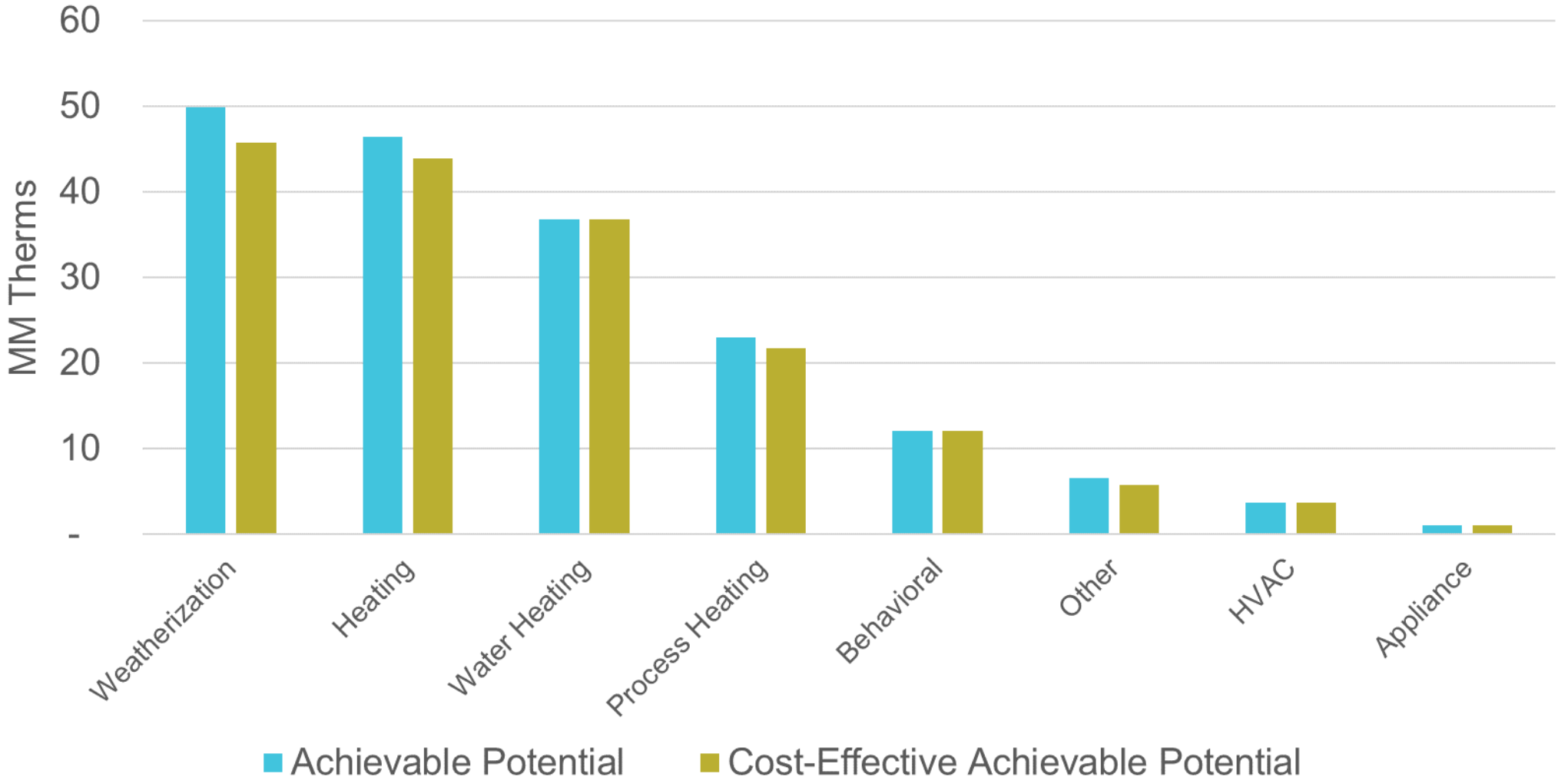


Chart includes major end uses only and does not add up to total potential.

Draft Results and Deployment

20-year Energy Efficiency Potential (Therms) – NW Natural

Sector	Technical Potential	Achievable Potential	Cost-effective Achievable Potential	Draft Savings Projection*
Residential	118,293,686	103,106,365	100,304,907	64,669,878
Commercial	62,033,369	53,171,566	48,412,079	52,333,938*
Industrial	36,027,494	30,623,370	29,095,532	32,061,305*
Total	216,354,549	186,901,300	177,812,517	**149,065,121**

Previous IRP Comparison

2022 IRP Total	*244,561,513*	*200,433,518*	*184,161,265*	*142,100,613*
% Change	*-12%*	*-7%*	*-3%*	***5%***

**Draft Projections include exogenous savings. As such, they can exceed the 20-year cost-effective achievable totals*

NW Natural Deployment, Draft Savings Potential

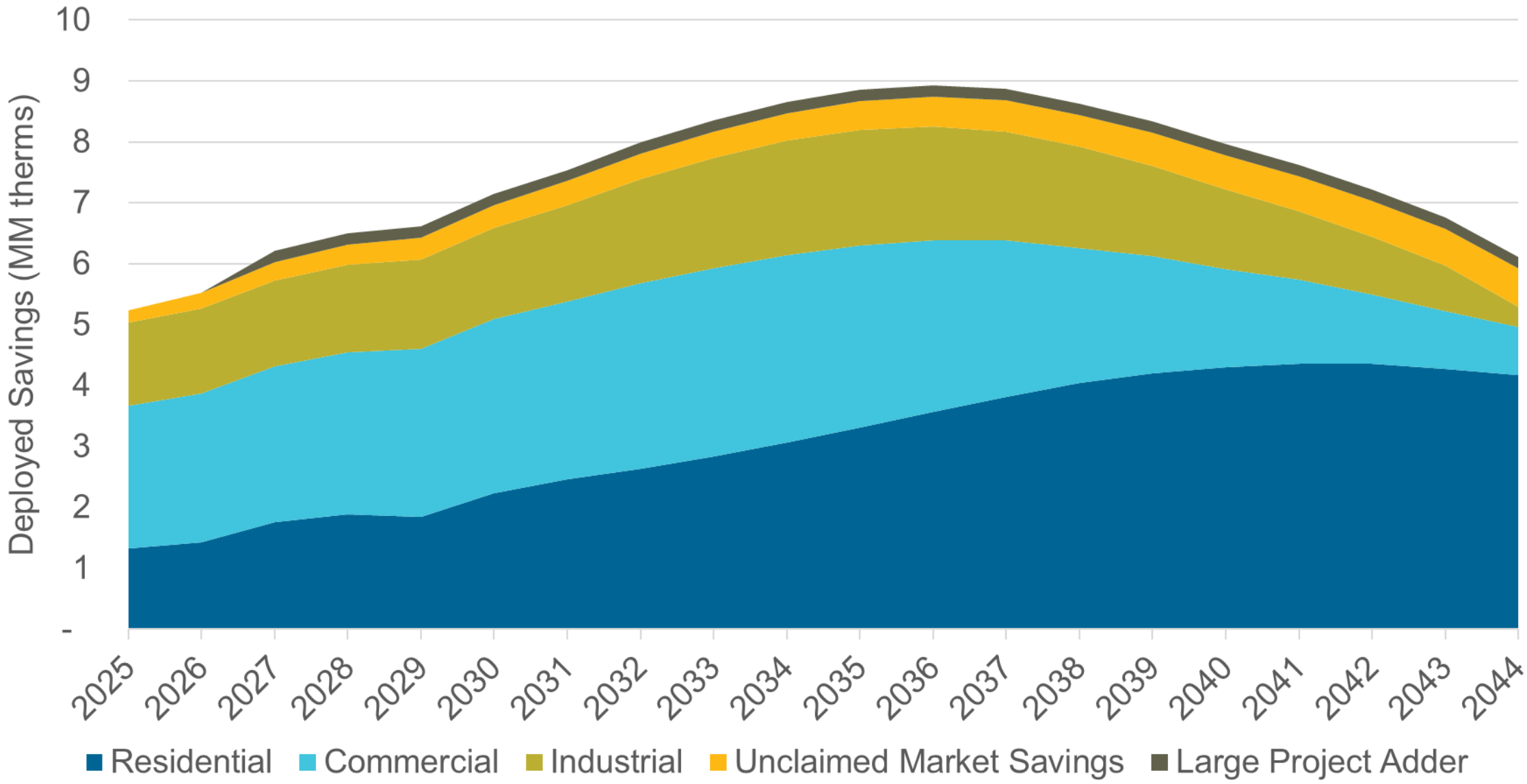
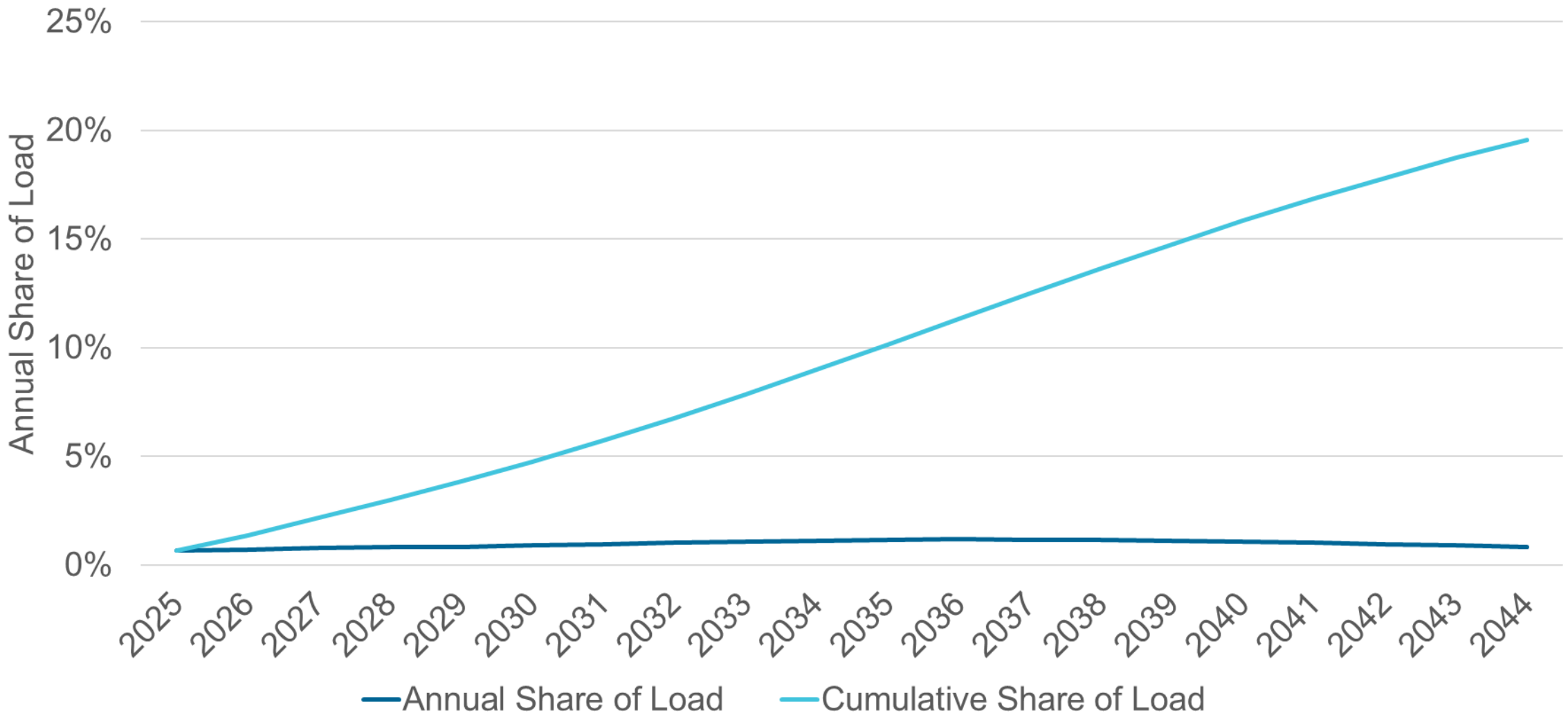


Chart shows total expected efficiency and includes savings from codes and standards. Energy Trust may not claim the entirety of savings depicted above.

Draft Deployed Savings Compared to NW Natural Load Forecast



Average Annual Share of Load Saved: 0.98%

High Social Cost of Carbon - Avoided Costs Scenario

Comparison of 20-year cost-effective achievable potential between reference avoided cost stack and high social cost of carbon avoided cost stack.

- Uses the EPA's 2023 Report on the Social Cost of Greenhouse Gases

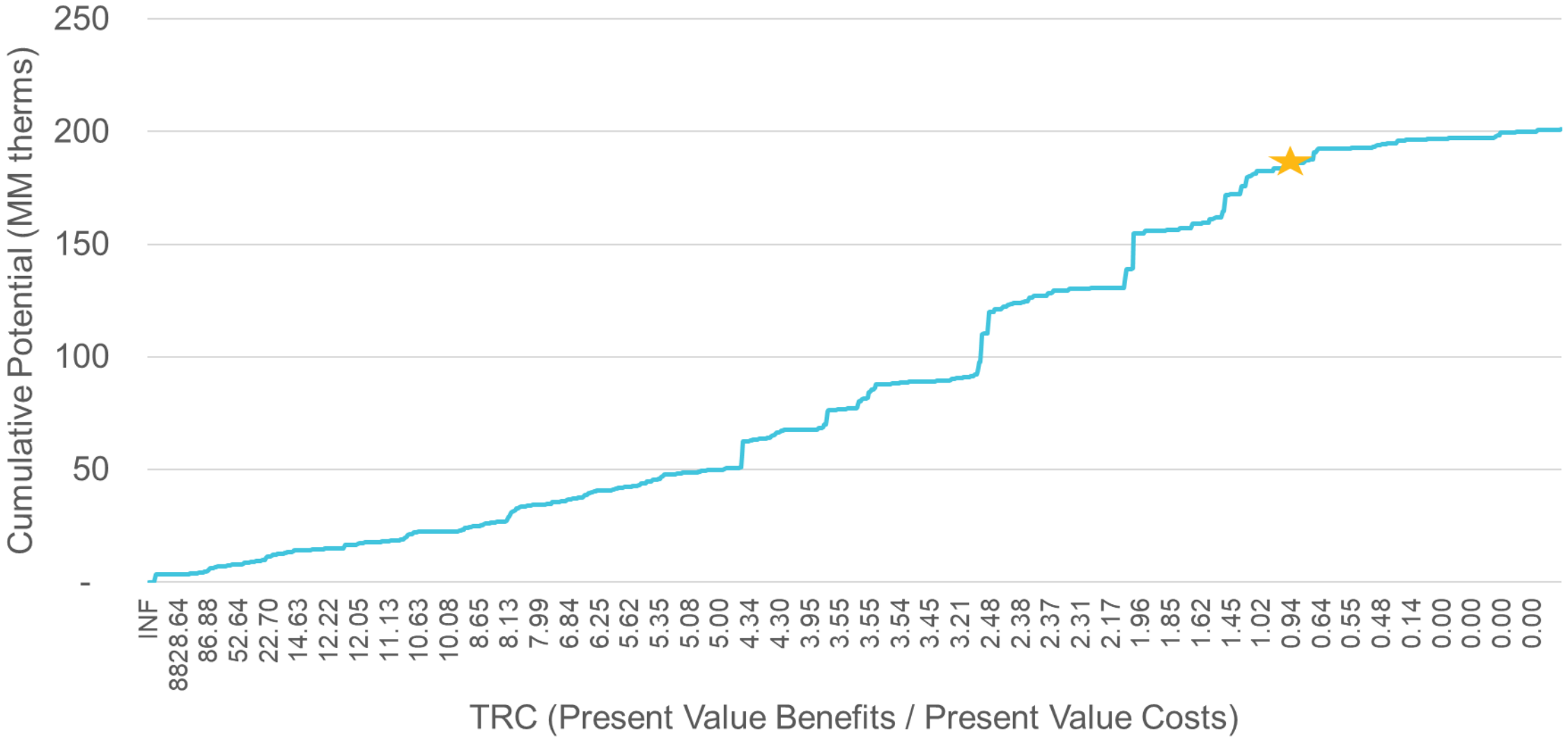
~ 1.0% increase in cost-effective potential from increase in avoided costs.

Load Profile	Reference ACs	High SCC ACs	% Difference
DHW	$ 1.53	$ 2.02	**33%**
Flat	$ 1.45	$ 1.95	**34%**
Res Heating	$ 2.10	$ 2.60	**24%**
Com Heating	$ 2.22	$ 2.72	**22%**
Clotheswasher	$ 1.50	$ 2.00	**33%**

Sector	Reference Avoided Costs	High SCC	% Difference
Residential	98.5	99.3	0.8%
Commercial	52.6	53.5	1.7%
Industrial	29.1	29.1	0.0%
Total	**180.2**	**182.0**	**1.0%**

Units: MM Therms

Supply Curve by TRC (20y Cumulative Achievable Potential)



Peak Day Therms, NW Natural Deployment, Draft Savings Potential

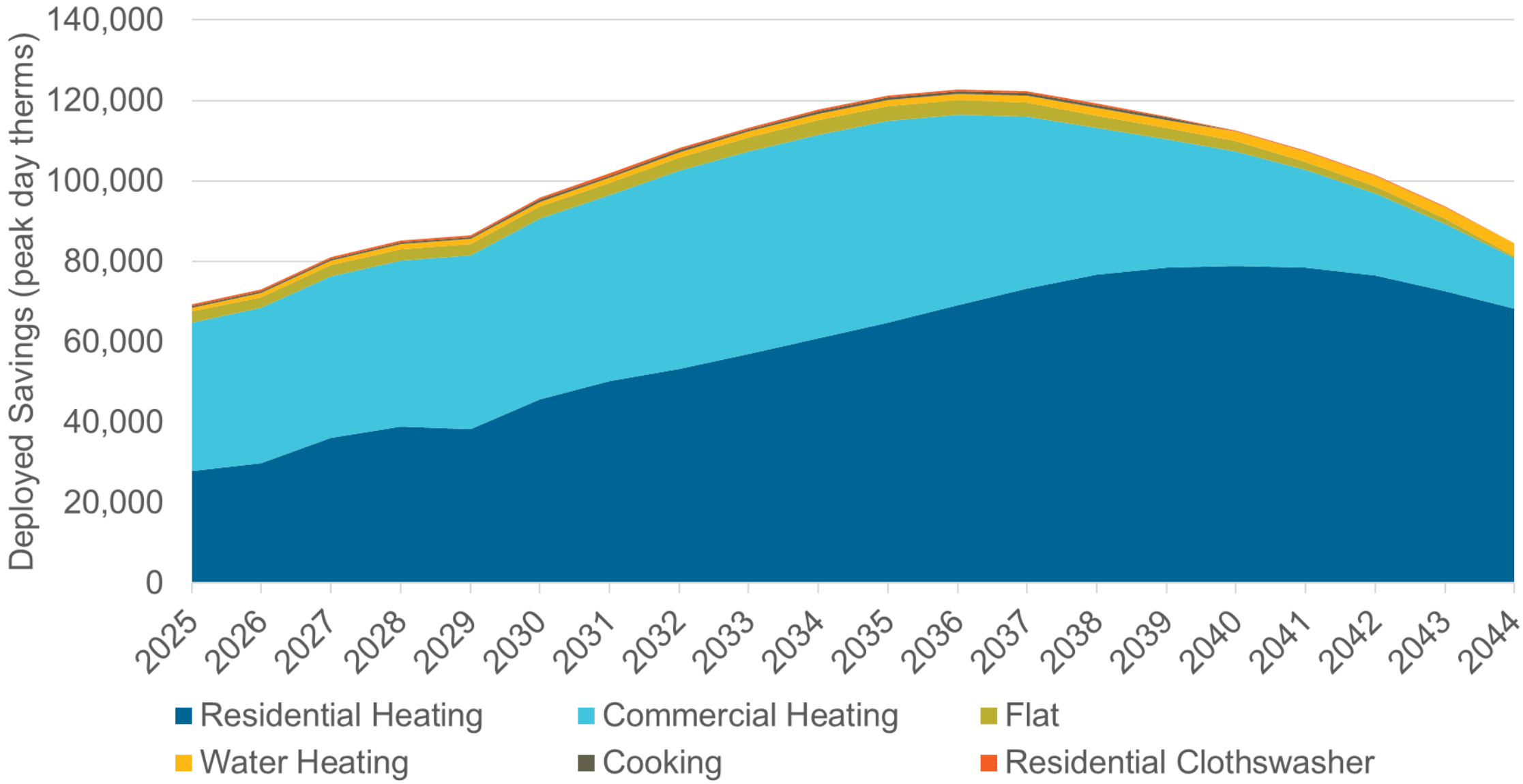


Chart shows total expected efficiency and includes savings from codes and standards. Energy Trust may not claim the entirety of savings depicted above.

Questions?

Thank you!

Kyle Morrill, Sr. Planning Project Manager
kyle.morrill@energytrust.org

EnergyTrust of Oregon

Oregon Low Income Energy Efficiency (OLIEE) and Washington Low Income Energy Efficiency (WALIEE)

Background

Low Income Energy Efficiency Programs provide free energy efficient retrofits to customers at or below the 80%AMI*

Oregon Low Income Energy Efficiency (OLIEE)

- Public Purpose charge
- Community Action Program (CAP)/ Open Solicitation Program (OSP)

Washington Low Income Energy Efficiency (WALIEE)

- Recovered through rates
- Clark County

***AMI- Area Median Income*

Project Eligibility

Funding is available for residential projects in NW Natural's Oregon and Washington service territories where:

- ✓ Gas service line is installed
- ✓ Occupant holds active account with NWN (or will have at the completion of work)
- ✓ Primary space heating equipment is fueled by natural gas
- ✓ Occupant meets income threshold (>80% AMI)

Funding Delivery

Funds are delivered through two programs:

Community Action Partnerships (CAP) & the Open Solicitation Program (OSP)

- The CAP program is an energy efficiency, reimbursement-based program, designed for single family homes and is administered in partnership with 11 community action agencies across NW Natural's service territory. WALIEE and our partner Clark County follow this program delivery model.
- The OSP (Open Solicitation Program) is a grant-based program for projects that fall outside of CAP parameters. The primary goal of the OSP is to provide cost-effective, energy efficiency assistance to a greater number of low-income households in NW Natural's Oregon service territory through a broad and diverse network of delivery channels.

Open Solicitation Program

Examples of most recent projects

Oregon Energy Fund (OEF)	• Albertina Kerr • Habitat for Humanity partnership
Homes for Good	• The Eugene Mission
Community Based Organizations	• Latino Built Foundation • African American Alliance for Homeownership

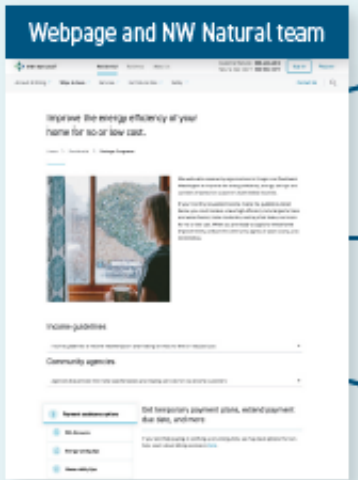
Partnerships in NW Natural Service Territory

- Multnomah County
- Washington County
- Yamhill County
- CSC (Linn, Benton, Lincoln, Polk)
- MWVCAA (Marion, Polk)
- CAT (Columbia, Clatsop, Tillamook)
- Clackamas County
- Clark County – (WALIEE)
- Oregon Energy Fund (OEF) (Habitat for Humanity Portfolio and Multifamily)
- Latino Built Foundation (Kaiser/Salem/ Independence/Beaverton/Aloha)
- African American Alliance for Homeownership (Multnomah County)

Communications, outreach and engagement

NW Natural helps customers with limited incomes save money and improve home energy efficiency via continual communication and outreach.

A variety of communication methods guide customers to one place, where they can learn about and enroll in beneficial NW Natural programs. All communications repeat the same messages, in several languages, to make the path to participate as clear and simple as possible.



Multnomah County

Community Action Team

Community action agencies and community-based organizations

Free heating and weatherization upgrades via community organizations

+

Billing assistance via state organizations

+

Additional NW Natural programs to lower bills and improve home energy efficiency

- Bill discounts
- Flexible payment plans
- Online account, billing and payment self-service
- Annual equipment inspections and tune-ups
- Safety resources and tips
- Energy education and smart thermostats
- More opportunities announced in newsletters, emails and social media

Energy Education

. COMMUNITY ENGAGEMENT

PROGRAM AWARENESS

CROSS-PROMOTION OF PROGRAMS

Outreach Energy Planning

- 700 attendees
  250 DIY kits distributed

  "I really need to get weatherization done on my house, but I'm on fixed income, so all of this information will be really helpful"

  " I have a cracked window at my house that I don't have funds to fix. This window film is exactly what I need so the cold air does not leak in"

2024 Program Changes and Results

- **WALIEE Changes**
  - Increased per project funding
  - Additional $4,000 in flexible spending.
- **Results**
  - Increase in number of projects, mainly furnace tune-ups and replacements

- **OLIEE Changes**
  - 100% funding of energy efficiency measures and health/safety/repair
  - Increased Program eligibility from 200% FPL to 80% AMI
  - Increased funding for impact and program evaluation
- **Results**
  - $3.4M in PY 2023-2024 58% increase from 2022-2023.
  - Increase in health safety and repair measures (From $217,689 in PY 22-23 to $586,129.73 in PY 23-24)
  - 223 completions from single family home program with 60K therms saved.
  - 320 individuals impacted through OSP.

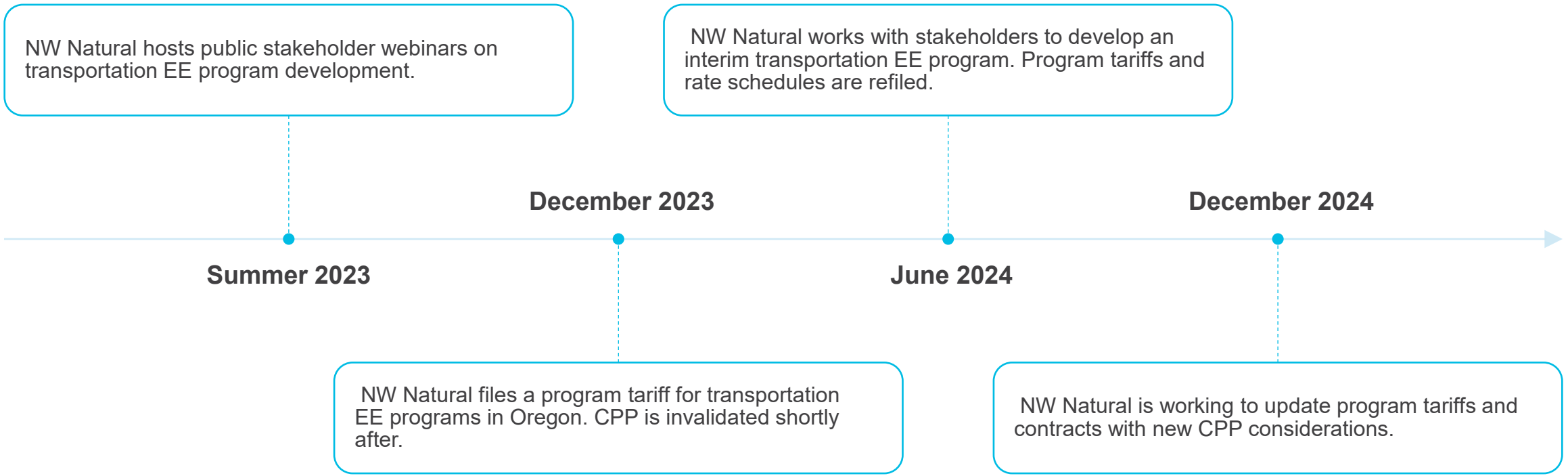
*Health/Safety/Repair are any updates that need to be made to install energy efficiency measures

Transportation Customer Energy Efficiency Programs

Transportation Energy Efficiency Context

- Transportation customers are customers that purchase their own gas wholesale and pay NW Natural to transport it to their site via the Company's distribution system.
- These are typically large industrial facilities but there are a smaller subsect of commercial transportation customers.
- Historically, energy efficiency programs have not been available to these customers.
  - Privacy restrictions on data sharing.
  - Not cost-effective from a Utility Cost Test (UCT) perspective.
- Carbon regulation now brings many transportation customers natural gas usage under NW Natural's emission obligation.

OR Transportation Energy Efficiency (EE)



OR Transportation EE – 2024 Program

- NW Natural partnered with Energy Trust of Oregon to deliver the interim transportation EE program.
- Offerings were limited to Energy Trust's Standard Track offerings.
  - The "Standard Track" is delivery method in which customers may apply for incentives from a list of measures that have deemed savings associated. The most applicable measures for industrial applications are steam traps and pipe insulation.
- Total program budget was capped at $700,000.

OR Transportation EE – 2025 Plan

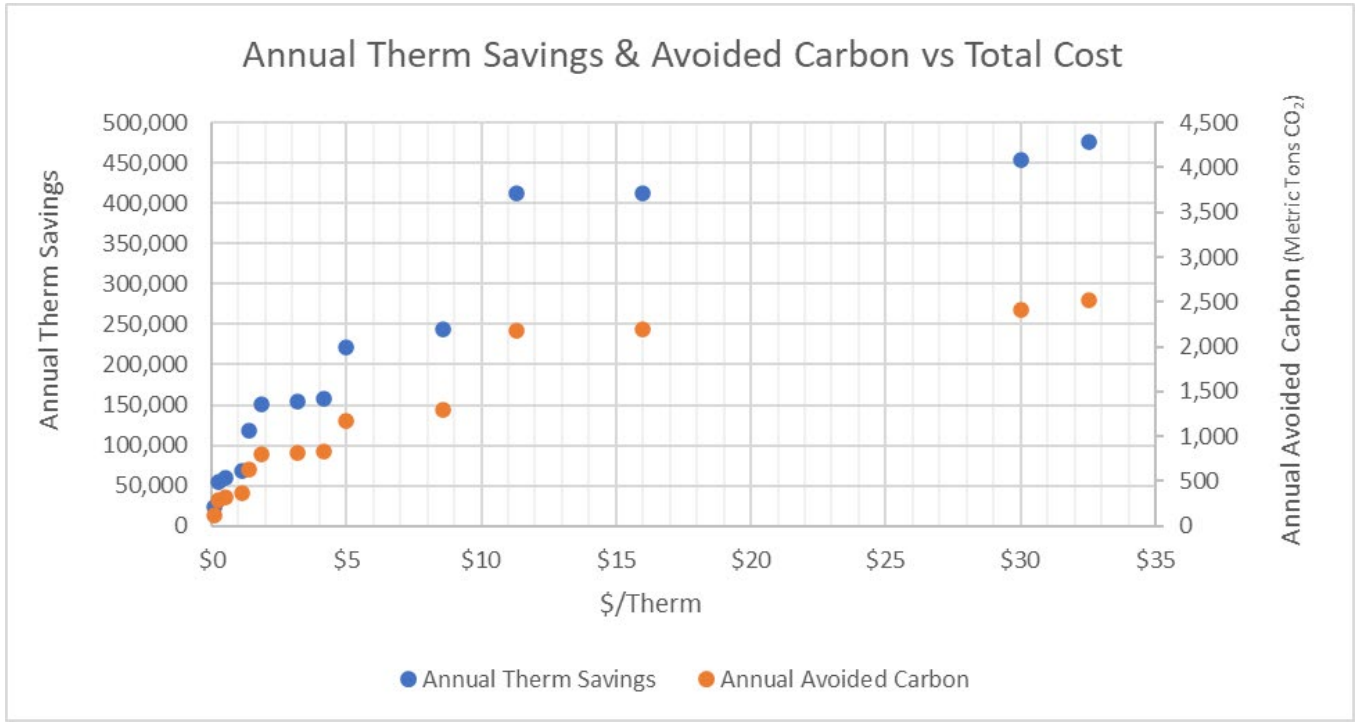
- Continue to partner with Energy Trust to deliver standard track incentives to customers.
- Emission Intensive Trade-Exposed Entities (EITEs) will not be eligible for the program.
- Engage with stakeholders on additional program opportunities for further development.
  - Expanded Energy Trust offerings
  - Custom energy efficiency "plus"
  - Voluntary opt-in for EITEs

Category	Budget
Delivery Cost	$311,002
Incentives	$630,685
Energy Trust Admin	$188,337
Total	$1,130,025

Sector	Savings Goal (therms)
Commercial	100,000
Industrial	450,319
Total	550,319

WA Transportation EE

- NW Natural worked directly with Energy 350 to offer high-level energy audits to industrial customers in Washington.
- 6 sites completed audits; savings opportunities are shown in the chart below.



WA Transportation EE – 2025 Plan

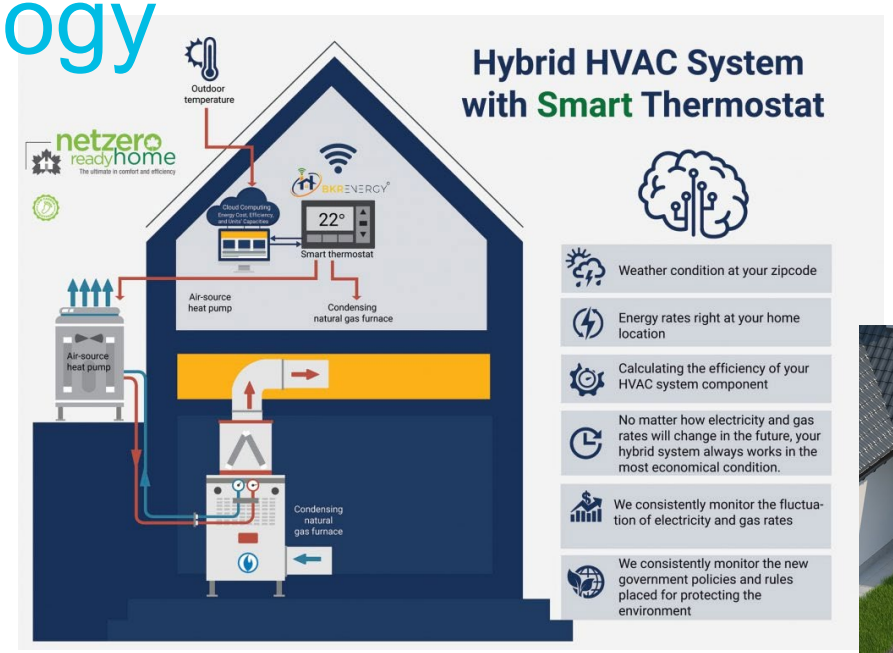
- NW Natural has budgeted $150,000 for initial program development and outreach in 2025. Due to an anticipated mid-year launch and project lead times, there are no savings anticipated for the transportation sector in 2025.
- EITEs will not be eligible for the program.
- Final program structure will be dependent on feedback and engagement with NW Natural's Energy Efficiency Advisory Group (EEAG).

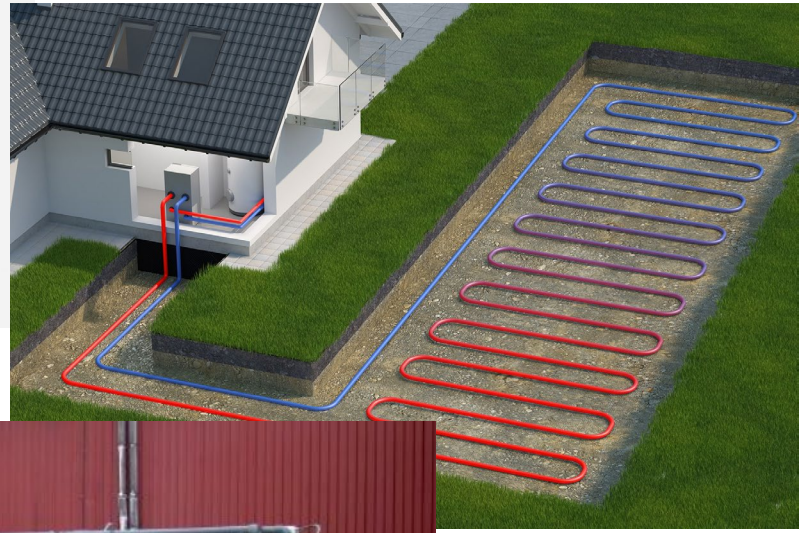
Emerging Technologies

Emerging Technology

- Dual fuel/Hybrid Systems
  - Air-source heat pump with natural gas furnace as back up
  - Ground-source heat pump with natural gas furnace as back up

- Gas-fired heat pumps / Thermal heat pumps





Feedback Form

Feedback preferred by February 4th

https://www.surveymonkey.com/r/NWNaturalIRP

Thank you!

We value your feedback.

IRP@nwnatural.com

IRP Website

IRP Feedback Form