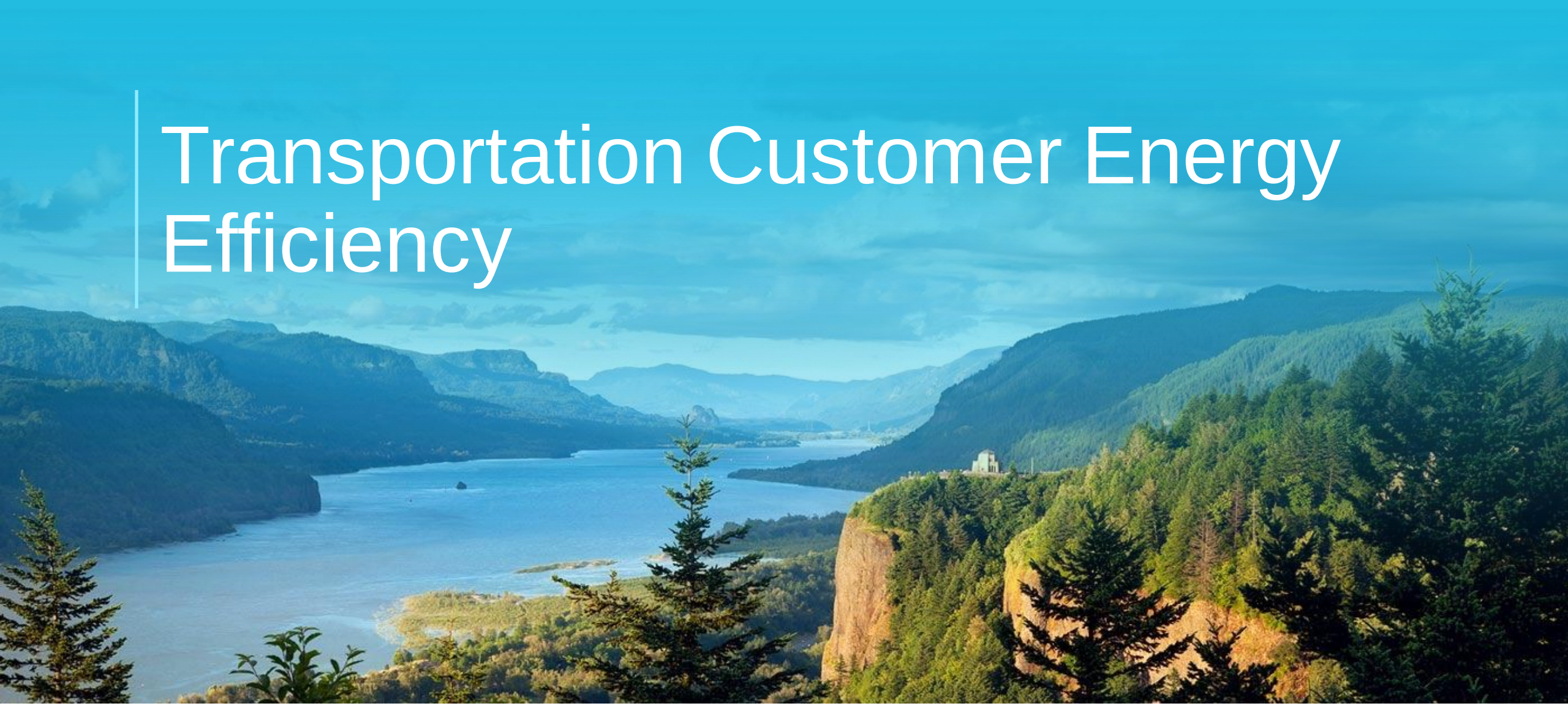
Transportation Customer Energy Efficiency



Stakeholder Meeting
July 10, 2023

NW Natural®

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

Welcome

Background & Context

Estimated Potential – AEG Presentation

AWEC Comments

Program Implementation

Cost-Effectiveness Evaluation

Next Steps

2 Minutes for Safety:

July is UV safety awareness month

Ultraviolet (UV) rays:

- 3 types (UVA, UVB, UVC)
- are invisible
- can come from the sun, tanning beds, & sun lamps
- can penetrate & change skin cells
- UVB rays primarily cause sunburn while UVA rays penetrate deeper into the skin

Protect yourself:

- Look for broad spectrum sunscreen (protects against both UVA & UVB)
- Wear U.P.F rated clothing
- Cotton and denim can also provide some protection
- Wear UV-absorbent sunglasses
- Stay hydrated

Adapted from nationaltoday.com and safetystage.com

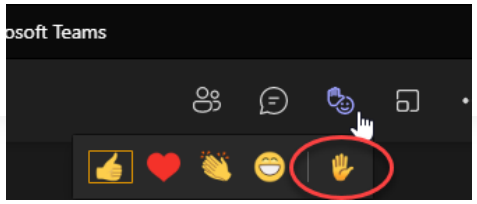
Procedures for Participation

- Please mute your microphones during the presentation, except when commenting and/or asking a question
- All participants are muted upon entry into the meeting

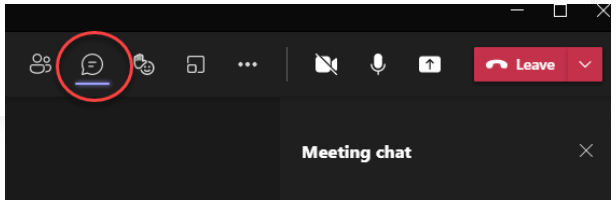
- Cameras are optional and up to each participant to use
- All participant cameras are set to off upon entry into the meeting

- Add a comment or question at any time using the “raised hand” or the chat box

Raised hand function is found in the reactions

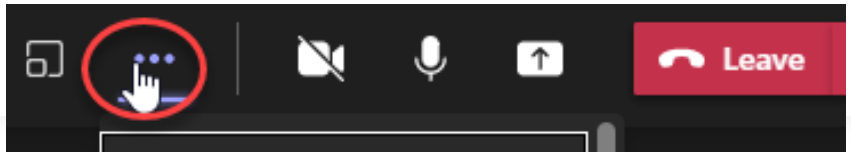


Chat box will open when you click on the conversation bubble



- Microsoft Teams has a live caption function for any participant to use

Click the ellipses, then chose “turn on live captions”



NW Natural Transportation Customers

Transportation customers are gas customers that purchase their own gas wholesale and pay NW Natural to transport it to their site via the Company's system.

They're typically large industrial facilities, but there is a smaller subsect of commercial transportation customers.

The 10 biggest transport users in Oregon make up roughly 64% of NW Natural's Oregon transportation load.

Changing Carbon Policy

Climate Protection Program (CPP) in Oregon

- Requires 50% reduction in NW Natural's customer emissions by 2035 and 90% by 2050
- NW Natural is responsible for all transport customers

Climate Commitment Act (CCA) in Washington

- Requires 95% reduction in Washington's emissions by 2050
- NW Natural is responsible for non EITE transport customers under 25,000 metric tons of GHG emissions

Current Transportation Efforts

Oregon

- Transportation Potential Study
- LBNL 50001 Ready Cohort
- 50% Carbon Reduction Audit

Staff Recommendations

OPUC Staff Recommendation 23: NW Natural should convene a stakeholder group immediately following the conclusion of the IRP to establish a transport customer efficiency program in time to be able to report on its status in the 2024 IRP update.

OPUC Staff Recommendation 24: NW Natural, in the development of a transport customer efficiency program for 2024, should explore and share findings regarding an incentive that would adequately incentivize efficiency, but would not be applied as a flat, per therm rate to usage reductions for operational, economic, or other reasons.

Estimated Transportation Energy Efficiency Potential

AEG
APPLIED ENERGY GROUP

NW Natural OR Transport Customer Potential Study

Date: July 10th, 2023
Prepared for: NW Natural Stakeholder Workshop

AEG Introduction

Eli Morris
Project Director

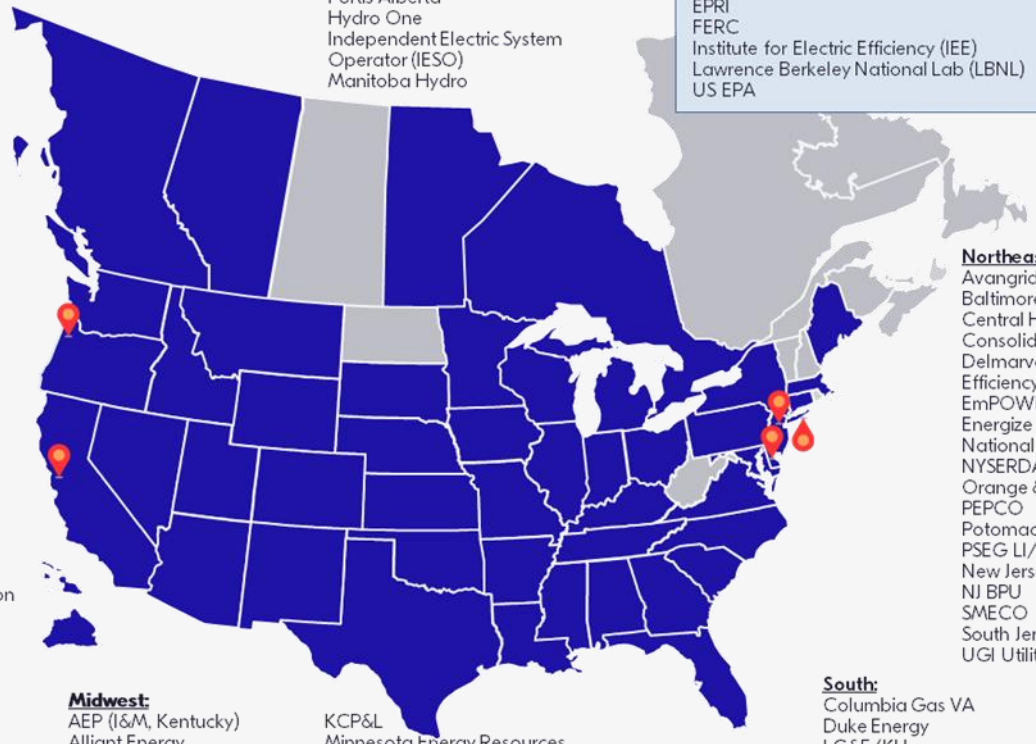
Ken Walter
Analysis Lead

With support from
AEG analysts and engineers

Northwest & Mountain:
Avista Energy
Bonneville Power Ad. (BPA)
Black Hills Energy
Cascade Natural Gas
Chelan PUD
City of Fort Collins
Colorado Electric
Cowlitz PUD
Energy Trust of OR
Idaho Power
Inland P&L
Northwest EE Alliance
Northwest Natural Gas
Northwest Power & Conservation Council
Northwestern Energy
Oregon Trail Electric Co-op
PacifiCorp
PNGC
Portland General Electric
Seattle City Light
Snohomish PUD
Tacoma Power

Canada:
BC Hydro
Fortis Alberta
Hydro One
Independent Electric System Operator (IESO)
Manitoba Hydro

National:
American Society of Mechanical Engineers (ASME)
EPRI
FERC
Institute for Electric Efficiency (IEE)
Lawrence Berkeley National Lab (LBNL)
US EPA



Northeast & Mid Atlantic:
Avangrid (RG&E & NYSEG)
Baltimore Gas & Electric
Central Hudson Electric & Gas
Consolidated Edison of NY
Delmarva Power
Efficiency Maine
EmPOWER Maryland
Energize Delaware
National Grid
NYSERDA
Orange & Rockland
PEPCO
Potomac Energy
PSEG LI/LIPA
New Jersey Natural Gas
NJ BPU
SMECO
South Jersey Industries
UGI Utilities

Southwest:
Alameda Municipal Power
Burbank W&P
California Energy Commission
HECO
LADWP
NV Energy
PNM
PG&E
SCE
SDG&E
SMUD
State of NM
State of HI
Tucson Electric Power
Xcel/SPS

Midwest:
AEP (I&M, Kentucky)
Alliant Energy
Ameren Missouri
Ameren Illinois
Black Hills Energy
Citizens Energy
ComEd
Empire District Electric
First Energy
Indianapolis P&L
KCP&L
Minnesota Energy Resources
Midcontinent ISO
NIPSCO
Omaha Public Power District
Peoples Gas/North Shore Gas
Spire
State of Michigan
Sunflower Electric Power
Vectren (IN & OH)
Wisconsin PSC

South:
Columbia Gas VA
Duke Energy
LG&E/KU
Oklahoma Gas & Electric (OK and AR)
South Mississippi Electric Power Association
Southern Company (Services and utilities)
TVA

States and Provinces in which we've worked
AEG offices

As of January 2023

Prepared for IRP Working Group- Not to be used for investment purposes.

Study Objectives

1. Assess the potential for energy efficiency to reduce energy consumption and on-site GHG emissions for NW Natural Oregon transport customers as a result of Oregon's Climate Protection Program (CPP).
2. Efficiently leverage information and assumptions from the potential study AEG performed for NW Natural's Washington service territory in 2021.
3. Incorporate NW Natural data and insights to understand how Oregon transport customers use natural gas and prioritize energy efficiency upgrades.

Methodology

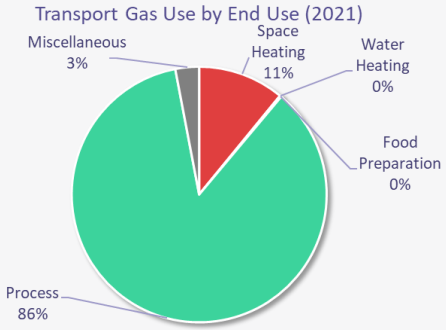
AEG's Modeling Approach

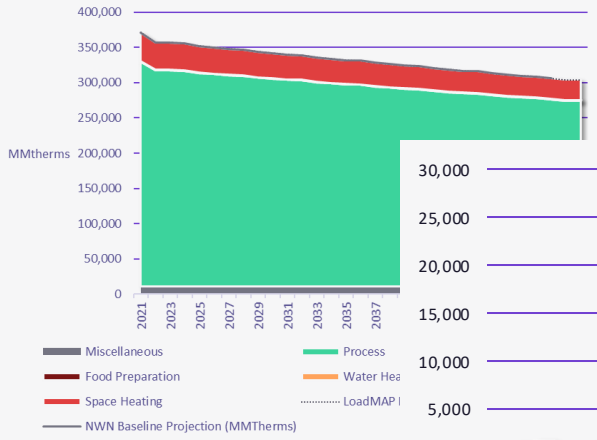
Market Characterization
- Baseline studies
- Utility data
- Secondary data

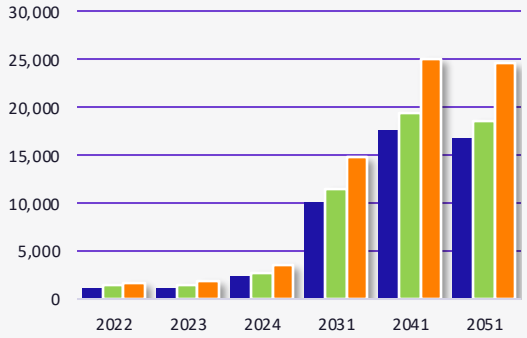
Identify Demand-Side Resources
- EE equipment
- EE measures
- Emerging tech.

Baseline Projection
- Utility forecasts
- Standards and building codes

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







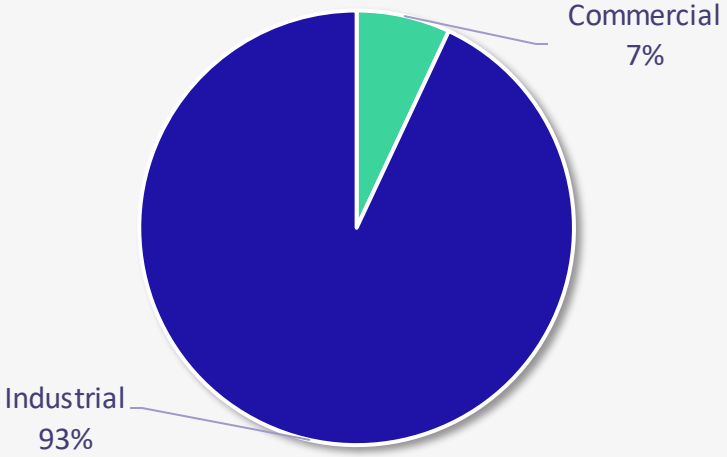
NW Natural Data

- Customer account data including SIC codes
- Customer equipment database including nameplate BTU
  - Vetted and adjusted by NW Natural field techs
- Transport customer class energy totals and forecast
- Washington CPA conducted by AEG served as a starting point for many measure characterizations and applicable market/adoption rate assumption

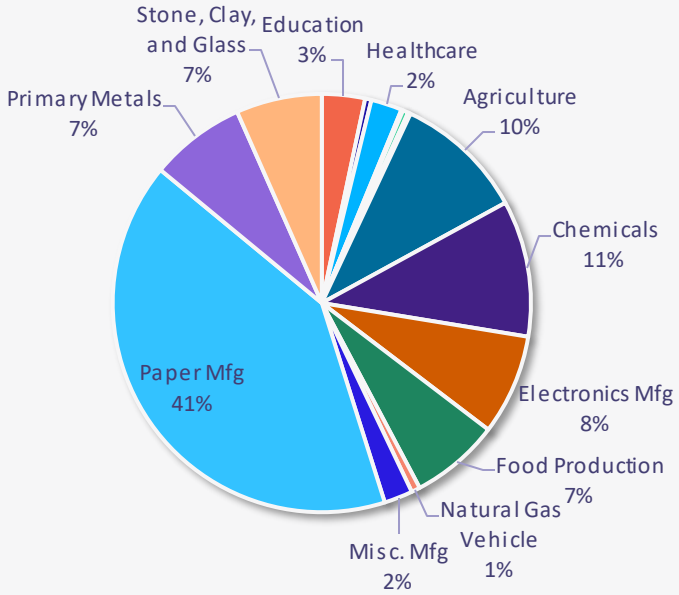
Market Characterization

- Define energy-consumption characteristics in the base year of the study (2021).
- Incorporates NW Natural's actual consumption and customer counts to develop "Control Totals" – values to which the model will be calibrated.
- Grounds the analysis in NW Natural data and provides enough detail to project assumptions forward to develop a baseline energy projection.
- After separating gas consumption into sectors and segments, it is allocated to specific end uses and technologies.

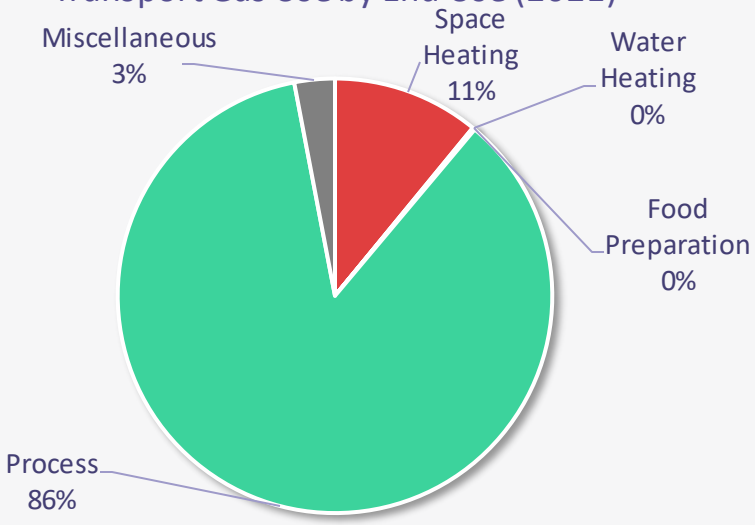
Transport Gas Use by Sector (2021)



Transport Gas Use by Segment (2021)



Transport Gas Use by End Use (2021)



Considerations for this Analysis

- Available potential is largely a function of baseline consumption – segments with the highest baseline consumption are likely to have the highest potential

- Potential studies rely on average information, which may not reflect conditions or opportunities for any single customer
  - This is particularly relevant for this study, where a small number of customers represent a large share of transport load
  - Ramp rates are derived from the Northwest Power and Conservation Council's 2021 Power Plan and reflect expected adoption across a broad set of customers. Actual adoption of energy efficiency for large transport customers may be lumpier based on cycles for implementing large capital projects

- Equipment data provided from NW Natural's system contain some uncertainty around frequency of use which could affect the actual impact of measures

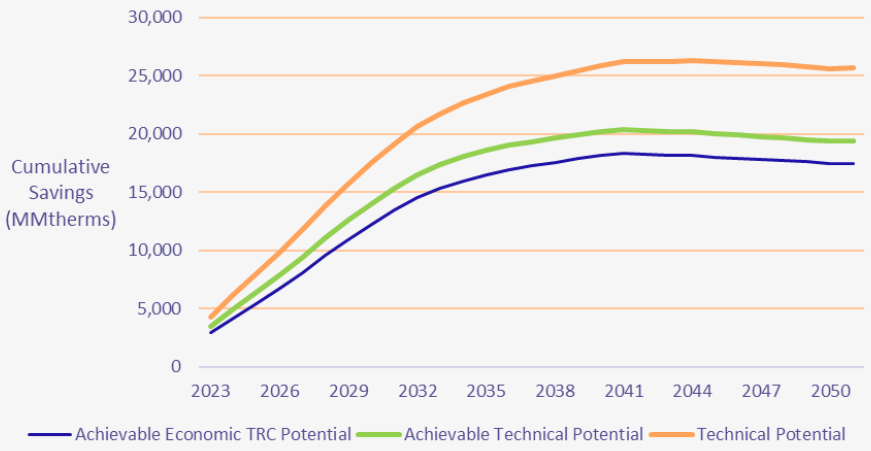
Potential Results

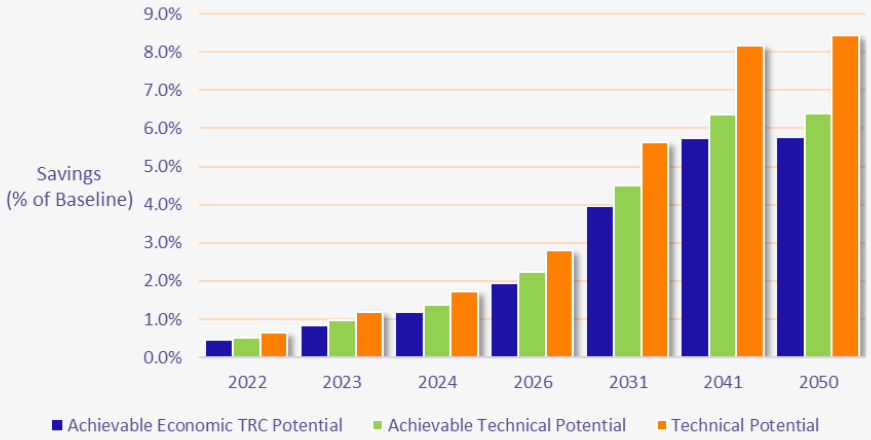
Total Resource Cost vs. Utility Cost Test

	Total Resource Cost Test (TRC)	Utility Cost Test (UCT)
Purpose	Assesses cost-effectiveness from the perspective of the utility and its customers, including attributable and quantifiable **non-energy impacts**. Non-energy impacts include reduced water, detergent, or wood, any electric benefits for applicable measures, etc.	Assesses cost-effectiveness from a utility or program administrator's perspective which includes the avoided energy benefits, incentive costs, and administrative costs.
Measure Passes If…	it has non-negative net benefits (i.e. its benefits equal or exceed its costs) based on the test-specific benefits and costs identified below:	
Benefits Calculation	- Avoided energy supply, distribution, and capacity - Includes social cost of carbon in Oregon - 10% Conservation Credit for Oregon - Quantifiable non-energy impacts	- Avoided energy supply, distribution, and capacity - Includes social cost of carbon in Oregon - 10% Conservation Credit for Oregon
Costs Calculation	- Incremental measure cost relative to baseline (includes equipment & labor cost) - Program administration costs - Operations and maintenance costs relative to baseline	- Assumed incentives and administration costs

Cumulative Energy Efficiency Potential

- AEG assessed potential for technical, achievable technical, and achievable economic scenarios.
- Economic screening is from a Total Resource Cost (TRC) perspective, including the commodity cost of natural gas.
- Potential was estimated over a 30-year period, though most potential is assumed to be acquired within the first 20 years.
- Cumulative Achievable Technical Potential by 2031 is estimated at 15.4 million therms (4.5% of baseline sales), growing to 20.4 million therms (6.4%) by 2041.
- Most of the Achievable Technical Potential is expected to be cost-effective from a TRC perspective.
  - TRC Cost-effective potential is estimated at 13.4 million therms (3.9% of baseline) in 2031, growing to 18.4 million therms (5.7%) by 2041.

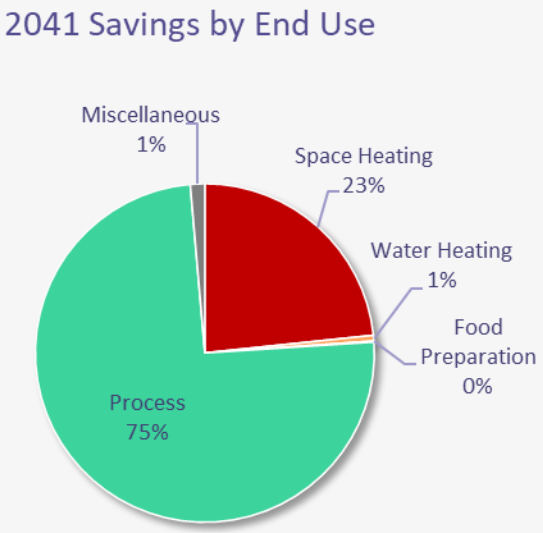


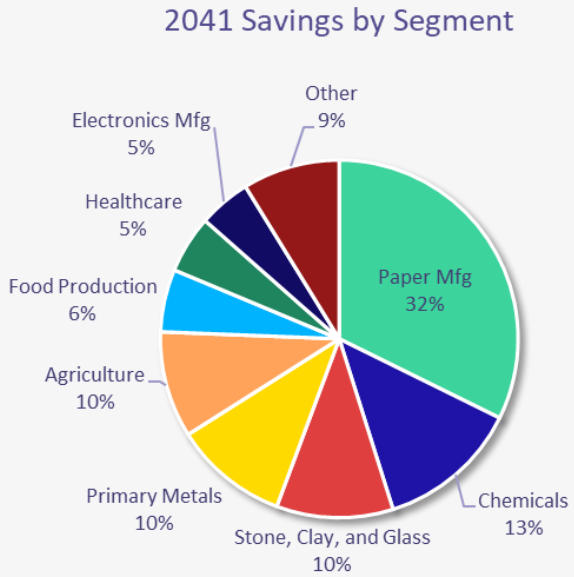


Cumulative Potential by End Use and Segment

Achievable Economic Potential in 2041

- Savings are generally proportional to consumption in the base period
- Space heating savings come mainly from the commercial segments (Education and Healthcare) and have some easier/cheaper interventions compared to Process
- A large potion (32%) of potential comes from the Paper segment where there are only a few customers





Thank You.

Eli Morris
emorris@appliedenergygroup.com

Ken Walter
kwalter@appliedenergygroup.com

Phone: 631-434-1414

AEG
APPLIED ENERGY GROUP

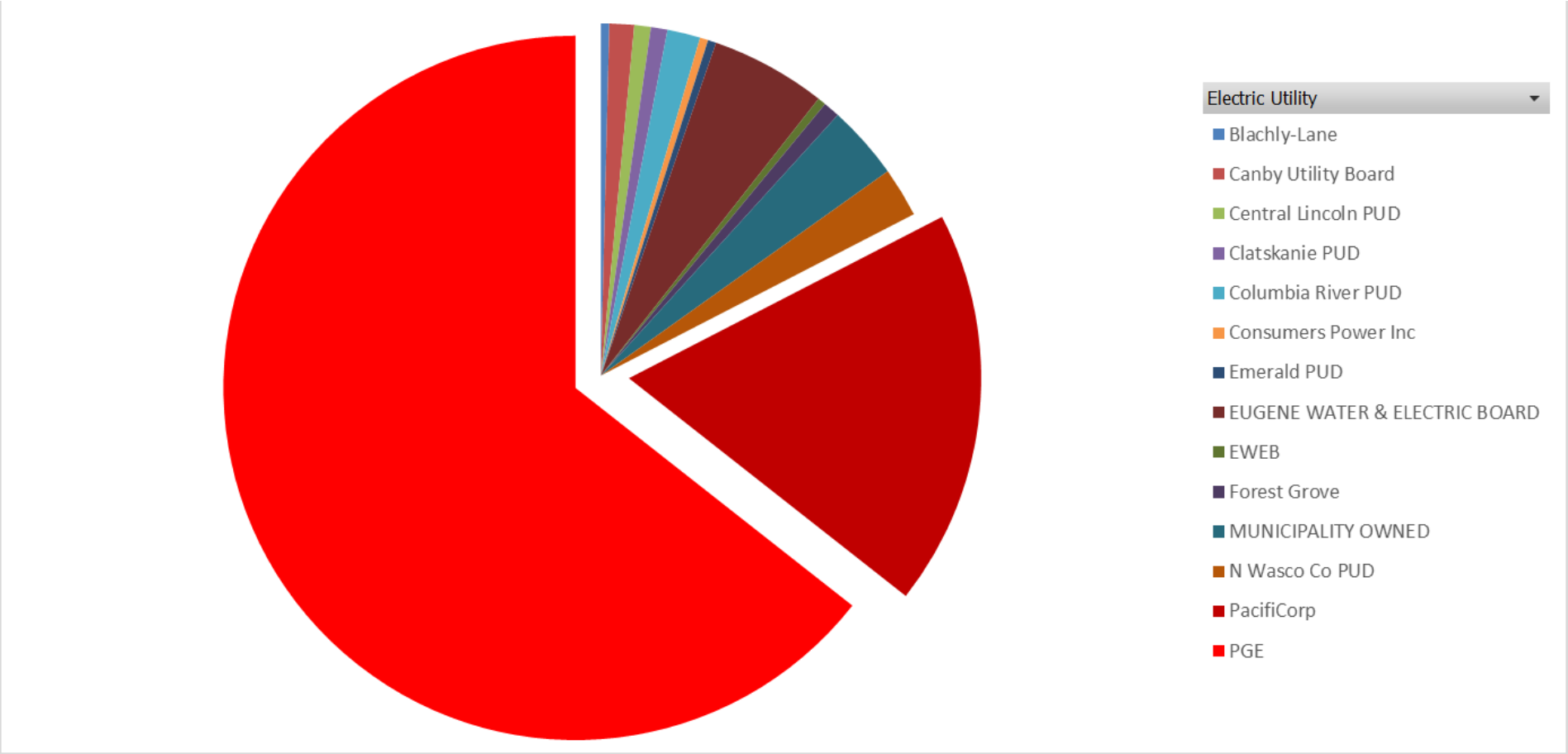
AWEC Perspective

Program Implementation

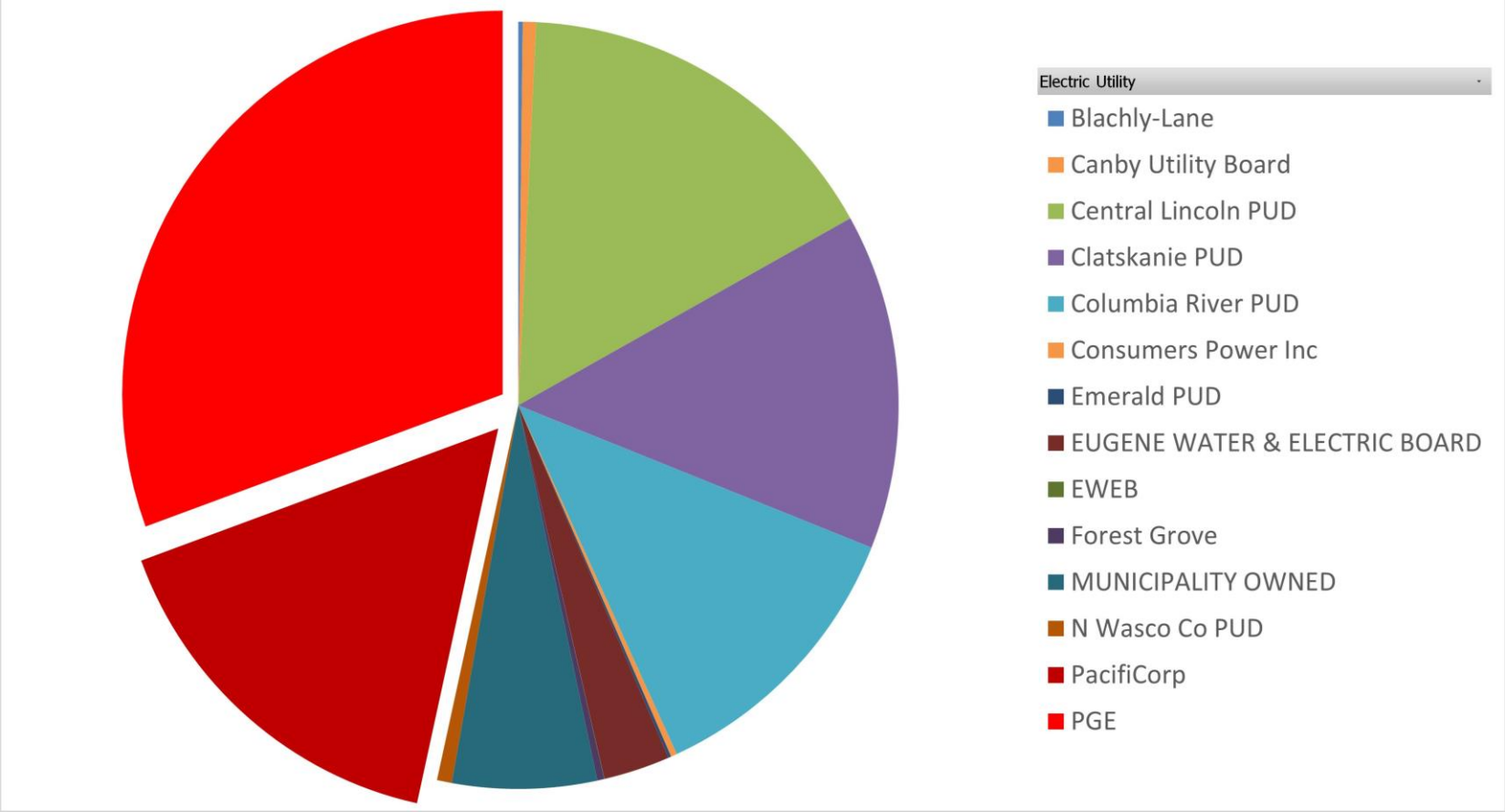
Program Opportunities

- Transportation customers are a unique group of customers that vary in size and needs. Additional programs to target decarbonization of the largest customers may be prudent
- Energy Trust has been running industrial programs which may directly benefit a large portion of transport customers, as is
- NW Natural would like to have multiple programs to maximize achievable savings
- Multiple entities have important relationships with the customers which are important for implementing programs
  - NW Natural account managers and industrial technicians regularly meet with large customers
  - Energy Trust has established relationships serving customers in electric IOU territory
  - AWEC represents large customer needs and interests, for both gas and electric

Electric Providers by 2022 Transport Customer Count



Electric Providers by 2022 Transport Usage



Program Implementation Timeline

NW Natural®

July 2023

Initial Stakeholder Meeting
Transport Customer Survey

August 2023

Program Design Stakeholder Meeting
Establish Reporting Requirements

September 2023

Program Development
- Offerings
- Budgets

December 2023

Implementer Contracting

2024

Transportation Energy Efficiency Program Launch

Program Design Meeting

- NW Natural will send all transport customers a survey to gather feedback on their priorities for a program that delivers energy efficiency.
- Potential Program Design Meeting topics:
  - Program delivery
  - Eligible technology and projects
  - Reporting and evaluation requirements

Cost-Effectiveness

Discussion Questions

- Which cost-effectiveness tests are appropriate for transportation EE (TRC, UCT, RIM, PCT)?
- What avoided cost components need to be included as benefits for transportation EE?
- Are there other benefit elements to be included?
- How should the amount of the incentive for transportation EE be determined?
- Is the incentive equitable to other customer types?

EE cost-effectiveness evaluation methods and avoided costs for firm sale customers

The foundation of cost-effectiveness analysis for all demand-side resources is based on the California Standard Practice Manual (2001) *

- Participant Cost Test (PCT)
- Rate Impact Measure (RIM)
- Total Resource Cost (TRC)
- Utility Cost Test (UCT) or Program Administrator Cost Test (PACT)
- Societal Cost Test (SCT)

* https://www.raponline.org/wp-content/uploads/2016/05/cpuc-standardpractice-manual-2001-10.pdf

Elements of Cost Effectiveness Tests

Elements		TRC	UCT/PACT	RIM	PCT	SCT
Benefits	Avoided costs	√	√	√		√
	Bill reductions				√	
	Conservation credits	√				√
	Non energy benefits					√
	Indirect fuel benefits	√				√
	Incentives/rebates				√	
Costs	Implementation costs	√	√	√		√
	Direct customer costs	√			√	√
	Program Admin and M&V	√	√	√		√
	Incentives/rebates		√	√		
	Reduced sales			√		

Energy Trust of Oregon (ETO) methods

NW Natural®

Total resource cost test (TRC) and utility cost test (UCT) are directed by OPUC

	Total Resource Cost Test (TRC)	Utility Cost Test (UCT)
Purpose	To determine whether to provide an incentive for an energy-efficiency measure.	To help determine the maximum allowable amount of the incentive.
Measure passes if...	The value of the energy saved exceeds the total cost of the measure, and the cost of the energy-efficiency resource provides good value to all utility customers and the participating customer.	The value of the energy saved exceeds the cost of the incentive, and the cost of the energy-efficiency resource provides good value to all utility customers.
Benefits calculation	• Savings from avoiding the use of more expensive energy • Quantifiable non-energy benefits to the participating customer or the utility, like water savings or operations and maintenance benefits	Savings from avoiding the use of more expensive energy.
Costs calculation	• Amount of incentive • Remaining amount of participant's costs	Amount of incentive
Calculation used by Energy Trust	(Lifetime (Savings) • (Avoided Costs) + (Non-Energy Benefits)) / Total Cost of Measure	(Lifetime (Savings) • (Avoided Costs)) / Incentive Amount

Source: Energy Trust of Oregon. https://www.energytrust.org/wp-content/uploads/2016/11/GEN_FS_CostEffectiveness.pdf

Energy Trust of Oregon (ETO) methods (continued)

NW Natural®

Cost-Effectiveness Screen

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

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

- If TRC is > 1.0, it is cost-effective

- Measure Benefits:
  - Avoided Costs (provided by NWN)
    - Annual measure savings x NPV avoided costs per therm
  - Quantifiable Non-Energy Benefits
    - Water savings, etc.

Total Measure Costs:
- The customer cost of installing an EE measure (full cost if retrofit, incremental over baseline if replacement)

Source: Energy Trust of Oregon, Slide 74 in TWG4_AvoidedCostandDemandSideResource_April_13_2022_CombinedPresentations.pdf.

Applied Energy Group (AEG) methods

NW Natural®

Total resource cost test (TRC) and utility cost test (UCT) are directed by OPUC

	Total Resource Cost Test (TRC)	Utility Cost Test (UCT)
Purpose	Assesses cost-effectiveness from the perspective of the utility and its customers, including attributable and quantifiable **non-energy impacts**. Non-energy impacts include reduced water, detergent, or wood, any electric benefits for applicable measures, etc.	Assesses cost-effectiveness from a utility or program administrator's perspective which includes the avoided energy benefits, incentive costs, and administrative costs.
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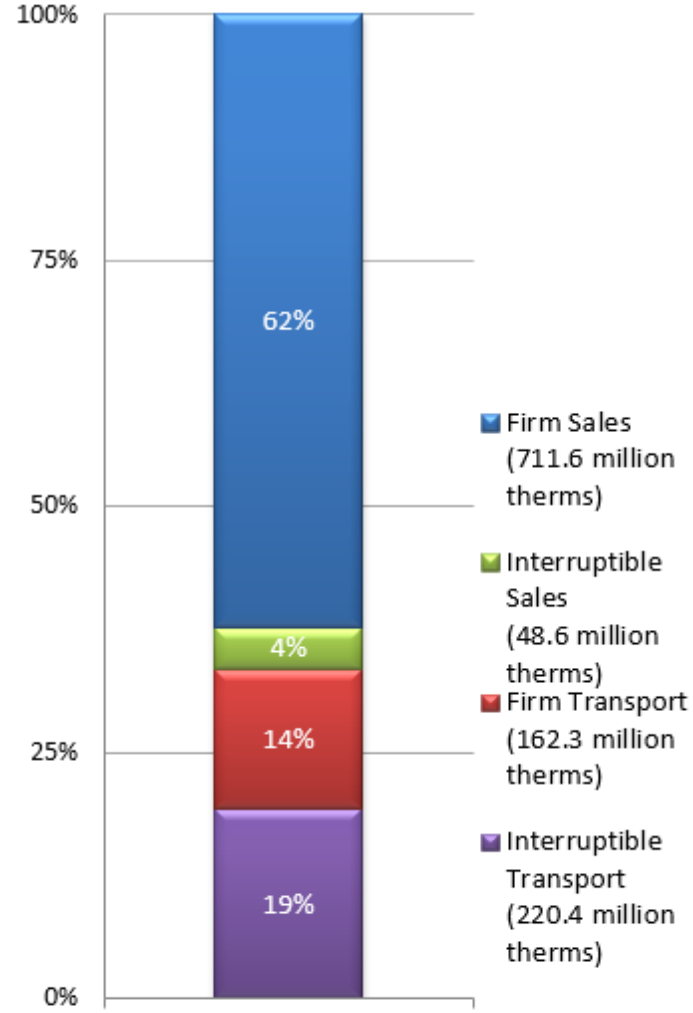
Customer Types and Resource Planning

	System Capacity Resource Planning			Distribution System Planning
Customer Category	**Design Winter Weather Energy Requirements**	**Peak Day Capacity Requirements**	**Emission Compliance**	**Peak Hour Capacity Requirements**
Firm Sales	✓	✓	✓	✓
Interruptible Sales	✓		✓	
Firm Transport			✓	✓
Interruptible Transport			✓	

Note: Transport customers pay NW Natural to provide distribution services to *transport* the gas from the interstate pipeline to the customer's site location but are responsible for purchasing and upstream shipping of their gas.



Percentage of YE Volume 2020 by Service Type

60

Source: TWG4_Avoided Cost and Demand Side Resources on April 13, 2022, Slide 60.

Avoided Cost Component Applications

NW Natural®

Costs Avoided		Resource Option Application						Transportation Energy Efficiency	
		Demand-Side Resources			Supply-Side Resources				
			Demand Response		Low-Carbon Gas Supply				
		Energy Efficiency	Interruptible Schedules	Other DR	On-System Resources	Off-System Resources	Recall Agreements	Firm	Interruptible
Commodity Related Avoided Costs	Natural Gas Purchase and Transport Costs	✓			✓	✓			
	Greenhouse Gas Compliance Costs	✓			✓	✓		√	√
	Commodity Price Risk Reduction Value	✓			✓	✓			
Infrastructure Related Avoided Costs	Supply Capacity Costs	✓	✓	✓	✓		✓		
	Distribution System Costs	✓	✓	✓	✓			√	
Unquantified Conservation Costs	10% Northwest Power & Conservation Council Credit	✓						√	√

Source: TWG4_Avoided Cost and Demand Side Resources on April 13, 2022, Slide 20.

30 Year Levelized Avoided Costs (2021$/Dth)

NW Natural®

	Commodity Costs			Capacity Costs			
	Natural Gas Commodity and Transport Costs	Greenhouse Gas Compliance Costs	Risk Reduction (Hedge) Value	Supply Capacity Costs Avoided	Distribution System Resources	10% Conservation Credit	**Total Avoided Costs**
Residential Space Heating	$3.83	$7.61	$0.86	$0.64	$4.72	$0.92	**$18.58**
Residential Hearths and Fireplaces	$3.83			$0.64	$2.37	$0.68	**$16.00**
Commercial Space Heating	$3.83			$0.57	$5.69	$1.01	**$19.57**
Water Heating	$3.58			$0.11	$1.07	$0.48	**$13.70**
Cooking	$3.55			$0.12	$2.92	$0.66	**$15.72**
Process Load	$3.55			$0.09	$0.47	$0.41	**$12.99**
Interruptible Loads	$3.55			X	X	$0.36	**$12.38**
Firm Transportation	X	$7.61	X	X	$0.47	$0.05	**$8.12**
Interruptible Transportation	X	$7.61	X	X	X	X	**$7.61**

Questions/Feedback

Strategic Planning | Integrated Resource Planning Team
irp@nwnatural.com