2023 Electric Integrated Resource Plan

Technical Advisory Committee Meeting No. 4 Agenda

Wednesday, August 10, 2022
Microsoft Teams Virtual Meeting

Topic	Time	Staff
Introductions	9:00	John Lyons
Electric Conservation Potential Assessment	9:05	AEG
Break		
Electric Demand Response Study	10:35	AEG
Lunch	11:30	
Clean Energy Survey	12:30	Mary Tyrie
Adjourn	2:00	

Microsoft Teams meeting

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2023 IRP Introduction

2023 Avista Electric IRP

TAC 4 – August 10, 2022

John Lyons, Ph.D. Senior Resource Policy Analyst

Meeting Guidelines

- IRP team is working remotely and is available for questions and comments
- Stakeholder feedback form
  - Responses shared with TAC at meetings, by email and in Appendix
  - Would a form and/or section on the web site be helpful?
- IRP data posted to web site – updated descriptions and navigation are in development
- Virtual IRP meetings on Microsoft Teams until able to hold large meetings again
- TAC presentations and meeting notes posted on IRP page
- This meeting is being recorded and an automated transcript made

Virtual TAC Meeting Reminders

- Please mute mics unless commenting or asking a question
- Raise hand or use the chat box for questions or comments
- Respect the pause
- Please try not to speak over the presenter or a speaker
- Please state your name before commenting
- Public advisory meeting – comments will be documented and recorded

Integrated Resource Planning

The Integrated Resource Plan (IRP):

- Required by Idaho and Washington* every other year
  - Washington requires IRP every four years and update at two years
- Guides resource strategy over the next twenty + years
- Current and projected load & resource position
- Resource strategies under different future policies
  - Generation resource choices
  - Conservation / demand response
  - Transmission and distribution integration
  - Avoided costs
- Market and portfolio scenarios for uncertain future events and issues

Technical Advisory Committee

- Public process of the IRP – input on what to study, how to study, and review of assumptions and results
- Wide range of participants involved in all or parts of the process
  - Please ask questions
  - Always soliciting new TAC members
- Open forum while balancing need to get through topics
- Welcome requests for new studies or different modeling assumptions.
- Available by email or phone for questions or comments between meetings
- Due date for study requests from TAC members – October 1, 2022
- External IRP draft released to TAC – March 17, 2023, public comments due – May 12, 2023
- Final 2023 IRP submission to Commissions and TAC – June 1, 2023

2023 IRP Progress Update

- Please provide any feedback on Washington and Regional Carbon Pricing Assumptions by August 15th
- Schedule changes:
  - Oct 12th TAC moved to Oct 11th
  - Move Global Climate Change Studies from Oct 11th meeting to Sept 28th meeting
  - Move L&R and load forecast from September 28th meeting to Oct 11th meeting
- Public Participation Partner's (P3) reach out opportunity (Date TBD)

2023 IRP TAC Meeting Schedule

- TAC 4: August 10, 2022
- TAC 5: September 7, 2022
- TAC 6: September 28, 2022
- TAC 7: October 11, 2022
- Technical Modeling Workshop: October 20, 2022
- Washington Progress Report Workshop: December 14, 2022
- TAC 8: February 16, 2023
- Public Meeting Gas & Electric IRPs: March 8, 2023
- TAC 9: March 22, 2023

Today's Agenda

9:00	Introductions, John Lyons
9:05	Electric Conservation Potential Assessment, AEG
	Break
10:35	Electric Demand Response Study, AEG
11:30	Lunch
12:30	Clean Energy Survey, Mary Tyrie
2:00	Adjourn Electric IRP

AEG
APPLIED ENERGY GROUP

Avista 2022 Electric Conservation Potential Assessment

Date: 8/10/2022
Prepared for: Avista Technical Advisory Committee

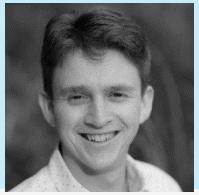
Agenda

- AEG Introduction
- Study Objectives
- AEG's CPA Methodology
- Electric CPA Draft Results Summary
- Electric DR Analysis Summary

AEG Introduction

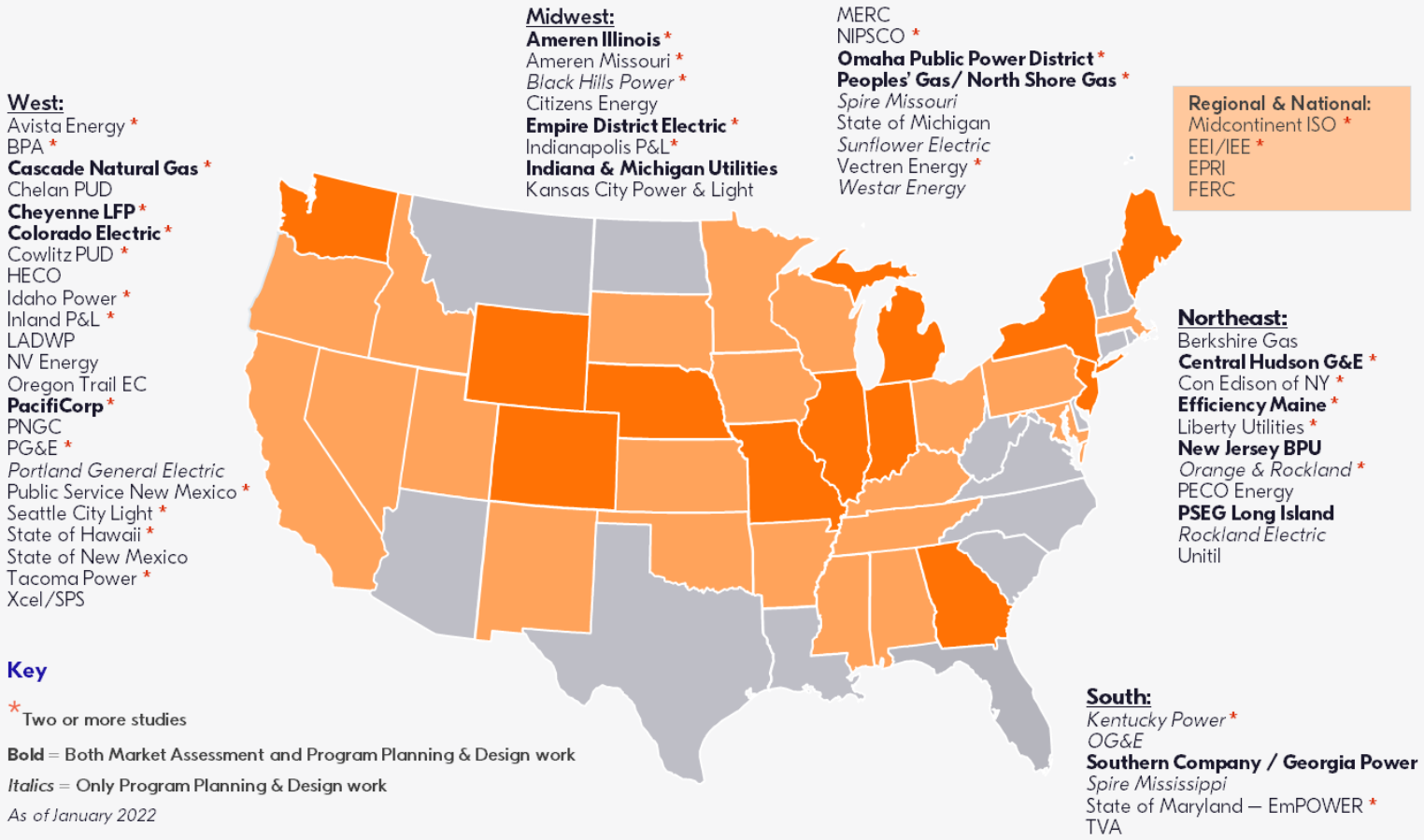
Eli Morris
Project Director

Kelly Marrin
Demand
Response Lead



Max McBride
Energy Efficiency
Lead Analyst

Andy Hudson
Project Manager

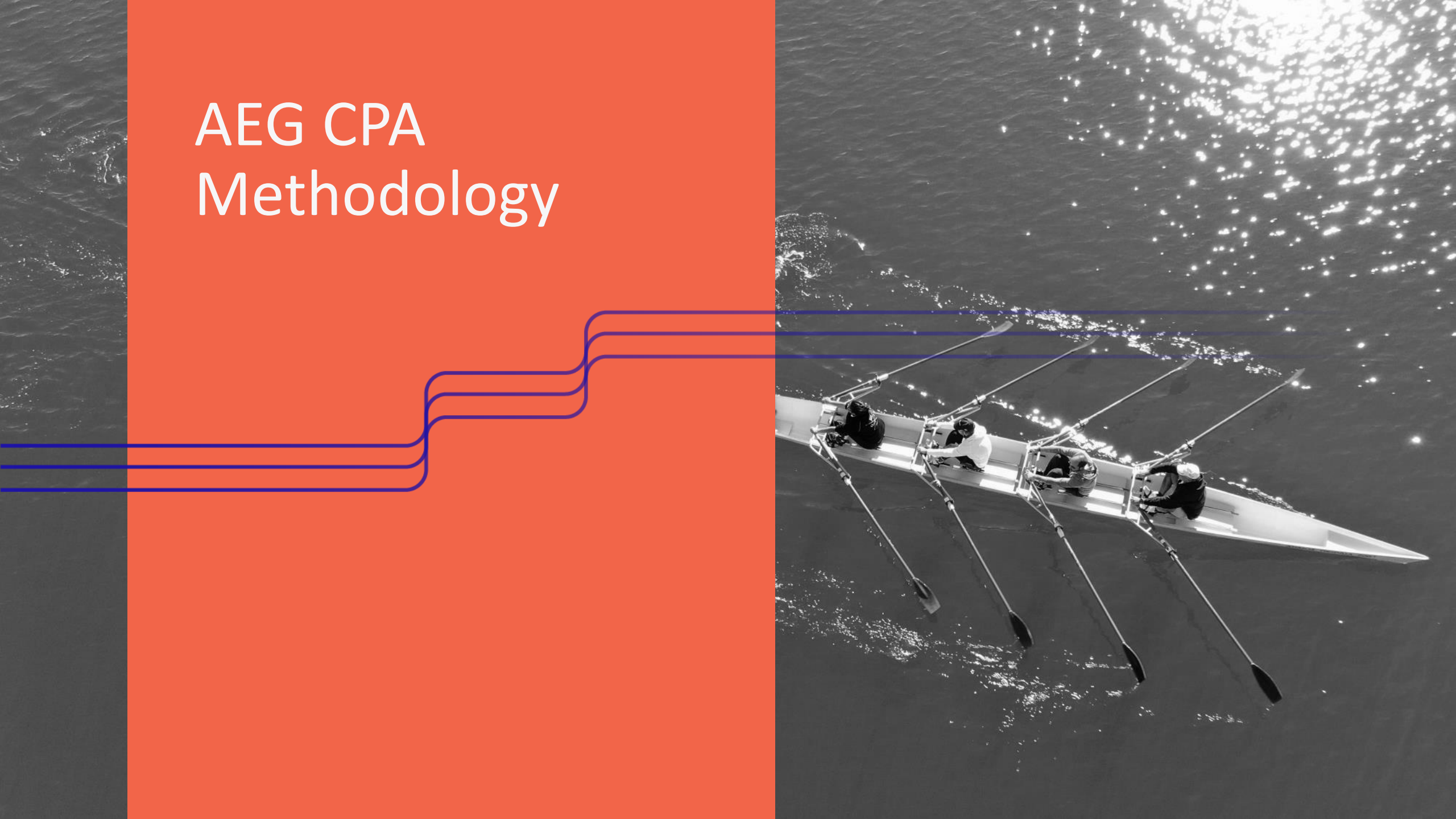


- 60 potential studies in last 5 years, many of these in the Pacific Northwest

CPA Objectives

- Assess a broad set of technologies to identify long-term energy efficiency and demand response potential in Avista's Washington and Idaho service territories to support:
  - Integrated Resource Planning
  - Portfolio target-setting
  - Program development
- Provide information on costs and seasonal impacts of conservation to compare to supply-side alternatives
- Understand differences in energy consumption and energy efficiency opportunities by income level
- Ensure transparency into methods, assumptions, and results

AEG CPA Methodology



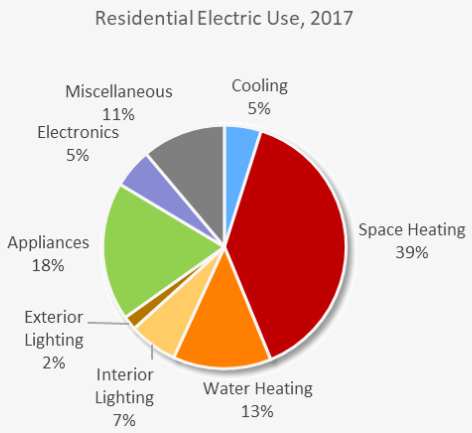
AEG's Modeling Approach

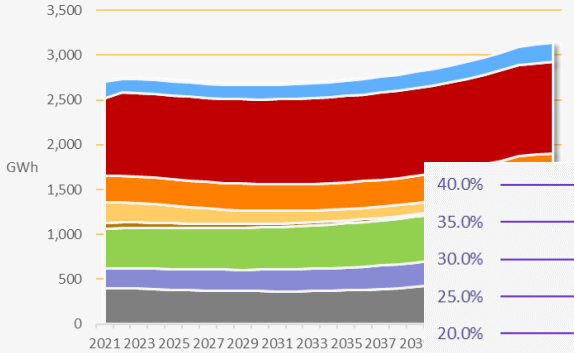
Market Characterization
- Baseline studies
- Utility data
- Secondary data

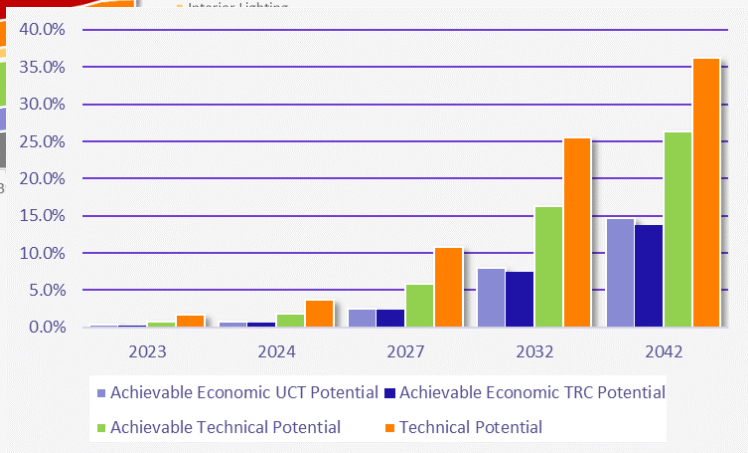
Identify Demand-Side Resources
- EE equipment
- EE measures
- Emerging tech.

Baseline Projection
- Utility forecasts
- Standards and building codes

Potential Estimation
- Technical
- Achievable Tech.
- Economic screen in IRP







Key Sources of Data

Data from Avista is prioritized when available, followed by regional data, and finally well-vetted national data.

Avista data sources:

- 2013 Residential GenPop Survey
- Historical energy, peak loads, and customer counts
  - CPA Base Period: Sept 2020 – Aug 2021
- Forecast data and load research
- Recent-year program accomplishments and plans

Additional sources:

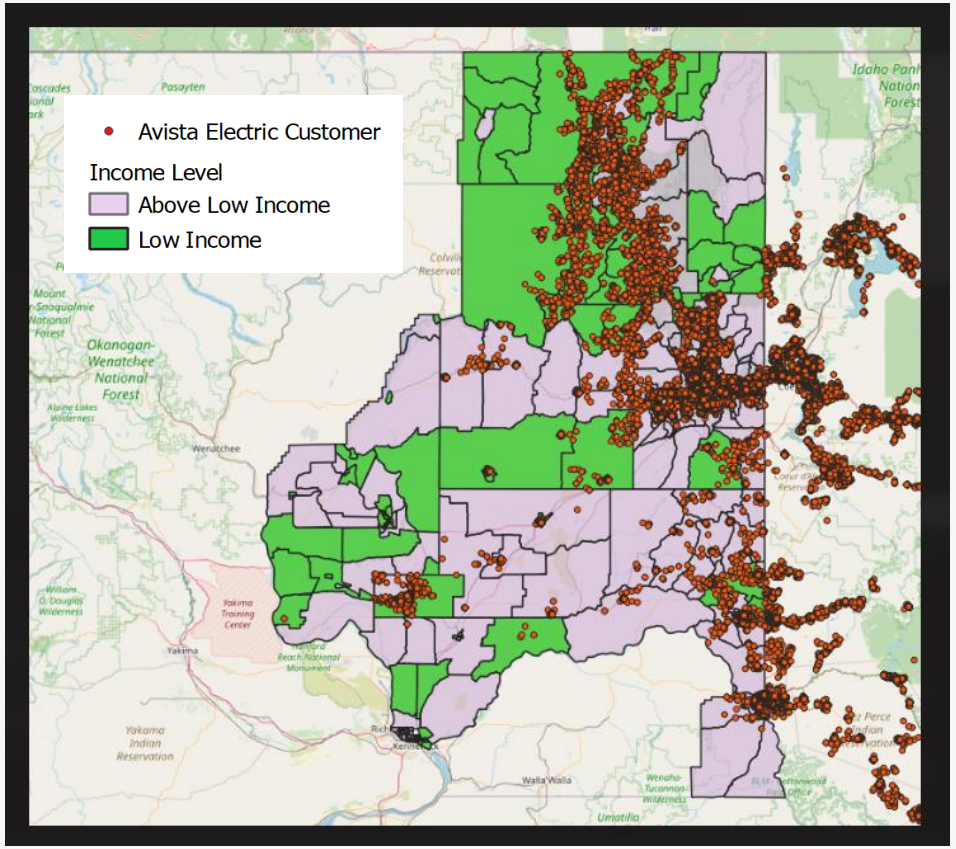
- U.S. DOE's Annual Energy Outlook
- U.S. DOE's projections on solid state lighting technology improvements
- Technical Reference Manuals and California DEER
- AEG Research

Regional data sources:

- NEEA studies (RBSA 2016, CBSA 2019, IFSA)
- Regional Technical Forum and NW Power and Conservation Council methodologies, ramp rates, and measure assumptions

Residential Customer Segmentation

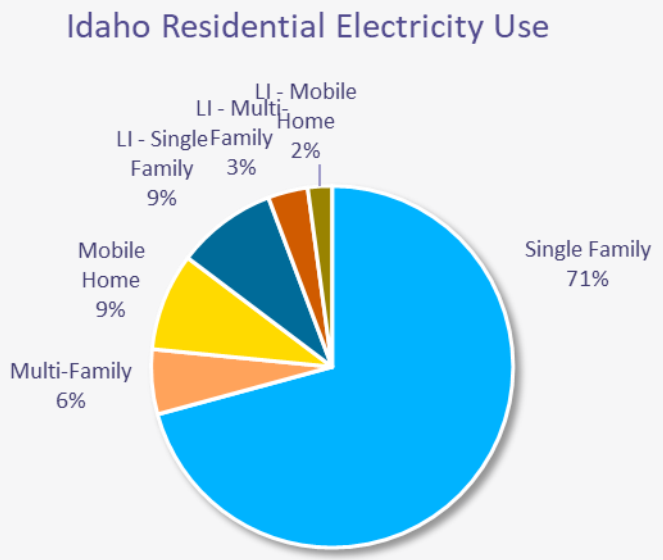
- This CPA enhances the residential segmentation to distinguish low-income households within each housing type rather than a single grouped “low income” segment.
- AEG cross referenced geographic data from Avista’s customer database with data from the US Census American Community Survey to estimate the presence of low-income households within Avista’s service territory (WA Census blocks shown at right).
  - “Low Income” was defined by household size. In Washington the threshold is 80% of Area Median Income, and in Idaho it is 200% of the Federal Poverty Level.
- Data from NEEA’s Residential Building Stock Assessment (RBSA II, 2016) was used to differentiate energy characteristics of low-income households, including differences in building shells, energy use per customer, and presence of energy-using equipment

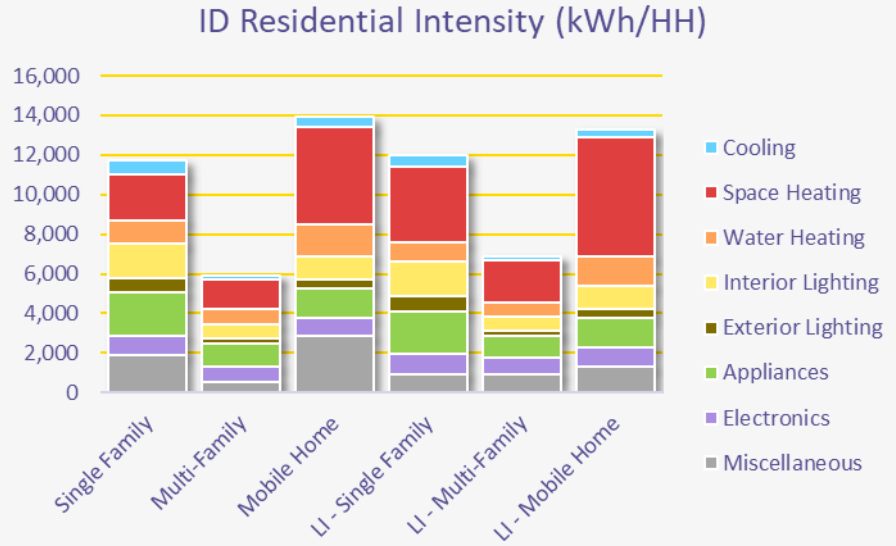


Market Profiles

Example – Idaho Residential

- Always calibrated to Avista's use-per-customer at the household level
- Breaks down energy consumption to the end use and technology level
- Defines the **saturation** (presence of equipment) and the annual consumption of a given technology where it is present **(Unit Energy Consumption – UEC)**
- Refer to data sources slide





Single Family Reg. Income Profile (excerpt)

End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (MWh)
Cooling	Central AC	33%	1,432	471	37,616
	Room AC	11%	487	52	4,127
	Air-Source Heat Pump	14%	1,476	207	16,539
	Geothermal Heat Pump	1%	1,300	11	855
	Ductless Mini Split Heat Pump	1%	517	6	450
Space Heating	Electric Furnace	5%	16,251	830	66,273
	Electric Room Heat	9%	1,616	139	11,100
	Air-Source Heat Pump	12%	9,954	1,230	98,255
	Geothermal Heat Pump	1%	8,539	62	4,946
	Ductless Mini Split Heat Pump	1%	4,977	54	4,328
Water Heating	Water Heater (<= 55 Gal)	46%	2,364	1,096	87,540
	Water Heater (> 55 Gal)	3%	2,144	71	5,669

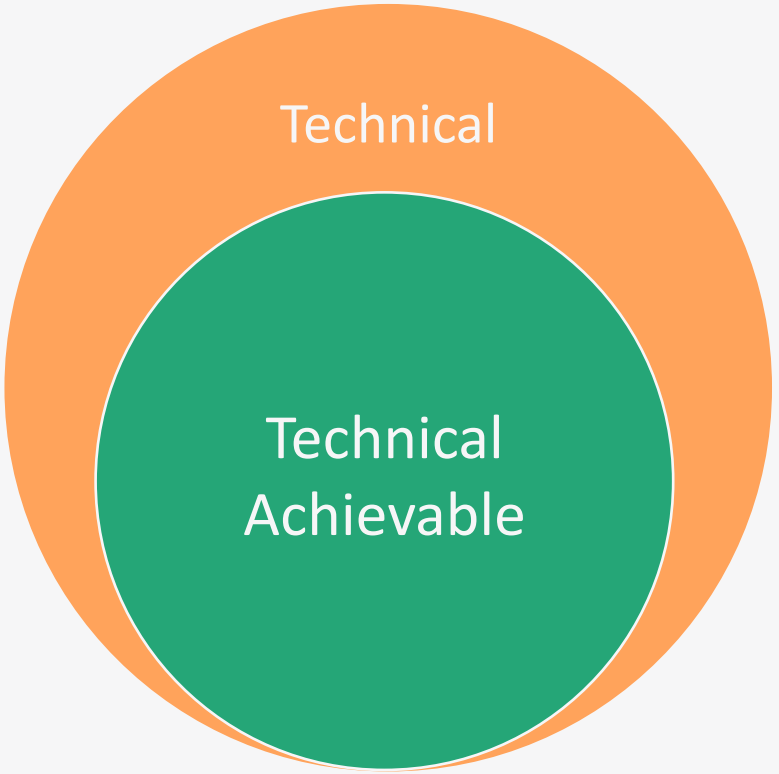
Two Levels of Savings Estimates

NW Power Council Methodology

This study develops two sets of estimates:

- **Technical potential (TP**): upper bound on potential, assuming all of the most energy efficiency opportunities are adopted without consideration of cost or customer willingness to participate.
  - This may include emerging or very expensive ultra-high efficiency technologies
- **Technical Achievable Potential (TAP)** is a subset of TP that accounts for customer preference and likelihood to adopt through **both** utility- and non-utility driven mechanisms, but does not consider cost-effectiveness

In addition to these estimates, the study produces cost data for the Total Resource Cost (TRC) and Utility Cost Test (UC)T perspectives that can be used by Avista's IRP process to select energy efficiency measures in competition with other resources (see next slide)



Levelized Costs

Two Cost-Effectiveness Tests

AEG provided a levelized cost of conserved energy ($/kWh) for each measure within the technical achievable potential within Avista's Washington and Idaho territories from two perspectives.

- Utility Cost Test (UCT): Assesses cost-effectiveness from a utility or program administrator's perspective.
- Total Resource Cost Test (TRC): Assesses cost-effectiveness from the perspective of the utility and its customers. Includes quantifiable and monetizable non-energy impacts if they can be quantified and monetized.

Component	UCT	TRC
Measure Incremental Cost		Cost
Incentive	Cost	
Administrative Cost	Cost	Cost
Non-Energy Benefits*		Benefit
Non-Energy Costs* (e.g. O&M)		Cost

*Council methodology includes monetized impacts on other fuels within these categories

Both values are provided to Avista for all measure level potential, so that the IRP can use the appropriate evaluation for each state: TRC for WA and UCT for ID.

Potential Estimates

Achievability

All potential “ramps up” over time – all ramp rates are based on those found within the NWPCC’s 2021 Power Plan

- Max Achievability
  - NWPCC 2021 Plan allows some measures max achievability to reach up to 100% of technical potential
  - Previous Power Plans assumed a maximum achievability of 85%
  - AEG has aligned assumptions with the 2021 Plan and measures such as lighting reach greater than 85%
- Note that Council ramp rates are agnostic to delivery to acquisition mechanism and include potential that may be realized through utility DSM programs, regional initiatives and market transformation, or enhanced codes and standards

Measures examples over 85% Achievability:

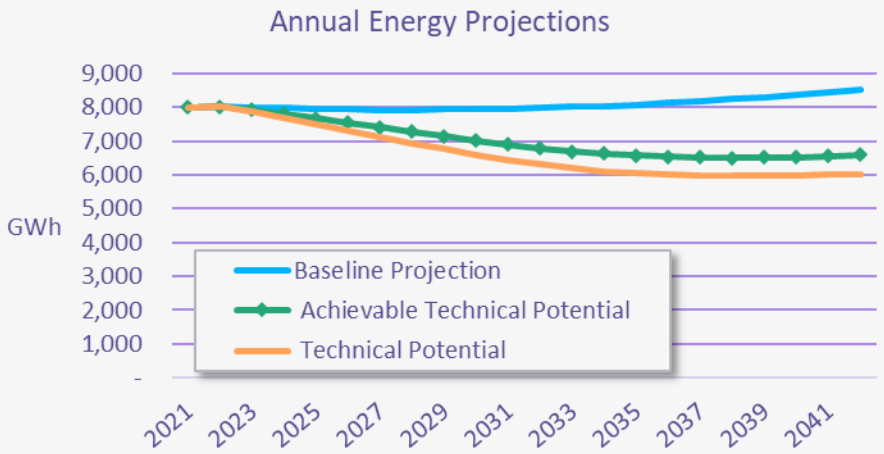
- All Lighting
- Washers/Dryers
- Dishwashers
- Refrigerators/Freezers
- Circulation Pumps
- Thermostats
- C&I Fans

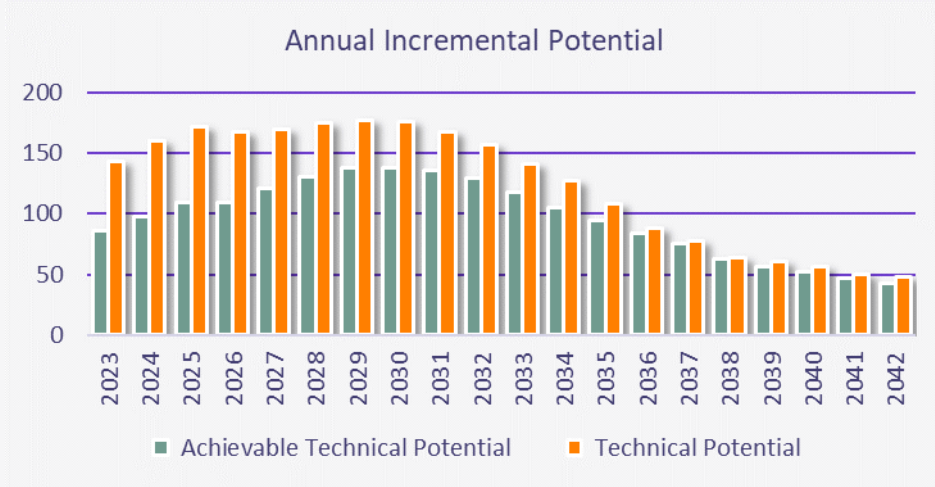
Electric CPA Draft Results

Energy Efficiency Potential (WA & ID, All Sectors)

Draft results indicate energy savings of ~1.1% of baseline consumption per year are Technically Achievable.

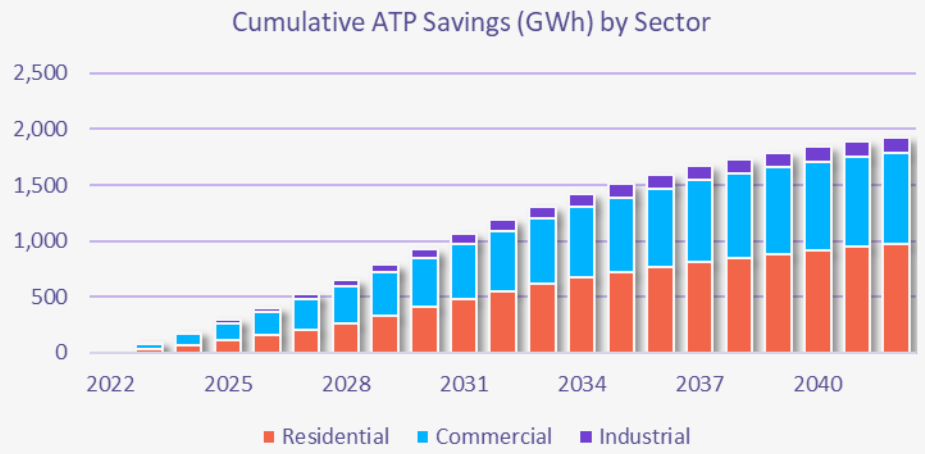
- 183 GWh (20.9 aMW) in next biennial period (2023-2024)
- 1,193 GWh (136.2 aMW) by 2032
- 1,929 GWh (220.2 aMW) by 2042

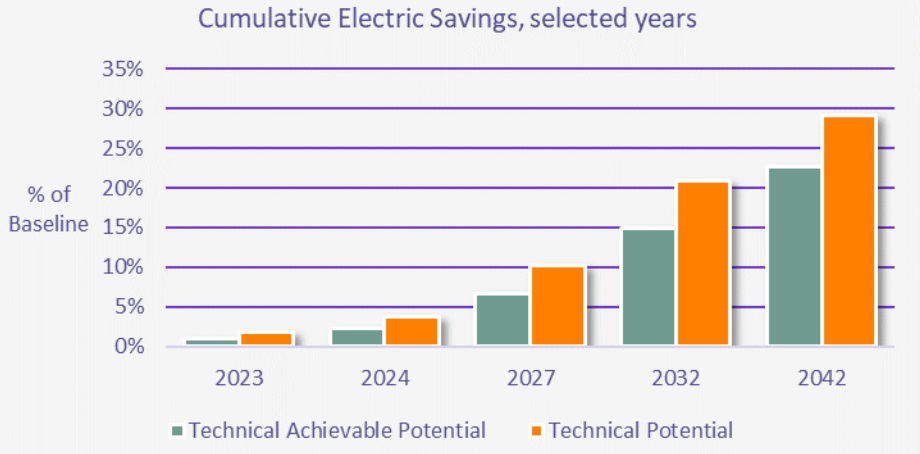




Energy Efficiency Potential, Continued

Potential Summary – WA & ID, All Sectors

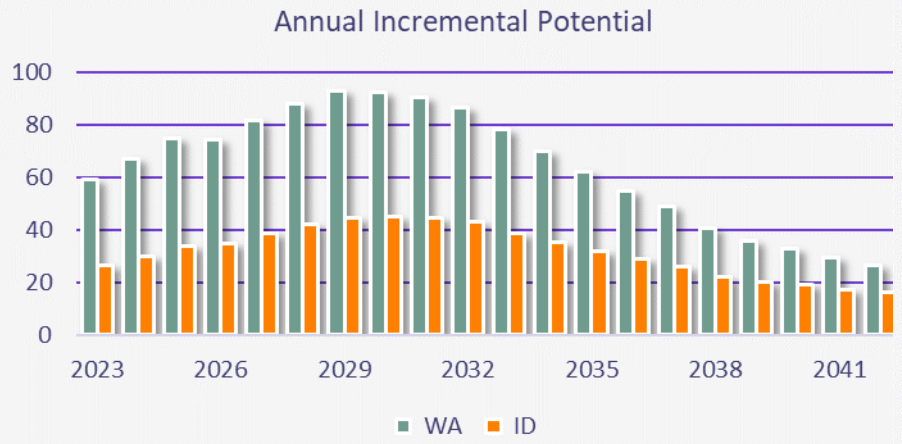


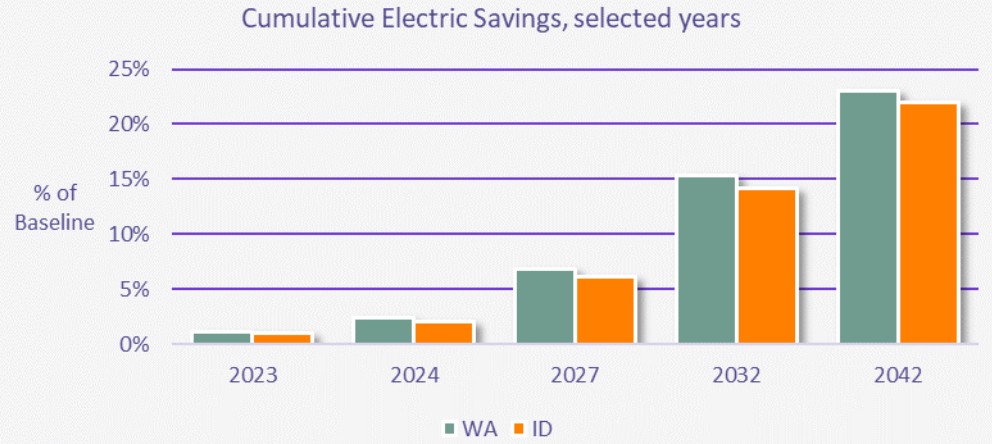


Summary of Energy Savings (GWh), Selected Years	2023	2024	2027	2032	2042
Reference Baseline	8,009	7,996	7,933	7,982	8,520
Cumulative Savings (GWh)					
Technical Achievable Potential	86	183	522	1,193	1,929
Technical Potential	144	304	813	1,665	2,486
Energy Savings (% of Baseline)					
Technical Achievable Potential	1.1%	2.3%	6.6%	15.0%	22.6%
Technical Potential	1.8%	3.8%	10.3%	20.9%	29.2%
Incremental Savings (GWh)					
Technical Achievable Potential	86	97	121	130	43
Technical Potential	144	160	170	157	48

EE Potential, Continued

Potential Summary – State Comparison





Summary of Energy Savings (GWh), Selected Years	2023	2024	2027	2032	2042
Reference Baseline					
Washington	5,309	5,301	5,256	5,277	5,608
Idaho	2,700	2,695	2,678	2,705	2,912
Cumulative Savings (GWh)					
Washington	59	127	358	809	1,289
Idaho	26	57	165	384	640
Energy Savings (% of Baseline)					
Washington	1.1%	2.4%	6.8%	15.3%	23.0%
Idaho	1.0%	2.1%	6.1%	14.2%	22.0%
Incremental Savings (GWh)					
Washington	59	67	82	87	27
Idaho	26	30	39	43	16

EE Potential - Top Measures

Cumulative Potential Summary – WA

Top Measure Notes

- Some expensive or emerging measures have significant technical achievable potential, but may not be selected by the IRP due to costs
- Heat Pump measures, including DHPs and HPWHs, have significant annual energy benefits, however since heat pumps revert to electric resistance heating during extreme cold, they may not have a corresponding winter peak benefit
- In addition to being expensive, some emerging tech measures are included in Technical Achievable which may not prove feasible for programs at this time, but can be kept in mind for future programs

Rank	Measure / Technology	2032 Achievable Technical Potential (MWh)	% of Total	TRC Levelized $/kWh
1	Residential - Connected Thermostat - ENERGY STAR (1.0)	66,516	8.2%	$0.25
2	Commercial - Linear Lighting	56,757	7.0%	$0.00
3	Commercial - Ductless Mini Split Heat Pump	46,099	5.7%	$0.89
4	Residential - Windows - Low-e Storm Addition	42,942	5.3%	$0.21
5	Residential - Water Heater (<= 55 Gal)	38,857	4.8%	$0.12
6	Residential - Home Energy Management System (HEMS)	26,551	3.3%	$0.35
7	Commercial - HVAC - Dedicated Outdoor Air System (DOAS)	18,215	2.3%	$1.30
8	Residential - Windows - Cellular Shades	16,852	2.1%	$0.62
9	Commercial - Retrocommissioning	13,583	1.7%	$0.01
10	Commercial - Strategic Energy Management	11,198	1.4%	$0.18
11	Commercial - HVAC - Energy Recovery Ventilator	10,374	1.3%	$0.13
12	Commercial - Server	9,551	1.2%	$0.01
13	Commercial - Refrigeration - High Efficiency Compressor	9,429	1.2%	$0.40
14	Residential - Windows - High Efficiency (Class 22)	9,328	1.2%	$0.54
15	Commercial - High-Bay Lighting	9,066	1.1%	$0.00
16	Commercial - Insulation - Wall Cavity	8,551	1.1%	$0.03
17	Residential - Windows - High Efficiency (Class 30)	8,417	1.0%	$0.42
18	Commercial - Ventilation - Demand Controlled	8,267	1.0%	$2.15
19	Residential - Insulation - Floor Installation	8,249	1.0%	$0.17
20	Commercial - Desktop Computer	7,884	1.0%	$0.11
	Total of Top 20 Measures	**426,685**	**52.7%**	
	Total Cumulative Savings	**809,194**	**100.0%**	

EE Potential - Top Measures

Cumulative Potential Summary – ID

Top Measure Notes

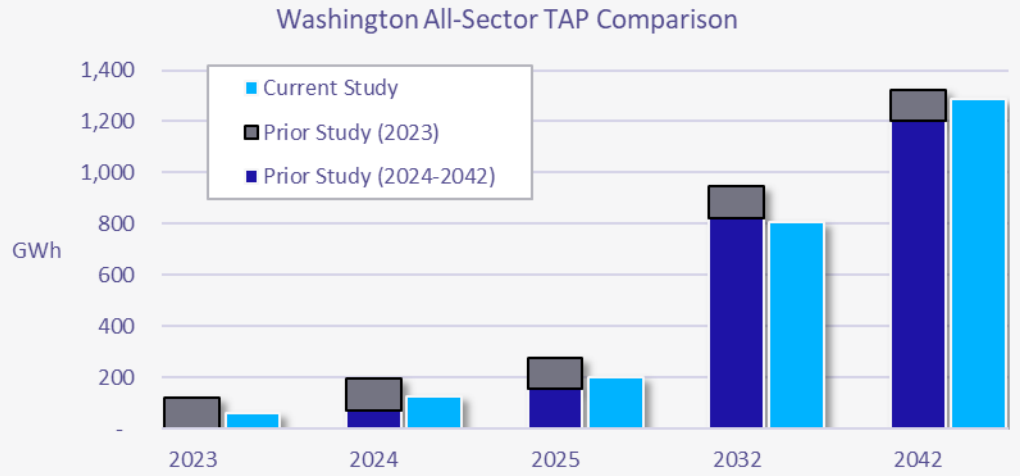
- Some expensive or emerging measures have significant technical achievable potential, but may not be selected by the IRP due to costs
- Heat Pump measures, including DHPs and HPWHs, have significant annual energy benefits, however since heat pumps revert to electric resistance heating during extreme cold, they may not have a corresponding winter peak benefit
- In addition to being expensive, some emerging tech measures are included in Technical Achievable which may not prove feasible for programs at this time, but can be kept in mind for future programs

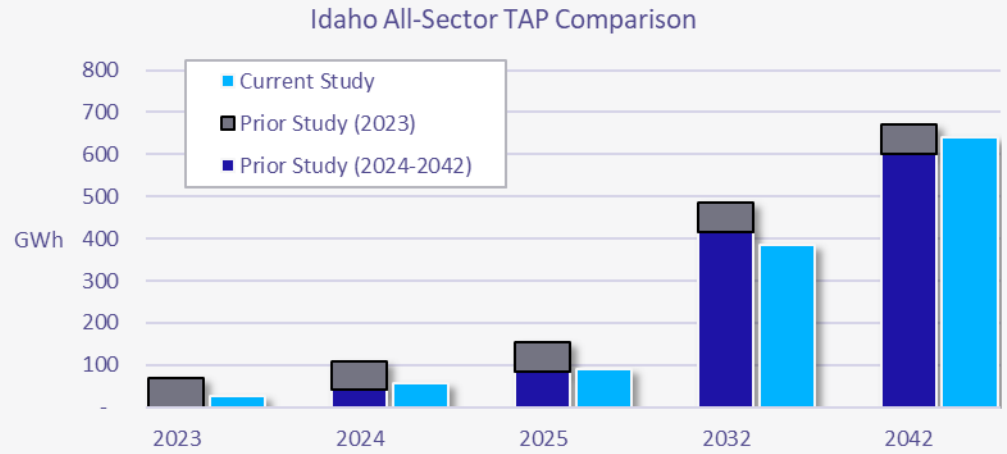
Rank	Measure / Technology	2032 Achievable Technical Potential (MWh)	% of Total	UCT Levelized $/kWh
1	Commercial - Linear Lighting	27,909	7.3%	$0.00
2	Commercial - Ductless Mini Split Heat Pump	17,184	4.5%	$0.59
3	Residential - Water Heater (<= 55 Gal)	16,791	4.4%	$0.09
4	Residential - Windows - Low-e Storm Addition	13,713	3.6%	$0.17
5	Residential - Connected Thermostat - ENERGY STAR (1.0)	11,260	2.9%	$0.20
6	Residential - Home Energy Management System (HEMS)	10,512	2.7%	$0.27
7	Residential - Windows - Cellular Shades	8,363	2.2%	$0.49
8	Commercial - HVAC - Dedicated Outdoor Air System (DOAS)	7,942	2.1%	$0.86
9	Residential - Insulation - Floor Installation	7,934	2.1%	$0.13
10	Commercial - Engine Block Heater Controls	7,437	1.9%	$0.01
11	Commercial - Refrigeration - High Efficiency Compressor	6,570	1.7%	$0.16
12	Commercial - Retrocommissioning	6,391	1.7%	$0.01
13	Commercial - Refrigeration - Floating Head Pressure	6,079	1.6%	$0.06
14	Residential - Advanced New Construction Design - Zero Net Energy	5,436	1.4%	$0.10
15	Industrial - Linear Lighting	5,385	1.4%	$0.01
16	Residential - Insulation - Ceiling Installation	5,247	1.4%	$0.16
17	Commercial - Strategic Energy Management	5,164	1.3%	$0.12
18	Commercial - Server	4,976	1.3%	$0.01
19	Commercial - Insulation - Wall Cavity	4,457	1.2%	$0.02
20	Residential - TVs	4,225	1.1%	$0.00
	Total of Top 20 Measures	**182,975**	**47.6%**	
	Total Cumulative Savings	**384,102**	**100.0%**	

Comparison with 2020 Electric CPA

Achievable Potential Comparison

Comparison with Prior Potential Study (2022-2042 **TAP**)

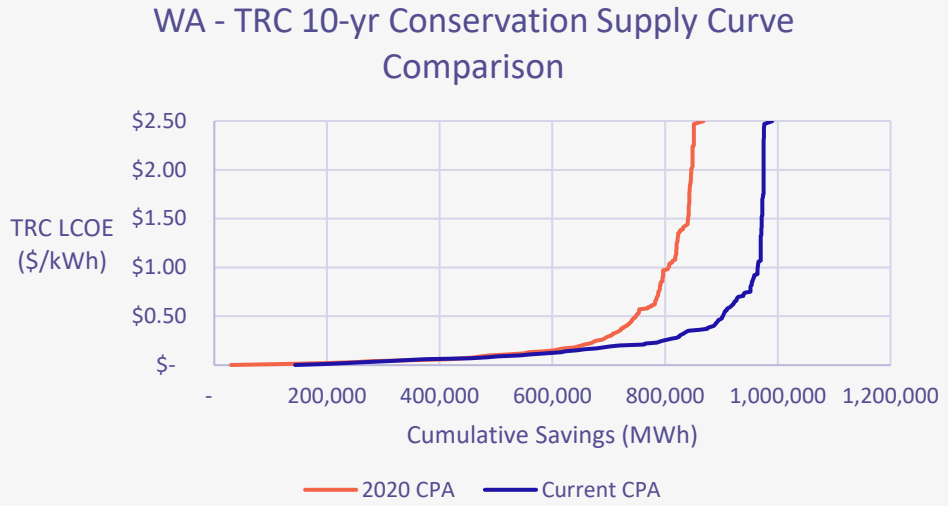


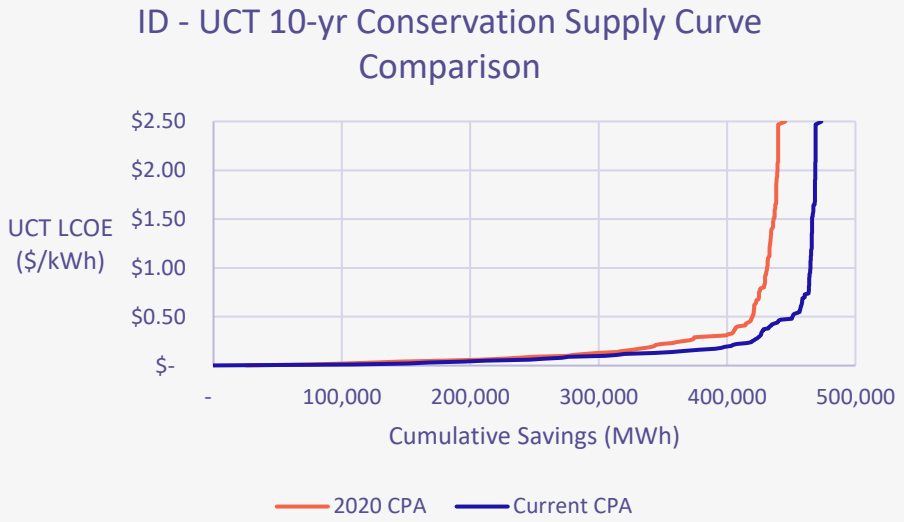


Sector (All States)	End Use	Prior CPA 2042 MWh	Current Study 2042 MWh	Diff.
Residential	Cooling	112,802	75,404	-37,398
	Heating	403,894	453,969	50,075
	Water Heating	220,393	227,303	6,910
	Interior Lighting	18,040	29,624	11,584
	Exterior Lighting	1,320	10,922	9,601
	Appliances	85,150	96,145	10,995
	Electronics	56,747	59,310	2,563
	Miscellaneous	46,509	20,171	-26,339
Commercial	Cooling	130,699	127,447	-3,252
	Heating	89,773	113,699	23,925
	Ventilation	100,043	119,087	19,045
	Water Heating	21,941	25,733	3,791
	Interior Lighting	195,773	192,109	-3,663
	Exterior Lighting	52,777	48,740	-4,037
	Refrigeration	107,229	105,453	-1,776
	Food Preparation	7,662	26,932	19,270
	Office Equipment	13,101	45,382	32,282
	Miscellaneous	9,240	14,077	4,837
Industrial	Cooling	4,218	11,895	7,677
	Heating	461	6,912	6,451
	Ventilation	12,137	5,346	-6,791
	Interior Lighting	42,345	22,883	-19,462
	Exterior Lighting	4,745	18,386	13,641
	Motors	60,407	62,550	2,142
	Process	6,055	8,346	2,291
	Miscellaneous	678	1,511	833
Grand Total		**1,804,139**	**1,929,335**	**125,196**

Supply Curves – Compare to Prior CPA

WA & ID Technical Achievable Potential





Sector-Level Notes

Comparison with Prior Potential Study – Technical Achievable

Residential:

- Updates to RTF Workbooks and latest Avista TRM are driving increase in potential across weatherization measures.
  - Low-E Storm Addition, Floor Insulation and Cellular Shades are the largest increases.
- Ductless Mini Split Heat Pump measures showing less potential driven by RTF savings update.

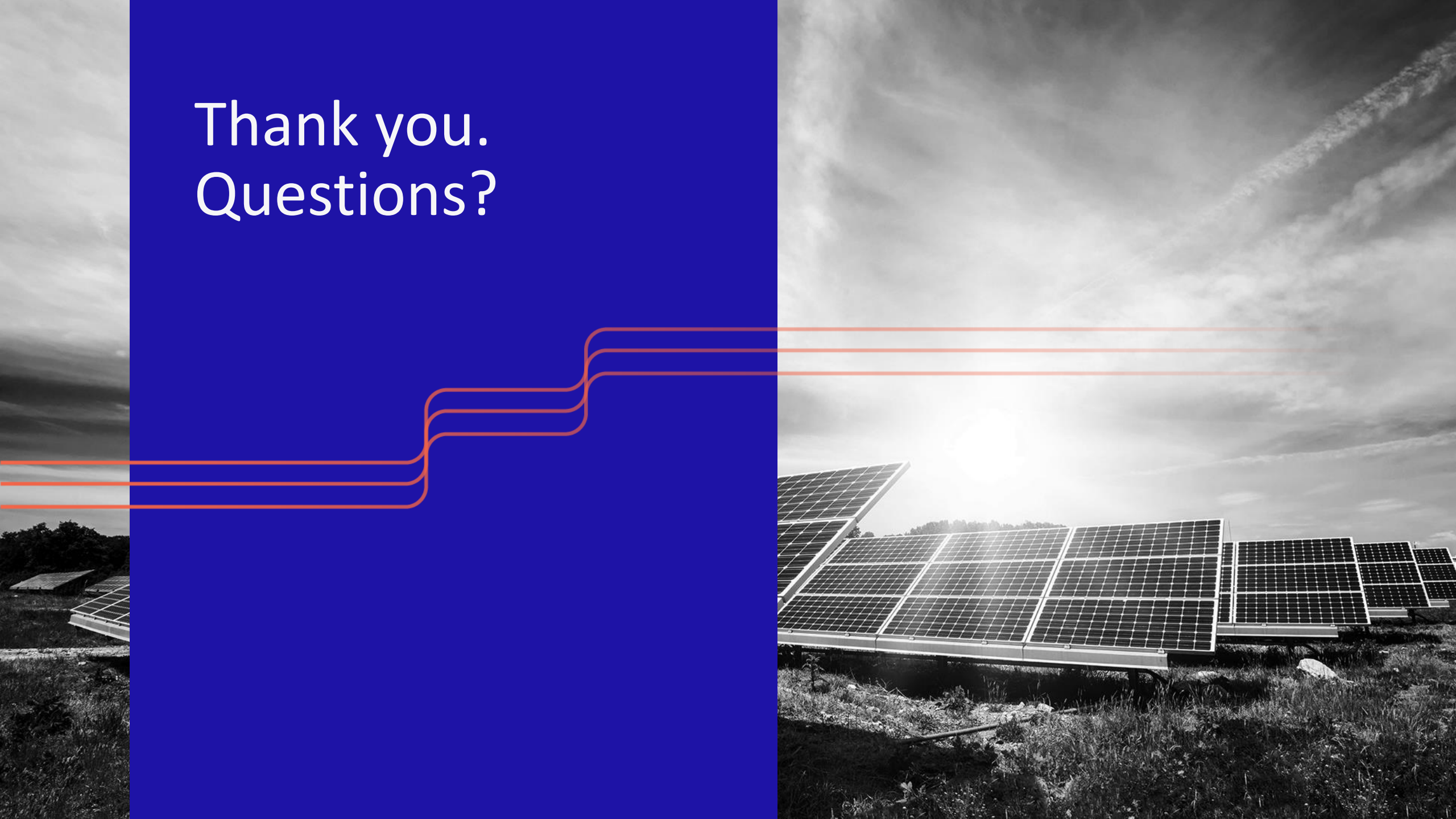
Commercial:

- Similar lighting potential. New LED replacement with Controls measure offsets increase in LED saturation.
- Increase in potential across Food Preparation and Office Equipment end uses driven by updates to ENERGY STAR specifications and market data.
- Updated savings characterizations across HVAC and water heating measures leading to lower potential estimates in those end uses.

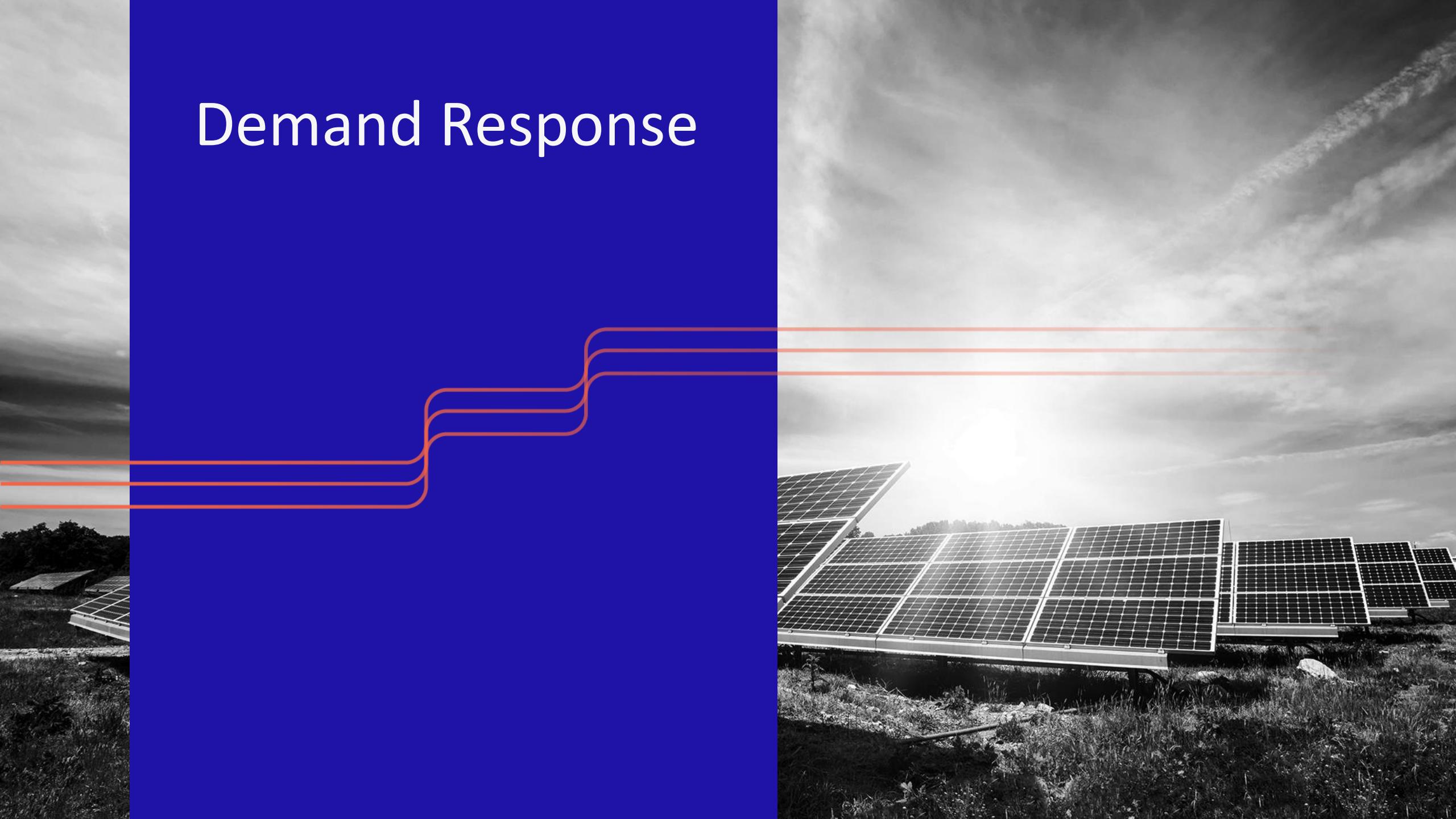
Industrial:

- Industrial measure data was revised to reflect the newest iteration of the 2021 Industrial Tool (v8), updating savings and costs for many measures.
- Pumping measures showing increased potential due to explicit accounting for Avista pumping rate schedule and the new Pumping measures from the V8 Industrial Tool update.
- Fan controls also have greater savings as a result of the measure data update

Thank you.
Questions?



Demand Response



Approach to the Study

Characterize the Market

Develop list of DR Options

Characterize the Options

Estimate Potential

Align with EE Potential Study
- Market Profiles

Secondary Sources
- Industry or regional reports
- Previous studies

Segmentation by Customer Class
- Residential
- General Service
- Large General Service
- Extra-Large General Service

Program Categories
- Conventional DLC
- Smart/Interactive DLC
- Curtailment
- Energy Storage
- Time-Varying Rates/Behavioral
- Ancillary Services

Develop Program Assumptions
- Impacts
- Participation
- Technology
- Costs
- Incentives

Technical Achievable Potential
- Potential for all programs regardless of cost and without consideration of dual participation

Achievable Potential
- Integrated program options without participant overlap

All Program Options

Conventional DLC	Central AC Water Heating Electric Vehicle Charging
Smart/Interactive DLC	Grid-Interactive Water Heating Smart Thermostats (Cooling/Heating) Smart Appliances
Third Party Curtailment	Capacity Bidding Emergency Curtailment
Energy Storage	Battery Storage Thermal Storage
Time-Varying Rates/Behavioral	Behavioral Time-of-Use Electric Vehicle Time-of-Use Variable Peak Pricing

Avista Pilot Program Scenario

Avista plans to run the following DR Pilot Programs in Washington:

- CTA-2045 HPWH
- CTA-2045 ERWH
- Time-of-Use Opt-in
- Peak Time Rebate

All Pilot Programs will run for a three-year period starting in 2024

The TOU Opt-in Pilot will have an optional two-year extension pending results

Advanced Metering Infrastructure (AMI) Assumptions

Some of the options require AMI

- DLC Options- No AMI Metering Required
- Dynamic Rates- require AMI for billing

Washington

- Assume 100% throughout study for all sectors

Idaho starting AMI rollout in 2024

- 36-month deployment schedule

Assumptions and Updates

Smart Thermostat - Heating Program will piggyback off Cooling Program

- Shared Admin, Development, and O&M Costs

Grid-Interactive Water Heaters

- Split results across water heater type- ER and HP
  - Lowered CTA-2045 impacts to reflect "BPA 2018" peak mitigation strategies

Dynamic Rates

- PTR for Residential and General Service
- VPP for Large and Extra-Large General Service
- Added EV TOU

Program Impact and Cost assumptions mainly based on NWPCC 2021 Power Plan assumptions

- Diverged from these where appropriate
  - Customization for Avista's service territory
  - Where NWPCC program information wasn't available

Program Impact Calculation

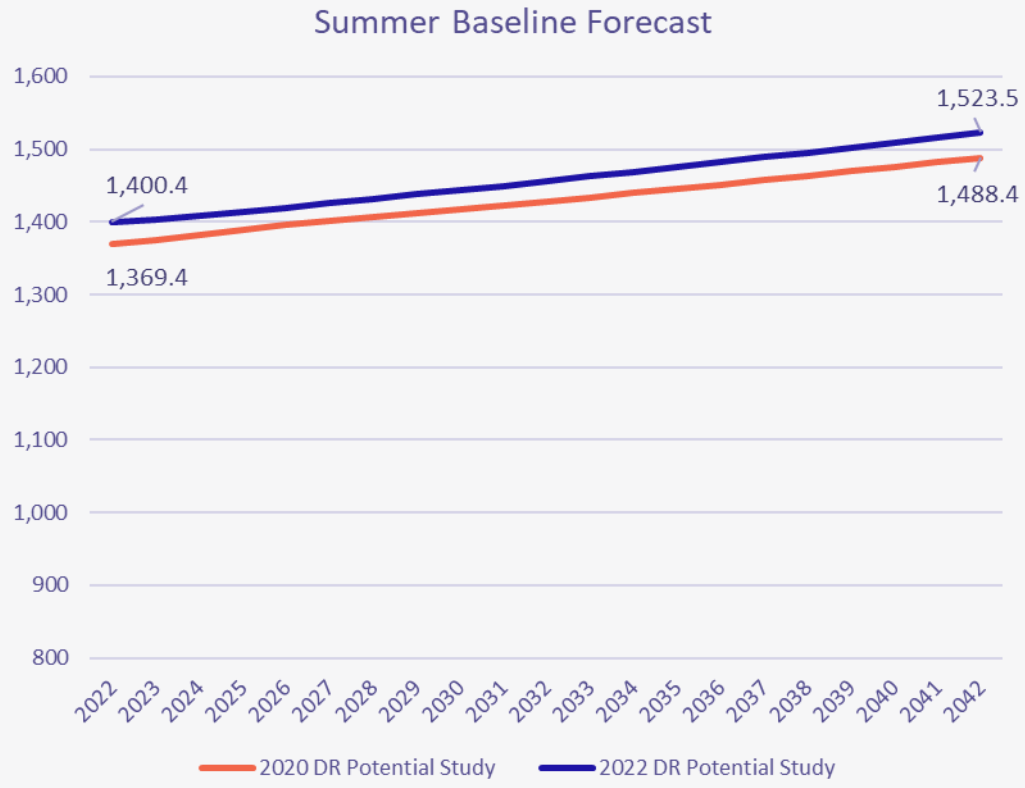
$$Program\ Impact_{year,program}$$

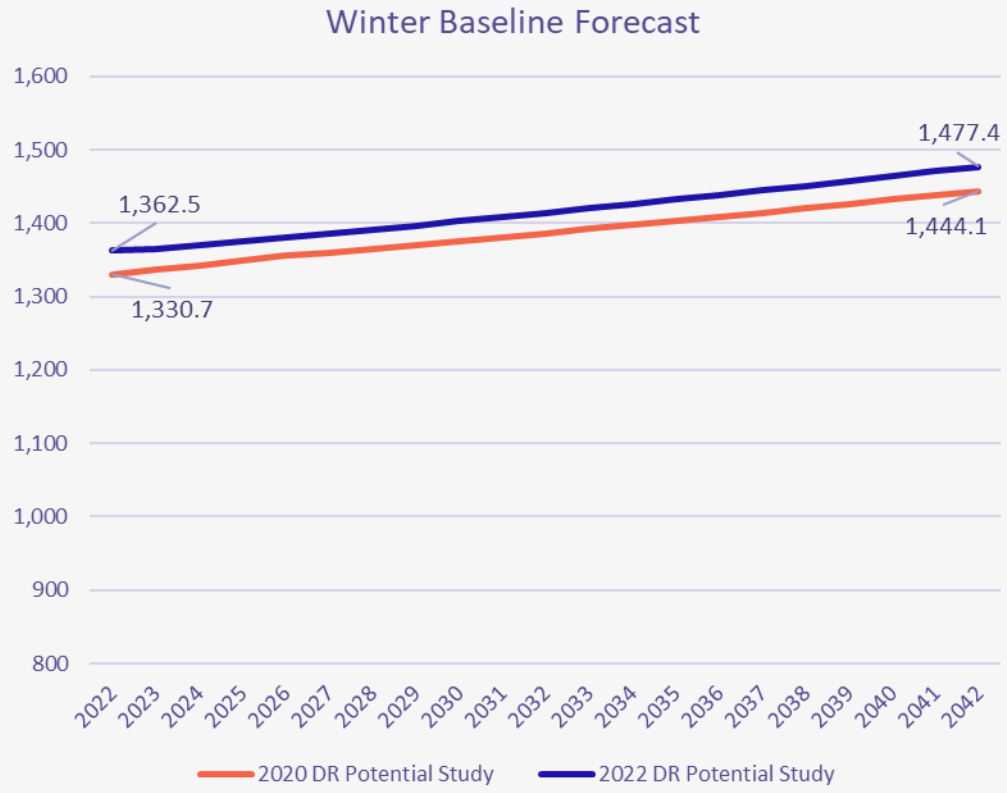
$$= Per\ Customer\ Peak\ Impact_{y,p} * Eligible\ Participants_{y,p} * Participation\ Rate_{y,p}$$

$$* Equipment\ Saturation\ Rate_{y,p}$$

Baseline Characterization

Baseline Comparisons to 2020 Study

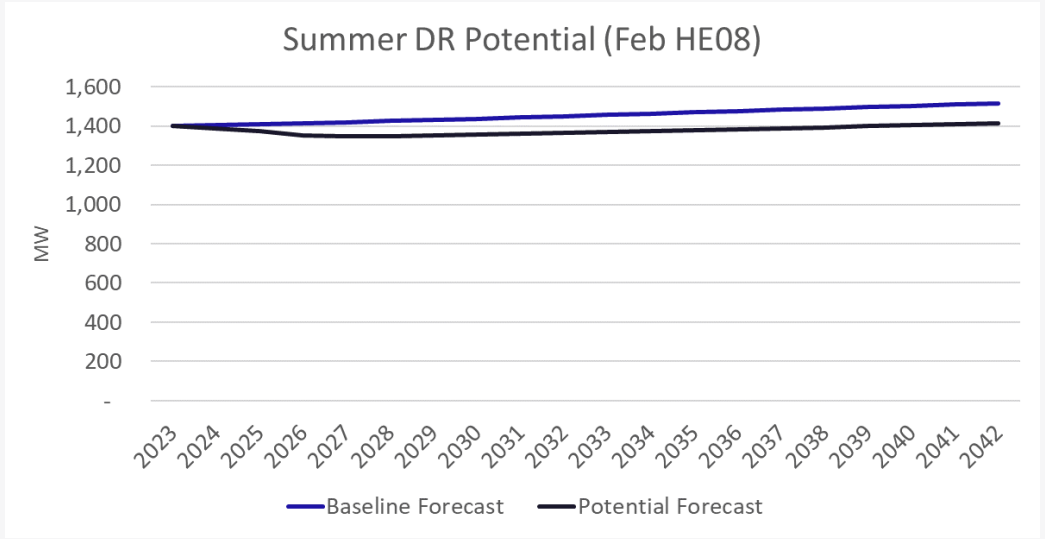


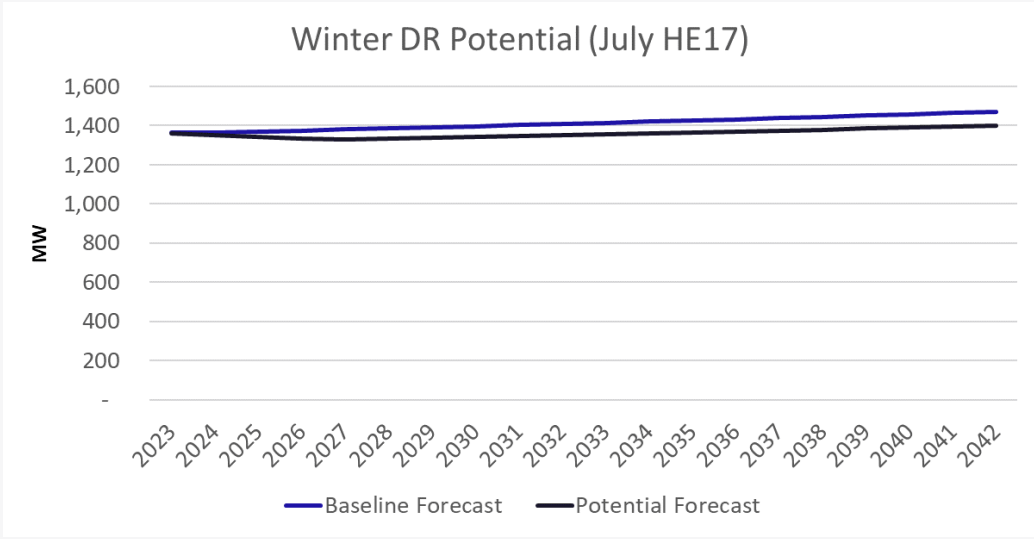


Achievable Potential

All Program Options

Potential by Season

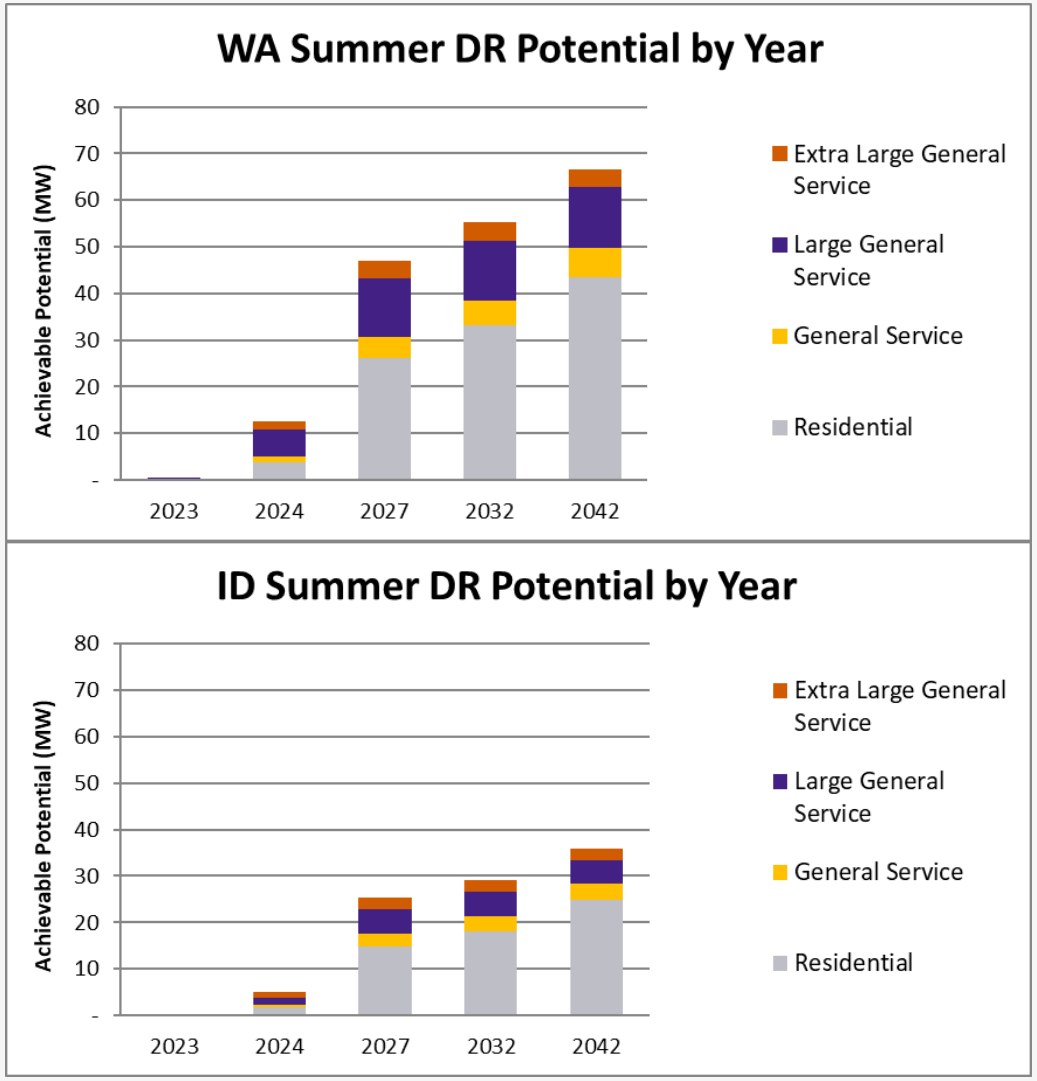


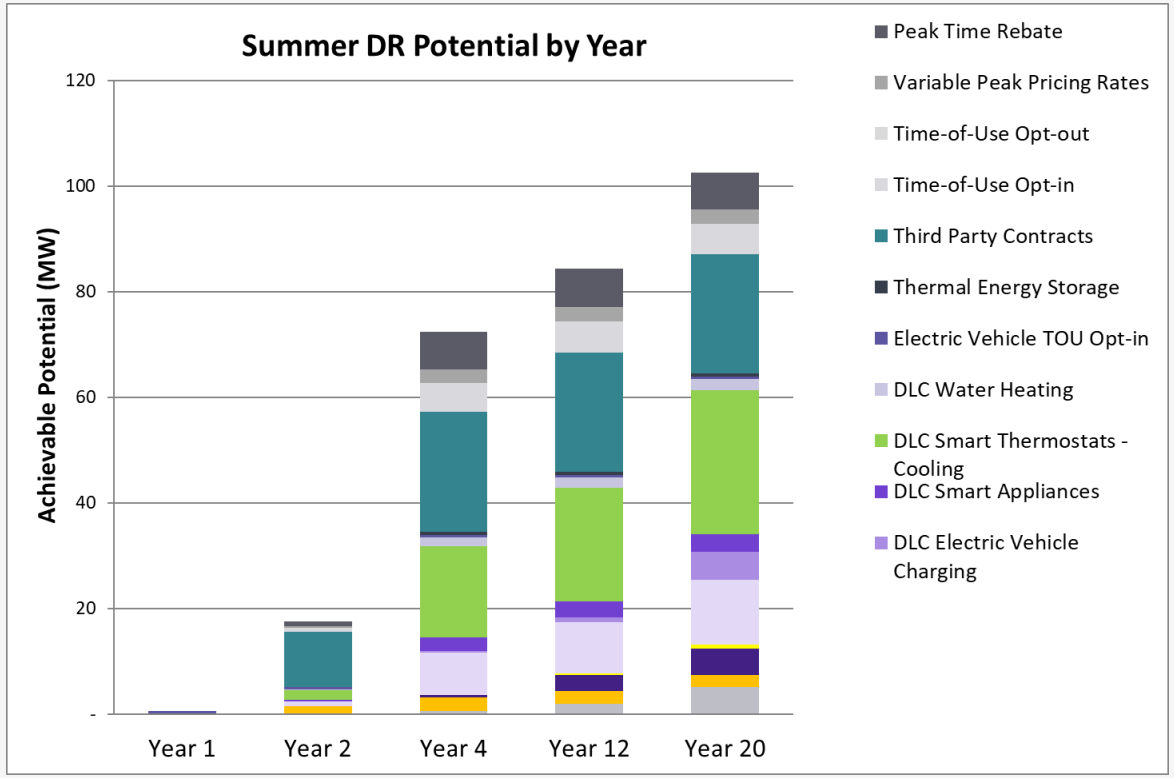


Summer Potential	2023	2024	2027	2032	2042
Baseline Forecast	1,400	1,404	1,420	1,450	1,516
Achievable Potential	0.5	17.5	72.3	84.3	102.6
% of Baseline	0.0%	1.2%	5.1%	5.8%	6.8%
Potential Forecast	1,400	1,386	1,348	1,365	1,414

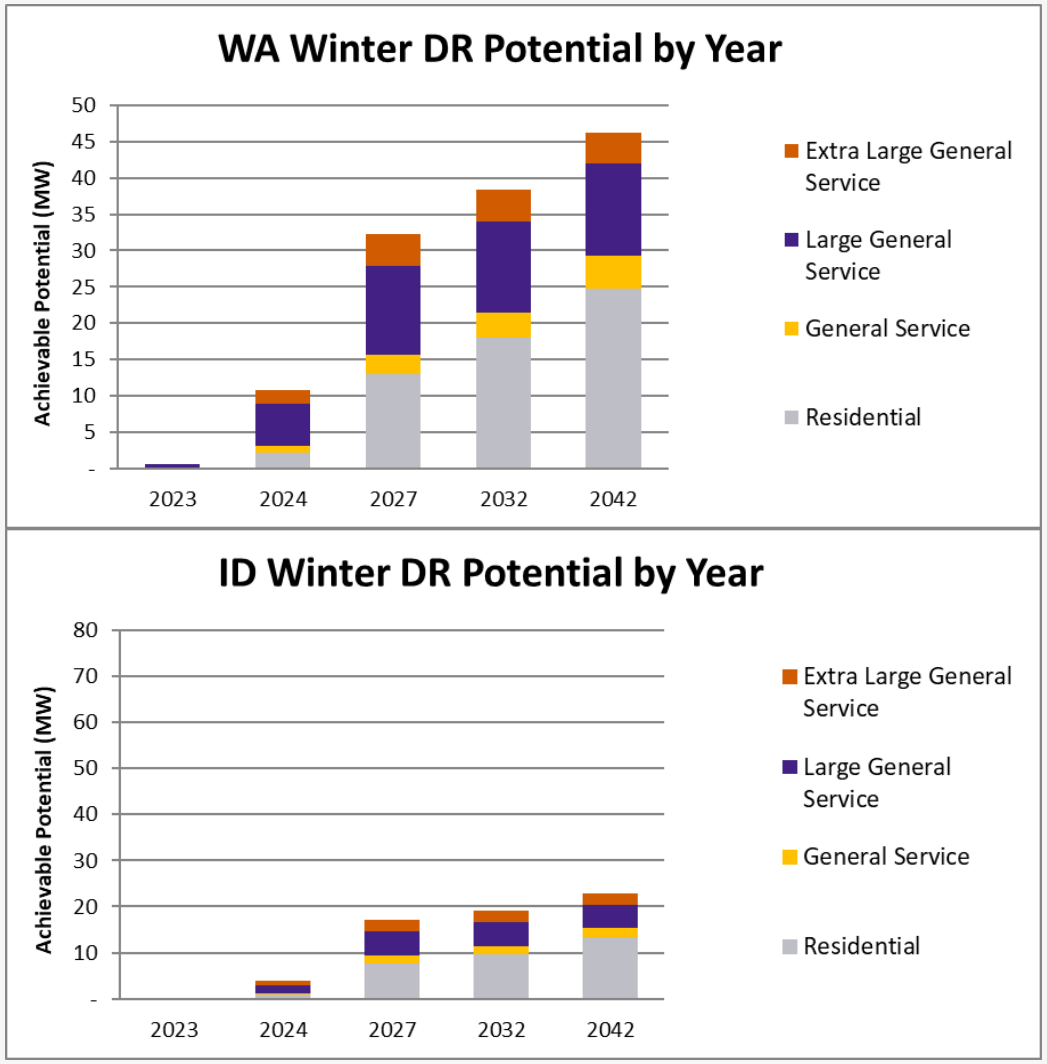
Winter Potential	2023	2024	2027	2032	2042
Baseline Forecast	1,363	1,366	1,381	1,408	1,471
Achievable Potential	0.5	14.8	49.4	57.6	69.3
% of Baseline	0.0%	1.1%	3.6%	4.1%	4.7%
Potential Forecast	1,362	1,351	1,331	1,351	1,401

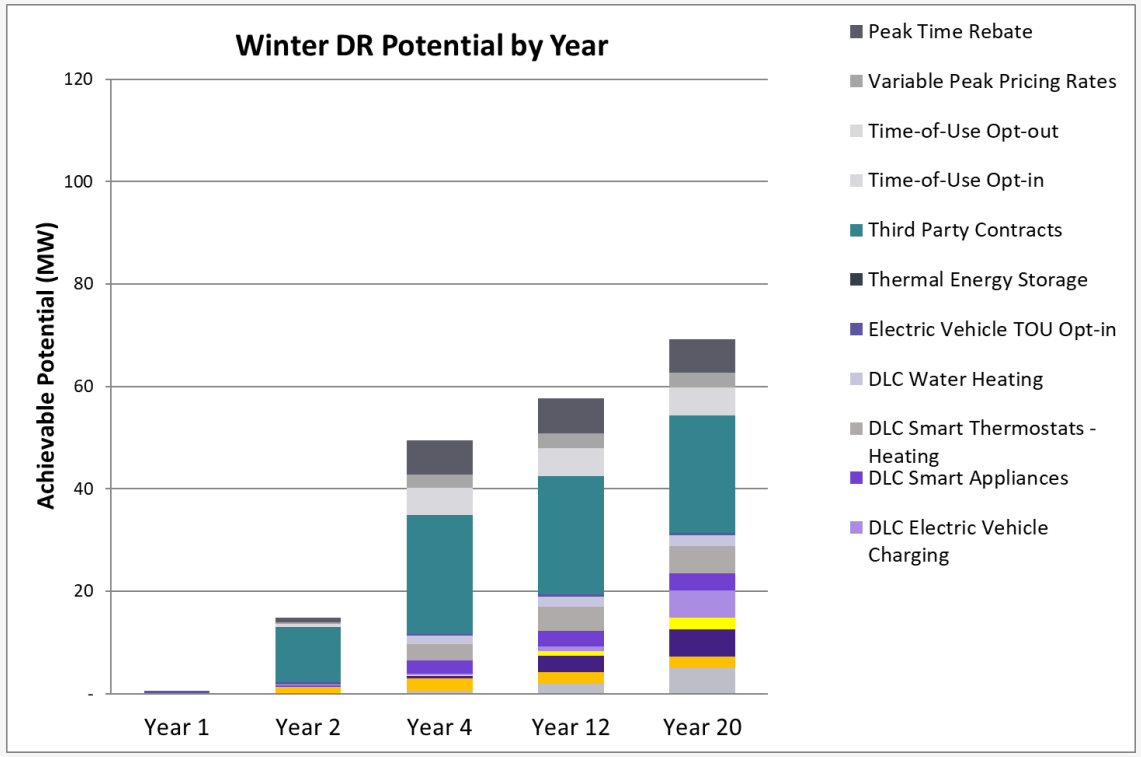
Summer DR Potential





Winter DR Potential

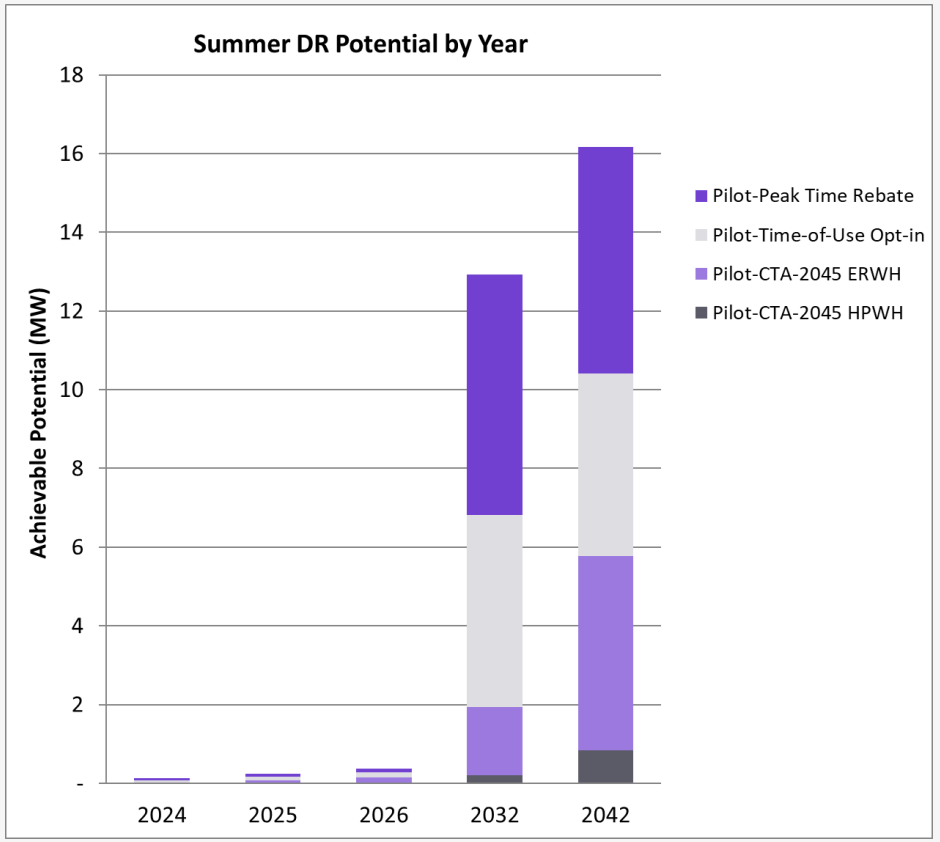




Pilot Program
Scenario WA

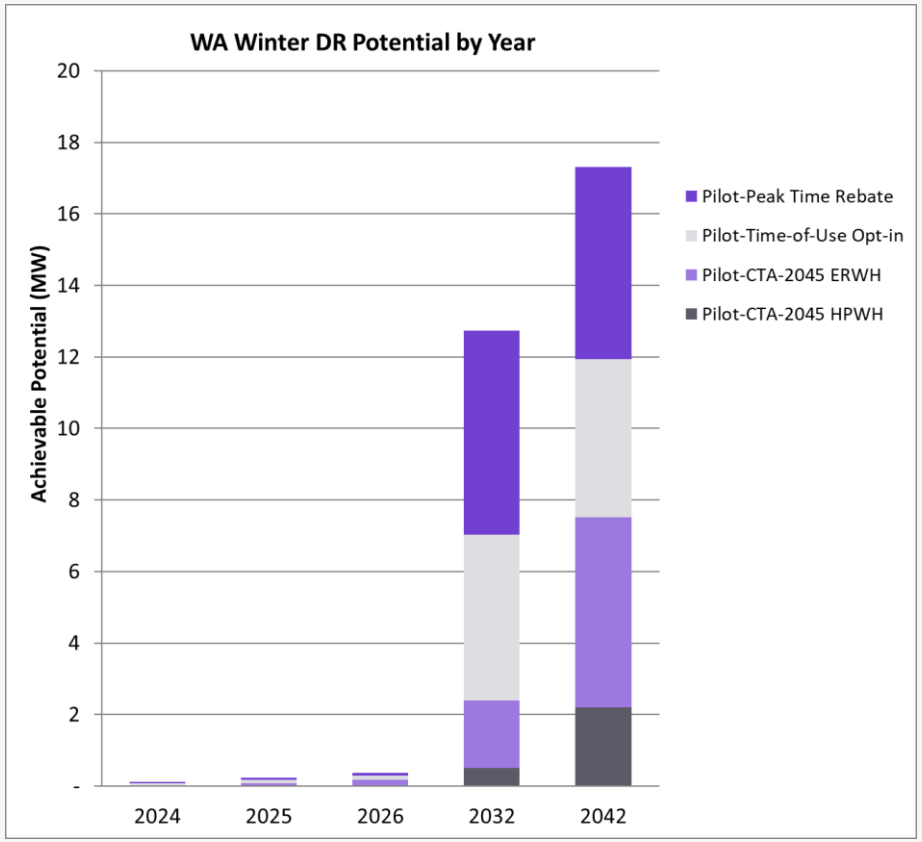
Pilot Programs Summer DR Potential

Pilot Summer Potential	2024	2025	2026	2032	2042
Baseline Forecast (MW)	**941**	**944**	**948**	**975**	**1,024**
Achievable Potential (MW)	**0.1**	**0.2**	**0.4**	**12.9**	**16.2**
Pilot-CTA-2045 HPWH	0.0	0.0	0.0	0.2	0.8
Pilot-CTA-2045 ERWH	0.0	0.1	0.1	1.7	4.9
Pilot-Time-of-Use Opt-in	0.1	0.1	0.1	4.9	4.7
Pilot-Peak Time Rebate	0.0	0.1	0.1	6.1	5.7



Pilot Programs Winter DR Potential

Pilot Winter Potential	2024	2025	2026	2032	2042
Baseline Forecast (MW)	**910**	**914**	**917**	**942**	**988**
Achievable Potential (MW)	**0.1**	**0.2**	**0.4**	**12.7**	**17.3**
Pilot-CTA-2045 HPWH	0.0	0.0	0.0	0.5	2.2
Pilot-CTA-2045 ERWH	0.0	0.1	0.2	1.9	5.3
Pilot-Time-of-Use Opt-in	0.1	0.1	0.1	4.6	4.4
Pilot-Peak Time Rebate	0.0	0.1	0.1	5.7	5.4



Demand Response Program Costs

Developing Demand Response Resource Costs

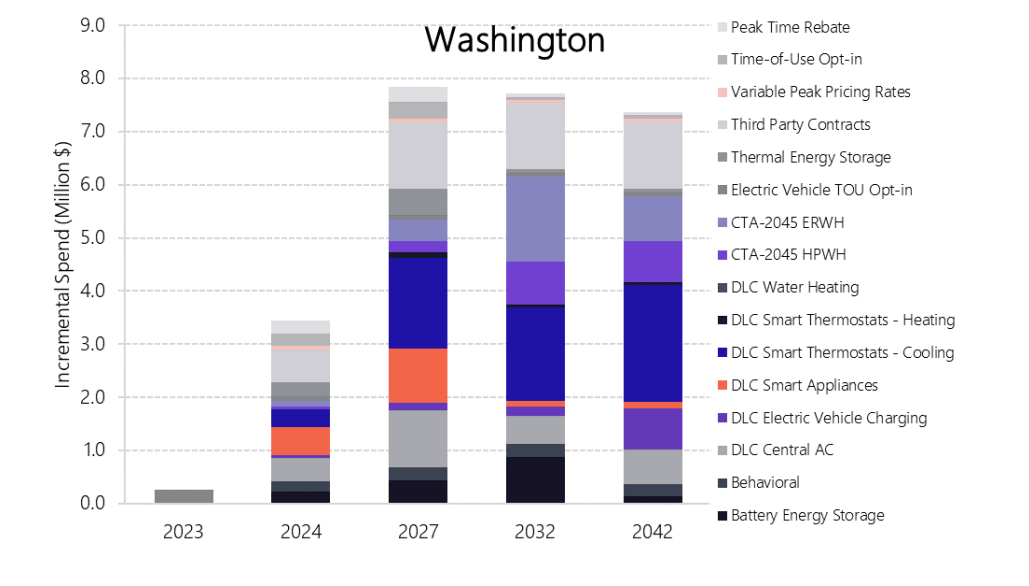
- DR Programs have both upfront and ongoing costs according to the table below
- DR costs are amortized over 10 years to allow programs time to fully ramp up
- Levelized costs are presented in $/kW-year

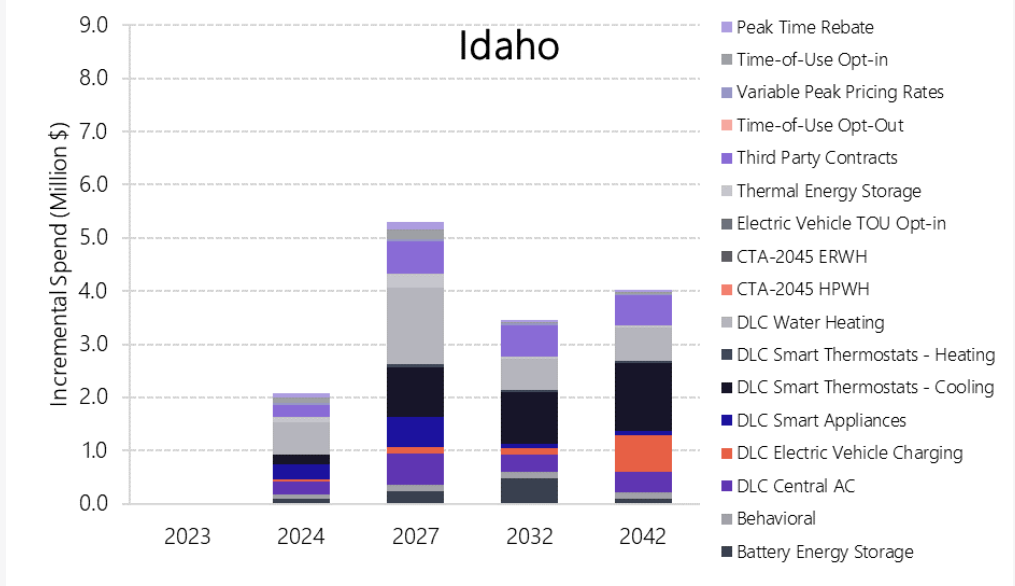
One-Time Fixed Costs	One-Time Variable Costs	Ongoing Costs
Program Development Costs ($/program)	Equipment Costs ($/participant)	Administrative Costs (shared costs)
	Marketing Costs ($/participant)	O&M Costs ($/participant)
		Incentives ($/participant or $/kW)

Example: Residential Grid-Interactive Electric Resistance Water Heaters

Cost Type	Unit	Cost
Development	$/program	$34,000
Administrative	$/program/yr	$40,800
O&M	$/participant/yr	$0
Marketing	$/new participant	$60
Equipment	$/new participant	$170
Incentive	$/program/yr	$24

Program Costs





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APPLIED ENERGY GROUP

Appendix

Baseline Projection

- "How much energy would customers use in the future if Avista stopped running conservation programs now and in the absence of naturally occurring efficiency?"
  - The baseline projection answers this question
- The baseline projection is an independent end-use forecast of electric or natural gas consumption at the same level of detail as the market profile

The baseline projection:

Includes

- To the extent possible, the same forecast drivers used in the official load forecast, particularly customer growth, natural gas prices, normal weather, income growth, etc.
- Trends in appliance saturations, including distinctions for new construction.
- Efficiency options available for each technology , with share of purchases reflecting codes and standards (current and finalized future standards)
- Expected impact of appliance standards that are "on the books"
- Expected impact of building codes, as reflected in market profiles for new construction
- Market baselines when present in regional planning assumptions

Excludes

- Expected impact of naturally occurring efficiency (except market baselines)
  - **Exception:** RTF workbooks have a market baseline for lighting, which AEG's models also use.
- Impacts of current and future demand-side management programs
- Potential future codes and standards not yet enacted

Conventional DLC Assumptions

Conventional DLC Assumptions		Program Option	Residential	General Service	Large General Service	Extra Large General Service	Source
	Peak Impacts	Central AC	0.5 kW	1.25 kW			NWPCC DLC Switch Cooling
		Water Heating	0.5 kW	1.26 kW			Best Estimate based on Industry Exp.
		Electric Vehicle Charging	0.5 kW				Avista Background and Research
	Steady-State Participation	Central AC	10%	10%			NWPCC DLC Switch Cooling
		Water Heating	15%	5%			Best Estimate based on Industry Exp.
		Electric Vehicle Charging	25%				NWPCC Electric Resistance Grid-Ready

Smart/Interactive DLC Assumptions

		Program Option	Residential	General Service	Large General Service	Extra Large General Service	Source
Smart/Interactive DLC Assumptions	Peak Impacts	Smart Thermostats - Cooling	0.5 kW	1.25 kW			NWPCC Smart Thermostat- Cooling (Adjusted for proposed cycling strategy)
		Smart Thermostats - Heating	1.09 kW	1.35 kW			NWPCC Smart Thermostat- Heating
		Grid-Interactive WH (ER)	0.35-0.37 kW	0.87 kW			BPA 2018 Peak Mitigation (ER)
		Grid-Interactive WH (HP)	0.09-0.22 kW	0.21 kW			BPA 2018 Peak Mitigation (HP)
		Smart Appliances	0.14 kW	0.14 kW			Ghatikar, Rish. Demand Response Automation in Appliance and Equipment. Lawrence Berkley National Laboratory, 2015
		Third Party Curtailment		10%	21%	21%	2019 Statewide Load Impact Evaluation of California Aggregator Demand Response Programs
	Steady-State Participation	Smart Thermostats - Cooling	20%	20%			NWPCC Smart Thermostat Cooling
		Smart Thermostats - Heating	5%	3%			Piggybacks off of cooling- Adjusted down to reflect realistic participation for space heating in Avista's territory
		Grid-Interactive WH (ER)	50%	50%			Reflects Rollout→ Ten-Year Ramp Rate
		Grid-Interactive WH (HP)	50%	50%			Reflects Rollout→ Ten-Year Ramp Rate
		Smart Appliances	5%	5%			2015 ISACA IT Risk Reward Barometer - US Consumer Results. October 2015
		Third Party Contracts		15%	21%	22%	Best Estimate based on Industry Exp.

Time-Varying Rates/Behavioral Assumptions

		Program Option	Residential	General Service	Large General Service	Extra Large General Service	Source
Time-Varying Rates/Behavioral Assumptions	Peak Impacts	Behavioral	2%				Opower documentation for Behavioral DR with Consumers and DTE
		Time-of-Use Opt-In	2.9%-5.7%	0.1%-0.2%	1.3%-2.6%	1.6%-3.1%	Brattle Analysis and Estimate - PacifiCorp 2019 opt-in scenario
		Time-of-Use Opt-Out	1.7%-3.4%	0.1%-0.2%	1.3%-2.6%	1.6%-3.1%	Brattle Analysis and Estimate - PacifiCorp 2019 opt-out scenario
		Time-of-Use Electric Vehicles		0.1%-0.2%	1.3%-2.6%		Brattle Analysis and Estimate - PacifiCorp 2019 opt-in scenario
		Variable Peak Pricing	8%-10%	3%-4%	3%-4%	3%-4%	OG&E 2020 Smart Hours Study
	Steady-State Participation	Behavioral	20%				PG&E rollout with six waves
		Time-of-Use Opt-In	13%	13%	13%	13%	Best estimate based on industry experience; Brattle Analysis and Estimate
		Time-of-Use Opt-Out	74%	74%	74%	74%	Best estimate based on industry experience; Brattle Analysis and Estimate
		Time-of-Use Electric Vehicles		13%	13%		Best estimate based on industry experience; Brattle Analysis and Estimate
		Variable Peak Pricing	25%	25%	25%	25%	OG&E 2020 Smart Hours Study

Energy Storage Assumptions

Energy Storage Assumptions		Program Option	Residential	General Service	Large General Service	Extra Large General Service	Source
	Peak Impacts	Battery	2 kW	2 kW	15 kW	15 kW	Typical Battery Size Per Segment
		Thermal	0.5 kW	1.26 kW			2016 Ice Bear Tech Specifications
	Steady-State Participation	Battery	0.5%	0.5%	0.5%	0.5%	Best Estimate Based on Industry Exp.
		Thermal		0.5%	1.5%	1.5%	Best Estimate Based on Industry Exp.

MDC Research

Your Trusted Insights Partner Since 1978

Avista IRP Clean Energy Research

April 2022

Research Overview

Objectives

Determine willingness to pay for the implementation of clean energy among Avista customers

- Establish baseline of environmental concerns; perceived responsibility of individuals, businesses, and Avista specifically
- Understand customer tradeoffs between bill increases and carbon emission goals
- Explore perceptions associated with Avista should they invest in carbon-neutral or carbon-free emissions
- Gauge perceptions specific to natural gas preferences and tradeoffs
- Quantify differences by state, customer type, green perceptions, and demographic factors

Methodology

Web survey with Avista customers.

- Customers from Washington, Idaho, and Oregon sourced randomly by email
- Survey optimized for both desktop and mobile
- Conducted in April 2022
- Final sample size of n=1,100

Proportional representation of state and service type.

WA	ID	OR	G	GE	E
52%	29%	20%	25%	47%	29%

Respondents screened to ensure appropriate target

- Avista customer age 18+
- Has or shares household finance and utility bill responsibility
- Not employed by a utility company, or in media, advertising, or market research firm

Report Interpretation

- All significant differences are reported at the 95% confidence level or higher. The total sample size of n=1,100 has a maximum sampling variability of +/-3.0% at the 95% level.
- Some percentages may not add to 100% due to rounding

Analysis Approach

This study incorporates a conjoint exercise to force tradeoffs between various green initiatives and customer willingness to pay.

Respondents review various combinations of **energy goals**, **timeframes for that goal**, **energy sources**, and **potential bill increases**, and select their "most preferred" from a series of options (including an option for "none" each time).

Subsequent analysis produces utility scores for each individual attribute, allowing us to calculate which combination has the broadest appeal.

Energy Goal	Investing in renewables to achieve carbon neutrality Providing 100% carbon-free power by only generating energy through clean energy sources
Goal Timeframe	In the next year In the next 5 years (by 2027) In the next 10 years (by 2032) In the next 25 years (by 2047)
Bill Increase	2% monthly increase 5% monthly increase 10% monthly increase 20% monthly increase 50% monthly increase 100% monthly increase
Energy Source	Sourced locally Sourced regionally Sourced from anywhere

Key Takeaways

Price is Important. 

When faced with tradeoffs, price is the prevailing factor. While the majority of customers find importance in sourcing green or local energy, they are only willing to pay so much. Anything beyond a 10% monthly bill increase shows significant declines in popularity.

If bill increases to invest in carbon-free or carbon-neutral options are kept below 10%, the specific energy goal, timeframe, local vs. regional source are less important.

Some customers see beyond price 

Increases beyond 10% monthly still appeal to a certain subset of customers, particularly those who place great importance on “green,” and/or when the goal can be achieved within the next 10 years.

***Any* increase to invest in “green” energy will alienate some customers** 

Overall, roughly one in five do not find importance in being “green”

When evaluating various green investment options, 17% reject all, including more ambitious outcomes for just a 2% increase

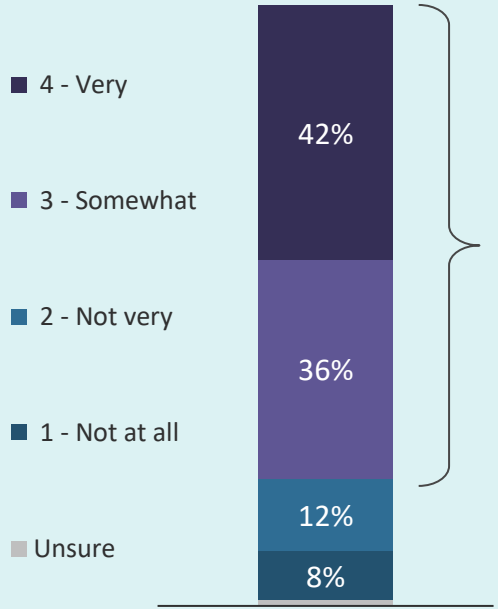
Three in ten say they would be likely to seek bill assistance or consider moving to another state if bill were to increase due to Avista investing in carbon-free or carbon-neutral energy

Detailed Findings:
Green Insights

At a personal level, the concept of being environmentally friendly or “green” is important to nearly eight in ten customers

Personal Importance of “Green”

(n=1,100)



78%
find the concept of being “green” important

Key Differences and Insights

Green importance differs by state.

Customers in **Oregon** and **Washington** are significantly more likely than those in Idaho to find the concept of “green” to be important.

83% **80%** **71%**

Green importance differs by area.

Customers in **urban** areas are significantly more likely than those in rural areas to find the concept important.

urban **84%** | suburban **80%** | rural **75%**

Green importance differs by gender.

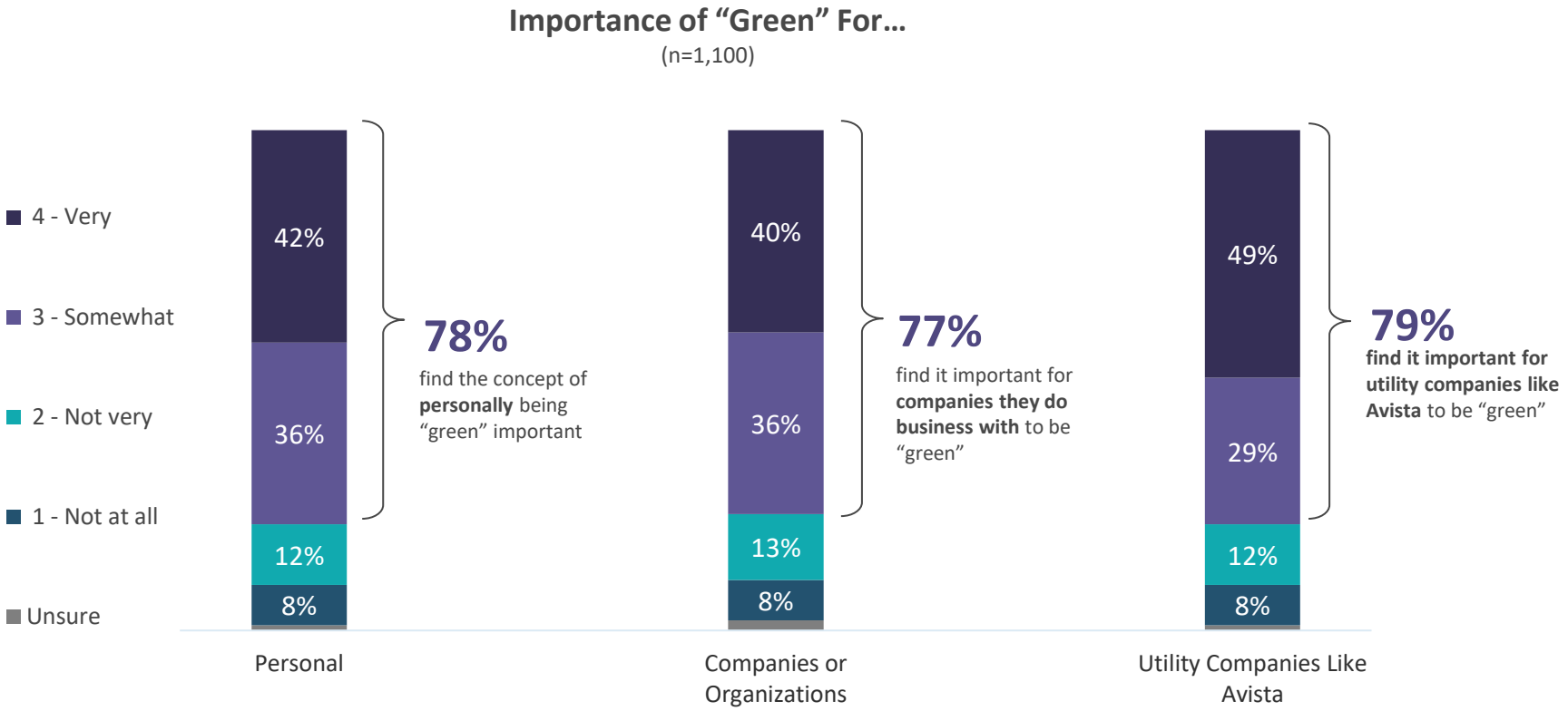
Women are significantly more likely than men to find it important.

85% **73%**

Green importance is consistent across age and income categories.

Q1. How important is the concept of being environmentally friendly or "green" to you personally?

Customers place similar importance on the “green” responsibility of themselves, businesses, and utility companies



Q1. How important is the concept of being environmentally friendly or "green" to you personally?
Q3. How important is it for general companies or organizations you do business with to be environmentally friendly or "green?“
Q4. How important is it specifically for utility companies like Avista to be environmentally friendly or "green?"

Personal importance to be “green” is driven by responsibility to protect the planet; for those believing it is not important to personally be green, cost is the main reason

Why is it Important?

(n=860)

- To protect our planet/environment (38%)
- Good for the future/future generations (24%)
- Responsibility/right thing to do/stewardship (16%)
- To address climate change/global warming (13%)

“If we take care of our planet, it will in turn last for generations to come. If we take care of it, it will always take care of us.”

“Every person has to take responsibility for the environment. We are stewards of the Earth after all. That responsibility cannot, and should, not be abrogated. If we don't stand up and insist on choices that protect that for which we are responsible then no one will and we necessarily choose a very dark alternative for an uncertain and unjust future.”

Why is it NOT Important?

(n=224)

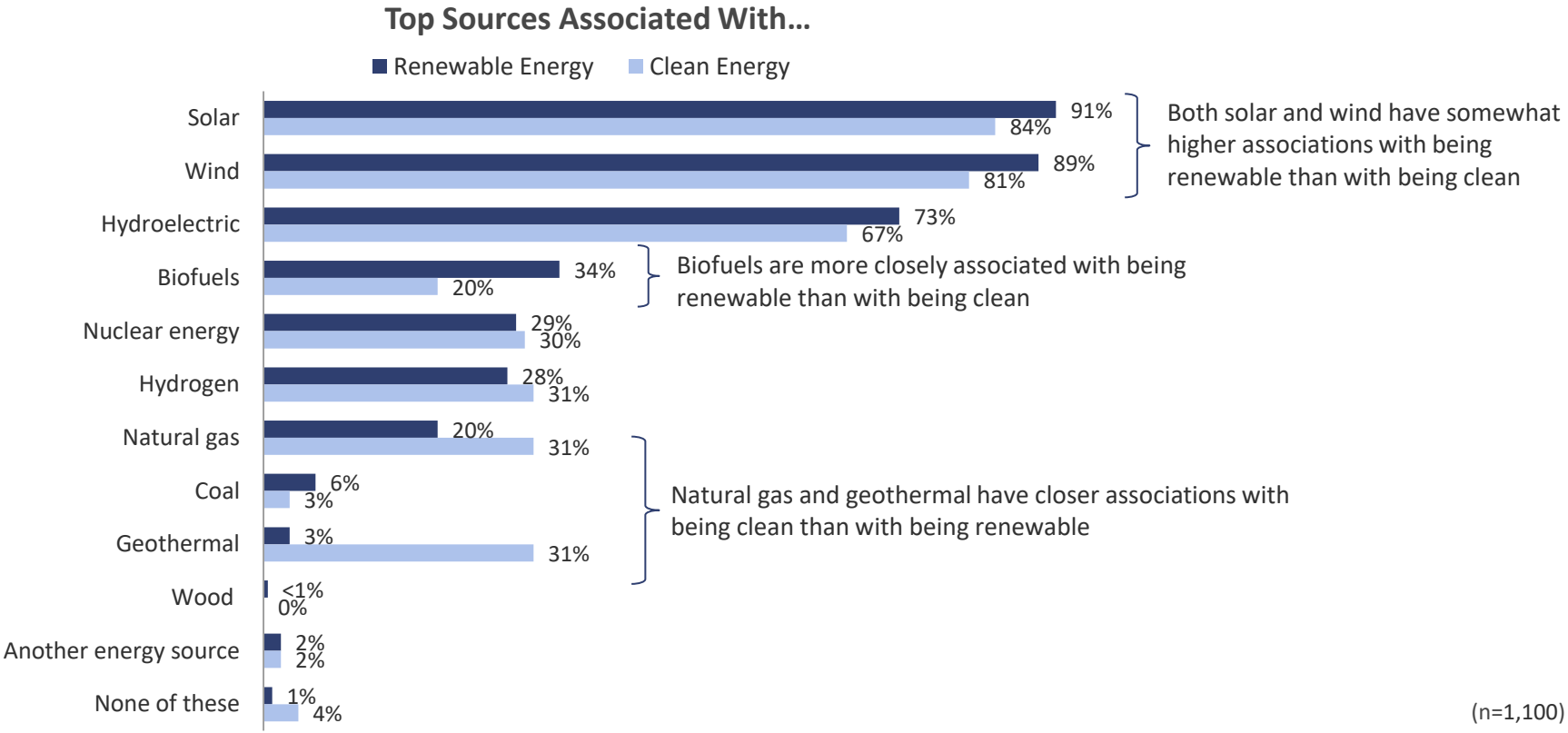
- Cost/it’s expensive (29%)
- Not real/hoax/misinformation (25%)
- “Green” is worse for the environment, not better (20%)
- Politics/Political Agenda (17%)

“In the 60+ years I've been around, the air land and waters have markedly improved. As the current crop of ‘renewables’ are unreliable and expensive, good ol' fossil fuels are the best bang for bucks.”

“Because the terms ‘environmentally friendly’ and ‘green’ have been distorted to the point where they have little relevance to actually protecting the environment.”

Q2A. Why is it [very/somewhat important] to personally be environmentally friendly or "green?“
Q2B. Why is it [not very/not at all important] to personally be environmentally friendly or "green?"

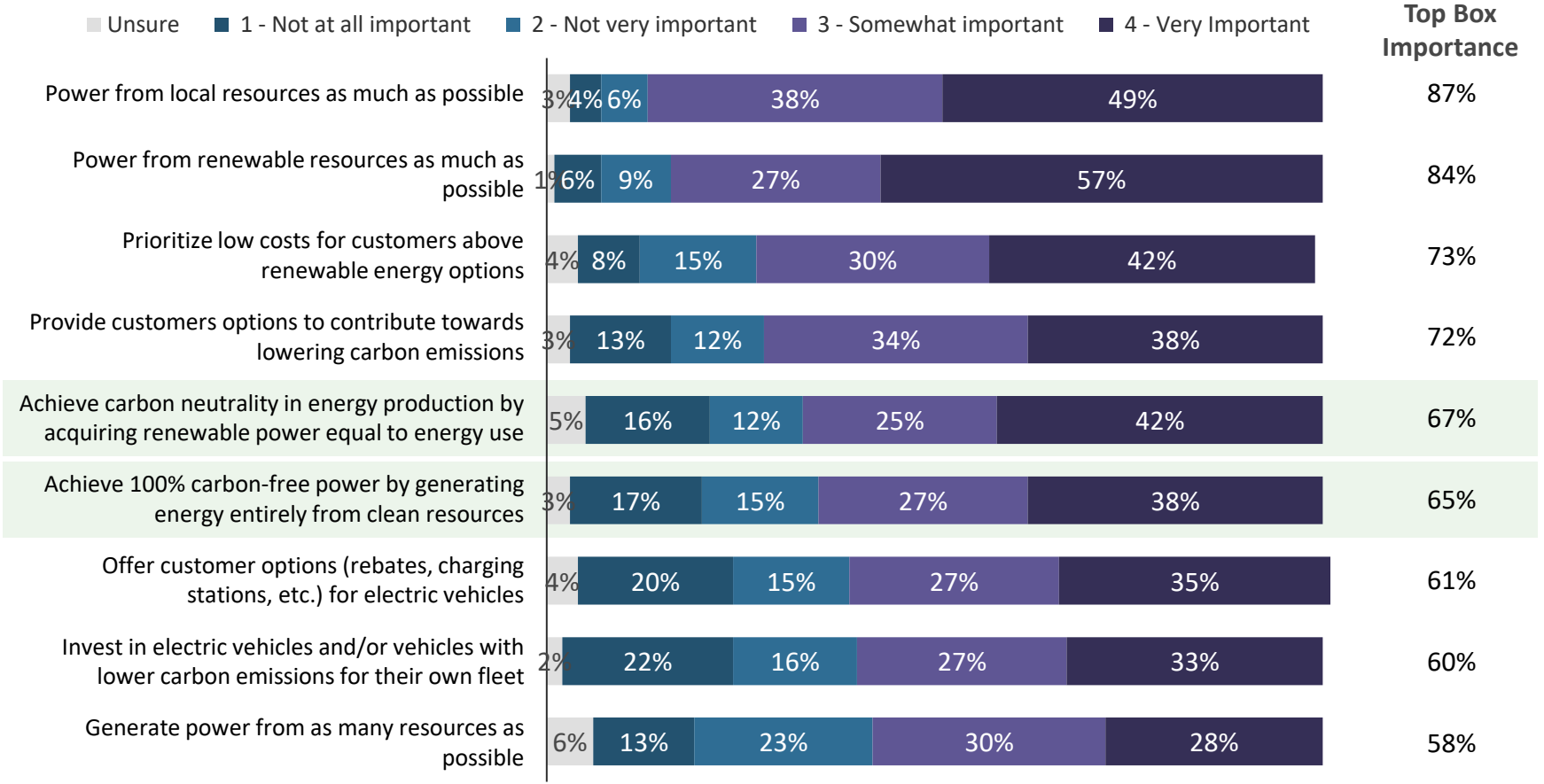
Solar and wind are commonly associated with both renewable and clean energy



(n=1,100)

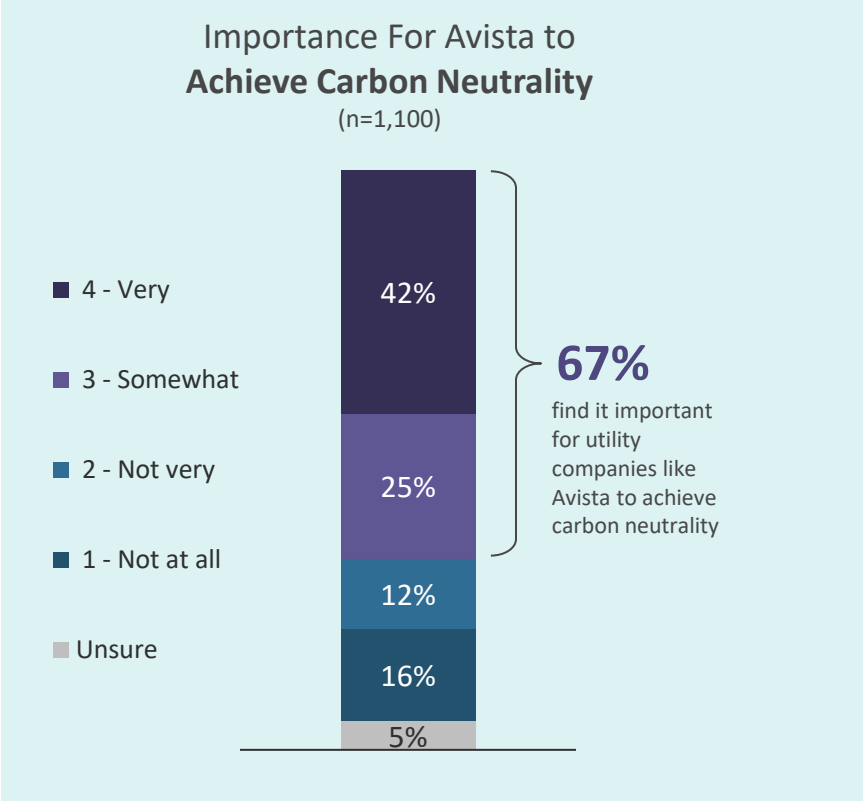
Q6. When you hear the words "renewable energy," what sources come to mind?
Q7. When you hear the words "clean energy," what sources come to mind?

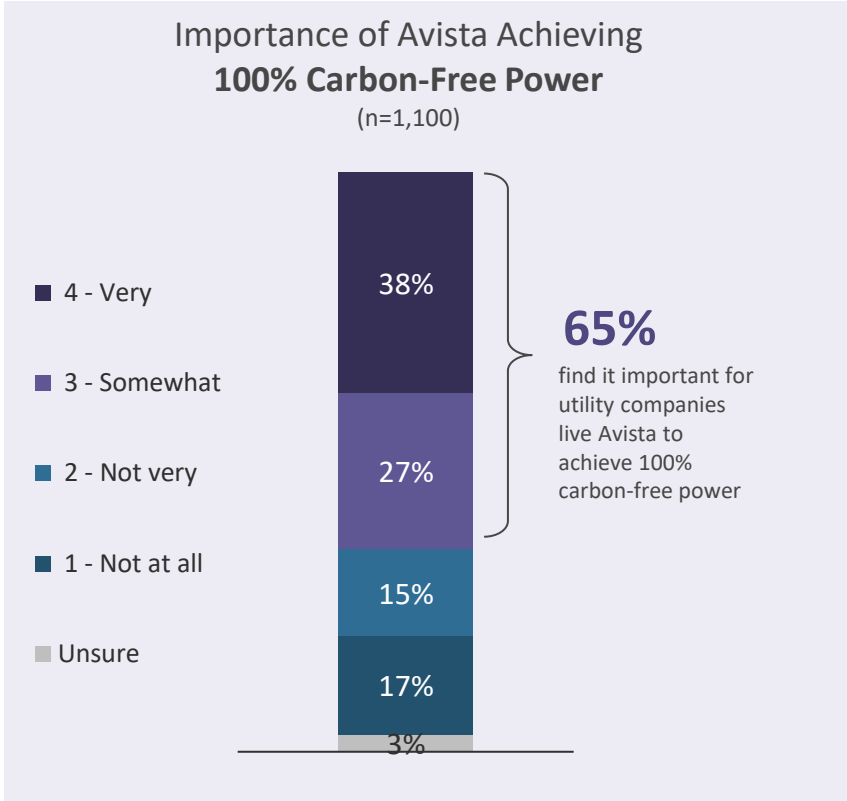
When considering potential utility company initiatives, customers place highest importance on generating power from local and renewable resources



Q5. How important is it for utility companies like Avista to do each of the following?

Customers place near equal importance on Avista achieving carbon neutrality and on achieving 100% carbon-free power





Q5. How important is it for utility companies like Avista to do each of the following?
Achieve carbon neutrality in energy production by acquiring renewable power equal to energy use.
Achieve 100% carbon-free power by generating energy entirely from clean resources.

The importance of Avista achieving these goals differs by certain key audiences

Key Differences and Insights: Carbon Neutrality

Carbon neutrality importance differs by state.

Customers in **Oregon** are significantly more likely than those in Idaho to say it is important for to achieve carbon neutrality.

73% 67% 61%

Carbon neutrality importance differs by area.

Customers in **urban** areas are significantly more likely than those in rural areas to find the achievement important.

urban 72% | suburban 69% | rural 63%

Carbon neutrality importance differs by gender.

Women are significantly more likely than men to find it important.

75% 60%

Importance of carbon neutrality differs by income.

Those making **$150K+ in household income** are significantly more likely than those making less than $60K to say it is important.

<$60K	$150K+
62%	72%

Key Differences and Insights: 100% Carbon-Free

Carbon-free power importance differs by state.

Customers in **Oregon** are significantly more likely than those in Idaho to find an achievement of 100% carbon-free to be important.

69% 66% 60%

Carbon-free power importance differs by area.

Customers in **urban** and **suburban** areas are significantly more likely than those in rural areas to find the achievement important.

urban 74% | suburban 67% | rural 59%

Importance of 100% carbon-free power differs by gender.

Women are significantly more likely than men to find it important.

73% 59%

Importance is consistent across age and income categories.

Q5H. How important is it for utility companies like Avista to do each of the following? *Achieve carbon neutrality in energy production by acquiring renewable power equal to energy use.* | *Achieve 100% carbon-free power by generating energy entirely from clean resources.*

Detailed Findings:
Green Investment

Conjoint Results Summary: Overall Feature Scoring

Category	Attribute	Result	Meaning
 **Energy Goal**	Investing in renewables to achieve carbon neutrality	0.55	If all other factors are held consistent, providing 100% carbon-free energy vs. investing in carbon neutrality has almost no impact
	Providing 100% carbon-free power by only generating energy through clean energy sources	0.59	
 **Goal Timeframe**	In the next year	0.60	There is a drop-off in utility at the 25-year level; however, there is little differentiation between *in the next year*, *five years*, or *ten years* when all other factors are held consistent
	In the next 5 years (by 2027)	0.59	
	In the next 10 years (by 2032)	0.59	
	In the next 25 years (by 2047)	0.52	
 **Bill Increase**	2% monthly increase	0.83	If all other factors are held consistent, the monthly bill increase has the biggest impact; utility drops off considerably with more than a 10% increase
	5% monthly increase	0.78	
	10% monthly increase	0.69	
	20% monthly increase	0.53	It should be noted, however, that those placing high importance on being green demonstrate a willingness to pay beyond the 10% mark
	50% monthly increase	0.36	
	100% monthly increase	0.25	
 **Energy Source**	Sourced locally	0.59	Though 87% find sourcing power locally to be important, ultimately there is little differentiation between *local*, *regional*, and *anywhere*, when considering other factors along with locality
	Sourced regionally	0.58	
	Sourced from anywhere	0.55	
 **None**		0.39	Overall, 17% of respondents said no to all options presented, indicating no willingness to pay for green investments

(n=1,100)

C2. Now, we will present you with a series of 12 screens, each with a set of options for an energy package that could be made available in the future for your home. For each set, please indicate the one you would be most likely to choose. You can always select "none" if you would not select any of the options.

Conjoint Results Summary: Feature Scores by Personal Green Importance

Category	Attribute	Feature Score by Green Importance		
		Very (n=445)	Somewhat (n=399)	Not (n=331)
Energy Goal	Investing in renewables to achieve carbon neutrality	0.67	0.53	0.38
	Providing 100% carbon-free power by only generating energy through clean energy sources	0.76	0.54	0.35
Goal Timeframe	In the next year	0.79	0.54	0.33
	In the next 5 years (by 2027)	0.76	0.54	0.35
	In the next 10 years (by 2032)	0.72	0.55	0.38
	In the next 25 years (by 2047)	0.59	0.52	0.39
Bill Increase	2% monthly increase	0.87	0.86	0.71
	5% monthly increase	0.88	0.78	0.60
	10% monthly increase	0.85	0.65	0.45
	20% monthly increase	0.74	0.46	0.24
	50% monthly increase	0.53	0.30	0.13
	100% monthly increase	0.42	0.17	0.04
Energy Source	Sourced locally	0.72	0.55	0.39
	Sourced regionally	0.73	0.55	0.37
	Sourced from anywhere	0.69	0.51	0.34
None		0.14	0.43	0.80

C2. Now, we will present you with a series of 12 screens, each with a set of options for an energy package that could be made available in the future for your home. For each set, please indicate the one you would be most likely to choose. You can always select “none” if you would not select any of the options.

Conjoint Results Summary: Feature Scores by Service Type

Category	Attribute	Feature Score by Service Type		
		Gas Only (n=271)	Dual (n=513)	Electric Only (n=316)
Energy Goal	Investing in renewables to achieve carbon neutrality	0.57	0.56	0.54
	Providing 100% carbon-free power by only generating energy through clean energy sources	0.61	0.60	0.58
Goal Timeframe	In the next year	0.63	0.60	0.58
	In the next 5 years (by 2027)	0.62	0.59	0.57
	In the next 10 years (by 2032)	0.61	0.59	0.57
	In the next 25 years (by 2047)	0.52	0.52	0.51
Bill Increase	2% monthly increase	0.83	0.84	0.82
	5% monthly increase	0.79	0.79	0.76
	10% monthly increase	0.71	0.70	0.66
	20% monthly increase	0.56	0.53	0.50
	50% monthly increase	0.39	0.35	0.35
	100% monthly increase	0.28	0.24	0.24
Energy Source	Sourced locally	0.61	0.59	0.57
	Sourced regionally	0.60	0.59	0.56
	Sourced from anywhere	0.57	0.55	0.53
None		0.36	0.38	0.42

C2. Now, we will present you with a series of 12 screens, each with a set of options for an energy package that could be made available in the future for your home. For each set, please indicate the one you would be most likely to choose. You can always select "none" if you would not select any of the options.

Conjoint Results Summary: Optimal Feature Combination

Unsurprisingly, the optimal utility results from customers achieving the most for the lowest cost. While this is not a realistic scenario, it provides a baseline for any changes made to move toward carbon-free or carbon-neutral energy in the future. Subsequent slides show change from optimal should other factors be considered.

Category	Attribute
Energy Goal	Investing in renewables to achieve carbon neutrality
Goal Timeframe	In the next year
Bill Increase	2% monthly increase
Energy Source	Sourced locally

(n=1,100)

C2. Now, we will present you with a series of 12 screens, each with a set of options for an energy package that could be made available in the future for your home. For each set, please indicate the one you would be most likely to choose. You can always select "none" if you would not select any of the options.

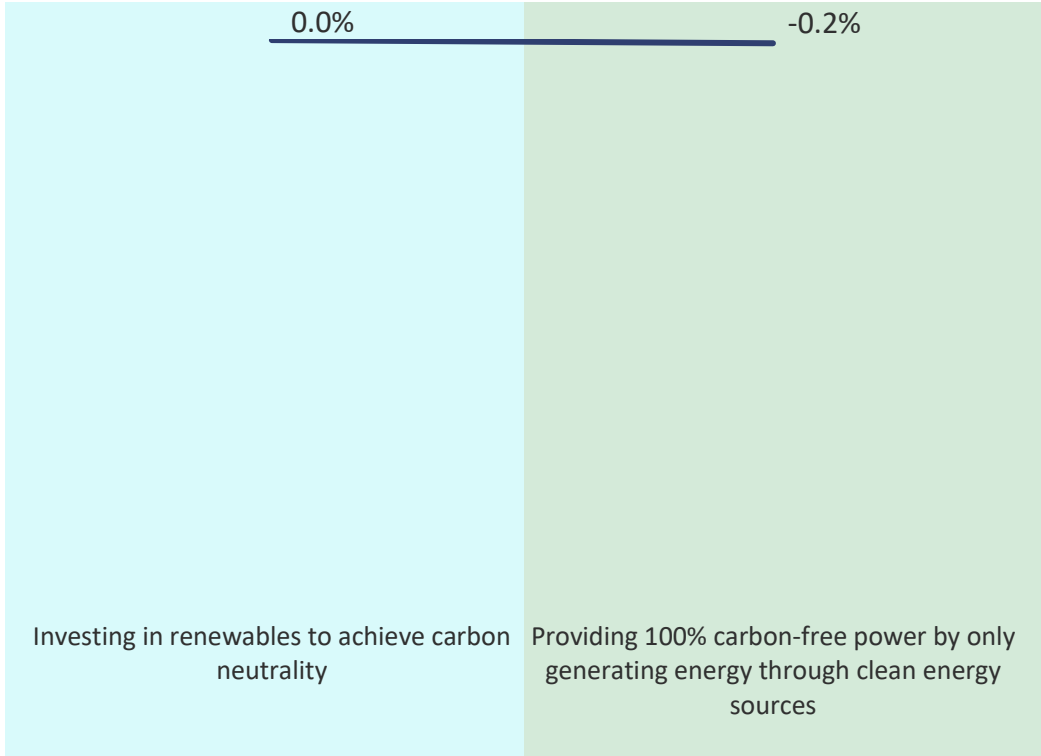
Conjoint Summary: Difference from Optimal Combination (Based on Goal)

Optimal Feature Combination

Energy Goal	Investing in renewables to achieve carbon neutrality
Goal Timeframe	In the next year
Bill Increase	2% monthly increase
Energy Source	Sourced locally

If all other factors are held consistent, providing 100% carbon-free energy vs. investing in carbon neutrality has almost no impact

Change from Optimal Based on **Goal**



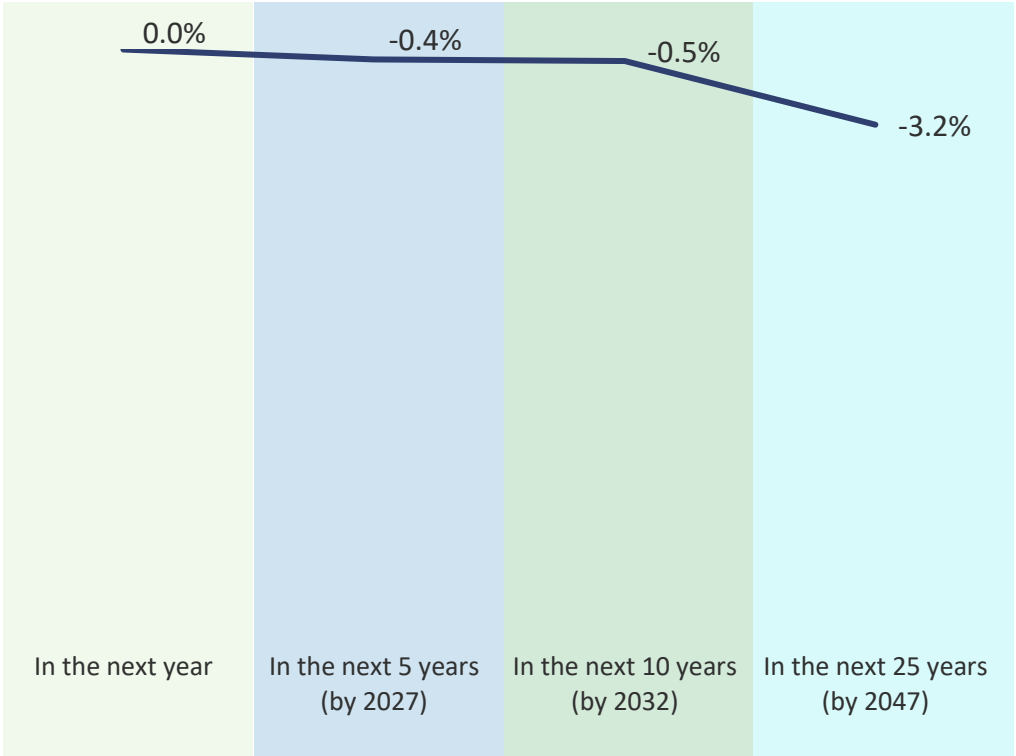
Conjoint Summary: Difference from Optimal Combination (Based on Timeframe)

Optimal Feature Combination

Energy Goal	Investing in renewables to achieve carbon neutrality
Goal Timeframe	In the next year
Bill Increase	2% monthly increase
Energy Source	Sourced locally

If all other factors are held consistent, a shorter timeline has minimal impact; utility drops off after 10 years

Change from Optimal Based on **Timeframe**



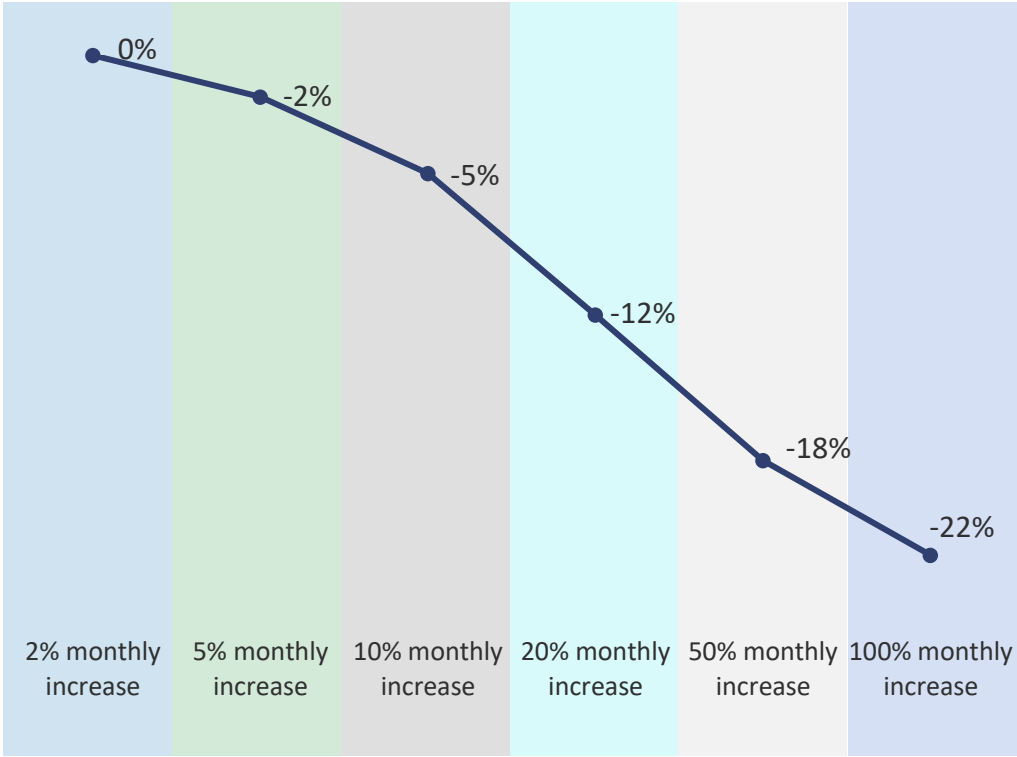
Conjoint Summary: Difference from Optimal Combination (Based on Bill Increase)

Optimal Feature Combination

Energy Goal	Investing in renewables to achieve carbon neutrality
Goal Timeframe	In the next year
Bill Increase	2% monthly increase
Energy Source	Sourced locally

If all other factors are held consistent, the monthly bill increase has the biggest impact; utility drops off considerably with more than a 10% increase

Change from Optimal Based on **Monthly Bill Increase**



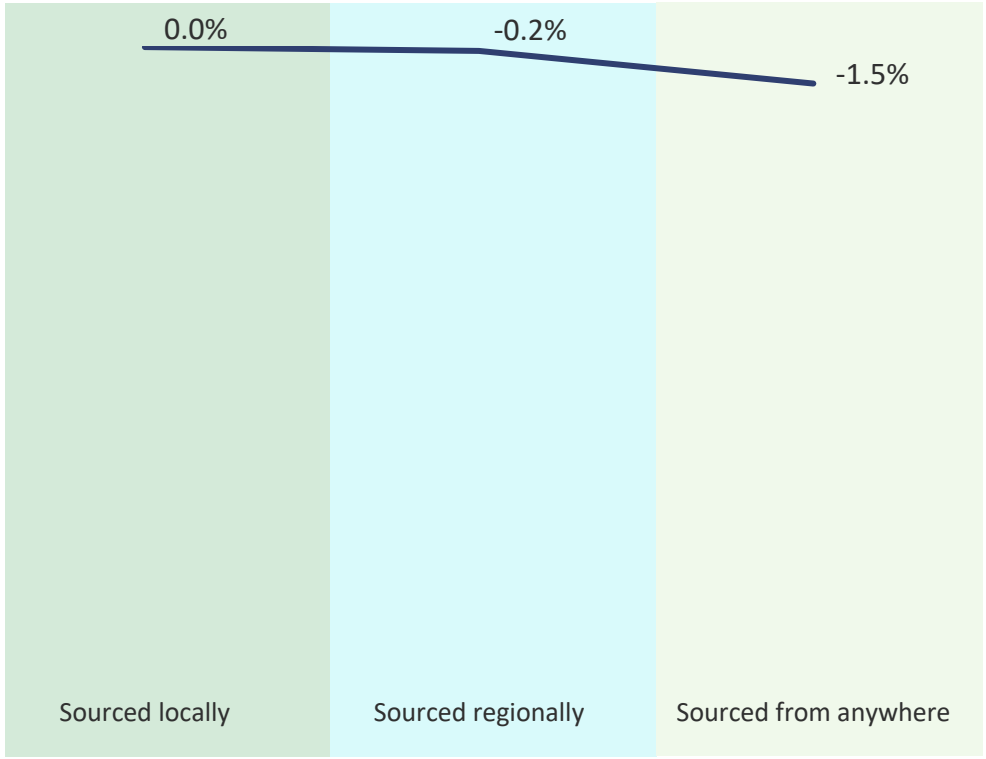
Conjoint Summary: Difference from Optimal Combination (Based on Source)

Optimal Feature Combination

Energy Goal	Investing in renewables to achieve carbon neutrality
Goal Timeframe	In the next year
Bill Increase	2% monthly increase
Energy Source	Sourced locally

If all other factors are held consistent, the source of energy has almost no impact; energy sourced locally or regionally is only slightly more preferred

Change from Optimal Based on **Source**

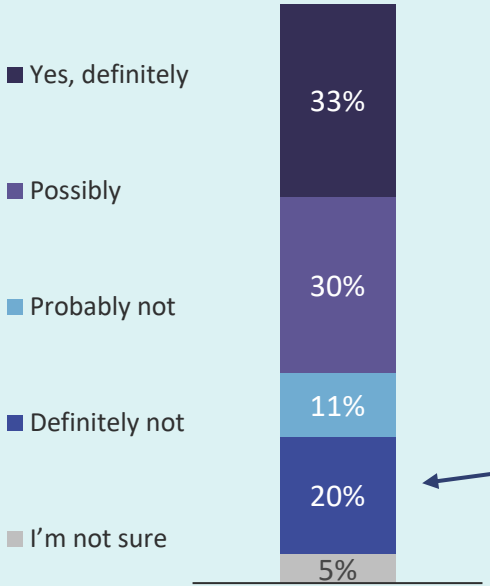


Detailed Findings:
Investment Support

Three in five customers say Avista should invest in carbon-neutral energy even if it involves a rate increase for customers

Should Avista invest in carbon-neutral or carbon-free energy, even if it involves a rate increase for customers?

(n=1,100)



Key Differences and Insights

Investment sentiment differs by income.

Those with **higher household incomes** are significantly more likely than those making $60K or less to agree Avista definitely should invest, even if it involves a rate increase.

<$60K	$60K+
28%	42%

Investment sentiment differs by area.

Customers in **urban** areas are significantly more likely than those in rural areas to believe Avista should definitely invest.

urban	suburban	rural
40%	36%	29%

Lack of investment support differs by gender.

While those **supporting** investment is consistent across gender**, men** are significantly more likely than women to **definitely not** support investment.

♀	♂
15%	23%

Support is consistent across age and state.

C3. Should Avista invest in carbon-neutral or carbon-free energy, even if it involves a rate increase for customers?

Supporters say the main reason Avista should invest in carbon-neutral energy is to “save the planet,” while the main reason to not invest among detractors is “consumer cost”

What is the main reason to invest?

(n=697)

- To save the planet (21%)
- For a cleaner environment (19%)
- For cleaner air (16%)
- To fight climate change (16%)
- Depends on cost effectiveness (16%)
- It’s the right thing to do (16%)

“Finite resources are finite. It doesn't matter that you save money today but have fewer or no energy sources later.”

What is the main reason to NOT invest?

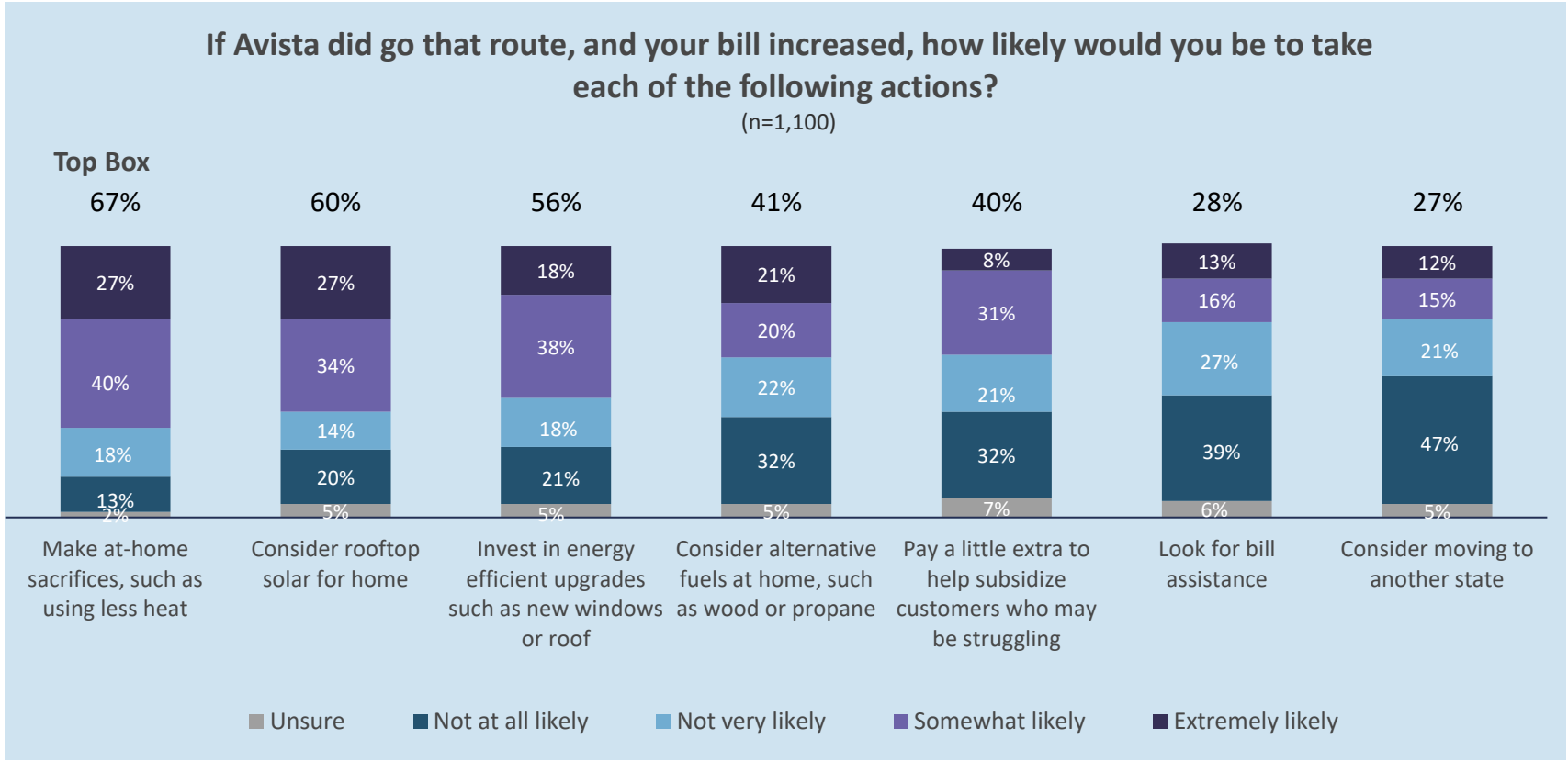
(n=345)

- Consumer costs/expensive (57%)
- Don’t believe in it/hoax/impossible (17%)
- Unnecessary/will not change anything (16%)
- Politics/political agenda (10%)

“Carbon neutral and carbon free energy are ridiculous ideas that only increase the cost of energy for everyone.”

C3A. In your opinion, what is the main reason Avista should invest in carbon-neutral or carbon-free energy, even if it involves a rate increase for customers?
C3B. In your opinion, what is the main reason or reasons Avista should not invest in carbon-neutral or carbon-free energy?

Nearly seven in ten customers would be likely to “make at home-sacrifices” if their bill increased due to Avista’s investment in carbon-neutral energy

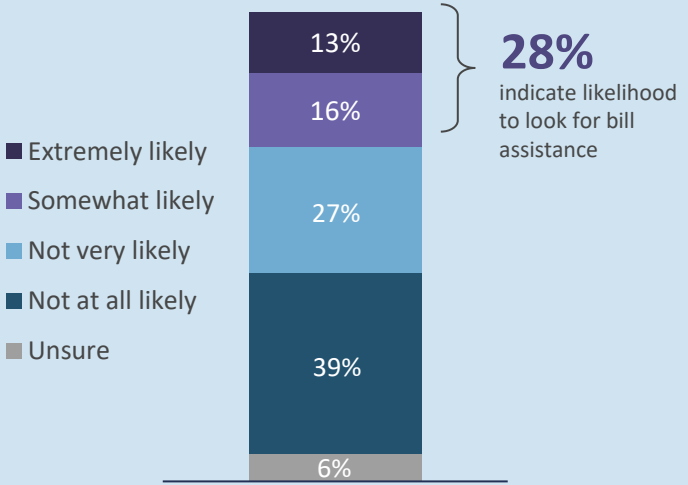


C4. If Avista did go that route, and your bill increased, how likely would you be to take each of the following actions?

Just over a quarter indicate they'd seek bill assistance should rates rise due to Avista pursuing carbon-neutral or carbon-free options; for over half, this would take a 10% increase or more

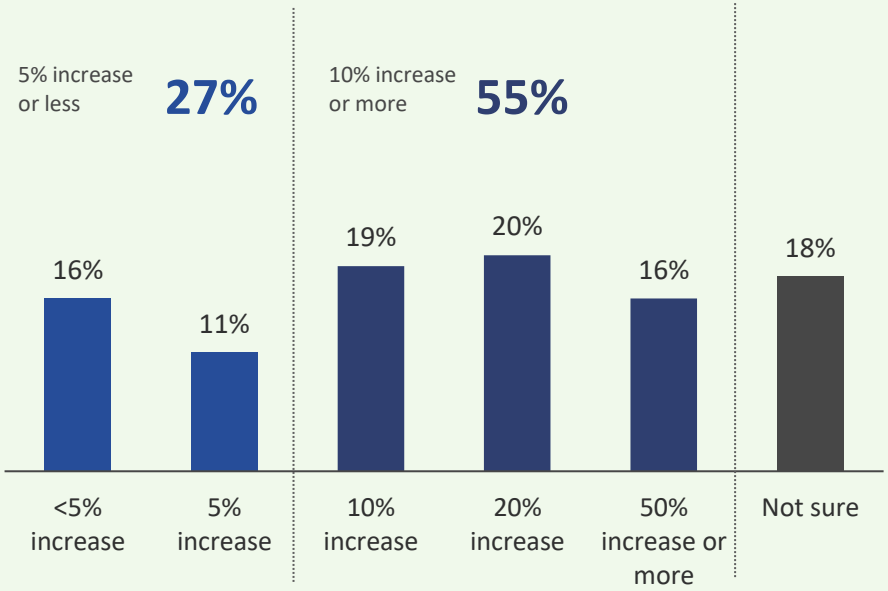
Likelihood to Seek Bill Assistance if Bill Increased

(n=1,100)



Level of Bill Increase That Would Drive Seeking Assistance

(Among Those Likely to Seek Assistance; n=313)

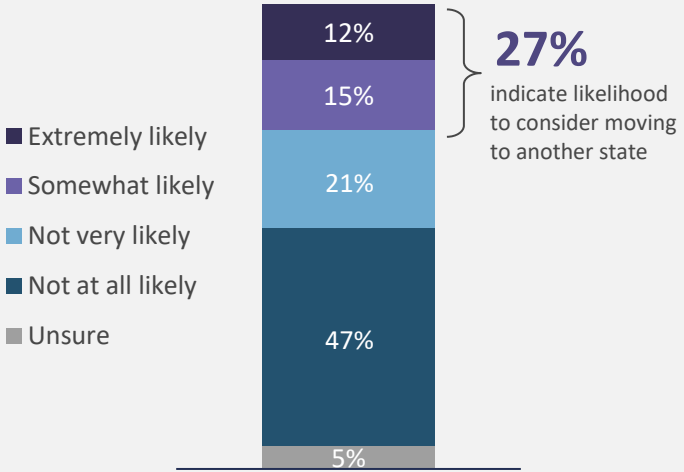


C4. If Avista did go that route, and your bill increased, how likely would you be to take each of the following actions? *Look for bill assistance*
C5. What level of bill increase would you envision driving you to seek bill assistance?

Roughly a third indicate they'd consider moving to another state should rates rise; however, there is uncertainty around what threshold of increase would drive this decision

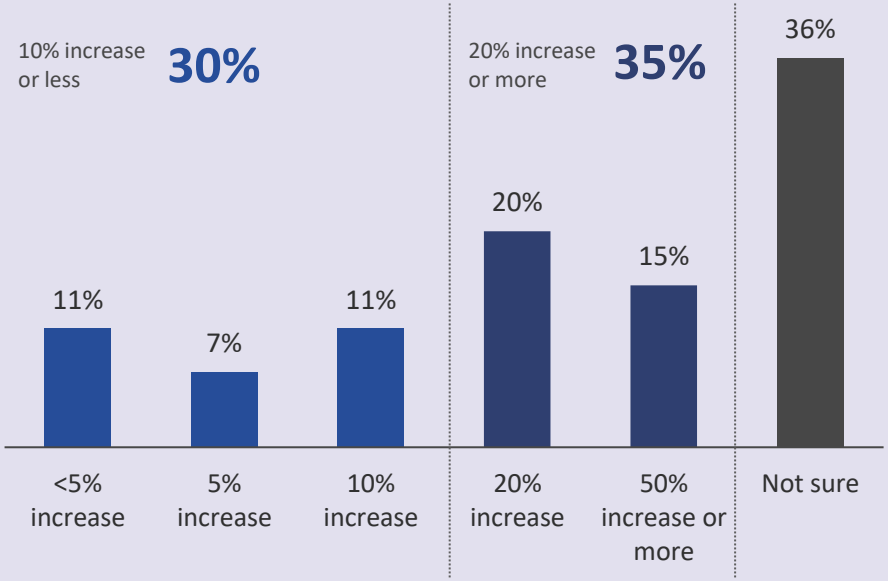
Likelihood to Move Out of State if Bill Increased

(n=1,100)



Level of Bill Increase That Would Drive Moving Out of State

(Among Those Likely to Consider Moving; n=299)

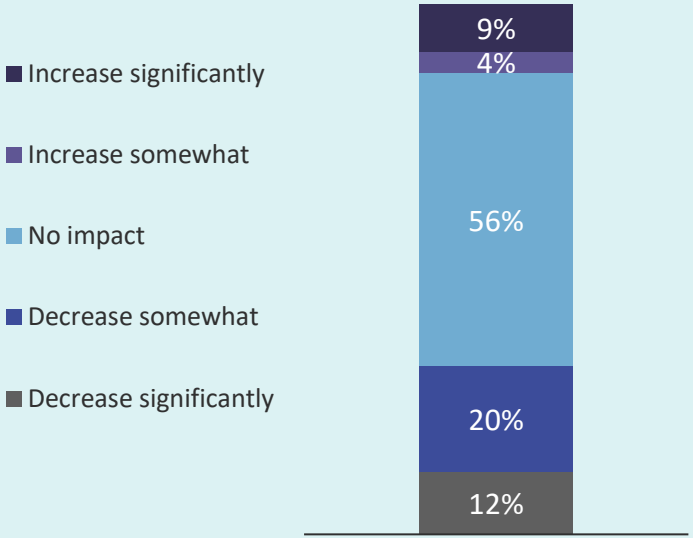


C4. If Avista did go that route, and your bill increased, how likely would you be to take each of the following actions? *Consider moving to another state*
C6. What level of bill increase would you envision driving you to consider moving to another state?

Over half of customers say their favorability would not be impacted if Avista does not achieve carbon neutrality by 2027

Favorability of the Company if Avista is not able to Achieve Carbon Neutrality by 2027

(n=1,100)



Potential decreased favorability differs by age.

Younger participants are significantly more likely than older participants to say their favorability of Avista would decrease significantly if Avista is not able to achieve carbon neutrality by 2027.

18-54	55+
15%	**10%**

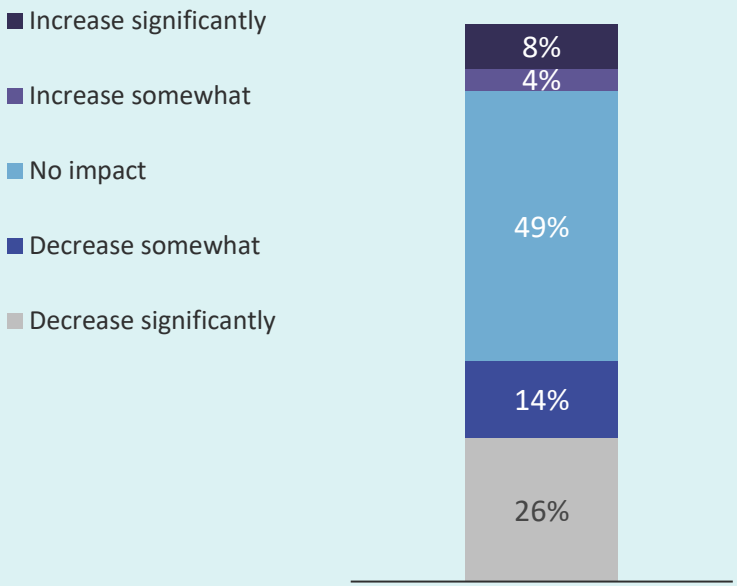
Potential decreased favorability is consistent across state, gender, area of residence, and income categories.

C7. If Avista is not able to achieve carbon neutrality by 2027, how would this affect your favorability of the company?

Nearly half say their favorability would not change if Avista does not achieve carbon free by 2045

Favorability of the Company if Avista is not able to Provide 100% Carbon-Free Power by 2045

(n=1,100)



Potential favorability differs by state.

Customers in **Oregon** and **Washington** are significantly more likely than those in Idaho say their favorability of Avista would decrease significantly.

29% **27%** **21%**

Potential favorability differs by area.

Customers in **urban** and **suburban** areas are significantly more likely than those in rural areas to decrease favorability.

urban **32%** | suburban **28%** | rural **21%**

Potential favorability differs by household income

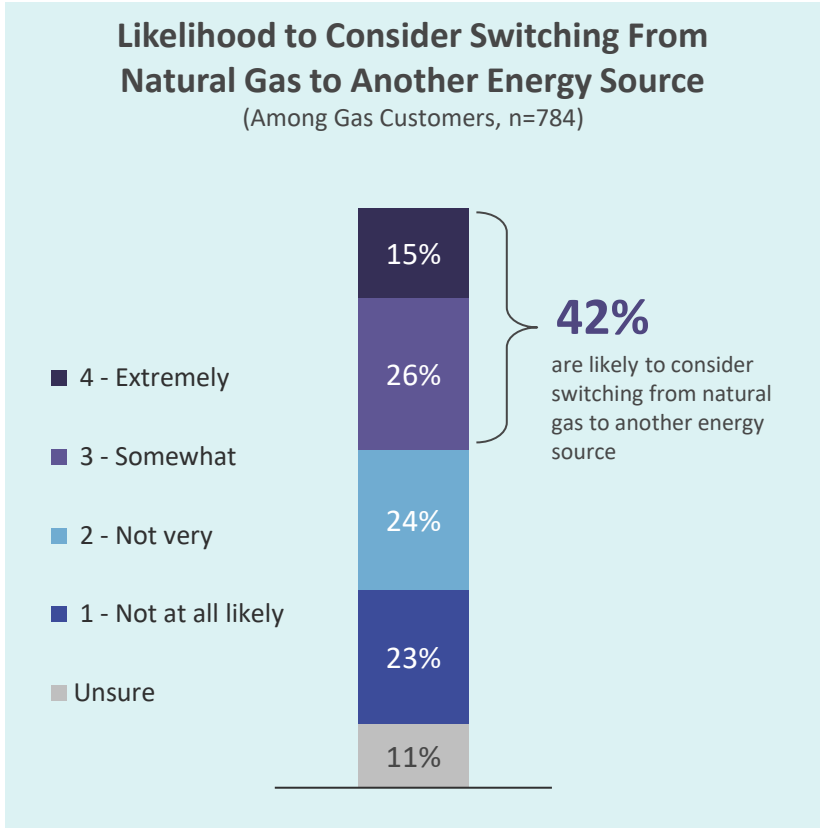
Those with **higher household incomes** are significantly more likely than those making $80K or less to decrease favorability.

<$80K	$80K+
23%	**33%**

C8. If Avista is not able to provide 100% carbon-free power by 2045, how would this affect your favorability of the company?

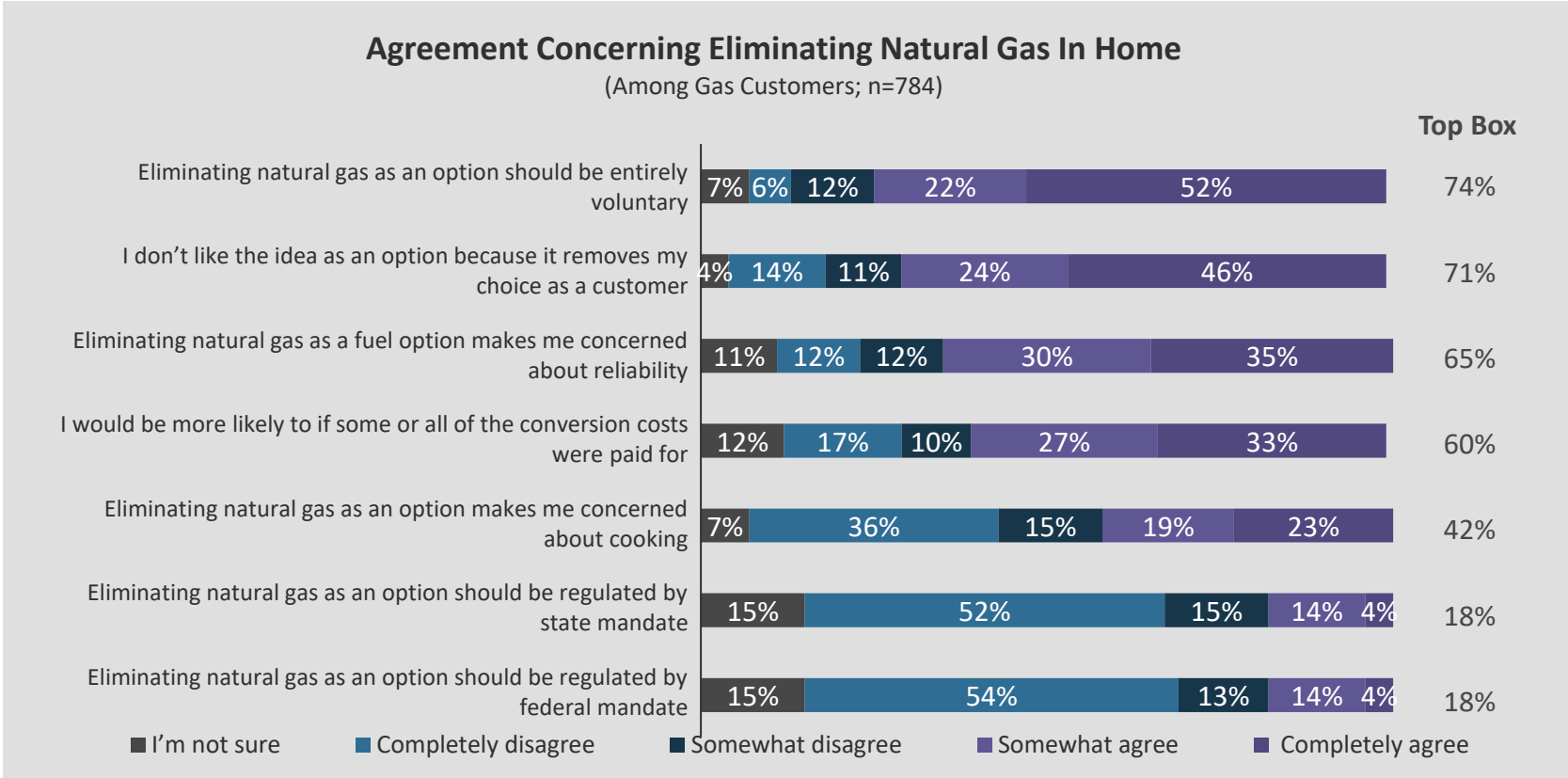
Detailed Findings:
Natural Gas Insights

Nearly half of customers would **not** consider switching from natural gas to help reduce carbon emissions



N1. How likely would you be to consider switching from natural gas to another energy source to help reduce carbon emissions?

Three-quarters gas customers agree eliminating natural gas should be entirely voluntary

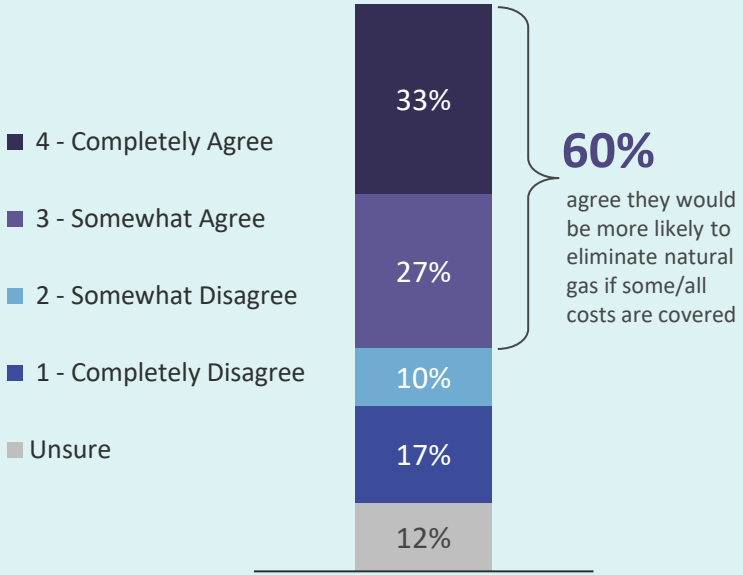


N2. How much do you agree or disagree with the following statements concerning natural gas in your home?

Six in ten would be more likely to convert from natural gas if some or all conversion costs were covered; of these, 59% would be willing to pay under $1000

Would be More Likely to Convert if Some or All Conversion Costs are Covered

(Among Gas Customers, n=784)



Maximum Personal Contribution

(Among Gas Customers More Likely to Convert If Some/All Costs Are Covered; n=473)

N2. How much do you agree or disagree with the following statements concerning natural gas in your home?

I would be more likely to eliminate natural gas as an option in my home if some or all of the conversion costs were paid for by the electric utility and/or government incentives

N3. If you did have to contribute some costs towards converting from natural gas in your home, how much would you consider your max level of contribution?

Customer Demographics

Demographics

Education	Total (n=1,100)	WA (n=569)	ID (n=316)	OR (n=215)
High school or less	7%	5%	10%	7%
Trade or Technical School	6%	6%	9%	4%
Some college	20%	20%	20%	21%
Graduated college	36%	37%	35%	33%
Graduate/professional school	26%	28%	22%	30%
Age				
18-24	1%	<1%	2%	--
25-34	5%	4%	9%	4%
35-44	13%	15%	14%	9%
45-54	14%	14%	14%	12%
55-64	23%	21%	26%	22%
65-74	25%	24%	24%	31%
75+	12%	16%	4%	16%
Refused	6%	5%	7%	7%

Home Type	Total (n=1,100)	WA (n=569)	ID (n=316)	OR (n=215)
Single family dwelling	83%	92%	64%	87%
A duplex or triplex	4%	2%	7%	3%
In a building with 4 or more units	6%	2%	16%	2%
Income				
Median	~$70K	~$78K	~$62K	~$66K
Household				
Mean # of people	2.4	2.5	2.2	2.2
Gender				
Women	46%	44%	47%	53%
Men	46%	49%	45%	40%
Non-binary or Other	<1%	1%	1%	--
Prefer not to say	7%	7%	7%	8%