BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

Docket No. LC 75

In the Matter of AVISTA UTILITIES, 2021 Integrated Resource Plan.	Staff's Opening Comments

Table of Contents

Introduction

The Public Utility Commission of Oregon (OPUC or Commission) Staff files these initial comments on the Avista Utilities (Avista or Company) 2021 Integrated Resource Plan (IRP or Plan), filed in Docket No. LC 75 on April 1, 2021. The Commission is currently scheduled to make a decision on whether to acknowledge the IRP at the regular public meeting on October 14, 2021.

Docket History

Avista's previous IRP, the 2018 IRP, was filed on August 13, 2018, as LC 72. In response to the proceedings, the Company filed an updated action plan on December 18, 2018. With the action plan update, the IRP was acknowledged on March 25, 2019 (Order No. 19-106).

On March 11, 2020, the Company was granted an extension to file the next IRP (Order No. 20-071). In January 2021, Avista circulated a draft IRP for informal stakeholder comment. Staff's comments on the draft IRP and Avista's responses to those comments can be found in Appendix 0.2 of the IRP.

IRP Overview

Avista provides natural gas services to customers in Washington, Oregon, and Idaho, as well as electric services in Washington. Avista serves 104,000 Oregon customers in three service territories: La Grande, Medford/Roseburg, and Klamath Falls.[1]

The Company lists a number of notable changes between the 2018 IRP and the 2021 IRP.

- The Company identifies resource needs under the high growth, low gas price scenario, and a resource compliance need in the carbon reduction scenario.
- The expected case demand growth decreased from 1.2 percent to 1.0 percent.
- Weather modeling changed from "coldest on record" to a probability-based approach.
- The 20-year conservation potential assessment increased slightly from 17.2 million therms to 18.0 million therms when comparing cost-effective achievable potential across IRPs.[2]
- The levelized price of natural gas declined by approximately 10 percent.
- The Company changed Oregon's GHG emission reduction price range from $17.86 – $51.58 to $15.73 – $97.90 to align the Company's modeling with estimates associated with DEQ's "Cap and Reduce" (or Climate Protection Program).[3]

The Company's action plan does not include any significant resource acquisitions in Oregon as it does not anticipate any capital work for supply side or distribution upgrades in the next four years. Instead, the action plan focuses on activities in the next IRP. These include:

- investigating new resource modeling software to replace SENDOUT,
- exploring modeling updates for carbon reductions and changing weather conditions,

[1] LC 75 – Avista 2021 IRP, p. 16.
[2] LC 75 – Avista 2021 IRP, p. 23, Avista compares 2018 cost-effective achievable potential to 2021 deployed savings projection. 18.0 milliion therms is the correct comparison for the 2021 IRP.
[3] LC 75 – Avista 2021 IRP, p. 23-24.

- ongoing Energy Trust funding, and
- other ongoing work associated with a regular IRP process.

Initial Analysis

Staff's comments are organized by topic and detail Staff's primary areas of focus for these initial comments. Staff also addresses the Company's response to Staff recommendations from the 2018 IRP throughout these comments. Staff continues to evaluate the Company's Plan and conduct discovery, and will review the participants' comments prior to issuing final recommendations in September 2021.

While Staff's review is ongoing, Staff has identified three major areas of inquiry:

> **1 - Demand Forecast Methodology:** Staff notes that a number of changes to the demand forecast methodology were proposed and implemented. Staff seeks to understand how these changes were implemented and whether the changes result in a forecast that better meets current modeling needs.
>
> **2 – Distribution Investment Need:** Staff understands that the Company does not anticipate any significant distribution project investments in the next four years. Staff seeks to further understand the planning activities supporting this conclusion.
>
> **3 – Executive Order 20-04:** Staff acknowledges and appreciates that the Company has sought guidance on how to incorporate the activities from OPUC's work plan for Executive Order (EO) 20-04 related to IRP modeling. While this guidance is still in development, Staff continues to consider additional actions the Company can take to support the EO 20-04 work plan.

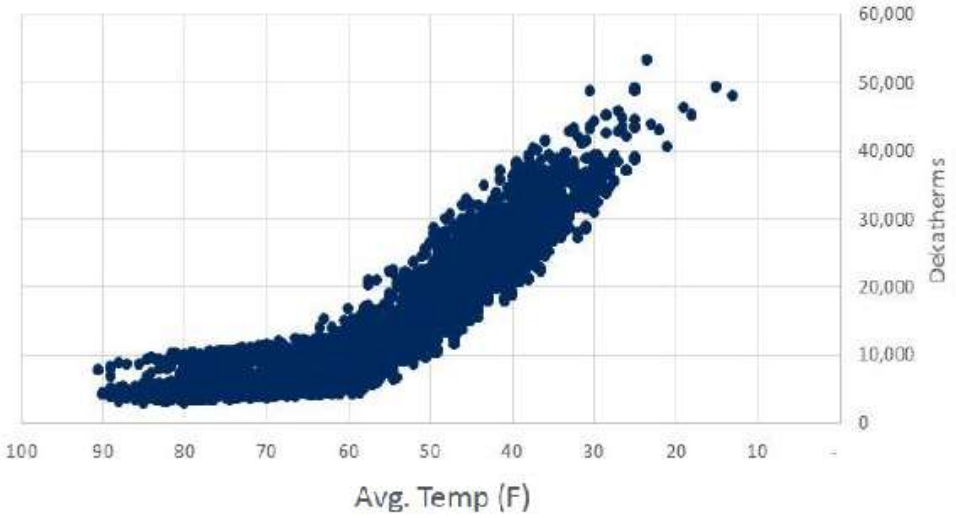
Other items are addressed as appropriate.

Demand Forecast

Avista prepares its load forecast by three service territories: Medford/Roseburg, Klamath Falls, and La Grande. For each service territory, the Company prepares annual and peak day forecasts. For most rate schedules, the Company forecasts number of customers and use per customer (UPC). The Company uses econometric models to forecast the number of customers.[4] The Company's Demand Forecast Methodology IRP Appendix describes its UPC load forecasting formulas. UPC is computed considering base non-weather sensitive usage and heating coefficients. For example, in Figure 1, reproduced from IRP page 500, gas usage is nearly flat at temperatures below about 60 degrees:

[4] See LC 75 – Avista 2021 IRP, Appendix 2 pages 40-44 for the load forecasting econometric formulas including ARIMA error correction terms.

Figure 1: Medford Daily Demand[5]



The Company prepares base case forecasts as well as high growth and low growth scenario forecasts. Additionally, the Company considers 33 demand sensitivities, such as a high carbon cost scenario and significant supply disruptions.[6]

Additionally, Order No. 19-106 in LC 72 included two action items related to Avista's load forecast: 1) to revisit the peak day cold weather planning standard and 2) to include the cost risk of greenhouse gas regulation.[7] Staff also recommended Avista continue to pursue other load forecasting improvements. Avista's 2021 IRP includes load forecast changes responsive to these action items, each of which will be discussed below.

Peak Day Cold Weather Planning Standard

In the last IRP, the Company identified the coldest day on record by service territory for its peak day forecast.[8] In contrast, Avista is proposing in this IRP that: "the expected weather planning standard will utilize a coldest average temperature each year for the past thirty years, by planning area, and combine these temperatures with a 99% probability of a weather occurrence."[9] Avista argues that by using a rolling thirty years, this change helps account for climate trends. Staff supports Avista using more recent weather data to account for trends. However, Staff is concerned that Avista's "99% probability" approach might result in too cold of a weather planning standard. Table 1 below is reproduced from page 32 of Avista's IRP and shows the prior IRP planning standard versus the proposed change:

[5] LC 75 – Avista 2021 IRP, at PDF p. 500.
[6] LC 75 – Avista 2021 IRP, p. 38.
[7] OPUC *Order No. 19-106* March 25, 2019, Appendix A page 1.
[8] LC 72 – Avista 2021 IRP, p. 28.
[9] LC 75 – Avista 2021 IRP, p. 30.

Table 1: Weather Planning Standard[10]

Area	Coldest on Record (Prior IRP's)	99% Probability Avg. Temp
La Grande	-10	-11
Klamath Falls	-7	-9
Medford	4	11
Roseburg	10	14

In regards to Avista's proposed change to the weather planning standard, Staff asked why the 99 percent cold weather day used in the peak forecast is colder than any of the actual observed data. The Company responded that "the temperature is colder based on historical figures in this dataset" and the Company references a 1-in-100 year event.[11]

To aid in Staff's review, Staff requests that the Company provide additional detail for how the 99 percent Probability Average Temperatures are computed in its Reply Comments. At this stage, Staff believes the Company's approach shows promise, particularly in attempting to balance a peak day planning standard with the risk of lower demand than forecasted.[12] Staff also supports Avista's approach of not modeling wind on the peak cold weather day, and agrees that the combination would lead to too cold of a planning standard. This is consistent with Staff comments in Northwest Natural's IRP.[13]

Reply Comment Request 1: Please describe in detail how the 99 percent Probability Average Temperatures are computed.

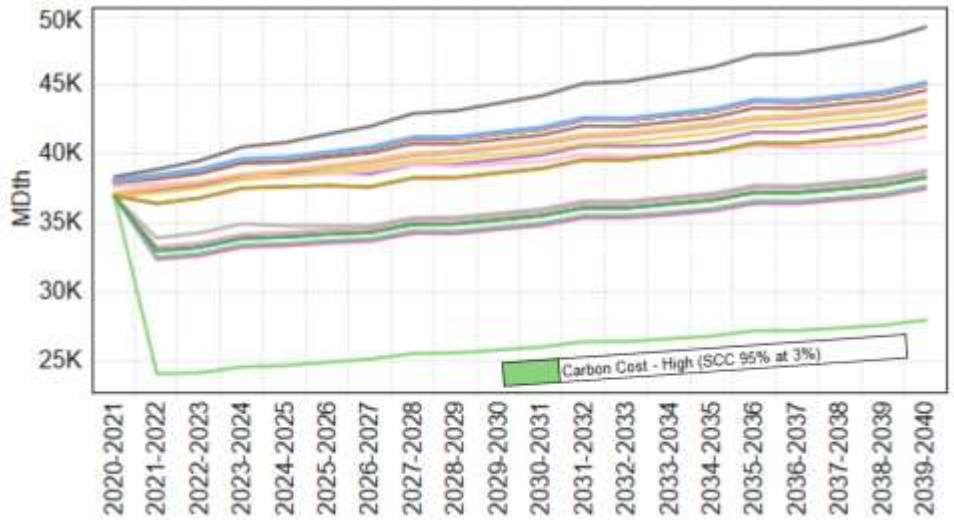
Cost Risk of Greenhouse Gas Regulation

In this IRP, Avista updated the cost risk of GHG regulation to align with a range described as "Cap and Reduce," which refers to a program currently under development by DEQ (now called the Climate Protection Program). The update resulted in an expanded range of values, going from $17.86 – $51.58 to $15.73 – $97.90. In response to an inquiry from Staff, Avista explained that the updated range was provided by the third party consulting group Woods Mackenzie. The Company further explained that the range may change as the Climate Protection Plan (CPP) rules—currently in development—inform how the Company would comply with GHG emission reduction targets.[14] However, the Company notes that higher gas costs, including the costs associated with compliance, would decrease demand for gas because of the price elasticity of

[10] LC 75 – Avista 2021 IRP, p. 32.
[11] See Staff Attachment 1, Avista response to Staff Data Request 29.
[12] LC 75 – Avista 2021 IRP, at PDF page 524 illustrates a scenario where demand is lower, or "flat demand".
[13] LC 75 – Avista 2021 IRP, at PDF page 522 describes: "Using wind chill effects combined with a 99% probability [would produce] some drastic changes in peak day planning and may require a large amount of capital to meet those design criteria."
[14] See Staff Attachment 1, Avista response to Staff Data Request 25.

demand.[15] The Company further explains that price elasticity used is based on actual data from Roseburg, OR.[16] Staff believes that the Company's use of a price elasticity of demand is appropriate because CO_2 prices can decrease demand for gas. This is illustrated by Figure 2, which is reproduced (with label added) from page 38 of the IRP, where the high carbon cost scenario significantly decreases gas demand below the base case.

Figure 2: IRP Demand Sensitivities



Staff initially has some concern with the choice to only use yearly data from Roseburg to compute the price elasticity of demand.[17] However, the Company adequately describes the difficulty it faced in including the other service territories, which it explains did not have statistically significant results. Further, the Company explained that the calculation is also challenged by the price lag caused by the PGA process. Staff greatly appreciates the Company's effort to evaluate and model these impacts and with this additional background, finds the Company's approach reasonable at this time.

Other Load Forecasting Changes

Customer growth greater than population growth

Related to the number of customers forecasted, in LC 72, Staff discussed the penetration rate of new homes with gas service. In this IRP, Staff followed up to ask why the Company's forecast of the number of customers grows faster than the rate of population growth. The Company responded that many existing homes add gas service. In addition to population growth, the Company sees additional gas adoptions in existing homes, especially when the economy is stronger.[18] Staff understands that forecasting the number of new gas customers is difficult. Staff supports the Company continuing to search out useful input data for its load forecasts.

[15] See Staff Attachment 1, Avista response to Staff Data Request 33.
[16] See Staff Attachment 1, Avista response to Staff Data Request 31.
[17] Ibid.
[18] See Staff Attachment 1, Avista response to Staff Data Request 26.

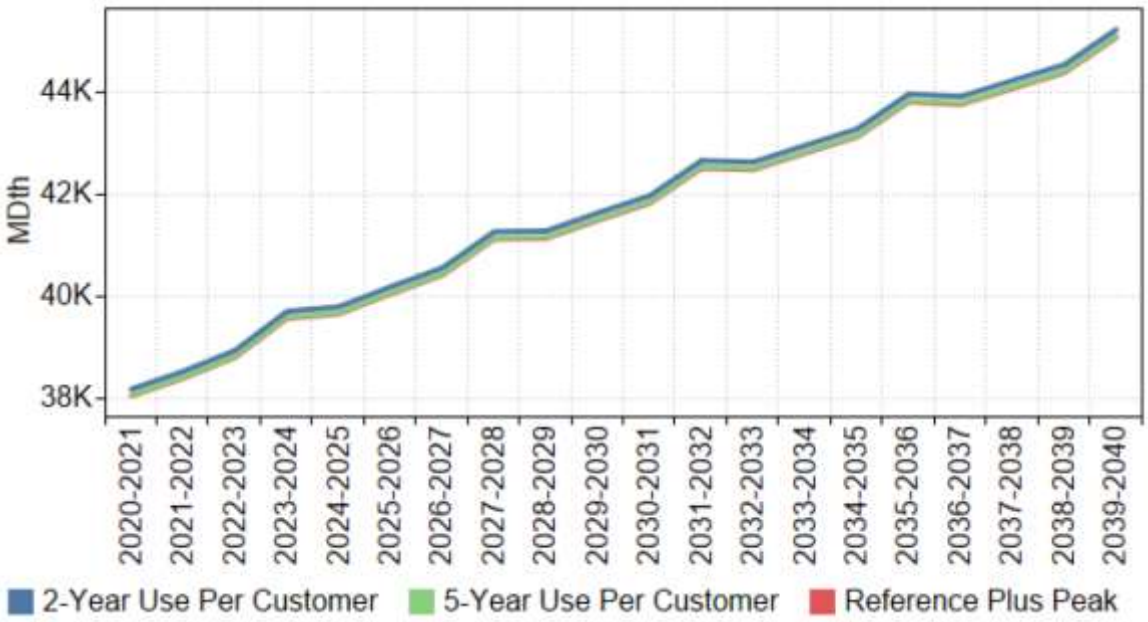
Further, Staff is cognizant that some Oregon communities are adopting climate goals that relate to natural gas. In its Reply Comments, Staff requests that Avista identify communities within its service territory that have climate plans referencing or considering natural gas related emissions and how the Company is engaging with those communities.

Reply Comment Request 2: Identify communities that have climate plans referencing or considering natural gas related emissions and how the Company is engaging with those communities.

UPC forecast

Related to the UPC forecast, the Company describes its computation of weather sensitivity. The Company contemplated using two, three, or five years of historical data to calculate UPC and shows the result of each approach on IRP page 29, which is reproduced as Figure 3.

Figure 3: Annual Demand – Demand Sensitivities 2-Year, 3-Year and 5-Year Use-per-Customer



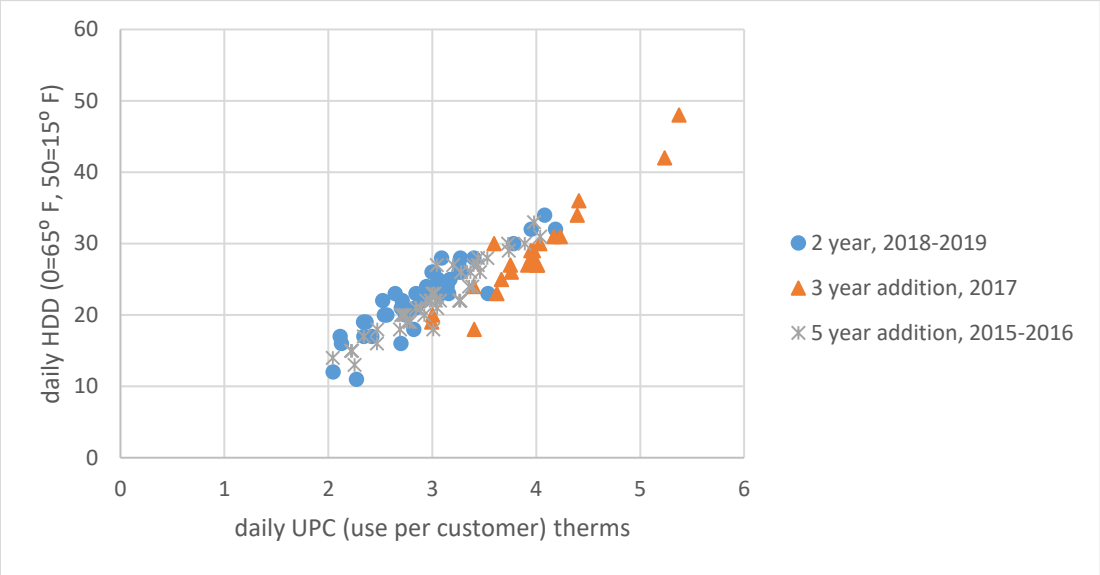
The Company summarizes Figure 3: "you can see the three year and 5-year coefficients are very close, with the two-year coefficient clearly higher."[19] The Company recommended against using 2 years of historical weather data because it is not enough time to capture the weather impact. The Company chose to use three years of historic data because it "most closely aligns with economic expectations and use within Avista's territories in the short-term forecast."[20]

Staff instead recommends using five or more years. The appropriate number of years to use when forecasting UPC is important because the Company describes that use per customer changes over time. For example, in Medford, which is the service territory with the largest number of residential customers, the UPC for a given heating degree day (HDD) is decreasing

[19] LC 75 – Avista 2021 IRP, p.29.
[20] LC 75 – Avista 2021 IRP, p. 20.

over time as shown in the leftward shift of the data from 2015 to 2019 in Figure 4. Staff made Figure 4 to inspect the tradeoff between using more data versus only using recent data. As described below, Staff is not convinced that removing older years of data from the computation is necessary.

Figure 4: Residential UPC vs. HDD for Medford January Weekdays[21]



The Company uses January to compute weather sensitive usage. In Staff's review of Avista's response to Staff DR 27, the weather sensitive heating demand coefficients do not necessarily follow a pattern, for example for some months and locations using two years of historic data results in less or more gas usage sensitivity to weather versus using three or five years. Likewise, in Figure 4, the picture is not clear because 2017 visually appears to have had higher UPC per HDD than 2015 or 2016. Staff's takeaway is that because there is not a clear-cut relationship, the conservative approach would be to use the maximum number of years of data. Whereas the Company uses three years of data to compute the weather sensitivity, Staff instead recommends the Company use at least five years of historic data for modeling use per customer.

Future IRP Recommendation 1: Use at least five years of historic data for modeling use per customer.

Resources

Demand Side Resources

In this IRP, the 20-year potential for cost-effective energy efficiency savings is 18.0 million therms, which is slightly higher than the 17.2 million therms estimated in the last IRP. In the last IRP, the Company proposed three action items related to demand-side resources. These

[21] Staff computation using Avista's Attachment A response to Staff DR 27.

included proposed changes in the modeling of demand-side resources (Action Item 1), integration of Energy Trust's Oregon data with Applied Energy Group (AEG) data used in Washington and Idaho (Action Item 6), and funding Energy Trust's energy efficiency activities (Action Item 8).[22]

Demand-side resource modeling

As stated in its action plan, the Company proposed to make changes to demand-side resource modeling so that each portfolio would select energy efficiency to meet unserved demand. After pursuing this change, the Company decided not to move forward. The Company states:

> This decision enables the greatest alignment between what Energy Trust expects they will be able to achieve under different policy scenarios. These scenarios may include modeling using differential assumptions such as: a) different avoided costs and b) accelerated and decelerated program uptake scenarios. This also allows Energy Trust to include measures in the CPA that are offered through Energy Trust programs under cost-effectiveness exceptions granted by the OPUC under UM-551 guidelines.[23]

Staff supports this decision to maximize alignment with Energy Trust projections, and appreciates the Company's flexibility in working with Energy Trust to use the most accurate energy efficiency acquisition information available.

Energy Trust and AEG data integration

The Company proposed to integrate data between Energy Trust in Oregon and what is used in the CPA for energy efficiency forecasting in the rest of its service territory. Staff is unclear as to what changes were implemented by Energy Trust or by AEG in response to this work. In Reply Comments, describe the specific actions that were taken to share data between Energy Trust and AEG and the implications of those changes.

Staff notes that the AEG report includes a comparison between the previous CPA and the current CPA. Staff appreciates this comparison and requests that the Company, in future IRPs, provide this comparison for Oregon as well, including a narrative explanation of major changes.

> **Reply Comment Request 3: Describe the specific actions that were taken to share data between Energy Trust and AEG and the implications of those changes.**
>
> ***Future IRP Recommendation 2: In future IRPs, provide a comparison between the current CPA and the last CPA, including a narrative explanation of major changes in the potential.***

Energy Trust funding

In the last action plan, the Company stated it will provide Energy Trust sufficient funding to acquire identified cost-effective therm savings. Staff has observed the Company's engagement in the budget process through numerous meetings and the resulting funding agreements. Staff agrees that the Company has provided the appropriate funding.

---

[22] LC 72 – Avista 2021 Revised Action Plan p. 6.
[23] LC 75 – Avista 2021 IRP, p 171.

Avoided Costs

Staff gained assistance from Energy Trust of Oregon to compare avoided cost numbers in this IRP with the numbers currently in use for energy efficiency avoided cost calculations through UM 1893. The preliminary comparison showed that the carbon compliance adder increased by 26 percent, the supply capacity value declined by 19 percent, and the natural gas price decreased by slightly over half across end uses. Staff believes there is an error in the natural gas price comparison. Staff will be following up with the Company to ensure the correct numbers are being compared, as well as to determine the cause of the changes to the supply capacity value.

Peak Day Factors

The peak day coincident factors are the percentage of annual savings that occur on a peak day. In Avista's 2018 IRP, Staff recommended that the Company work with the Company's Technical Advisory Committee (TAC) to calculate peak day factors in the next IRP to further refine the estimate of energy efficiency savings potential on the peak day.[24] Avista is currently using calculations from the Northwest Power Conservation Council and Northwest Natural shown in Table 2 below.

Table 2: Peak Day Coincident Factors by Load Profile[25]

Load Profile	Peak Day Factor	Source
Residential Space Heating	2.10%	NW Natural
Commercial Space Heating	1.80%	NW Natural
Water Heating	0.40%	NWPCC
Clothes Washer	0.20%	NWPCC
Process Load	0.30%	NWPCC

In the 2021 IRP, the Company stated it plans to update these peak day factors in the next IRP to include Oregon-specific numbers.[26] Staff is concerned about the delay and unclear about the reason for the delay in implementing this recommendation as Ordered by the Commission. Staff will follow up with the Company to better understand the cause for delays and report back in Final Comments.

Supply Side Resources

Staff's review of Avista's supply side resources consisted of IRP review, discovery, and a phone call with the Company on April 27, 2021. In general, Avista seeks to meet demand for its customers on a system-wide basis by buying gas from various regional gas basins and by

[24] Order No. 19-106 Appendix A p. 8.
[25] LC 75 – Avista 2021 IRP, p. 67.
[26] LC 75 – Avista 2021 IRP, p. 66-67.

buying gas transportation service from several regional pipelines. This includes firm and non-firm supplies, firm and interruptible transportation on six interstate pipelines, and storage. Avista purchases gas transportation services via contracts, and while contract specifics can vary, the Company has indicated that it only relies on firm gas transportation contracts for the IRP.[27] While the Company does attempt to optimize benefits by monetizing price spreads, these are typically not forecasted in the IRP.[28] Avista holds firm contracts with two pipelines and a storage facility: Northwest Pipeline (NWP) and Gas Transmission Northwest (GTN), and the Jackson Prairie storage facility.[29]

In the previous IRP, Staff provided a recommendation that the Company keep Staff and stakeholders apprised of any new pipeline projects. The Company has done so in this IRP, and there are no pipeline projects anticipated in the next four years. After the phone call on April 27, Staff's impression was that the likelihood of any new major pipeline projects in the region is relatively low.

Overall, Staff believes Avista has maintained a reasonable approach to procuring gas on a reliable basis for its customers. Securing this supply is part of the Company's basic obligation to provide safe and reliable service. However, the Company indicated that the average active contract length of firm transportation contracts that provide the ability to receive gas from a supply basin is about 15 years.[30] Because gas transportation contracts can last for long periods of time, Staff suggests that the Company begin considering the cost risk of renewing these contracts in the context of a changing policy environment shifting its approach to fossil fuels. Staff recommends that this be a topic of discussion at a future IRP TAC meeting in the next IRP cycle.

> ***Future IRP Recommendation 3: Include a discussion about long-term gas transport strategies in a TAC meeting.***

Risk Response Hedging Tool

In DR 22, Staff requested the expected value of the cost risk Avista hedges against with dynamic window hedging (DWH). In the Company's response, Avista revealed that: "Avista does not manage probability in the DWH program directly. The management of probability is done through the RRHT [Risk Responsive Hedging Tool] which measures market volatility and combines it with the commodity value to determine a cost per MMBtu."[31] In Reply Comments, Staff would like Avista to identify the expected value of the cost risk the Company's dynamic window hedging is protecting ratepayers from, using the RRHT if necessary.

[27] See Staff Attachment 1, Avista response to Staff Data Request 1.
[28] See Staff Attachment 1, Avista response to Staff Data Request 2.
[29] LC 75 – Avista 2021 IRP, p. 36.
[30] See Staff Attachment 1, Avista response to Staff Data Request 3.
[31] See Staff Attachment 1, Avista response to Staff Data Request 22.

Reply Comment Request 4: Identify the expected value of the cost risk the Company's dynamic window hedging is protecting ratepayers from.

Carbon Reduction

Staff appreciates the Company's efforts to remain up to date on carbon reduction policies and its efforts to incorporate these considerations into its modeling. Staff particularly notes the Company's analysis of a portfolio under the Carbon Reduction scenario, and the Company's consideration of creative solutions to compete as a buyer with California's Low Carbon Fuel Standard market.

Staff acknowledges that the Company is awaiting additional guidance on how to implement OPUC's work plan for implementing EO 20-04 and understands the Company is prepared to comply with future guidance as it is provided. As part of Staff's review of the Company's approach to incorporating carbon reductions in this IRP, Staff considered the extent to which these modeling decisions are consistent with current Oregon policy, including EO 20-04, and what further can be done in support of the OPUC's work plan for EO 20-04.

Emissions Estimates

In the Environmental Issues section, the Company describes assumptions for different emissions, with Table 5.1 in the IRP reproduced below, detailing emissions estimates for upstream and at combustion.[32]

Table 3: Avista Specific Local Distribution Company Natural Gas Emissions[33]

	Avista Specific Natural Gas	
Combustion	**Lbs. GHG/MMBtu**	**Lbs. CO2e/MMBtu**
CO2	116.88	116.88
CH4	0.0022	0.0748
N2O	0.0022	0.6556
Total Combustion		117.61
Upstream		
CH4	0.313406851	10.66
Total		128.27

In DR 18, Staff requested more information on assumptions about emissions across the delivery channel between resource extraction and delivery to the customer. In reply, the Company explained that estimates exist for the lifecycle of the fuel and is not broken out by delivery step.[34] Staff is interested in understanding more about these assumptions, whether or not any losses that accrue in delivering natural gas to the customer are negligible, and if there are any significant risks in estimating losses through transport or distribution. In Reply Comments,

[32] LC 75 – Avista 2021 IRP, p. 98-100.
[33] LC 75 – Avista 2021 IRP p 98.
[34] See Staff Attachment 1, Avista response to Staff Data Request 18.

please provide more detail about the risks and uncertainties related to this approach, and clarify whether leakage is negligible in the transport phase, and in the distribution phase.

> **Reply Comment Request 5: Provide more detail about the risks and uncertainties related to the current emission estimate approach and clarify whether leakage is negligible in the transport or distribution phases.**

Emissions Reductions

Staff is supportive of Avista taking meaningful, cost-effective actions to reduce emissions of its gas deliveries in Oregon in the near-term, and appreciates the Company's plans to further model carbon reduction as expressed in its Action Plan. Staff notes that the DEQ CPP rules, which are scheduled for release on May 25, 2021, are anticipated to directly impact natural gas utilities in Oregon. Staff looks forward to understanding more about Avista's feedback and response to Draft rules and whether the draft rules suggest specific changes to the Company's emission reduction strategies. For example, presentations from DEQ indicate that the proposed CPP "offset" cost may be $76/ton in 2020.[35] Staff will be interested in understanding how the proposed cost of "offsets" compares with the levelized cost of energy efficiency, and other proposed strategies for reducing GHG emissions in alignment with EO 20-04 goals.

Avista has not used the incentive mechanisms in SB 844 to develop GHG emission reduction programs, and suggested that it does not anticipate leveraging this program under its current form. In response to DR 51, the company states:

> Due to the complexity of requirements relating to approval of SB 844 projects, measurement and verification requirements of approved projects, lack of example project concepts put forth by other utilities in Oregon, and resource constraints of the Company, Avista has not proposed an SB 844 program. Further, due to the passage of SB 98, there are alternative pathways for investments in GHG reduction through Renewable Natural Gas.[36]

To assist in achieving near-term emissions reductions, Staff invites Avista to collaborate in providing a stakeholder workshop in Docket No. LC 75 within the next few months to discuss near-term, cost-effective actions that Avista can take to reduce its Oregon GHG emissions under a pilot program, SB 844, or SB 98. Staff envisions that this could either be a stand-alone workshop, or one associated with the OPUC's work plan activities for EO 20-04 related to GHG emissions reduction reporting and planning as part of IRPs. Workshops on GHG emissions in IRPs have not yet been scheduled, but Staff will reach out to Avista to further explore this possibility. This workshop may also help inform Avista's participation in the series of natural gas fact finding workshops recently announced beginning May 27, 2021.[37]

Additionally, as part of the OPUC's work plan for EO 20-04, Staff committed to convene stakeholders to identify ways to increase utilization of SB 844 and ensure that it is

---

[35] See slide 13 of https://www.oregon.gov/deq/Regulations/rulemaking/RuleDocuments/ghgcrRefPolResults.pdf.
[36] See Staff Attachment 1, Avista response to Staff Data Request 51.
[37] See workshop announcement at https://www.oregon.gov/puc/utilities/Documents/EO20-04-NG-FactFinding-WS1-20210527.pdf.

complementary to SB 98 and EO 20-04. The workshop referenced above may help inform this conversation by allowing stakeholders to discuss the challenges Avista articulated regarding the use of SB 844 as a mechanism for GHG emission reduction projects. The schedule for a workshop on SB 844 as part of EO 20-04 has not yet been decided.

Reply Comment Request 6: Please describe whether the draft CPP rules, as proposed, suggest the need to modify the Company's GHG emission reduction strategy, and provide a comparison of the proposed "offset" cost against the levelized cost of emission reduction strategies.

Reply Comment Request 7: Staff requests that Avista meet with Staff to discuss the possibility of holding a stakeholder workshop around carbon reduction.

Carbon Adder

Staff appreciates that Avista has considered the effects of the expected Oregon Climate Protection Plan (CPP) (also called the Cap and Reduce program) in the 2021 IRP. However, Staff would like to note that even after including the effects of compliance with CPP, it may be reasonable to consider using the social cost of carbon (SCC) associated with different types of gas as an adder to the cost of gas. This will help inform the risks and rewards of resource decisions that impact the carbon content of gas delivered in Oregon. Future carbon policies may be incremental to Oregon's CCP, and it is important to reflect the risks and opportunities associated with these potential future policies in resource decision making. There will be a stakeholder process at the Oregon PUC in the near future to discuss carbon risks in the IRP. Utilizing the SCC to reflect carbon risk in the IRP will be among the topics considered.

Future IRP Recommendation 4: Avista should consider incremental carbon risk in its future resource planning, after accounting for Oregon's CPP.

Renewable Natural Gas (RNG)

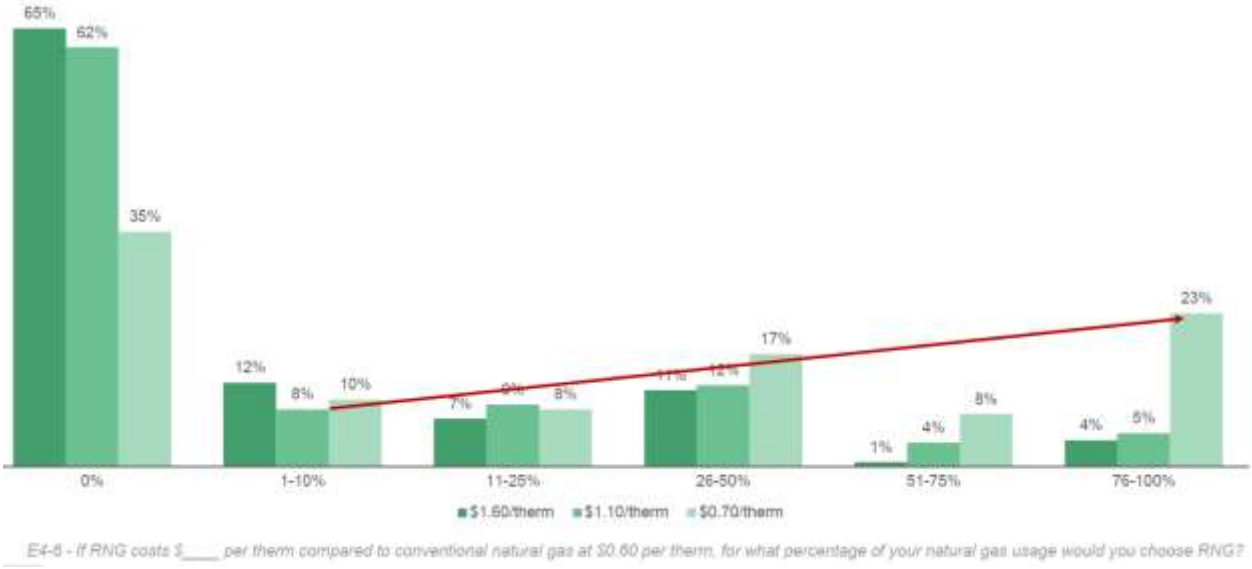
Avista included a new chapter in its IRP on their ongoing research regarding opportunities to develop and procure RNG projects. These projects are being explored as part of their effort to comply with decarbonization policies in Washington and Oregon and to mitigate climate policy related risks. Staff appreciates the Company's consideration of risks, benefits, and challenges associated with RNG projects and its work in identifying the role different RNG projects play in its decarbonization effort. While this IRP does not include consideration of any RNG projects, the Company indicates it anticipates the inclusion of RNG projects for consideration as soon as the next IRP.

Overall Staff is satisfied with the level of detail provided by the Company on the topic of RNG, but there are three issues Staff believes warrant mention and more attention: 1) the role of RNG in meeting emission reduction goals in Oregon, 2) interest in developing a deeper understanding about customer adoption potential in Oregon, and 3) ensuring protections for customers in the development and execution of RNG projects. The issue of emission reduction goals is addressed in the Emissions Reductions section above. Staff reiterates its request for a workshop regarding near-term emission reduction strategies.

Customer Adoption of RNG

Regarding customer adoption potential, Avista referenced two studies conducted with Washington and Idaho customers: the RNG Commercial Marketing Study completed in 2019, and the RNG Residential Marketing Survey conducted in September 2020.[38] These reports, submitted in response to Staff's DR 39, suggest that the cost differential between conventional fossil gas and RNG, as well as outstanding questions about the how effective RNG projects will be in reducing GHG emissions, may be significant barriers to program enrollment. Figure 5 below comes from a marketing study conducted for Avista in April of 2019. [39] It shows that the majority of Avista customers are not willing to commit to using large percentages of RNG at a price premium, but as the price decreases to $0.70/therm, customers are increasingly interested in purchasing larger percentages of RNG.

Figure 5: Percent of RNG customers would select at $1.60, $1.10, and $0.70/therm as compared to conventional gas at $0.60/therm [40]



Staff appreciates the work the company has done to understand customers' willingness to pay for RNG and thinks this information may be especially valuable in future conversations about DEQ CPP compliance and OPUC's Natural Gas Fact Finding effort. Staff would like to better understand how well these findings correlate with the behavior of Oregon customers and whether the Company anticipates these findings affecting its ability to rely on RNG to reduce GHG emissions. Additionally, staff looks forward to learning more about the company's revenue requirements associated with RNG and the potential rate impacts. To this end, Staff looks forward to engaging with Avista as part of the Natural Gas Fact Finding effort mentioned in the Emissions Reductions section above.

[38] Staff Attachment 3, Avista Attachment B of its response to Staff Data Request 39.
[39] Staff Attachment 2, Avista Attachment A of its response to Staff Data Request 39.
[40] Staff Attachment 2, Avista Attachment A to response to Staff Data Request 39 p. 52.

Customer Protections from RNG Investment Risk

In DRs, Avista provided helpful information regarding draft business cases the Company is considering for future RNG projects. While no ownership structures were suggested in the responses provided by the Company, Staff notes that the nature of the relationship between affiliated interests can result in more or less risk being born by ratepayers. Additionally, RNG project risk to ratepayers will vary greatly based on whether the project is a 'buy' versus a 'build project. Staff encourages Avista to engage with Staff early in the development process to discuss potential RNG project types and ownership structures and ways to mitigate or balance project risks fairly. Staff recommends Avista provide an update on its RNG project pipeline as part of its 2021 IRP Update.

> ***Future IRP Recommendation 5: Provide an update on the Company's RNG project pipeline as part of the next IRP Update.***

Hydrogen

Staff appreciates the analysis the Company conducted to assess the competitiveness of green hydrogen and the other various types of hydrogen projects. The Company explains that part of what will make green hydrogen cost-effective is its connection with the expansion of renewable electricity projects. Staff looks forward to engaging with Avista on the OPUC's work plan for EO 20-04 item 5.4.2: to consider the creation of a joint electric and natural gas utility pilot to explore leveraging resources for in-state production of hydrogen.[41]

Integrated Resource Modeling

Overall, Staff is impressed with the range of outcomes across scenarios and sensitivities. The Company considered a significant range of possibilities, which leads to helpful insights. Beyond this high level observation, Staff has additional observations and recommendations on aspects of the Company's modeling found below.

Natural Gas Price Forecast

Staff Recommendation No. 5 from Order No. 19-106 required Avista to provide additional information on resource optimization benefits and analyze risk exposure.[42] The discussion on dynamic window hedging in the 2021 IRP provided helpful additional information for how market purchases are optimized as a supply side resource. In Reply Comments, Staff requests that Avista provide more insight into the cost of market purchases over time by adding the cost of hedging to the forward price curve. This would allow the 20-year levelized cost of market purchases per dekatherm to be more easily compared with renewable resource acquisitions.

Staff finds the forward price curve in Appendix 6.1 to be a "black box" in need of methodological clarification. In the 2019 Public Meeting Memo, Staff recommended Avista: "Dedicate a TAC meeting, prior to the IRP update, to working with Staff and stakeholders to develop a shared

[41] OPUC EO 20-04 Work Plan p. 10-11 found at https://www.oregon.gov/puc/utilities/Documents/EO-20-04-WorkPlans-Final.pdf.
[42] OPUC *Order No. 19-106* March 25, 2019, p 15.

understanding of forward price curve modeling techniques."[43] In Reply Comments, Staff would like Avista to describe the forward price curve modeling techniques used for Appendix 6.1.

Reply Comment Request 8: Please describe the forward price curve modeling techniques used for Appendix 6.1.

Alternate Supply Resources

In addition to needs identified in scenario modeling, another reason to consider new resources is to plan for opportunities that offer better prices than buying from market hubs. Below, Staff has reconstructed Avista's Table 7.2[44] for comparison by replacing the $ per kWh column with $ per metric ton of CO_2 equivalent. In Reply Comments, Staff would like Avista to explain if the levelized costs displayed in Table 4 below only reflect current costs.

Table 4: Levelized Cost of Renewable Resources[45]

Resource	Dekatherms per year	20-year Levelized Cost per dekatherm (Year 1)	20-year levelized cost per carbon dioxide equivalent metric ton reduced (year 1)
Distributed Renewable Hydrogen	60,509	$47.25	$891.51
Distributed LFG to RNG	231,790	$15.90	$300.00
Centralized LFG to RNG	662,256	$14.11	$266.23
Dairy Manure to RNG	231,790	$14.30	$269.81
Wastewater Sludge to RNG	187,245	$23.34	$440.38
Food Waste to RNG	108,799	$33.14	$625.28

Staff also requests Avista clarify if the portfolio modeling applied assumptions about a learning curve to these renewable resources, such that their levelized cost declines in later years. The levelized cost of renewable natural gas may currently be high, but planning for acquisition of these resources outside the time frame of the action plan should incorporate reasonable assumptions of technological change.

Reply Comment Request 9: Please explain if the levelized costs displayed in Table 4 only reflect current costs.

Reply Comment Request 10: Please clarify if the portfolio modeling applied assumptions about a learning curve to renewable resources such that their levelized costs decline in later years.

[43] OPUC Staff LC 72 Staff Report February 28, 2019, p 3.
[44] LC 75 – Avista 2021 IRP, p 144.
[45] Ibid.

Stochastic Analysis

Staff appreciates Avista increasing the stochastic draw to 1000 from the 2018 IRP's 200,[46] following through on Action Item 10 and reinforced with Staff Recommendation 7 from Order No. 19-106 where Avista planned to "work with members of the OPUC to determine an alternative stochastic approach to Monte Carlo analysis prior to Avista's 2020 IRP and share any recommendations with the TAC members."[47] In Reply Comments, Staff would like Company to explain the recommendations on improved Monte Carlo analysis that were shared with TAC members and which, if any, of these recommendations were implemented in this IRP.

> **Reply Comment Request 11: Please explain the recommendations on improved Monte Carlo analysis that were shared with TAC members and which, if any, of these recommendations were implemented in resource modeling of this IRP.**

On pages 156 and 157 Avista presents electrification scenarios in Washington. In DR 48, Staff asked for a similar analysis in Oregon. In the Company's response, Avista explained the Company's inability to produce this analysis is due to the lack of load estimates, cost estimates, and other details from electricity providers in Oregon.[48] In Reply Comments, Staff would like Avista to describe in detail what data inputs are required from the electric utility to perform this analysis.

> **Reply Comment Request 12: Please describe in detail what data inputs are required from electric providers to perform the Washington electrification scenarios analysis for Oregon.**

Large-Scale Supply Interruption Scenario

In the last IRP, Staff recommended that the Company create a scenario to study large-scale supply interruptions such as the 2018 Enbridge incident.[49] Staff asked for clarification when commenting upon the draft IRP. In response, the Company referenced Chapter 2 of the 2021 IRP and states:

> In the cases of a 100% loss of supply or even 50% loss of supply at AECO, JP, SUMAS, or Rockies trading points puts an unserved in the first or second year of planning. Based on these sensitivities it became evident as to the extreme predictions and outcomes of these supply basin outages, so Avista chose not to run a specified scenario.[50]

Staff appreciates the range of outcomes modeled through the demand scenarios but is unclear about the connection between the outcomes of different demand scenarios and the conclusion drawn to not model an extreme supply shock. Staff is also unclear on what "an unserved" refers to. In Reply Comments, please clarify the rationale behind not modeling an extreme supply interruption.

---

[46] LC 75 – Avista 2021 IRP, p 147, 158
[47] OPUC *Order No. 19-106*, p 16.
[48] See Staff Attachment 1, Avista response to Staff Data Request 48.
[49] OPUC *Order No. 19-106* March 25, 2019, Appendix B, p. 3.
[50] LC 75 – Avista 2021 IRP, Appendix 0.2 p. 7.

Reply Comment Request 13: Please clarify the rationale behind choosing not to model an extreme supply interruption.

Distribution Planning

Avista approaches distribution system planning similarly to other local gas distribution companies (LDCs). In general, Avista uses software programs to model peak days on its distribution system. If the model detects areas at risk of pressure violations, the Company can attempt to "verify" whether there are actual low pressures on its system. The Company can verify low pressures through electronic devices, supervisory control and data acquisition (SCADA), or by physically sending service personnel to collect pressure readings.[51]

Avista routinely conducts load studies on its system to identify potential low pressure areas during peak. Like all other LDCs, Avista works to maintain levels of pressure on its system that do not violate safety standards. Much of the time, this involves ensuring that the pressure of gas flow remains above a certain threshold, such as 10 or 20 psig. As previously mentioned, if system modeling software, like Synergi, detects a potential problem area where pressures may get too low (for example, 5 psig), the utility can monitor this area and collect real-world data to ascertain whether the models are accurate. Sometimes, a company cannot collect data during an extreme weather event because the event has not occurred since the issue is detected, but the utility may still measure low pressures on non-peak days or identify other issues on the system that indicate improvements are necessary. If the Company determines an area is in need of improvement, it can do so in a variety of ways, including upgrading parts of its system to increase pressures, uprating pipelines so that they can flow more gas, or installing new pipes.[52]

Since the models are based on peak planning, the Company recognizes that this approach might seem aggressive because extreme temperatures are rarely experienced. However, given the potential impacts of customers' personal safety and damage to appliances caused by low (or no) pressures as a result of extreme weather events, in addition to impacts on Avista's infrastructure, the Company maintains that this is a prudent and regionally accepted planning standard.[53]

In this IRP, the Company proposes no distribution planning investments. Staff asked the Company if there were any monetary thresholds for a project that the Company uses to determine whether it should go into the Action Plan, and the Company responded that it does not use a monetary threshold.[54] Rather, Avista indicated that the decision to include a project in the Action Plan is based on the need for delivery of safe and reliable services.[55] The Company has confirmed via discovery that, based on current projections at the time of developing the IRP, the Company does not expect any investments in its distribution system in the next four years.[56]

---

[52] See Staff Attachment 1, Avista response to Staff Data Request 16.
[53] LC 75 – Avista 2021 IRP, p. 165.
[54] See Staff Attachment 1, Avista response to Staff Data Request 17.
[55] Ibid.
[56] Ibid.

Previous IRP Recommendations

In the 2018 IRP, Staff's recommendation was that the Company clarify the historical use and capacity of regulators, and if the data does not match planning assumptions, that the Company re-evaluate the use of operational assumptions in its distribution planning by the next IRP.[57] Staff has revisited this issue in this IRP. As explained above, the Company uses Synergi to model design days (e.g., peak conditions or worst-case scenarios), and it is standard practice for Companies to use software like Synergi and later "verify" the model with actual data.

To follow up on this recommendation, Staff asked the Company to describe its verification process, including where it places telemetry or other monitoring equipment to measure pressure on its system. Avista responded that its equipment is located "at approximately 240 sites throughout all three of states within the Company's service territory, at Gate Stations, Regulator Stations, Transport Customers, and at locations along the pipeline such as end of line pressure monitoring."[58] Staff does not dispute the practice of modeling design days, however Staff is still interested in how the Company verifies this data, and to what extent it collects information on its system. In Reply Comments, the Company should expand upon how it balances accuracy while minimizing costs in the process of data collection, and whether the Company has any plans in the future to add data collection points on its system.

A second recommendation from Staff in the previous IRP involved requesting updates on the Sutherlin and Klamath Falls areas. The Company still appears to be monitoring these areas for potential construction, however Staff could not identify much information in the IRP about the reason why the Company was monitoring these projects. Staff submitted discovery on these projects, and the Company responded with the following:

> The Klamath Falls City Gate Station mentioned in table 8.1 is at risk of exceeding physical capacity. Avista will continue to monitor and risk-rank these projects against other capacity projects. At this time, there are no short-term plans to rebuild or upgrade this city gate station.
>
> The Sutherlin City Gate Station mentioned in table 8.1 is at risk of exceeding physical capacity. Avista will continue to monitor and risk-rank these projects against other capacity projects. At this time, there are no short-term plans to rebuild or upgrade this city gate station.[59]

In Reply Comments, the Company should expand further upon these projects. Staff is interested in knowing why both these projects are at risk of exceeding physical capacity.

> **Reply Comment Request 14: Please expand upon how the Company minimizes costs in the process of data collection on its system, and whether the Company has any plans in the future to add data collection points on its system.**

[57] For context, a regulator in the natural gas world is a device used to maintain a certain level of pressure on the gas system.
[58] See Staff Attachment 1, Avista response to Staff Data Request 16.
[59] See Staff Attachment 1, Avista response to Staff Data Request 17.

Reply Comment Request 15: Please expand further upon the Klamath Falls and Sutherlin projects, and why both of these projects are at risk of exceeding physical capacity.

Action Plan

The Company's action plan focuses on activities leading up to the next IRP, including routine updates, and voluntary initiatives to enhance the planning process. Staff appreciates the action items to update carbon reduction modeling and to consider future weather conditions.

The action plan does not include any significant resource acquisitions in Oregon as it does not anticipate any supply side or distribution resource additions in the next four years.

In the last IRP, Staff recommended that the Action plan cover a four-year time period.[60] While Staff appreciates the clarification regarding these resources, the action plan is titled "2021-2022 Action Plan" and focuses on the next IRP, which covers only two years of activity. This labeling and IRP cycle focus leads to ambiguity as to whether the Company is presenting a two-year action plan or a four-year action plan. In Reply Comments, Staff requests clarification on the time frame of this action plan, and requests that in future IRPs, the Company be more explicit in showing that the action plan time frame covers four years.

Reply Comment Request 16: Please clarify the time frame of this action plan, and requests that in future IRPs, the Company be more explicit in showing that the action plan time frame covers four years.

Below are Staff's recommendations for the Company's Reply Comments:

Reply Comment Request 1: Please describe in detail how the 99 percent Probability Average Temperatures are computed.

Reply Comment Request 2: Identify communities that have climate plans referencing or considering natural gas related emissions and how the Company is engaging with those communities.

Reply Comment Request 3: Describe the specific actions that were taken to share data between Energy Trust and AEG and the implications of those changes.

Reply Comment Request 4: Identify the expected value of the cost risk the Company's dynamic window hedging is protecting ratepayers from.

Reply Comment Request 5: Provide more detail about the risks and uncertainties related to the current emission estimate approach and clarify whether leakage is negligible in the transport or distribution phases.

Reply Comment Request 6: Please describe whether the draft CPP rules, as proposed, suggest the need to modify the Company's GHG emission reduction strategy, and provide a comparison of the proposed "offset" cost against the levelized cost of emission reduction strategies.

[60] OPUC *Order No. 19-106* March 25, 2019, Appendix B, p. 3.

Reply Comment Request 7: Staff requests that Avista meet with Staff to discuss the possibility of holding a stakeholder workshop around carbon reduction.

Reply Comment Request 8: Please describe the forward price curve modeling techniques used for Appendix 6.1.

Reply Comment Request 9: Please explain if the levelized costs displayed in Table 4 only reflect current costs.

Reply Comment Request 10: Please clarify if the portfolio modeling applied assumptions about a learning curve to renewable resources such that their levelized costs decline in later years.

Reply Comment Request 11: Please explain the recommendations on improved Monte Carlo analysis that were shared with TAC members and which, if any, of these recommendations were implemented in resource modeling of this IRP.

Reply Comment Request 12: Please describe in detail what data inputs are required from electric providers to perform the Washington electrification scenarios analysis for Oregon.

Reply Comment Request 13: Please clarify the rationale behind choosing not to model an extreme supply interruption.

Reply Comment Request 14: Please expand upon how the Company minimizes costs in the process of data collection on its system, and whether the Company has any plans in the future to add data collection points on its system.

Reply Comment Request 15: Please expand further upon the Klamath Falls and Sutherlin projects, and why both of these projects are at risk of exceeding physical capacity.

Reply Comment Request 16: Please clarify the time frame of this action plan, and requests that in future IRPs, the Company be more explicit in showing that the action plan time frame covers four years.

Below are Staff's recommendations for the future IRPs and IRP Updates:

Future IRP Recommendation 1: Use at least five years of historical data for modeling use per customer.

Future IRP Recommendation 2: In future IRPs, provide a comparison between the current CPA and the last CPA, including a narrative explanation of major changes in the potential.

Future IRP Recommendation 3: Include a discussion about long-term gas transport strategies in a 2023 TAC meeting.

Future IRP Recommendation 4: Avista should consider incremental carbon risk in its future resource planning, after accounting for Oregon's CPP.

Future IRP Recommendation 5: Provide an update on the Company's RNG project pipeline as part of the next IRP Update.

This concludes Staff's Opening Comments.

Dated at Salem, Oregon, this 28th of May, 2021.

Anna Kim

_____
Anna KIM
Senior Utility Analyst
Energy Resources and Planning Division

AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	Oregon	DATE PREPARED:	04/26/2021
CASE NO.:	LC 75	WITNESS:	Jody Morehouse
REQUESTER:	PUC Staff	RESPONDER:	Tom Pardee
TYPE:	Data Request	DEPT:	Gas Supply
REQUEST NO.:	Staff – 1	TELEPHONE:	(509) 495-2159
		EMAIL:	Tom.Pardee@avistacorp.com

REQUEST:

See page 72 of the IRP. The Company states, "For this IRP, the SENDOUT® model assumes natural gas purchases under a firm, physical, fixed-price contract, regardless of contract execution date and type of contract. Avista pursues a variety of contractual terms and conditions to capture the most value for customers. Avista's natural gas buyers actively assess the most cost-effective way to meet customer demand and optimize unutilized resources."

a. Does SENDOUT consider non-firm contracts or other types of gas procurement? If not, please explain why? If yes, please explain when SENDOUT considers non-firm gas procurement.

b. How is Avista's approach of "pursue[ing] a variety of contractual terms and conditions to capture the most value for customers" reconciled with SENDOUT's assumption of firm, physical, fixed-price contracts?

RESPONSE:

a. Avista only relies on firm transportation contracts in its IRP. Readily having additional capabilities in non-firm resources could come into consideration if firm resources are exhausted but due to the requirement to serve customer demand, having firm resources is the only way to ensure the maximum amount of risk is removed for cold day events.

b. The 2021 IRP looks for resources with the least cost and least risk over a 20-year span. The SENDOUT model optimizes the planning areas on a daily basis and considers the single future cost of a commodity (in deterministic modeling) as a future price. It does not go into specifics of the type of contract or a hedge quantity. Avista's natural gas supply hedging program will monitor and adjust to daily market conditions while considering risk. In this hedging program the Company will look to the market for the lowest cost resource on a daily basis and procure a contract based on the identified need within the program. Finally, contracts are managed and approved by our Risk Policy team, whom take into account the length of contract, contract volume, and type of contract. The Risk Policy team activities are monitored by Avista's Executive Officers and Risk Department.

AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	Oregon	DATE PREPARED:	04/26/2021
CASE NO.:	LC 75	WITNESS:	Jody Morehouse
REQUESTER:	PUC Staff	RESPONDER:	Tom Pardee
TYPE:	Data Request	DEPT:	Gas Supply
REQUEST NO.:	Staff – 2	TELEPHONE:	(509) 495-2159
		EMAIL:	Tom.Pardee@avistacorp.com

REQUEST:

See page 72 of the IRP. The Company states, "Avista contracts for a sufficient amount of diversified firm pipeline capacity from various receipt and delivery points (including storage facilities), so that firm deliveries will meet peak day demand. This combination of firm transportation rights to Avista's service territory, storage facilities and access to liquid supply basins ensure peak supplies are available to serve core customers."

a. Does the above quote imply that in actual operations, Avista can monetize price spreads between market hubs (e.g., AECO and others)? (Yes) If the answer to this question is yes, please:

   i. Explain how the Company monetizes these price spreads

   ii. Explain how the Company forecasts these benefits in the IRP

RESPONSE:

i. Avista will purchase gas at AECO both in the forward market and in cash then sell at Malin utilizing the AECO to Malin transportation option when it is not needed for core load.

ii. Forecasting the benefits for these areas of optimization is not done within the IRP. SENDOUT is an optimization tool which simply looks for the lowest priced set of resources based on the supply side resources available for the expected demand. Additionally, forecasting benefits is difficult due to the changing market conditions and opportunities. The value of storage can be thought of as intrinsic or seasonal spreads from summer to winter storage and extrinsic being the number of times you can turn the inventory. The excess capacity on the day to optimize price spreads between basins combined with a market demand for this product is difficult to forecast and cannot be assumed. For these reasons, Avista does not forecast optimization benefits instead applying the actual benefits to the PGA.

AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	Oregon	DATE PREPARED:	04/26/2021
CASE NO.:	LC 75	WITNESS:	Jody Morehouse
REQUESTER:	PUC Staff	RESPONDER:	Tom Pardee
TYPE:	Data Request	DEPT:	Gas Supply
REQUEST NO.:	Staff – 3	TELEPHONE:	(509) 495-2159
		EMAIL:	Tom.Pardee@avistacorp.com

REQUEST:

See page 75 of the IRP. The Company states, "These contracts are of different vintages with different expiration dates; however, all have the right to be renewed by Avista. This gives Avista and its customers available capacity to meet existing core demand now and in the future."

a. In the Company's experience, what is the probability of Avista renewing each contract it requires for meeting projected customer demand?

b. What is the average contract length for Avista's firm physical, fixed-price contracts (e.g., 20 years, 10 years, 6 months)?

RESPONSE:

a. Avista is likely to renew each contract. In the event the contract is not needed to meet demand, Avista will release this contract to another entity with the ability and right to recall such contract in the event it is needed to meet future demand.

b. The average active contract length of Avista's transportation contracts, for the system, providing the ability to obtain natural gas from a given supply basin on a firm basis is 15 years.

AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	Oregon	DATE PREPARED:	04/29/2021
CASE NO.:	LC 75	WITNESS:	Jody Morehouse
REQUESTER:	PUC Staff	RESPONDER:	Terrence Browne
TYPE:	Data Request	DEPT:	Gas Supply
REQUEST NO.:	Staff – 16	TELEPHONE:	(509) 495-8551
		EMAIL:	terrence.browne@avistacorp.com

REQUEST:

Please see page 162 of the IRP. The Company states, "Avista regularly conducts integrity assessments of its distribution systems."

a. Please provide a detailed description of Avista's integrity assessment protocols.

b. Please provide a detailed description of how the Company identifies areas that require additional monitoring (because of low pressures or reinforcement needs, etc.).

c. Please explain how the Company monitors its system for low pressures. In your answer, please include:

   i. A map of all SCADA data gathering points/stations.

   ii. A detailed description of the type of telemetry Avista relies upon (e.g., radio, cellular networks, etc.), and in what types of areas Avista uses this equipment.

   iii. A detailed description of manual data Avista relies upon (e.g., field technician reports on peak day events, pressure recording charts, etc.), and on what type of equipment Avista collects this type of data.

   iv. A detailed explanation of how Avista verifies or validates problem areas identified/modeled by Synergi.

RESPONSE:
Please see the CONFIDENTIAL data response number Staff-16C. These screen shots provided are confidential in nature and protected under ORS 192.501(2).

a. Avista conducts two primary types of evaluations in its distribution system planning efforts: capacity requirements and integrity assessments. Integrity assessments start with the notification of projects that may affect distribution pipelines, like road, city/sewer, telecom, or pipeline replacement projects. Avista Operations regularly communicates and gathers information on such projects with other utility and city representatives. When projects affect Avista's pipelines, Gas Engineering is made aware and load studies are conducted to determine if adding or increasing existing pipelines in the affected area improve capacity and reliability to the surrounding distribution. Such improvements are then incorporated within the timelines of the necessitating project.

b. Avista regularly conducts load studies of each distribution system. As the system grows and changes (new customers, pipeline additions, tie-ins, etc.), load studies are updated to identify new areas that are at risk of low pressure during cold-winter conditions. These

new areas are then selected for monitoring during the winter season. Additionally, if an improved area is no longer at risk for low pressure, the pressure monitoring equipment may be removed.

c. Avista uses PI, a data-displaying interface, to monitor electronic pressure recorders placed within the distribution. If an usual cold-weather event is in the forecast, Avista may deploy service personnel to manually check anticipated low pressure spots within the distribution system and call in their reports directly to Gas Engineering.

Maps describing SCADA data gathering points are shown below, including the overall system and schematics for specific districts:

Confidential Screen Shot 1

Confidential Screen Shot 2

Confidential Screen Shot 3

Confidential Screen Shot 4

Confidential Screen Shot 5

Confidential Screen Shot 6

The types of telemetry and equipment Avista uses:

- Electronic pressure recorders including Honeywell/Mercury Instruments ERX and ER350 connected via cellular or dialup modems
- Electronic volume correctors including Honeywell/Mercury Instruments Mini AT, Mini Max and ER350 connected via cellular or dialup modems
- Flow computers from ABB's TotalFlow series connected via cellular modems

The equipment is located at approximately 240 sites throughout all three of states within the Company's service territory, at Gate Stations, Regulator Stations, Transport Customers, and at locations along the pipeline such as end of line pressure monitoring. Equipment is generally located outdoors. The SCADA alarms annunciate in the Gas Control Room. SCADA displays current conditions and we use OSI's PI Process Book and PI Vision for our historical data base with pressure trends displayed graphically.

Although infrequent, Avista may rely on non-cellular electronic pressure recorders when a location is outside of cellular range. A serviceman will then have to visit the location and download the data collected and send to Gas Engineering.

The temperature and distribution pressure history accessible in PI is used to validate the SynerGi model. By simulating a load study at a given temperature, and then comparing actual pressures recorded during a similar temperature condition, Gas Engineering can determine if a load study is accurately representing the distribution: if simulated and recorded pressures are within 5 psig at the pressure recording locations, then a "validated" load study model is achieved. Afterwards, Gas Engineering simulates peak cold weather conditions within the load study model to identify low pressure areas.

AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	Oregon	DATE PREPARED:	04/29/2021
CASE NO.:	LC 75	WITNESS:	Jody Morehouse
REQUESTER:	PUC Staff	RESPONDER:	Terrence Browne
TYPE:	Data Request	DEPT:	Gas Supply
REQUEST NO.:	Staff –17	TELEPHONE:	(509) 495-8551
		EMAIL:	terrence.browne@avistacorp.com

REQUEST:

Please see page 173 of the IRP. The Company indicates that though it is not planning on investing in any distribution or supply side projects for the next four years, the Company is not precluded from pursuing such work if it believes such investments are warranted.

a. Does the Company intend to say that it is not anticipating in investing in any distribution investments at all, or is this statement based on a monetary threshold (e.g., $500,000 or more)? If it is based on a threshold, please describe the threshold.

b. Please explain the potential issues in the Klamath Falls area as indicated in Table 8.1.

c. Please explain the potential issues in the Sutherlin area as indicated in Table 8.1

RESPONSE:

d. As mentioned on page 173, based on current projections at the time of developing the IRP, the Company does not expect any investments in distribution or supply side projects for the next four years; however, if capital work is needed on a high-pressure distribution line or city gate station in order to deliver safe and reliable services to our customers, we will perform such work. This statement is not based on a specific monetary threshold. Rather, when distribution investments are known to be upcoming in a future four-year period, they are included in the IRP.

e. The Klamath Falls City Gate Station mentioned in table 8.1 is at risk of exceeding physical capacity. Avista will continue to monitor and risk-rank these projects against other capacity projects. At this time, there are no short-term plans to rebuild or upgrade this city gate station.

f. The Sutherlin City Gate Station mentioned in table 8.1 is at risk of exceeding physical capacity. Avista will continue to monitor and risk-rank these projects against other capacity projects. At this time, there are no short-term plans to rebuild or upgrade this city gate station.

AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	Oregon	DATE PREPARED:	04/30/2021
CASE NO.:	LC 75	WITNESS:	Jody Morehouse
REQUESTER:	PUC Staff	RESPONDER:	Tom Pardee
TYPE:	Data Request	DEPT:	Gas Supply
REQUEST NO.:	Staff – 18	TELEPHONE:	(509) 495-2159
		EMAIL:	Tom.Pardee@avistacorp.com

REQUEST:

Please list the assumptions used about greenhouse gas emissions by emission type, and the step in the process of delivering natural gas to customers. These steps include but are not limited to: extraction site, transmission, distribution. If there are stages where there are no specified assumptions, please indicate so. If there are stages where emissions are negligible or zero, please indicate so.

RESPONSE:

Greenhouse gas emissions by emission type is available only in the form of the gas itself. For example, the combustion of natural gas per MMBtu is equivalent to 116.88 pounds of carbon or CO2. Other elements are CH4 contributing 0.0748 pounds and N20 contributes 0.6556 pounds of carbon equivalent per MMBtu. The upstream emissions are measured in CH4 leakage and when combined with a global warming potential of 34 produces an additional 10.66 pounds of CO2 equivalent to the total greenhouse gasses. The values used are measured in a lifecycle estimate or from production to burner tip.

Below is an example of greenhouse gas emissions by type the conversion to “Lbs. CO2e/Mmbtu”:

	Avista Specific Natural Gas	
Combustion	Lbs. GHG/MMBtu	Lbs. CO2e/Mmbtu
CO2	116.88	116.88
CH4	0.0022	0.0748
N2O	0.0022	0.6556
Total Combustion		117.61
Upstream		
CH4	0.313406851	10.66
Total		128.27
Upstream Emissions	Avista's Purchases	Emissions Location
0.77	89.72%	Canada
1.00	10.28%	Rockies
0.79		

AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	Oregon	DATE PREPARED:	04/30/2021
CASE NO.:	LC 75	WITNESS:	Jody Morehouse
REQUESTER:	PUC Staff	RESPONDER:	Tom Pardee
TYPE:	Data Request	DEPT:	Gas Supply
REQUEST NO.:	Staff – 22	TELEPHONE:	(509) 495-2159
		EMAIL:	Tom.Pardee@avistacorp.com

REQUEST:

Referencing the "cost risk" mentioned on page 91 of the 2021 IRP please identify:

a. The net present value of each cost Avista is using DWH to hedge against,

b. The probability each cost Avista is using DWH to hedge against will be realized without the hedge,

c. Please share the analysis behind the numbers in each subpart of this data request in an electronic Excel document with all formulas intact and the source for all assumptions identified.

RESPONSE:

a. Avista utilizes Dynamic Window Hedging to mitigate the cost risk of the natural gas commodity price for physical gas needed to serve its LDC customers on the system. The sole purpose of this program is to procure physical gas based on the average monthly load of the entire system (Idaho, Oregon and Washington). By time averaging our purchases, a proven hedging technique, it provides Avista and its customers with the ability to reduce the risk of the commodity increasing in cost. These hedges are monitored daily in what is known as a mark to market view. The mark is the price paid for the hedge and the market being the current price. The management of the portfolio is completed through the Risk Responsive Hedging Tool (RRHT) which manages this volatility and price movement.

b. Avista does not manage probability in the DWH program directly. The management of probability is done through the RRHT which measures market volatility and combines it with the commodity value to determine a cost per MMBtu. This program will then assign a probability of a price change in the next ten days and a 98% probability of price movement. This helps to inform Avista of market changes in either volatility or commodity value to help effectively manage price risk for customers.

c. Please see Staff_DR_22 Attachment A. Within this attachment, an example of the unknown of natural gas prices is depicted with a levelized average price of $3.94 per MMBtu. The levelized high price average in this example, or the 95th percentile, is $7.90 per MMBtu. This information is based on 1000 draws of monthly Henry Hub pricing from 2021 – 2045.

AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	Oregon	DATE PREPARED:	04/30/2021
CASE NO.:	LC 75	WITNESS:	Jody Morehouse
REQUESTER:	PUC Staff	RESPONDER:	Tom Pardee
TYPE:	Data Request	DEPT:	Gas Supply
REQUEST NO.:	Staff – 25	TELEPHONE:	(509) 495-2159
		EMAIL:	tom.pardee@avistacorp.com

REQUEST:

See page 23 of the IRP. How were the values for the price of CO2 emissions associated with Cap and Reduce determined? To what extent does Avista envision needing to rely on alternative compliance mechanisms and how might that affect demand and natural gas prices?

RESPONSE:

The values for Avista's Oregon territory were obtained from an analysis done by this party company, Wood Mackenzie. The cap and reduce program structure, guidelines, and rules have been under construction during the 2021 IRP process. Until a program and subsequent guidelines are developed, it is unknown how many alternative compliance mechanisms would be needed or the change to demand and natural gas prices.

AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	Oregon	DATE PREPARED:	04/30/2021
CASE NO.:	LC 75	WITNESS:	Jody Morehouse
REQUESTER:	PUC Staff	RESPONDER:	Tom Pardee
TYPE:	Data Request	DEPT:	Gas Supply
REQUEST NO.:	Staff – 26	TELEPHONE:	(509) 495-2159
		EMAIL:	tom.pardee@avistacorp.com

REQUEST:

See page 27 of the IRP. For the table at the bottom of the page, please provide a narrative description of why number of customers grows faster than population.

RESPONSE:

In a given year, the two primary drivers of natural gas customer growth are population growth (a proxy for new customers) and the addition of gas service to existing homes. This means during normal economic times, customer growth of existing homes adopting gas will be slightly above population growth in the long run. In Oregon, outside of recessionary periods, the spread between customer growth and population growth (population growth less customer growth) is typically in the range of +0.2% to +0.6%. For example, during the Great Recession, Avista's natural gas customer growth in Oregon slowed to approximately the rate of population growth from 2008 to 2011. This reflected a significant slowdown in the existing households adding gas as they cut spending in the face of the recession and a weak initial recovery. As the economy recovery improved starting in 2012, customer growth accelerated back to being slightly above population growth.

AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	Oregon	DATE PREPARED:	04/30/2021
CASE NO.:	LC 75	WITNESS:	Jody Morehouse
REQUESTER:	PUC Staff	RESPONDER:	Tom Pardee
TYPE:	Data Request	DEPT:	Gas Supply
REQUEST NO.:	Staff – 29	TELEPHONE:	(509) 495-2159
		EMAIL:	tom.pardee@avistacorp.com

REQUEST:

See page 31 of the IRP. In Figure 2.4 please describe why the 99% is colder than any of the actual observed data. In your response please describe the distribution function assumptions.

RESPONSE:

Figure 2.4 illustrates the statistical probability based on normal distribution of a temperature occurrence based on 30 years of average coldest temperature each year. Specifically, the distribution function assumption is a normal inverse of the normal cumulative distribution for the specified mean and standard deviation. The probability is set to 0.01 and the average and standard deviations consider a rolling 30 years. In the first year of a 30-year calculation, the probability includes the coldest on record temperature in addition to a near coldest on record temperature, both observed in December 1968. This probability is calculated every year after 1978 with the most recent 30 years of average yearly coldest temperature. In order to measure the 99% probability or a 1 in 100 event occurrences, the calculation considers the population of data found in the past 30 years. To account for the unknown random phenomenon the temperature is colder based on historical figures in this dataset. Its only when the coldest on record is removed from the 30-year calculation due to time that the temperature begins to increase as depicted in Figure 2.4.

AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	Oregon	DATE PREPARED:	04/30/2021
CASE NO.:	LC 75	WITNESS:	Jody Morehouse
REQUESTER:	PUC Staff	RESPONDER:	Tom Pardee
TYPE:	Data Request	DEPT:	Gas Supply
REQUEST NO.:	Staff – 31	TELEPHONE:	(509) 495-2159
		EMAIL:	tom.pardee@avistacorp.com

REQUEST:

See pages 38-41 of the IRP. Please describe how carbon regulation impacts demand forecasts and how Avista arrived at a price elasticity value. In your response please

d. Provide workpapers for all assumptions and calculations used to derive the elasticity response factor;
e. describe any price elasticities derived or assumed for different customer classes.

RESPONSE:

a. The current elasticity value reflects a weighted average (by customers) by regions where the price variable is negative and statistically significant. This is done using schedule 410 residential use-per-customer (UPC) as the dependent variable in regressions with price as an explanatory variable. In these models, price is the average annual price (annual revenue divided by annual usage in the same year) lagged by one year. This annual price is repeated over a 12-month period because the monthly value of price (monthly revenue divided by monthly usage) is highly seasonal and creates multicollinearity issues between price and the variables controlling for seasonality. Before using it in a regression, the annual price is deflated by the Consumer Price Index (CPI) less energy to arrive at the real price. The lagged value of price is used, because the relationship between concurrent price and concurrent UPC is statistically insignificant and the coefficient sign is unstable. The company believes this reflects the lag between price changes and customer recognition of those changes via the customer's bill via the PGA process. Using the estimated coefficient on lagged annual price (β-hat), own-price elasticity (ε) is for jurisdiction j (where price is an explicit explanatory variable and statistically significant) is calculated as:

$$\varepsilon_j = \widehat{\beta_J} \frac{\bar{P}_{y-1}}{\overline{UPC}_y}$$

Here, P_{y-1} is the average annual price in year y-1 and UPC_y-bar is the estimated average monthly UPC year Y for the most recent year Y. The average elasticity is then calculated as:

$$\varepsilon_{Average} = \sum_{j=1}^{Max\ 4} \alpha_j \cdot \varepsilon_j \ \ where \sum_{j=1}^{Max\ 4} \alpha_j = 1$$

Where α is the share of 410 customers in jurisdiction j, up to a maximum of 4 four jurisdictions (Medford, Roseburg, Klamath, and La Grande) if all areas have a price

variable that is negative and statistically significant. In the current IRP, only price for Roseburg was negative and statistically significant. This means, only Roseburg is used to estimate elasticity for the current IRP. A point of clarification: note that the current IRP text mentions Medford as part of the calculation, but this was the case in the previous IRP, but not the current IRP. This is a failure by Avista's economist to communicate to Gas Supply that Medford had fallen out of the calculation because price had become statistically insignificant.

The use of Roseburg solely reflects a general decline in the impact of price in the other jurisdictions from one IRP to the next. Since price in the elasticity calculation is lagged, econometrically this is closer to a long-run elasticity estimate—as opposed to an estimate using concurrent price, which would be considered the short-run elasticity estimate. For Roseburg, the estimate was calculated using the following numbers:

$$\varepsilon_{Roseburg} = -4.66951 \cdot \left(\frac{0.82}{47}\right) = -0.081$$

The β-hat value comes from the Fall 2020 load and customer forecast used for the company's revenue model. The average price (0.82) was the real price from 2019 and average UPC (47) is an estimate using data available at the time of the IRP.

b. Avista assumes this elasticity is equal across all customer class types.

AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	Oregon	DATE PREPARED:	04/30/2021
CASE NO.:	LC 75	WITNESS:	Jody Morehouse
REQUESTER:	PUC Staff	RESPONDER:	Tom Pardee
TYPE:	Data Request	DEPT:	Gas Supply
REQUEST NO.:	Staff – 33	TELEPHONE:	(509) 495-2159
		EMAIL:	tom.pardee@avistacorp.com

REQUEST:

See pages 38-41 of the IRP. Oregon DEQ's Climate Protection Program (CPP) modeling from consultant ICF applies a Social Cost of Carbon to the Community Climate Investment program, which is essentially an alternative compliance mechanism. How would your sensitivities change if DEQ's Community Climate Investment program values were used?[1]

RESPONSE:

A Social Cost Carbon at 2.5% would increase the costs associated with carbon and combined with the elasticity, would further reduce demand for natural gas.

[1] See slides 12-20 of Oregon DEQ's March 18, 2021 presentation to the Rules Advisory Committee for the CPP. Available at: https://www.oregon.gov/deq/Regulations/rulemaking/RuleDocuments/ghgcr2021m3Slides.pdf

AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	Oregon	DATE PREPARED:	04/30/2021
CASE NO.:	LC 75	WITNESS:	Jody Morehouse
REQUESTER:	PUC Staff	RESPONDER:	Tom Pardee
TYPE:	Data Request	DEPT:	Gas Supply
REQUEST NO.:	Staff – 48	TELEPHONE:	(509) 495-2159
		EMAIL:	tom.pardee@avistacorp.com

REQUEST:

The electrification scenarios presented in Figure 7.15 were for Washington. Please provide a similar analysis for Oregon.

RESPONSE:

At this time a similar analysis has not been completed for Oregon. The primary reason being, we do not have load estimates, cost estimates and details of each of the electricity providers in Oregon.

AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	Oregon	DATE PREPARED:	05/07/2021
CASE NO.:	LC 75	WITNESS:	Jody Morehouse
REQUESTER:	PUC Staff	RESPONDER:	Tom Pardee
TYPE:	Data Request	DEPT:	Gas Supply
REQUEST NO.:	Staff – 51	TELEPHONE:	(509) 495-2159
		EMAIL:	tom.pardee@avistacorp.com

REQUEST:

Has Avista ever proposed or considered a GHG reduction program under Oregon SB 844?

a. If so, what was the outcome of the proposal?
b. If not, please explain the reasons why Avista has not proposed such a program

RESPONSE:

Avista has not proposed a GHG reduction program under Oregon SB 844.

a. Not applicable

b. Due to the complexity of requirements relating to approval of SB 844 projects, measurement and verification requirements of approved projects, lack of example project concepts put forth by other utilities in Oregon, and resource constraints of the Company, Avista has not proposed an SB 844 program. Further, due to the passage of SB 98, there are alternative pathways for investments in GHG reduction through Renewable Natural Gas. Avista is still evaluating and exploring how we might put forth a project under SB 98.

AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	Oregon	DATE PREPARED:	05/07/2021
CASE NO.:	LC 75	WITNESS:	Jody Morehouse
REQUESTER:	PUC Staff	RESPONDER:	Tom Pardee
TYPE:	Data Request	DEPT:	Gas Supply
REQUEST NO.:	Staff – 52	TELEPHONE:	(509) 495-2159
		EMAIL:	tom.pardee@avistacorp.com

REQUEST:

Has Avista made a petition filing at the OPUC to indicate that it will participate in the Oregon SB 98 Renewable Natural Gas program?

a. If not, please explain the Company's reasoning for the decision not to participate in the RNG program at this time.

RESPONSE:

Avista has not yet filed a petition to participate in the Oregon SB 98 RNG program but anticipates doing so at some point in the future. The Company continues to evaluate the scope of SB 98, explore RNG supply options, and how it may participate in an RNG program.

C&I Customer Program Offering Assessment:

Phase 3 Quantitative Survey

April 2019

What we were looking for

Research Objectives

Help Avista Utilities **understand their Small/Medium and Large C&I customers** – what they'll expect/want over the next 2-3 years as they acquire and manage their energy – and how to improve their satisfaction.

In addition, this research explored:

- **The services** Avista should launch in order to simply meet customer expectations
- **Which programs or products will improve long-term loyalty**, including energy consumption detail, technologies, and service extensions
- **Prioritization of the program initiatives**

Shelton Grp

Phase 3 Methodology

As part of Phase 3, two separate surveys were fielded between January 22, 2019 and February 2, 2019 to test 10 potential program offerings to both SMB and Large C&I customers. Customer size was determined by a customer's highest electric rate schedule. The surveys lasted approximately 20-25 minutes each. With a total sample of 348 (251 SMB and 97 Large) and a 95% confidence interval, the overall margin of error for the Small/Medium customer survey is approximately +/-6.2%, and the overall margin of error for the Large customer survey is approximately +/-9.8%.

Report Introduction

Throughout the report, percentages are reported as overalls, meaning we combined the responses of both SMB and large customers when the difference was not statistically significant. At points where the responses of the two samples are statistically significant from each other, these differences are called out either in the slide footer or beneath the graph.

Data Callout Legend		
Sample	**Color**	**Icon**
SMB	**Pink**	
Large	**Purple**	
Owners	**Light blue**	
Renters	**Yellow**	

Shelton Grp

1 | Sample Overview & Firmographics

2 | Customer Perceptions of Avista

3 | Potential Program Evaluations

4 | Conclusions & Recommendations

Shelton Grp

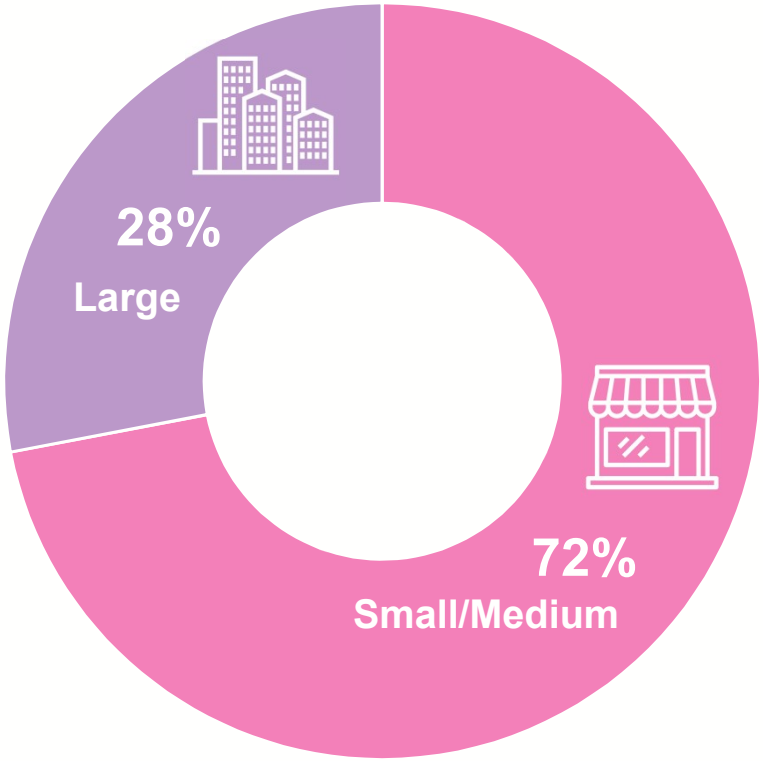
1 | Sample Overview & Firmographics

2 | Customer Perceptions of Avista

3 | Potential Program Evaluations

4 | Conclusion & Recommendations

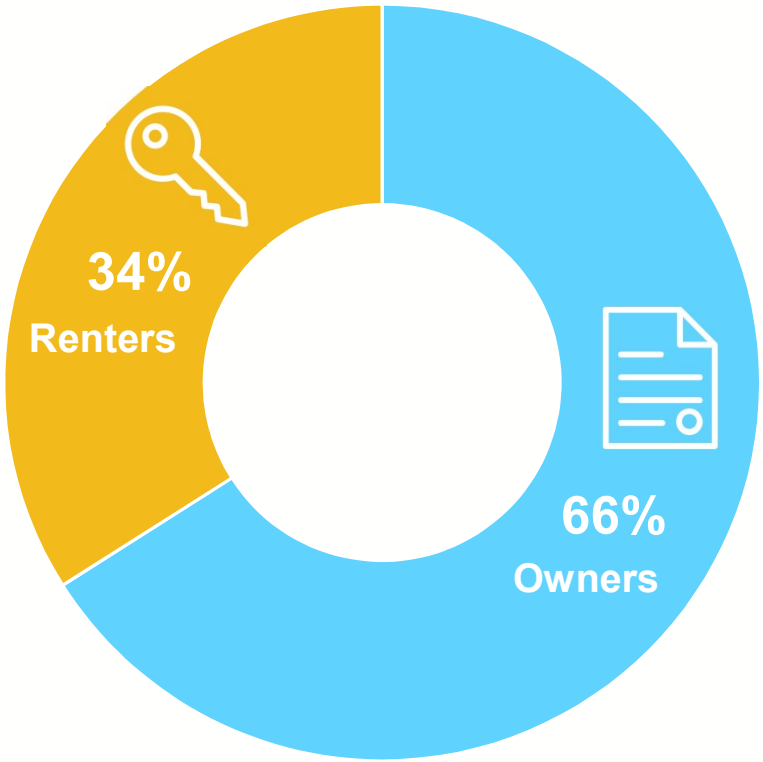
Sample Overview – Customer Distribution



Small/Medium sample total:	251
Large sample total:	97
Total:	**348**

Sample Overview – Owner/Renter Distribution

n=348

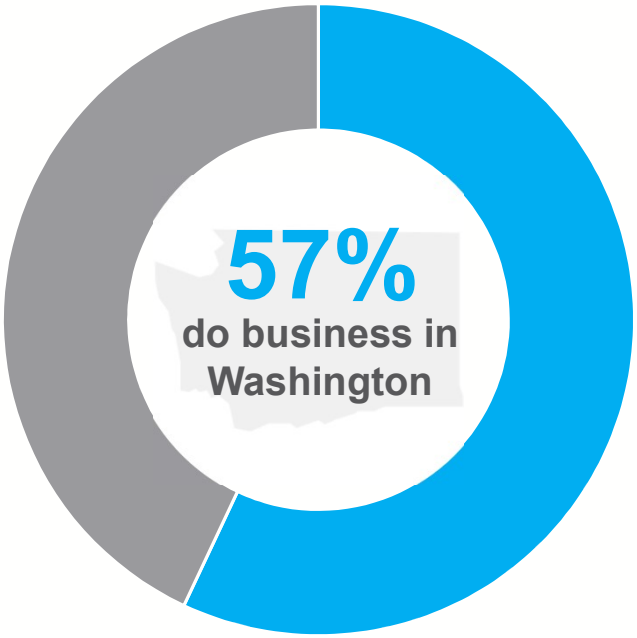


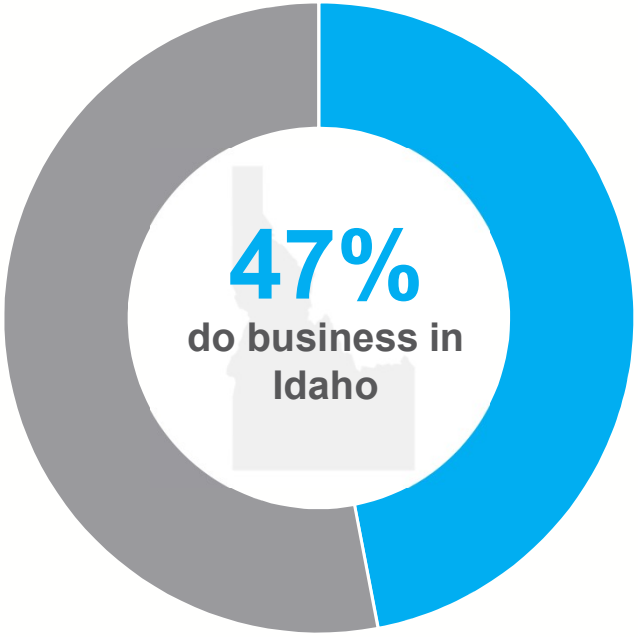
Owners sample total:	231
Renters sample total:	117

Large more likely to own space (91% vs. 57%)

Sample Overview – State Distribution

n=348

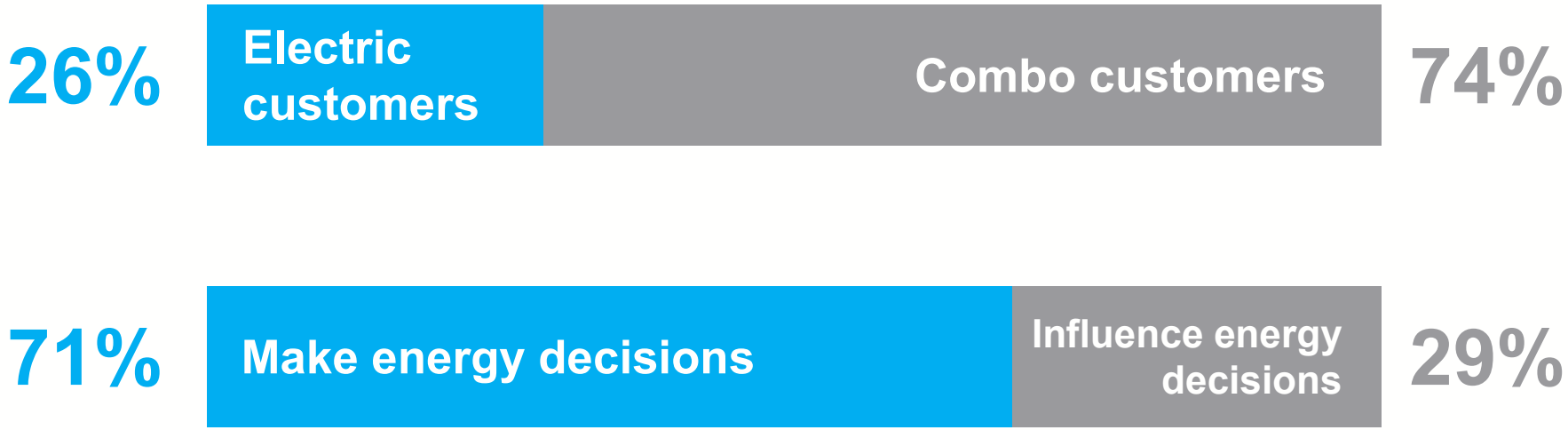




**Oregon (gas only) customers were excluded because program content pertained primarily to electric/combo customers—Oregon was also excluded from the qualitative (Phase 2).*

n=348

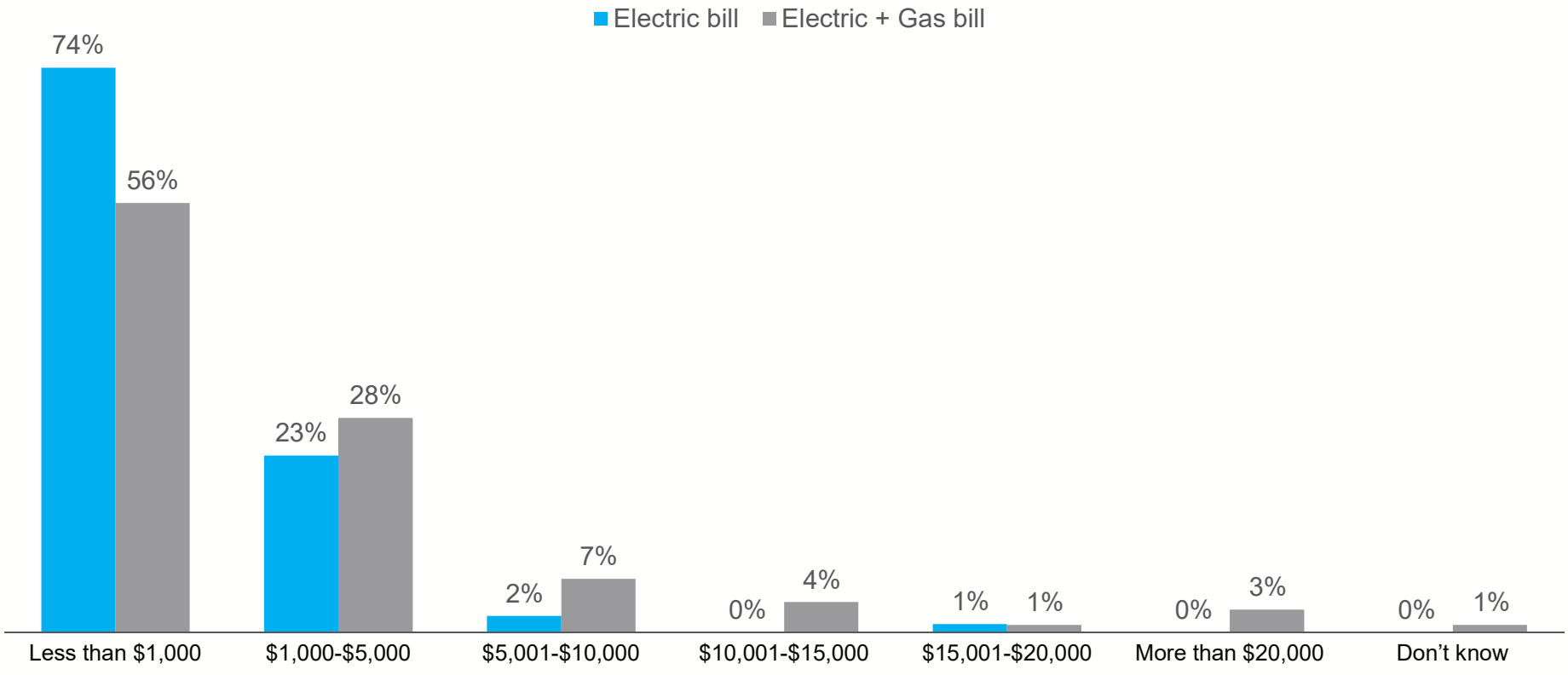
Sample Overview – Type of Service and Decision-Making Role



Q5 - Which type of service does your company receive from Avista?
Q1 - How would you describe your role when it comes to making decisions about energy use at your company? Would you say that you...?

Sample Overview – Average Utility Bill

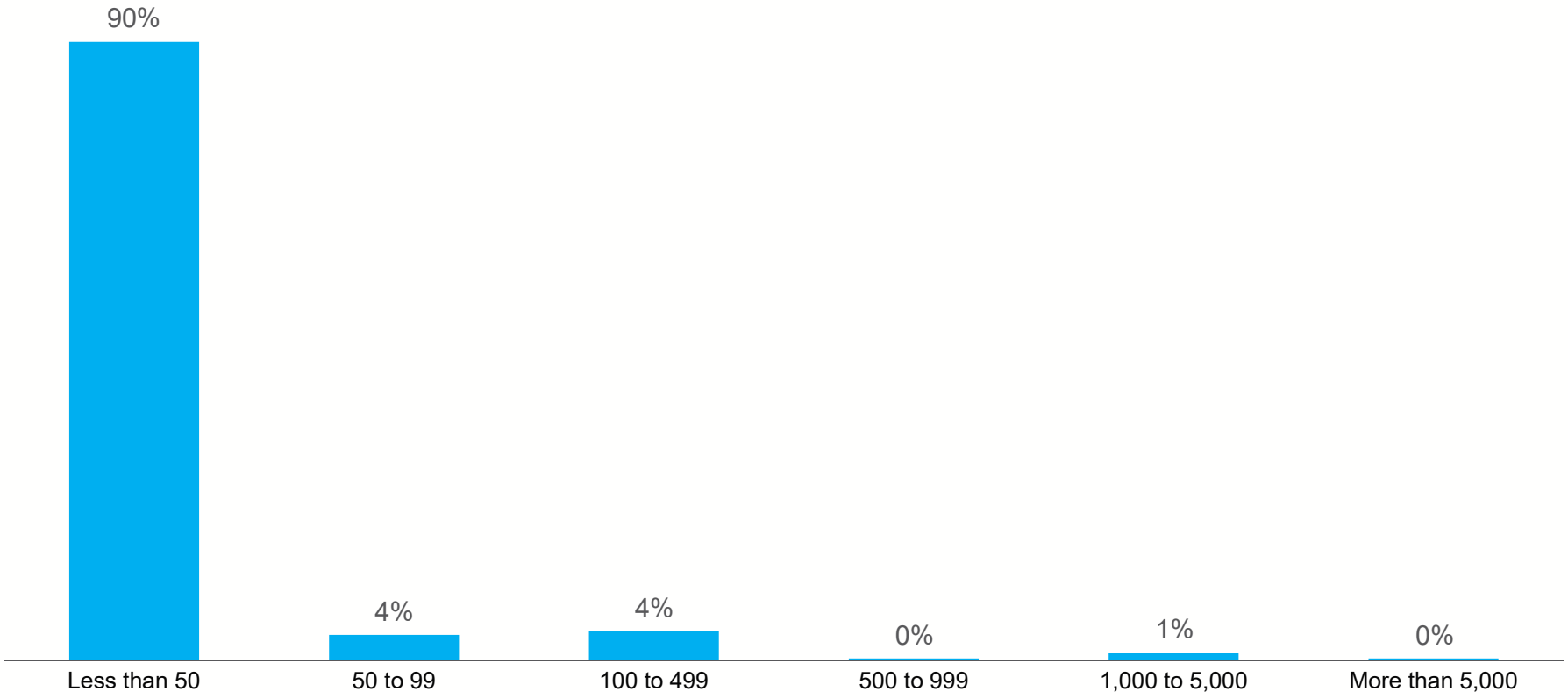
n=348



Q6 - What is your primary facility's average monthly electric bill? / What is your primary facility's average monthly combined electric and gas bill?

Sample Overview – Number of Employees

n=348



Q7 - How many people does your organization employ? If you are unsure, please provide your best guess.

Sample Overview – Industry Breakdown

Industry	Count	Industry	Count
Manufacturing/Mining	40	Automotive	11
Commercial Office	38	Lodging	11
Retail	33	Education	9
Health/Cosmetic Clinics	31	Grocery	9
Food Service	28	Other Business Services	9
Commercial Building Owner	24	Property Management	9
Church	17	Other	7
Agriculture	15	Public Administration	6
Construction	14	Outdoor Recreation	5
Nonprofit	14	Extended Healthcare Facility	4
Arts, Entertainment & Indoor Recreation	11	Hospital	3

Shelton Grp

1 | Sample Overview & Firmographics

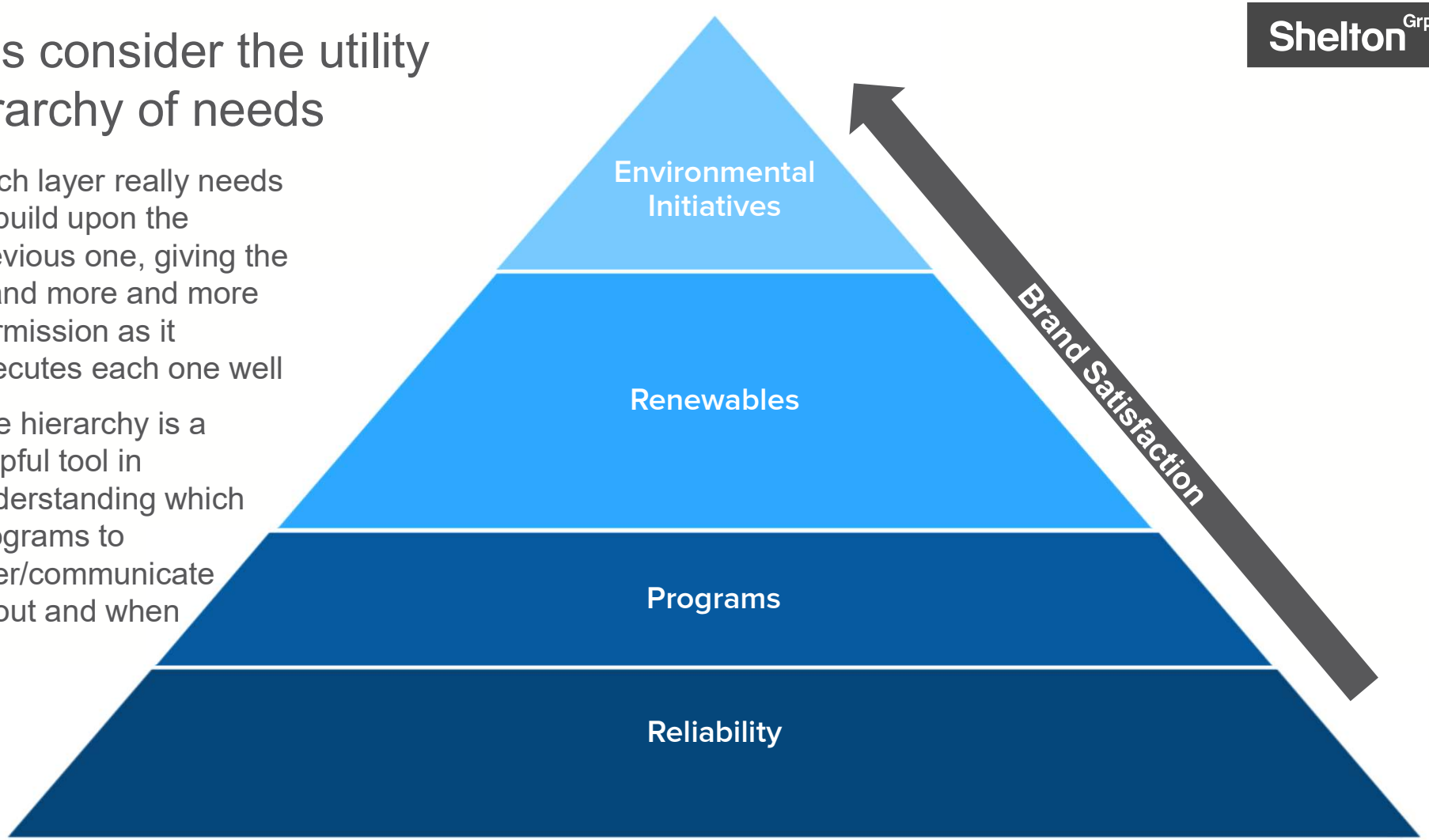
2 | Customer Perceptions of Avista

3 | Potential Program Evaluations

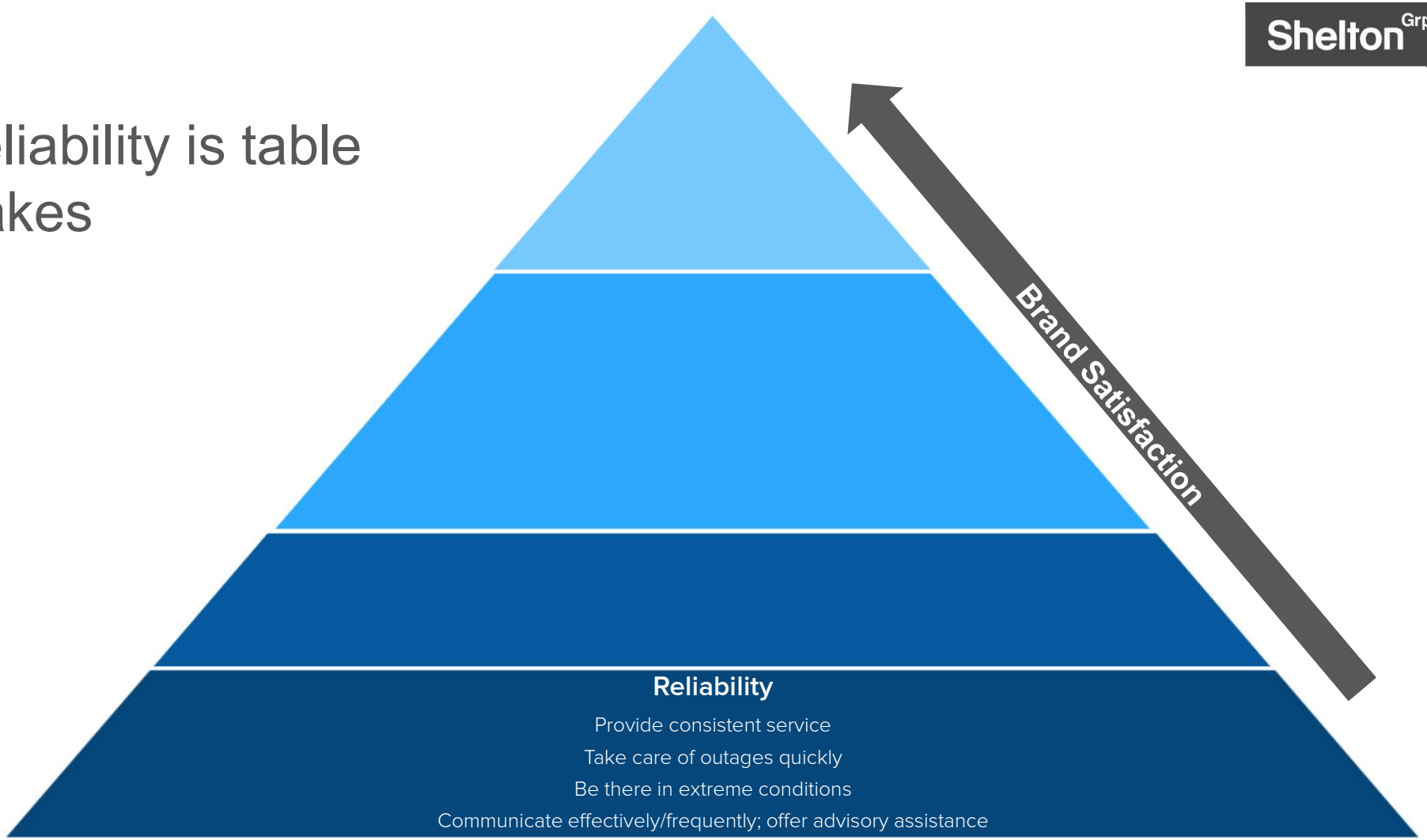
4 | Conclusion & Recommendations

Let's consider the utility hierarchy of needs

- Each layer really needs to build upon the previous one, giving the brand more and more permission as it executes each one well
- The hierarchy is a helpful tool in understanding which programs to offer/communicate about and when

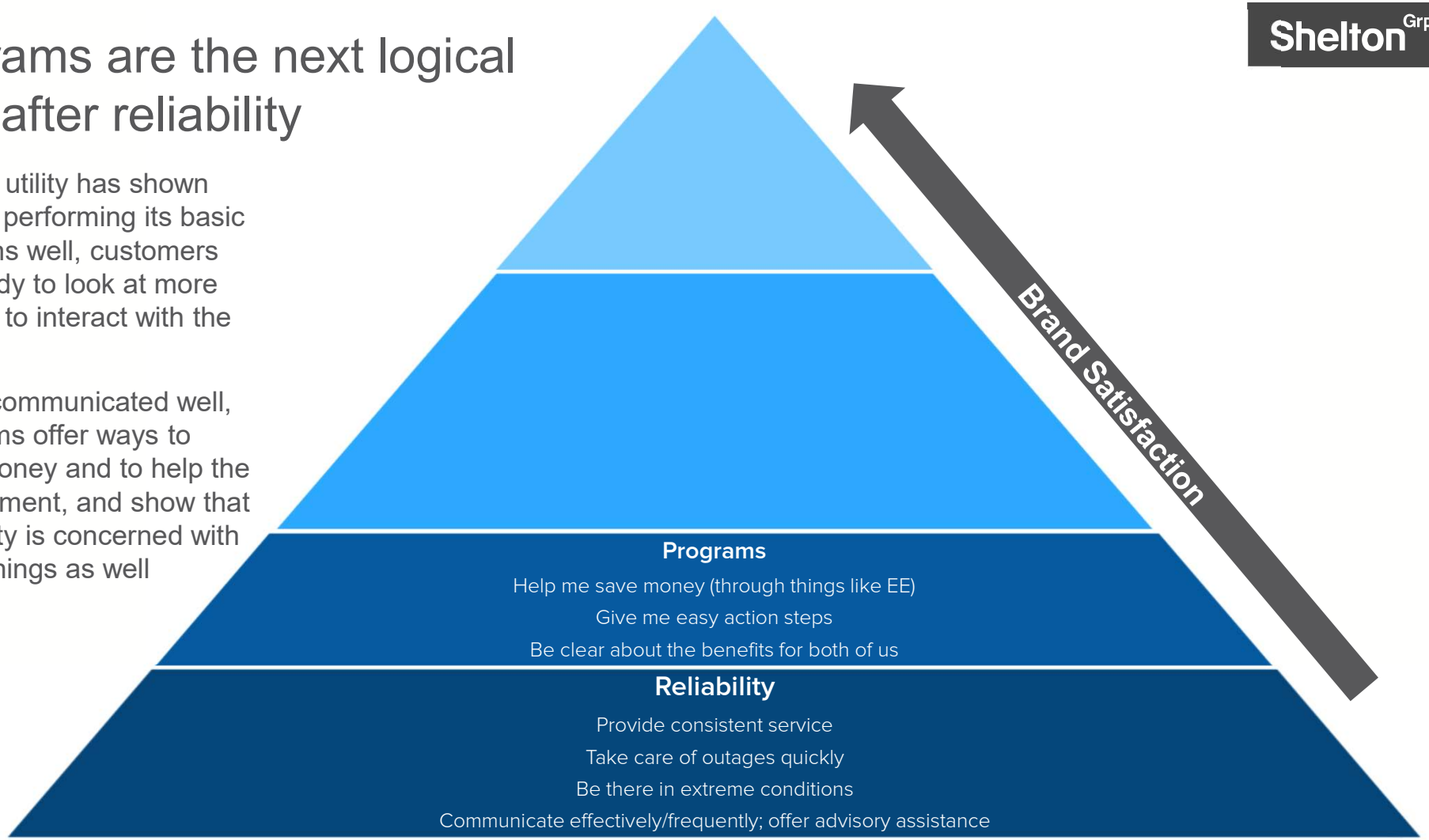


Reliability is table stakes



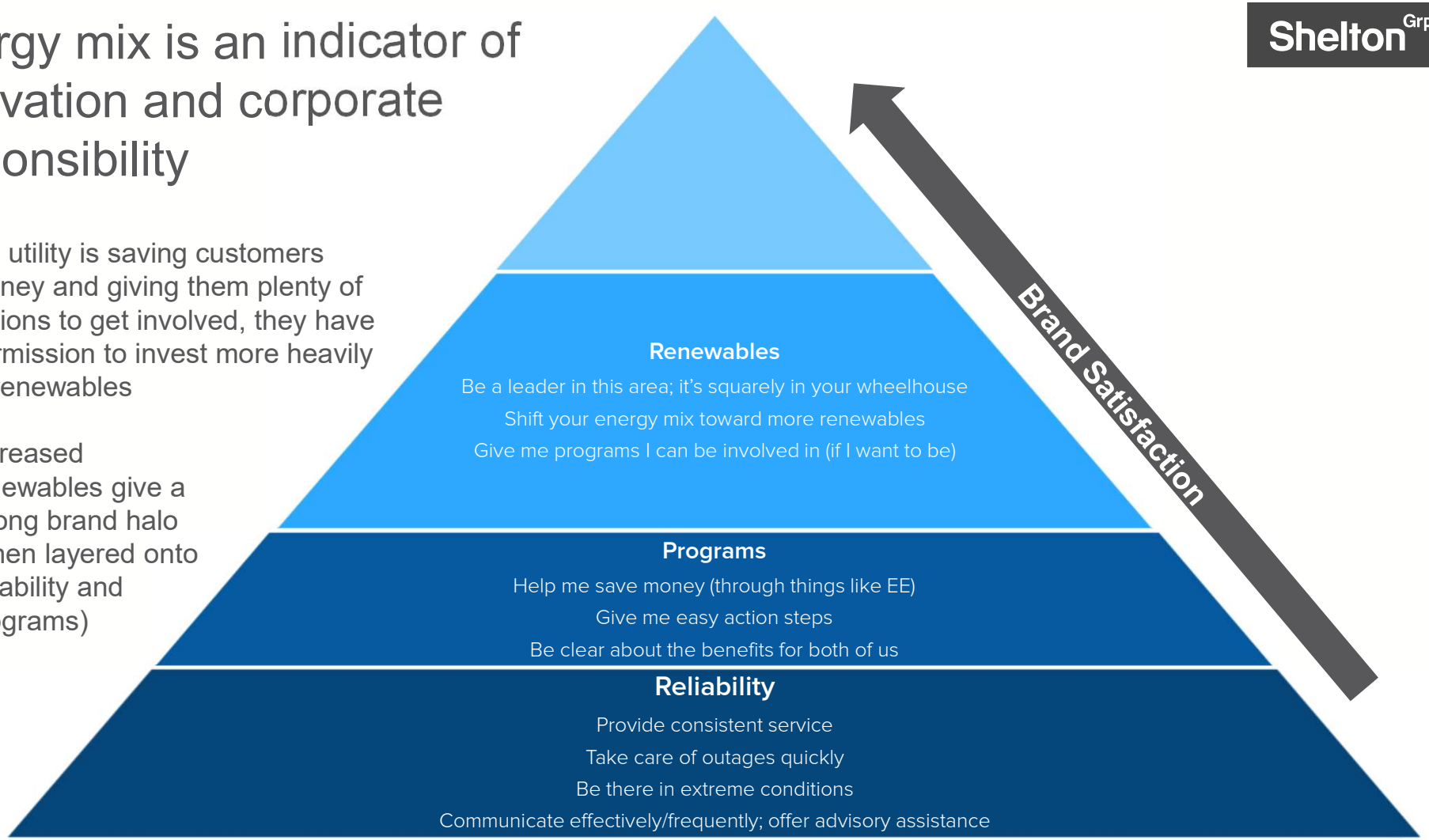
Programs are the next logical layer after reliability

- Once a utility has shown that it's performing its basic functions well, customers are ready to look at more options to interact with the brand
- When communicated well, programs offer ways to save money and to help the environment, and show that the utility is concerned with these things as well



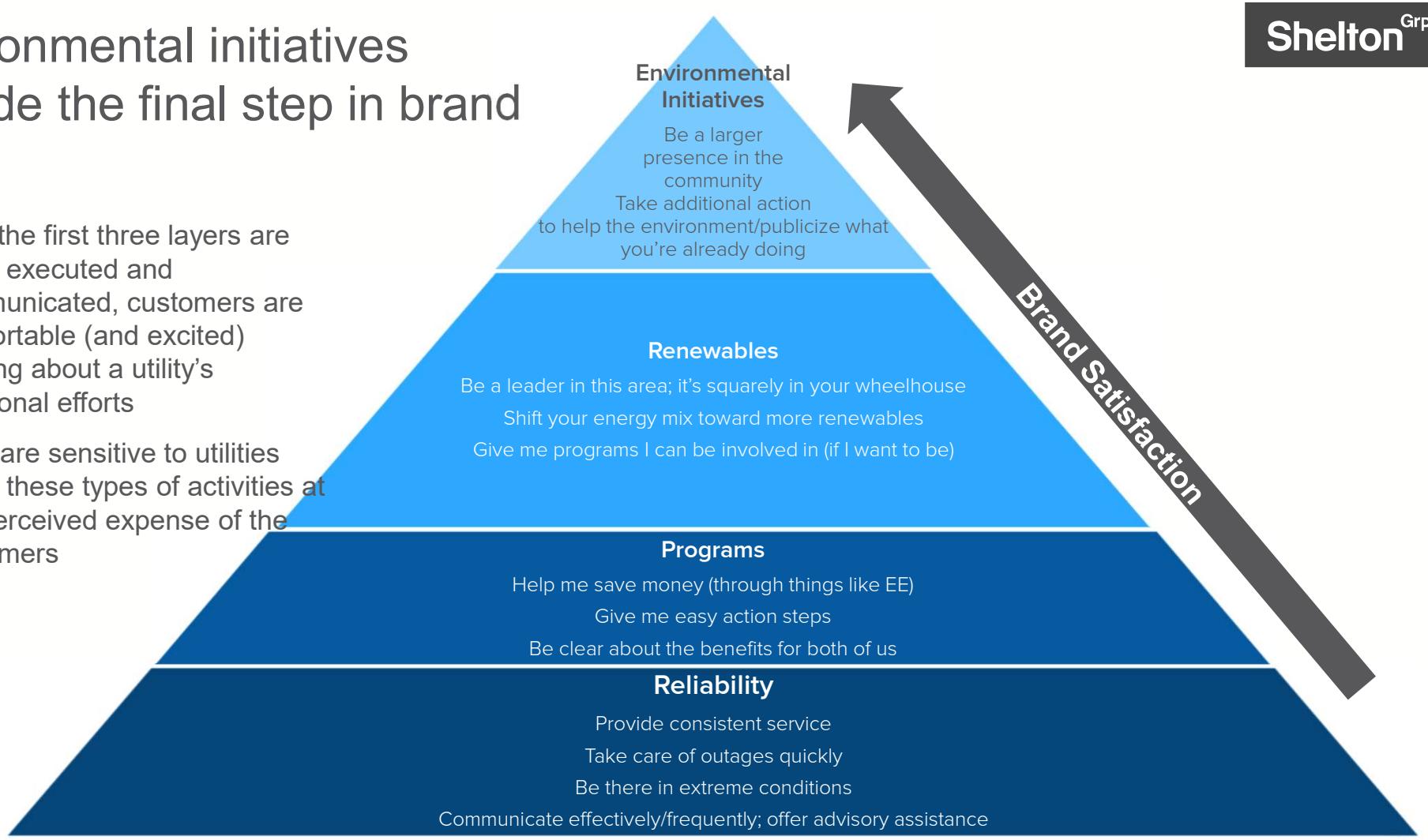
Energy mix is an indicator of innovation and corporate responsibility

- If a utility is saving customers money and giving them plenty of options to get involved, they have permission to invest more heavily in renewables
- Increased renewables give a strong brand halo (when layered onto reliability and programs)



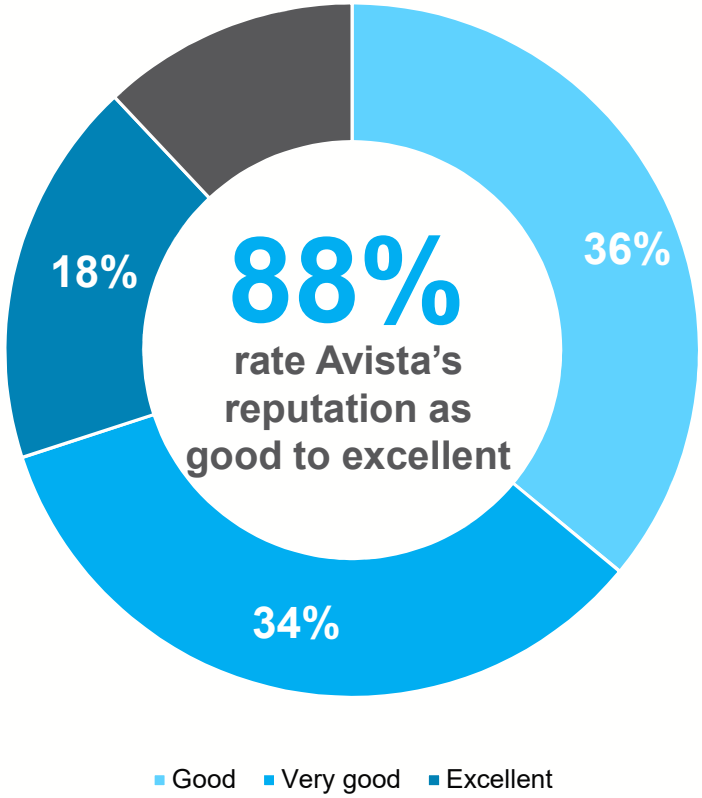
Environmental initiatives provide the final step in brand lift

- After the first three layers are being executed and communicated, customers are comfortable (and excited) hearing about a utility's additional efforts
- They are sensitive to utilities doing these types of activities at the perceived expense of the customers



The pyramid hierarchy helps to decode program priority

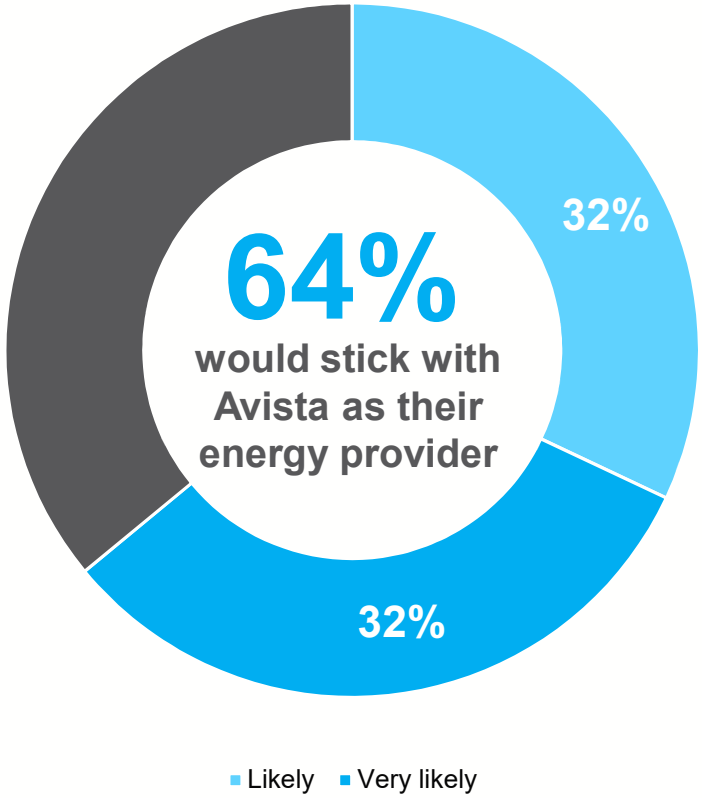
n=348



Good news! 88% of customers **rate Avista's reputation as good to excellent**

Q9 - How would you rate the overall reputation of Avista Utilities?

n=348

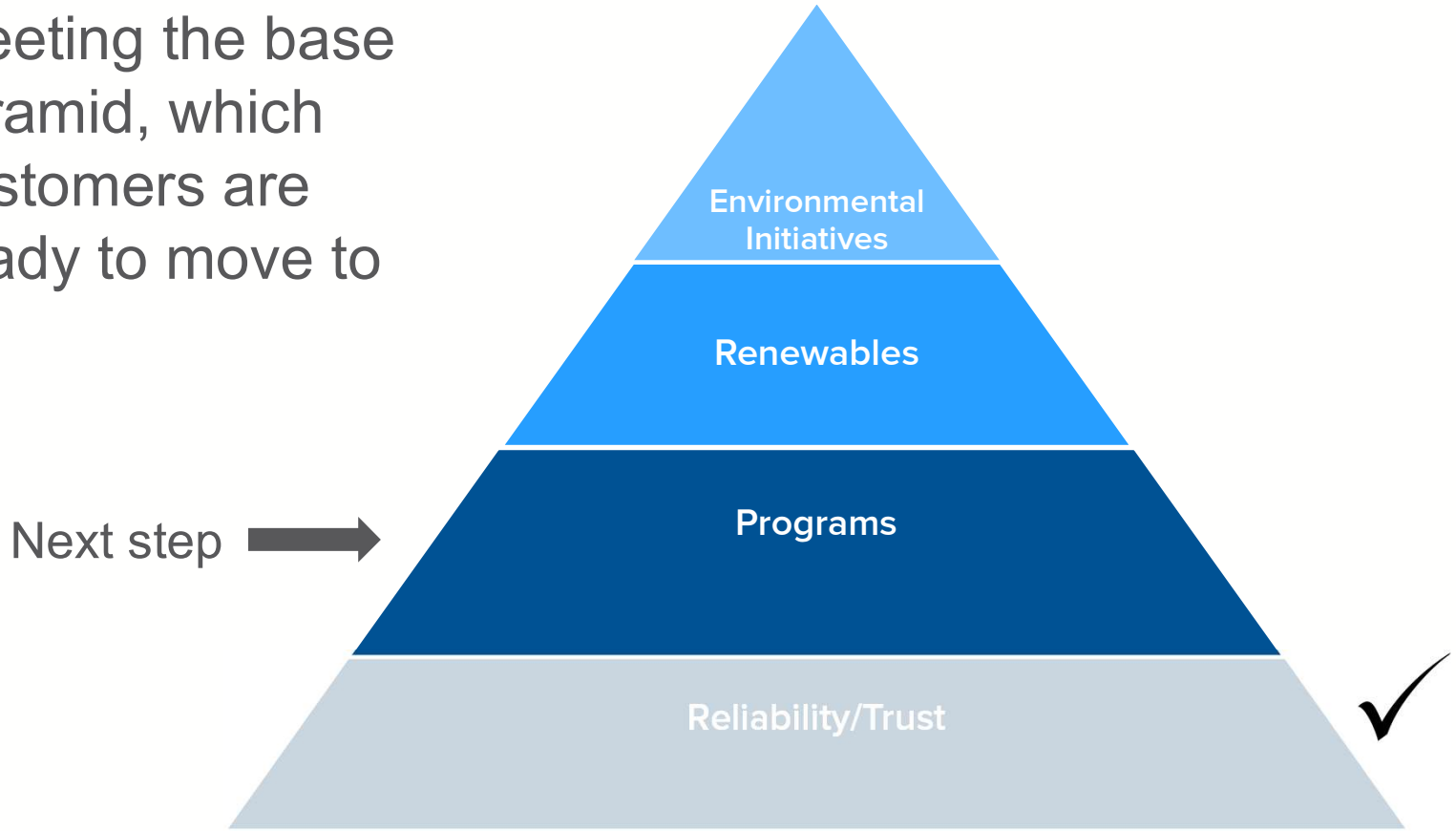


And if given the opportunity to get their energy elsewhere, 64% say they are **likely to *stay* with Avista**—24% were neither likely nor unlikely

This is comparable to Shelton Group's national B2B Pulse where 63% indicated they would stay with their current utility

Q8 - Assume that you were given a choice of energy providers and they all charged the same rates that you are now paying to Avista Utilities. What is the likelihood that you would stay with Avista rather than switch to another energy provider?

This means that, for most customers, Avista is having no problem meeting the base level of the pyramid, which means that customers are primed and ready to move to the next level



n=348

We did learn that both SMB customers and renters are more likely to be undecided when it comes to their loyalty

28%

of SMB customers say they are "Neither unlikely nor likely" to stay with Avista (vs. 16% of Large)

32%

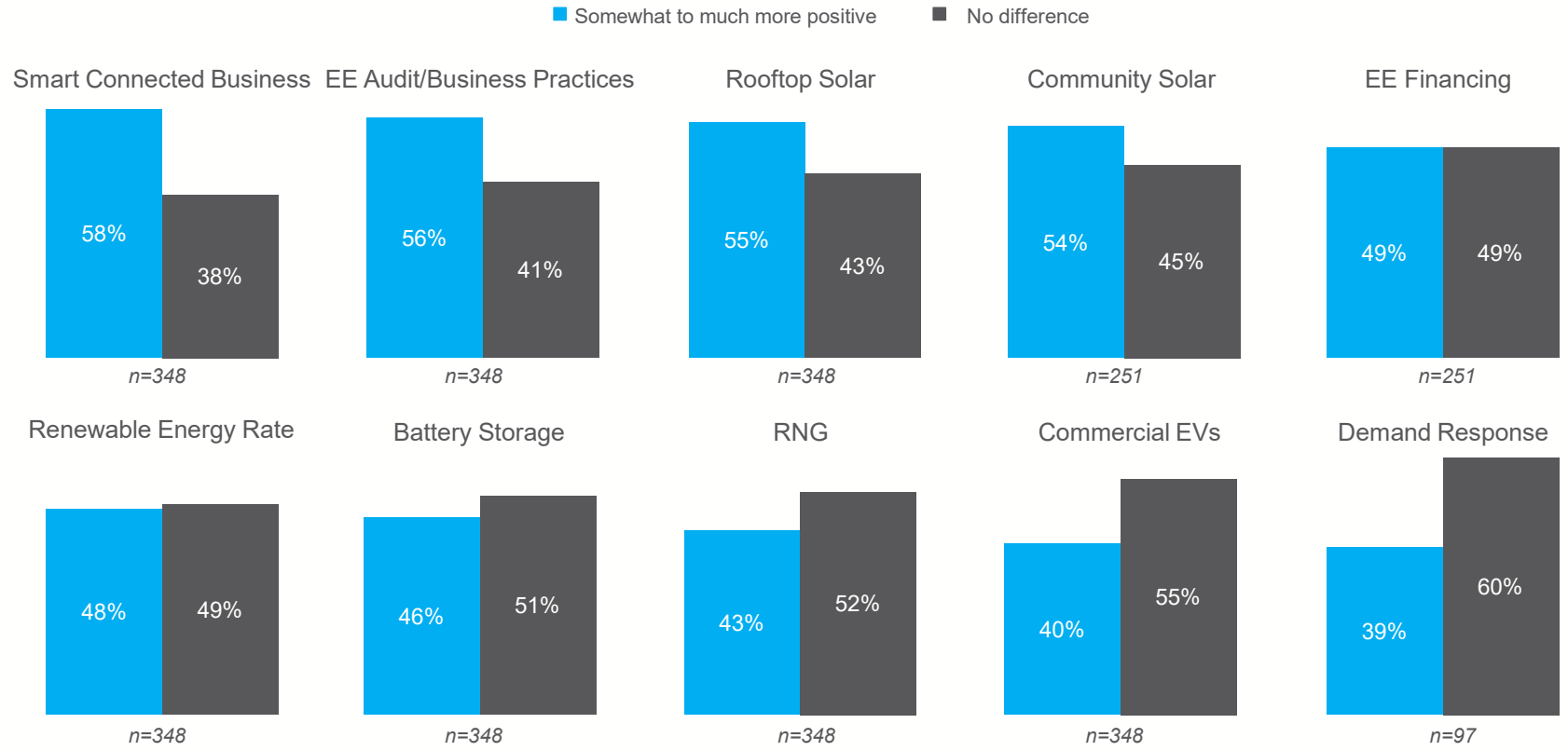
of renters say they are "Neither unlikely nor likely" to stay with Avista (vs. 20% of owners)

Q8 - Assume that you were given a choice of energy providers and they all charged the same rates that you are now paying to Avista Utilities. What is the likelihood that you would stay with Avista rather than switch to another energy provider?

Shelton Grp

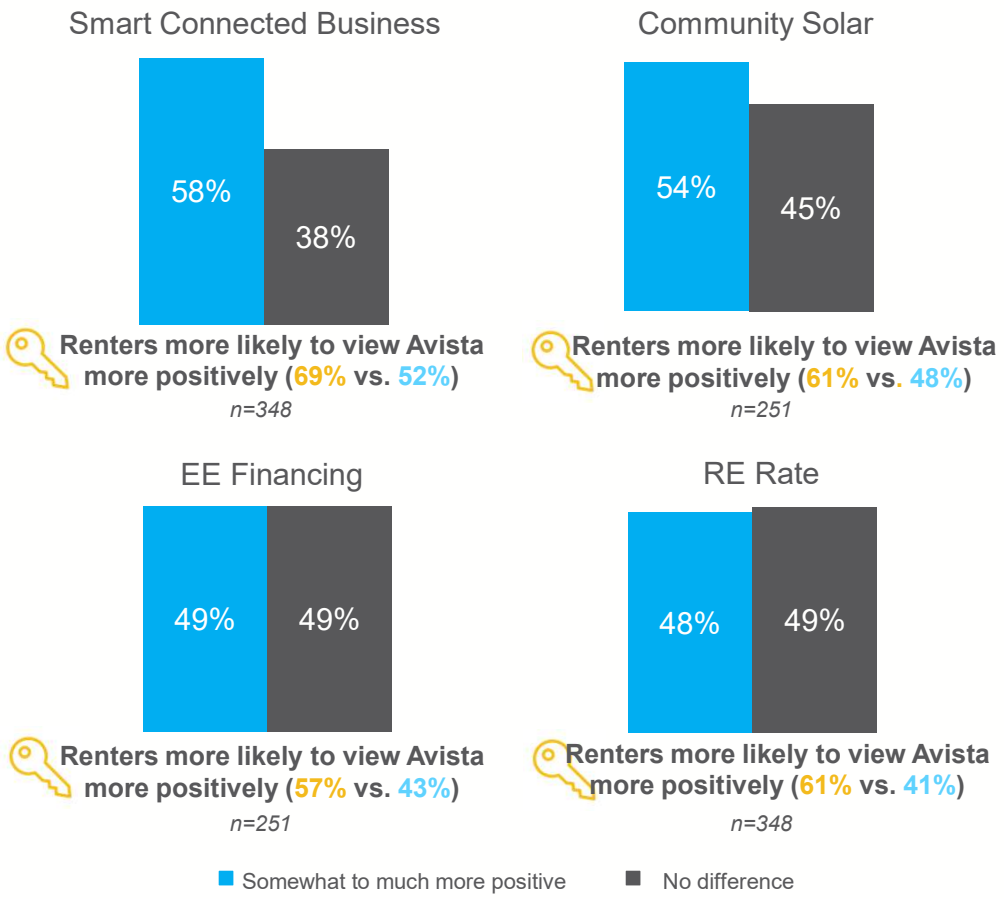
Program offerings can have a huge effect on customer retention (especially for at-risk groups) – *just knowing* that programs are offered can increase positive brand perception

Around half of Avista customers say that *just knowing* about these program offerings makes their perception of Avista more positive – especially for EE and solar programs



*QA1, B1, C1, D1, E1, F1, G1, H1, I1, J1 – How would knowing about **this** program affect your perception of Avista?*

This is **especially true for renters;** since they are restricted on what they can and cannot do within their spaces, **programs that empower them** to better control their energy use or adopt RE in some way fosters a more positive view of Avista



*QA1, B1, C1, D1, E1, F1, G1, H1, I1, J1 – How would knowing about **this** program affect your perception of Avista?*

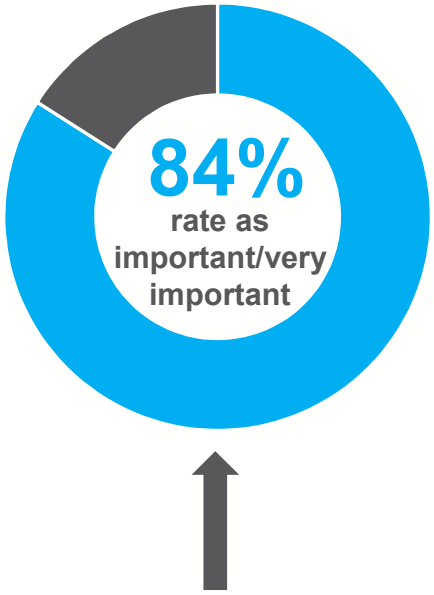
Shelton Grp

When it comes to actually participating in programs, businesses are chiefly focused on ways to save money

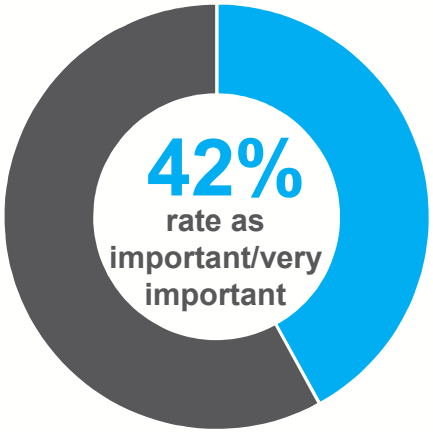
This focus on cost-reduction makes other considerations (like renewables or overall sustainability goals) secondary, meaning they've yet to meet the program level of the pyramid

n=292

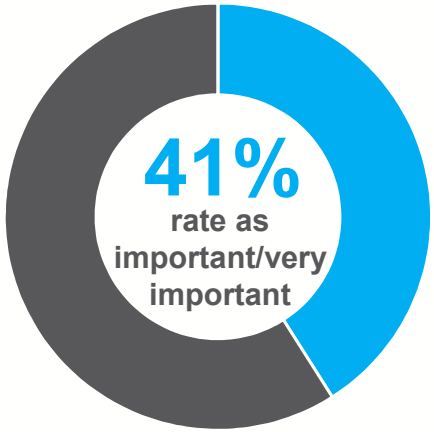
Reduced energy bills



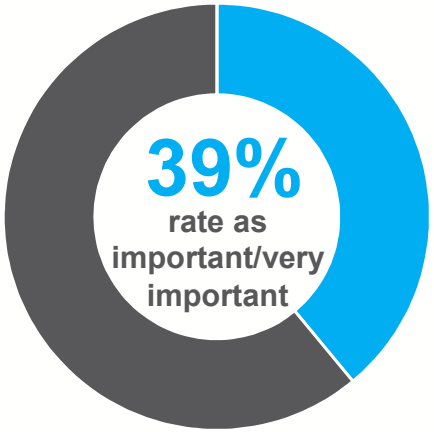
Integrated on-site solar



Backup battery power



Sustainability goals and/or industry sustainability certification



QA6_How important are the following items to you?

This cost-oriented mindset is largely influential in customers' RE decision process – cost savings potential is the highest reported decision factor

Shelton Grp

n=348

Cost savings potential

Price stability

Physical changes to building

Ease of participating

Choice of RE source

Contract length

Ranked as most important decision factor Ranked as second most important decision factor

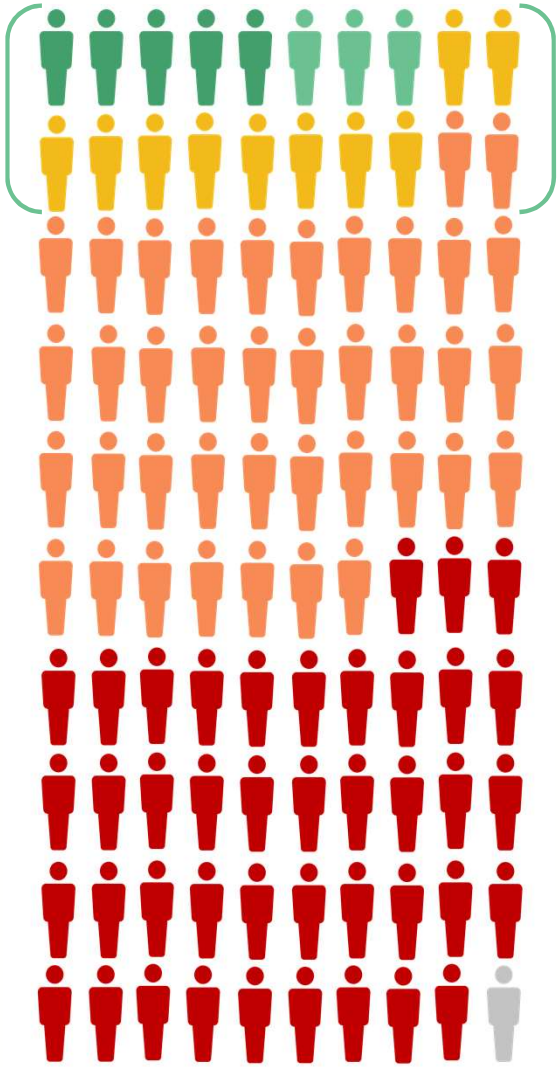
Owners are more likely to say cost savings potential is the most important factor (71% vs. 58%)

Q11 - Thinking about renewable energy, please rank the following program characteristics from most important to least important.

Shelton Grp

This makes sense knowing that utilities must offer programs that save customers money before they're ready to think about investing in renewables

Currently, only 18% of customers have made any sort of tangible progress towards implementing renewables



Shelton Grp

n=348

5%	I am currently using renewable energy to support some or all of the energy use at my business
3%	I plan to invest in / procure renewable energy in the next 6-12 months to support some or all of the energy use at my business
10%	I have reviewed or investigated what renewable energy options are available to my business but have not yet invested in or procured
39%	I have considered renewable energy for my business but have not investigated my options
43%	I have not considered renewable energy for my business
1%	Other

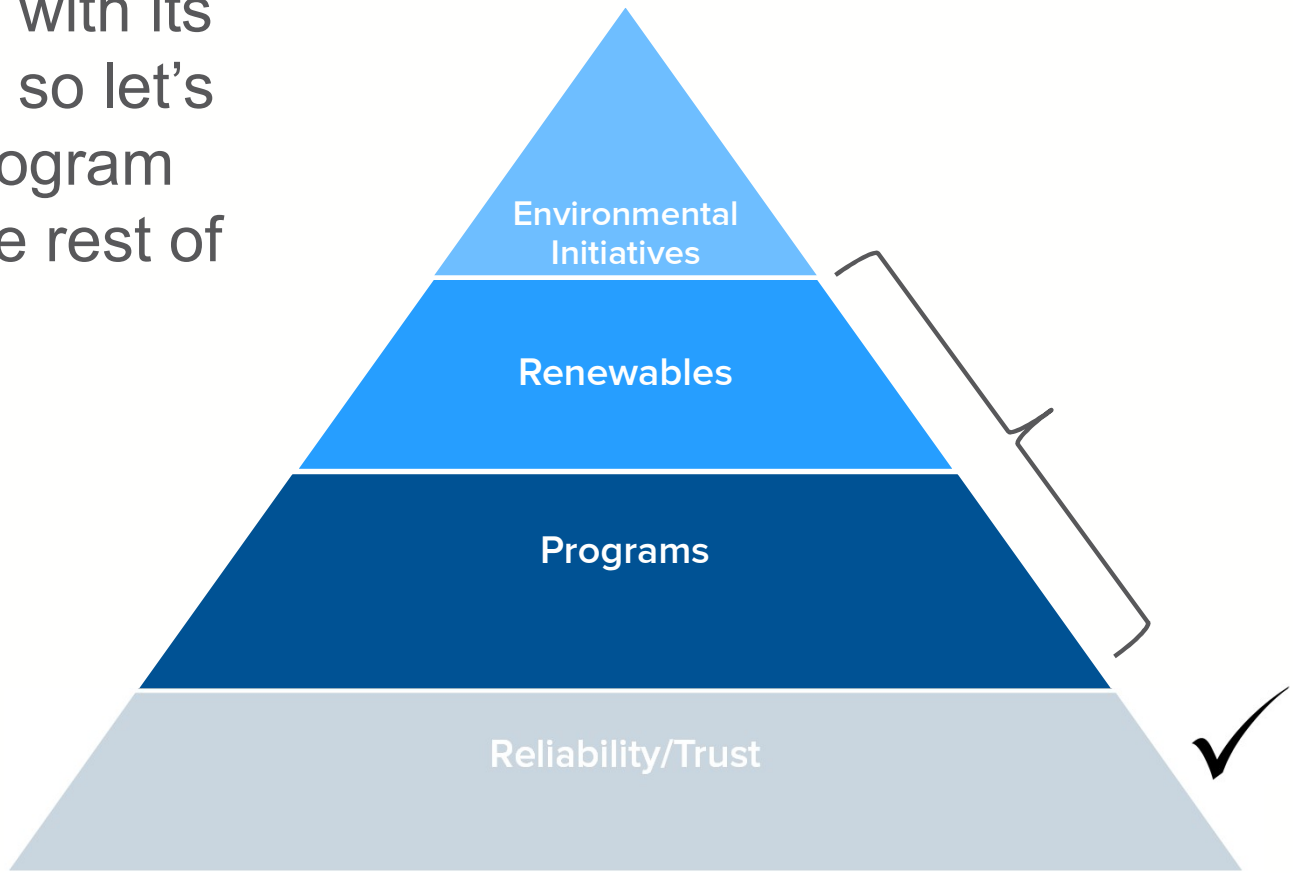
Large more likely to be currently using RE (12% vs. 2%)

Owners more likely to have investigated RE (12% vs. 5%)

Q10 - How interested are you in adding renewable energy to power your business?

Shelton Grp

Avista is generally meeting reliability/trust needs with its business customers, so let's evaluate potential program offerings, keeping the rest of the pyramid in mind



Shelton Grp

1 | Sample Overview & Firmographics

2 | Customer Perceptions of Avista

3 | Potential Program Evaluations

4 | Conclusion & Recommendations

Shelton Grp

Each program is rated on 3 separate qualities:

1. How likely customers are to participate (based on the most appealing version of a program if multiple options were presented)
2. How relevant it is to a customer's business
3. How knowledge about the program offering would affect a customer's view of Avista

	Likelihood to participate (best option)	Relevance	Brand lift
Program score (Green if above average; red if below average	X	X	X
Average of all programs	3.0	3.0	3.6

*Ratings are based on a program's mean score

**Likelihood of participation is calculated excluding the customers who rated the program as "extremely irrelevant

When ranked by their mean scores across 3 metrics, 3 programs consistently fall within the top 5

	Rankings
	Likelihood to participate
Energy Audit/Practices	1
Smart Business	2
Community Solar	3
RE Rate	4
RNG	5
Financing	6
Commercial EVs	7
Battery Storage	8
Rooftop Solar	9
Demand Response	10

When ranked by their mean scores across 3 metrics, 3 programs consistently fall within the top 5

	Rankings	
	Likelihood to participate	Relevance
Energy Audit/Practices	1	3
Smart Business	2	2
Community Solar	3	5
RE Rate	4	6
RNG	5	9
Financing	6	7
Commercial EVs	7	10
Battery Storage	8	8
Rooftop Solar	9	1
Demand Response	10	4

When ranked by their mean scores across 3 metrics, 3 programs consistently fall within the top 5

	Rankings		
	Likelihood to participate	Relevance	Brand lift
Energy Audit/Practices	1	3	1
Smart Business	2	2	4
Community Solar	3	5	3
RE Rate	4	6	6
RNG	5	9	10
Financing	6	7	5
Commercial EVs	7	10	9
Battery Storage	8	8	7
Rooftop Solar	9	1	2
Demand Response	10	4	8

SMB Ranking

	Rankings		
	Likelihood to participate	Relevance	Brand lift
Energy Audit/Practices	1	5 (tie)	3 (tie)
Smart Business	2	2	2
Community Solar	3	3	3 (tie)
RE Rate	4	4	6 (tie)
RNG	5	8	8
Financing	6	5 (tie)	5
Commercial EVs	7	9	9
Battery Storage	8	7	6 (tie)
Rooftop Solar	9	1	1
Demand Response	-	-	-

Large Ranking

	Rankings		
	Likelihood to participate	Relevance	Brand lift
Smart Business	1	2	3
Energy Audit/Practices	2	1	1
RE Rate	3	6	4
RNG	4	7	8
Commercial EVs	5	8	7
Rooftop Solar	6	3	2
Demand Response	7	4	5
Battery Storage	8	5	6
Community Solar	-	-	-
Financing	-	-	-

We'll examine each program in order of customers' likelihood to participate in the most appealing version of a program.

Program-specific questions were not asked of customers who rated that particular program as "extremely irrelevant" to their business.

Shelton Grp

Potential Programs

n=348

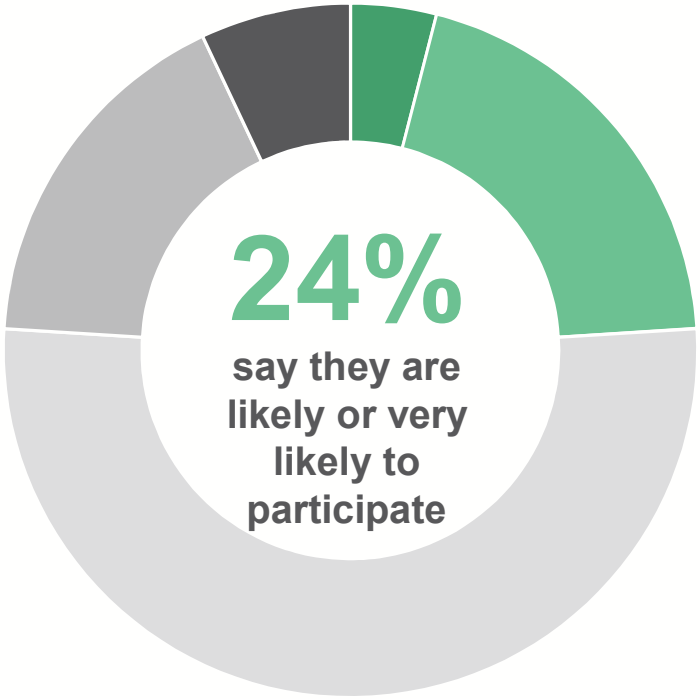
Renewable Natural Gas

Description: *Unlike conventional natural gas, which is what you buy today, RNG is a renewable energy source derived from feedstocks such as food waste, agricultural waste, waste water treatment, and landfills that capture methane and turn it into RNG. The gas you are delivered at your facility with the existing natural gas pipeline system is then a mix of conventional natural gas and RNG. RNG can be used anywhere conventional natural gas is used today and can also be used for transportation when converted to compressed natural gas (CNG) and used in vehicles that run on CNG.*
Here's how it works: The methane produced by renewable feedstocks is captured and converted into RNG and injected into the existing natural gas pipeline system, thus displacing conventional natural gas volumes. The RNG can then be sold to commercial customers like you as a percentage blend of your total natural gas demand. For example, you could opt to buy RNG for 0% up to 100% of your natural gas usage. Participating in a voluntary RNG program offers many benefits, including:
RNG is a green and sustainable replacement option to conventional natural gas and may help you meet sustainability goals.
Since RNG utilizes the existing natural gas pipeline system to deliver the fuel, your RNG blend is delivered without any new equipment or piping needs at your business.
Customers with existing or proposed CNG vehicle fleets will benefit from the displacement of gasoline and diesel fuel resulting in significant tailpipe emission reductions.
Participating in a RNG program that delivers green and sustainable RNG does come at a higher price point than conventional natural gas.

	Likelihood to participate (best option)	Relevance	Brand lift
Program score	3.0	2.8	3.5
Average of all programs	3.0	3.0	3.6

E2 - How relevant is a renewable natural gas program to your business?

n=283



Very likely | Likely | Neither likely nor unlikely | Unlikely | Very unlikely

Renewable natural gas generated the lowest amount of interest among the renewable energy programs – only about a quarter of customers say they are likely or very likely to participate

E3 - How likely would you be to participate in a renewable natural gas program?

SMB more likely to say "very unlikely" (10% vs. 2%)

What do we know about those likely to participate in renewable natural gas (RNG)?

Profile of likely participants for renewable natural gas

n=69

- More likely to be in Washington (62%)
- SMBs (75%)
- Predominantly own their facilities (62%), but more likely to rent (38% vs. 33% overall, index 113)
- Combo customers (90% vs. 74% overall, index 122)
- Monthly combo utility bill less than $1,000 (55%)
- Have less than 50 employees (90%)
- Have considered renewable energy, but not yet investigated options (57% vs. 39% overall, index 145)
- **Cost savings potential** is most important when it comes to renewable energy (61%)
  - But they also care about the **choice of renewable energy resource** (10% vs. 4% overall, index 252)

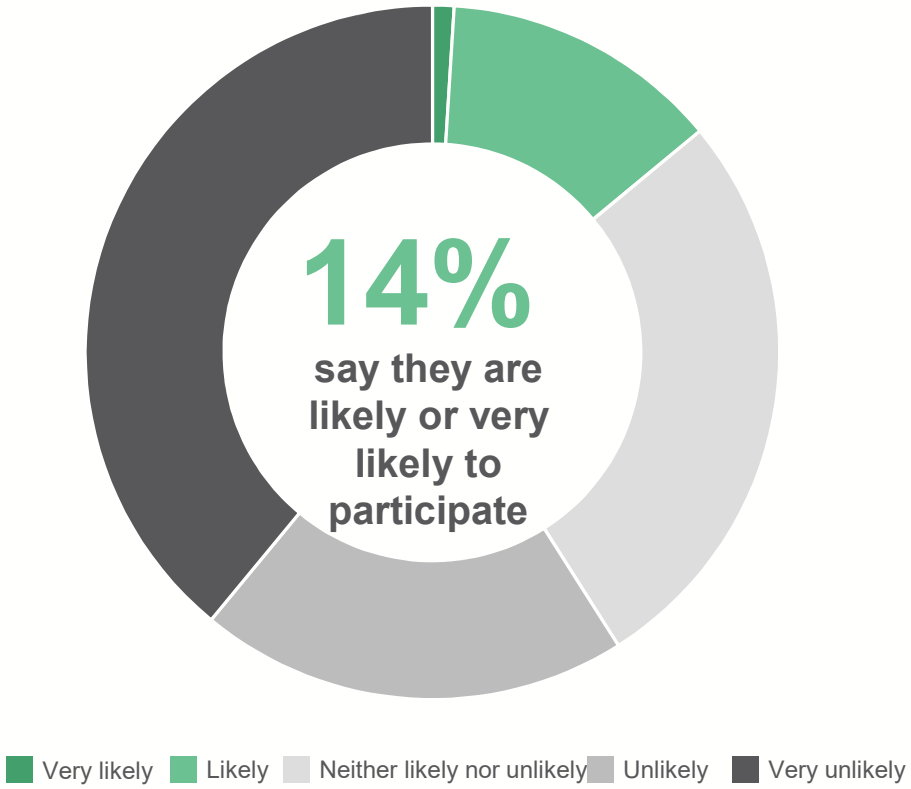
E3 - How likely would you be to participate in a renewable natural gas program?

Directional market sizing for renewable natural gas

Shelton Grp

	% Very likely (1/2)	% Likely (1/4)	Total	# Customers	# Premises
How likely would you be to participate in this a renewable natural gas program? (n=69)					
Small/medium	2.0%	4.2%	6.2%	1,211	2,453
Large	0.5%	4.1%	4.6%	103	151
Total				1,314	2,604

n=283



Compared to those who said they were likely to use RNG in general (24%), likelihood to use RNG specifically as a fuel for vehicles dropped by 10 percentage points

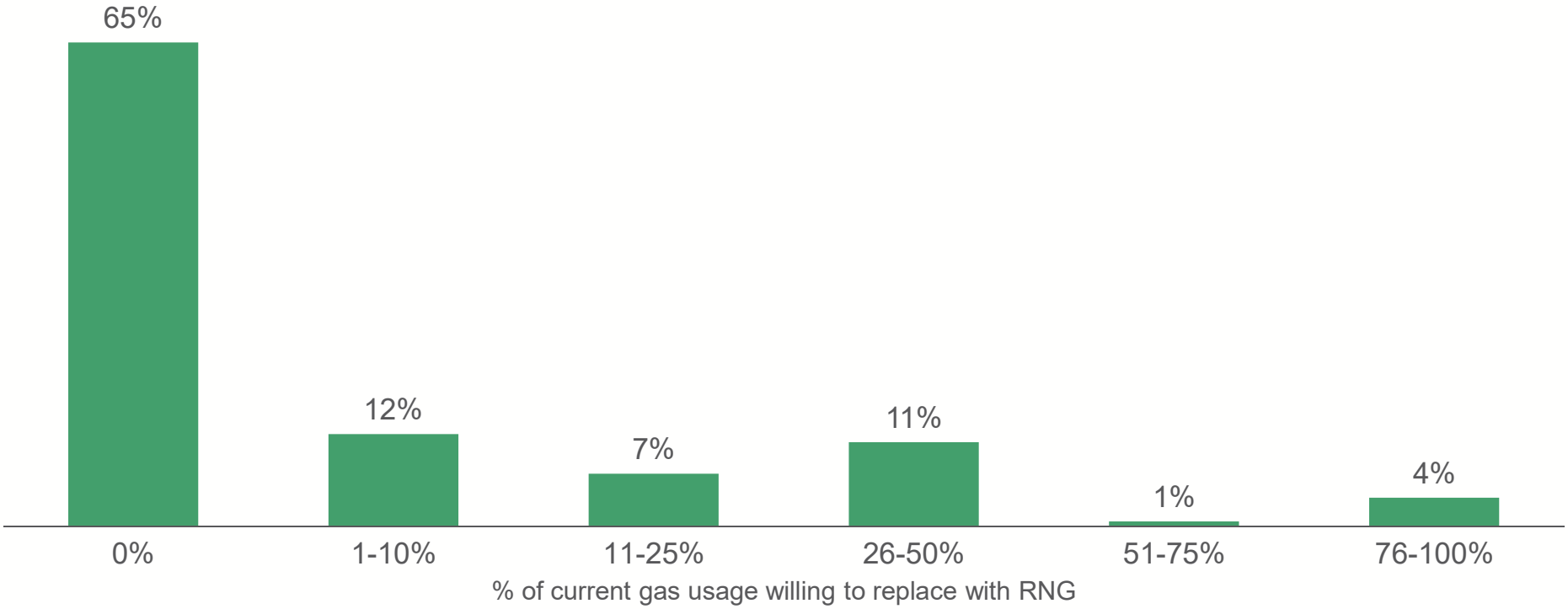
E7 - One possibility is to use RNG to fuel vehicles that use Compressed Natural Gas (CNG). How likely would you be to use RNG for this purpose?

The majority of customers are not willing to commit to using large percentages of RNG at a price premium

Shelton Grp

n=283

At $1.60/therm, I would replace this percentage of my current gas usage with RNG…



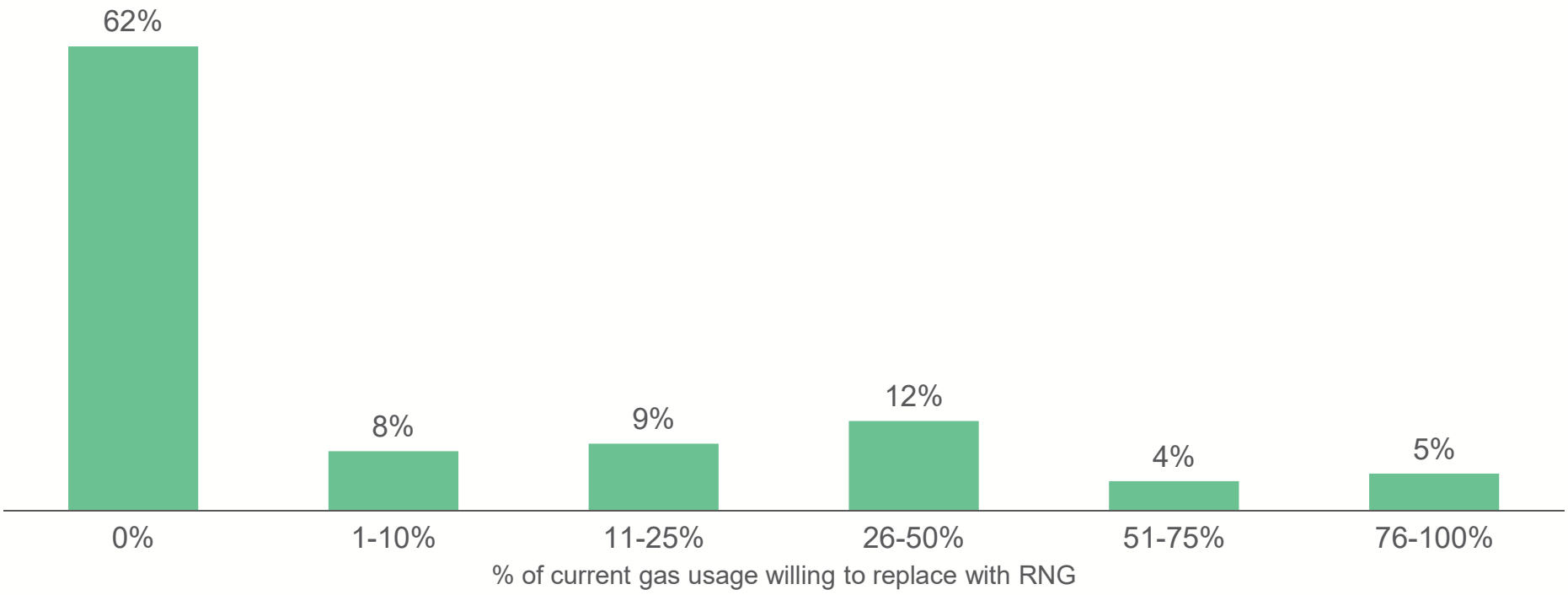
E4 - If RNG costs $1.60 per therm compared to conventional natural gas at $0.60 per therm, for what percentage of your natural gas usage would you choose RNG?

The majority of customers are not willing to commit to using large percentages of RNG at a price premium

Shelton Grp

n=283

At $1.10/therm, I would replace this percentage of my current gas usage with RNG…



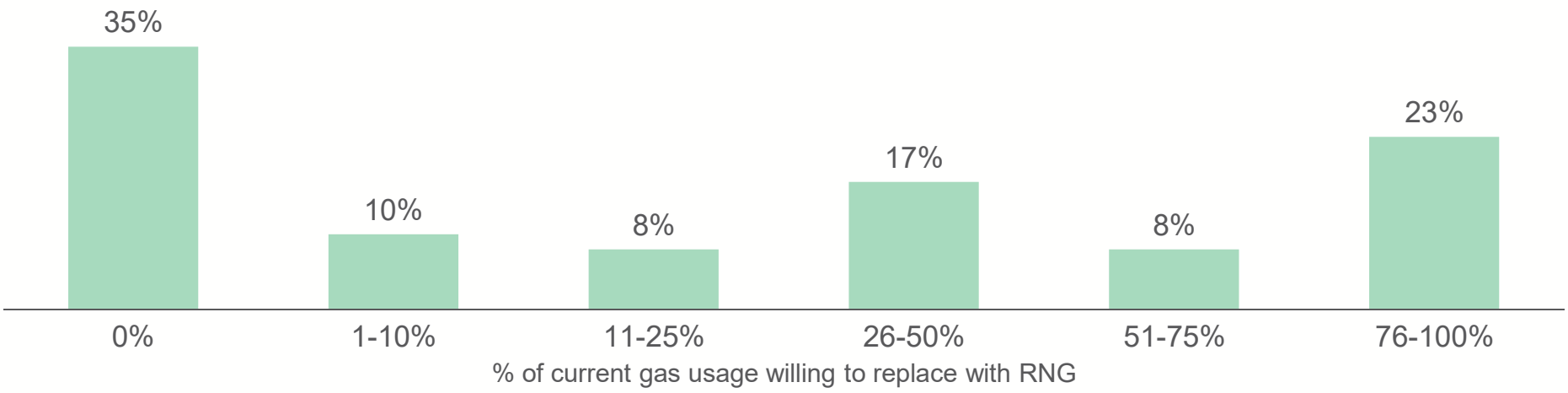
E5 - If RNG costs $1.10 per therm compared to conventional natural gas at $0.60 per therm, for what percentage of your natural gas usage would you choose RNG?

The majority of customers are not willing to commit to using large percentages of RNG at a price premium – however, interest increases at $0.70/therm

Shelton Grp

n=283

At $0.70/therm, I would replace this percentage of my current gas usage with RNG…



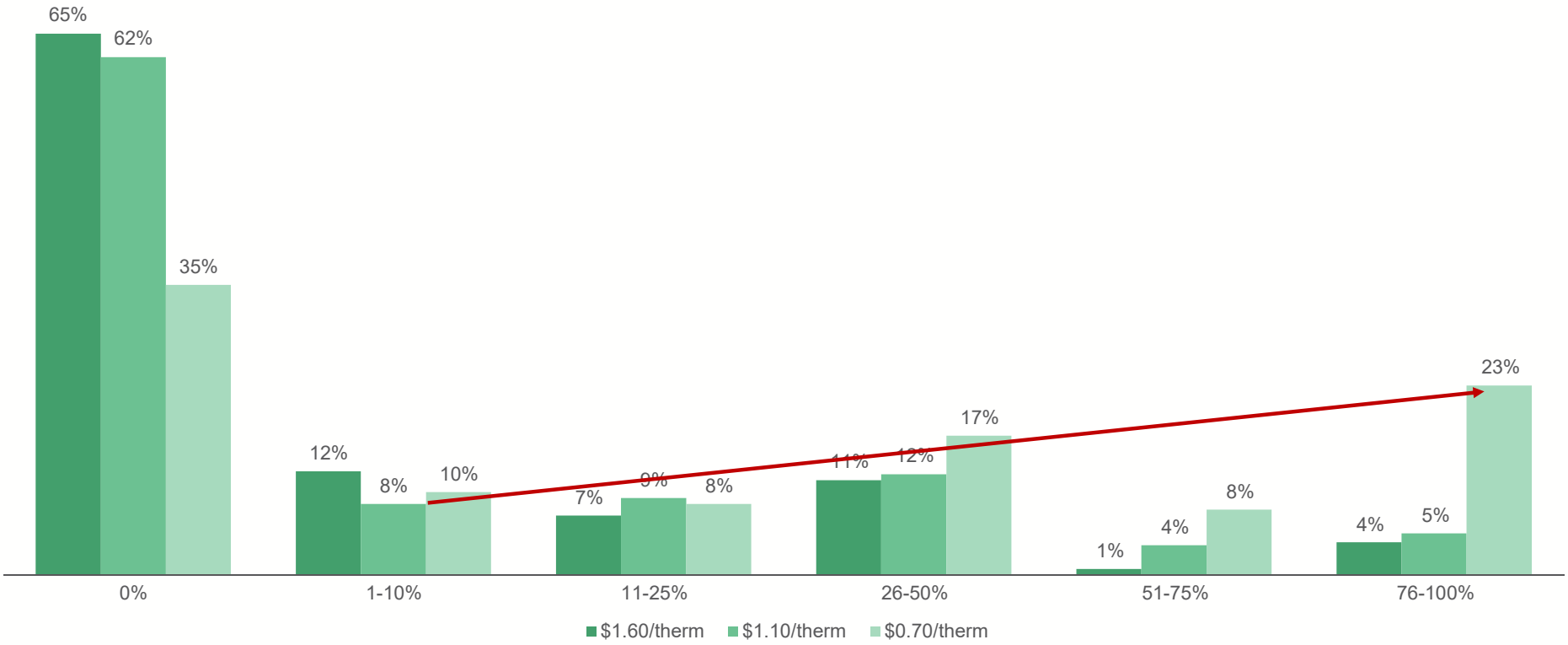
E6 - If RNG costs $0.70 per therm compared to conventional natural gas at $0.60 per therm, for what percentage of your natural gas usage would you choose RNG?

SMBs want to offset 50% of their gas with RNG @ $0.70/therm (16% vs. 7%)
Renters want to offset 100% of their gas with RNG @ $0.70/therm (23% vs. 8%)

The majority of customers are not willing to commit to using large percentages of RNG at a price premium – however, interest increases at $0.70/therm

Shelton Grp

n=283

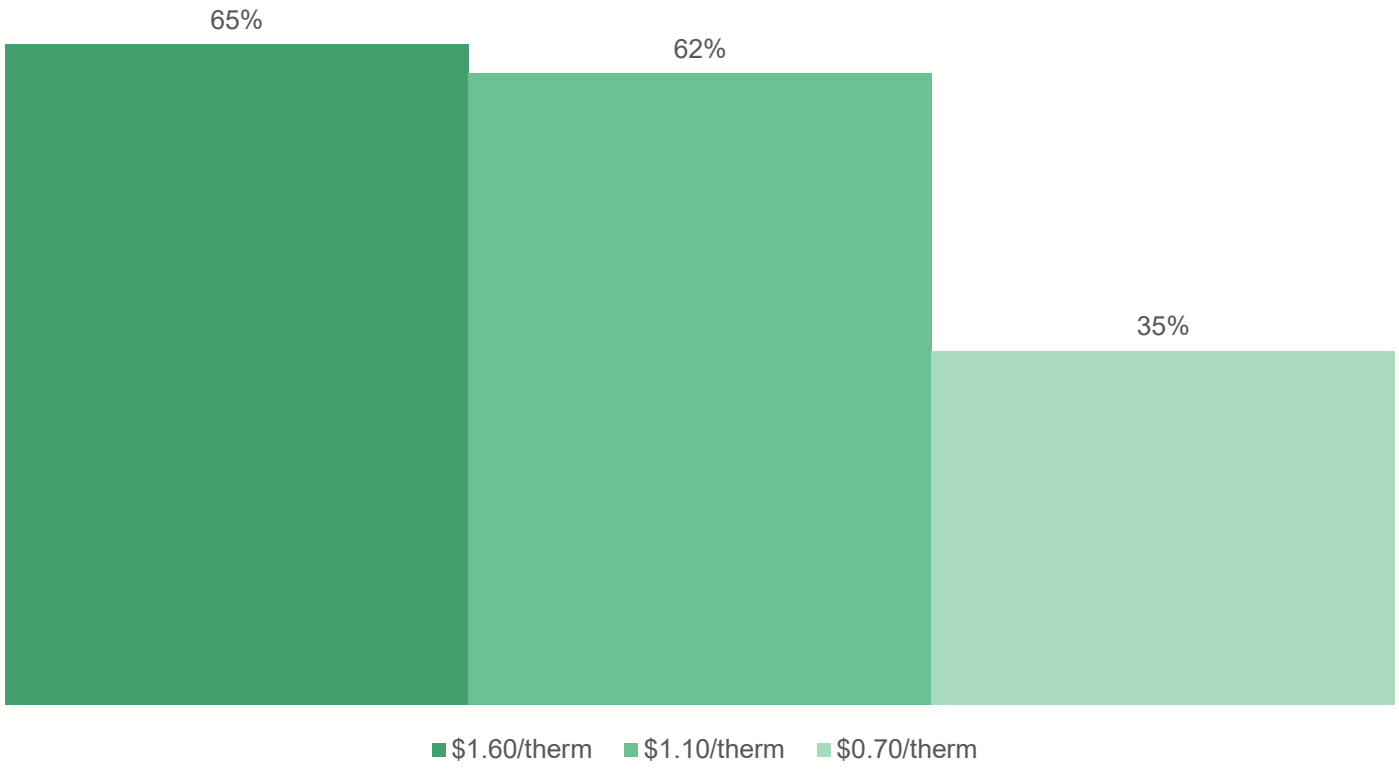


E4-6 - If RNG costs $____ per therm compared to conventional natural gas at $0.60 per therm, for what percentage of your natural gas usage would you choose RNG?

SMBs want to offset 50% of their gas with RNG @ $0.70/therm (16% vs. 7%)
Renters want to offset 100% of their gas with RNG @ $0.70/therm (23% vs. 8%)

The majority of customers are not willing to commit to using RNG at price premiums

n=283



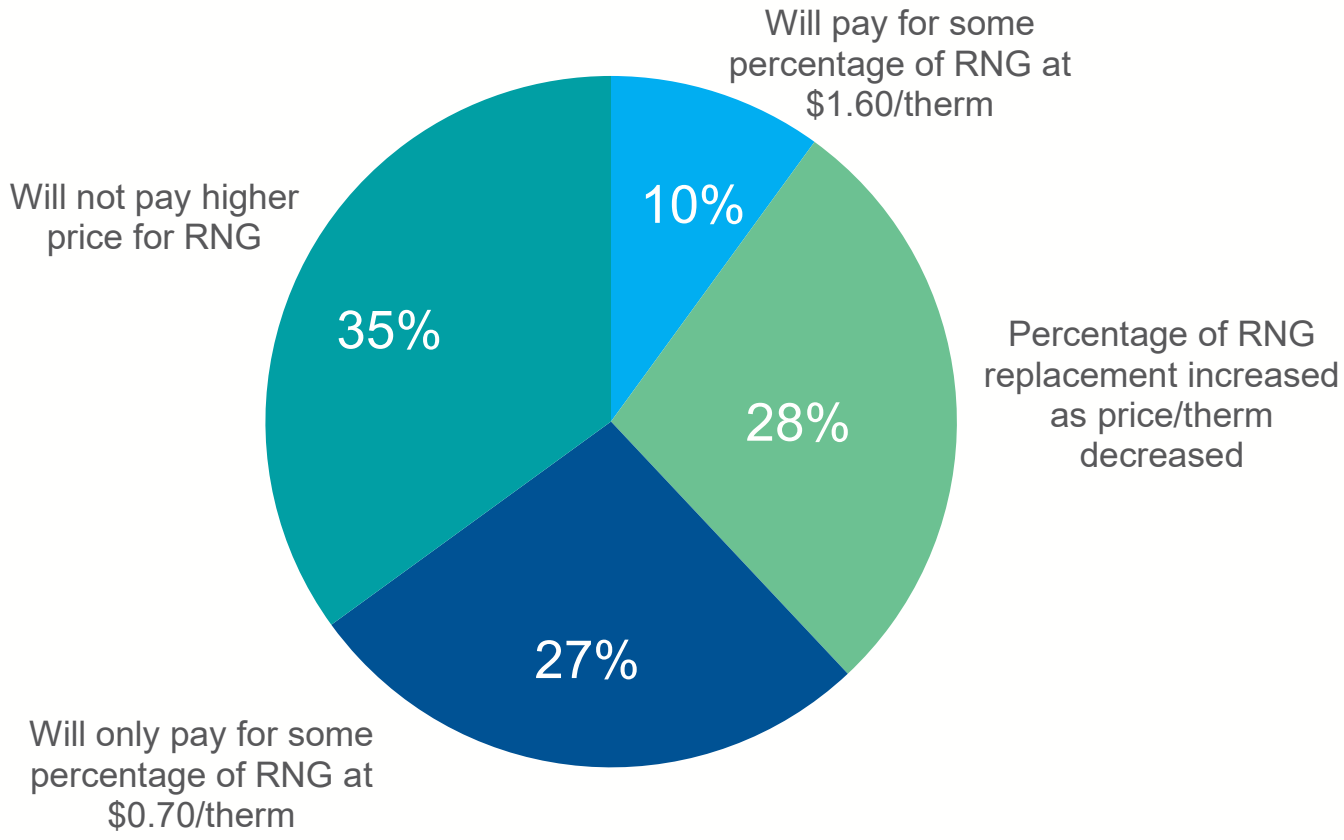
E4-6 - If RNG costs $____ per therm compared to conventional natural gas at $0.60 per therm, for what percentage of your natural gas usage would you choose RNG?

SMBs want to offset 50% of their gas with RNG @ $0.70/therm (16% vs. 7%)
Renters want to offset 100% of their gas with RNG @ $0.70/therm (23% vs. 8%)

Overall, 35% will not pay a higher price point for RNG; however, 27% will pay for some percentage of RNG at the $0.70/therm price point

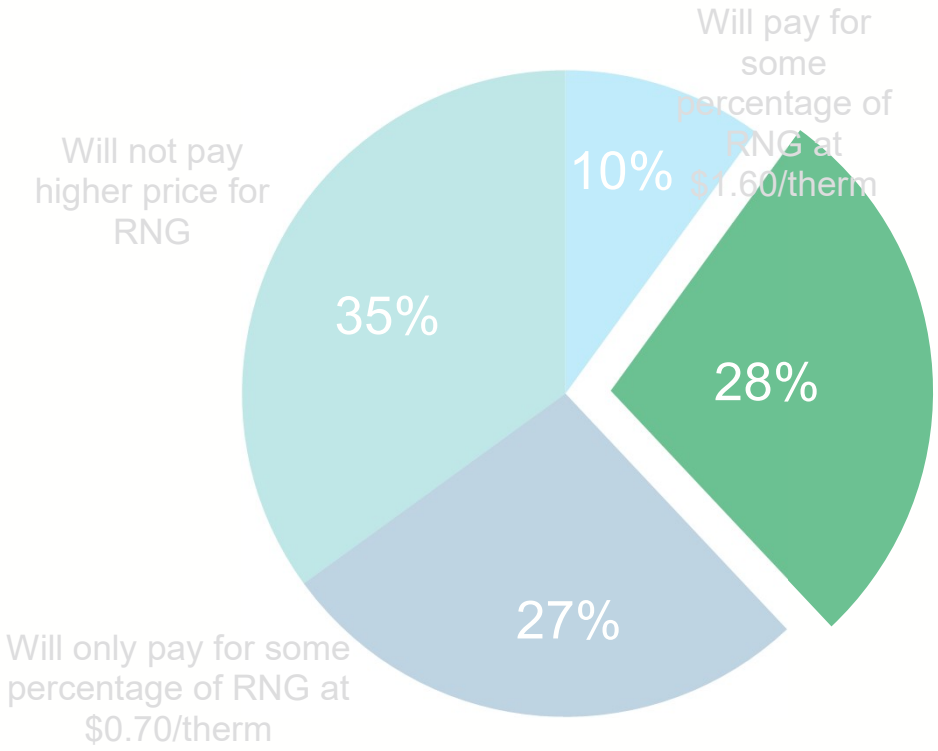
Shelton Grp

n=283



And, for another 28%, there was an increase in the percentage of RNG as the price point per therm decreased

n=283



Percentage of RNG replacement increased as price/therm decreased

Price	% replacement with RNG
$1.60	24%
$1.10	36%
$0.70	79%

Shelton Grp

1 | Sample Overview & Firmographics

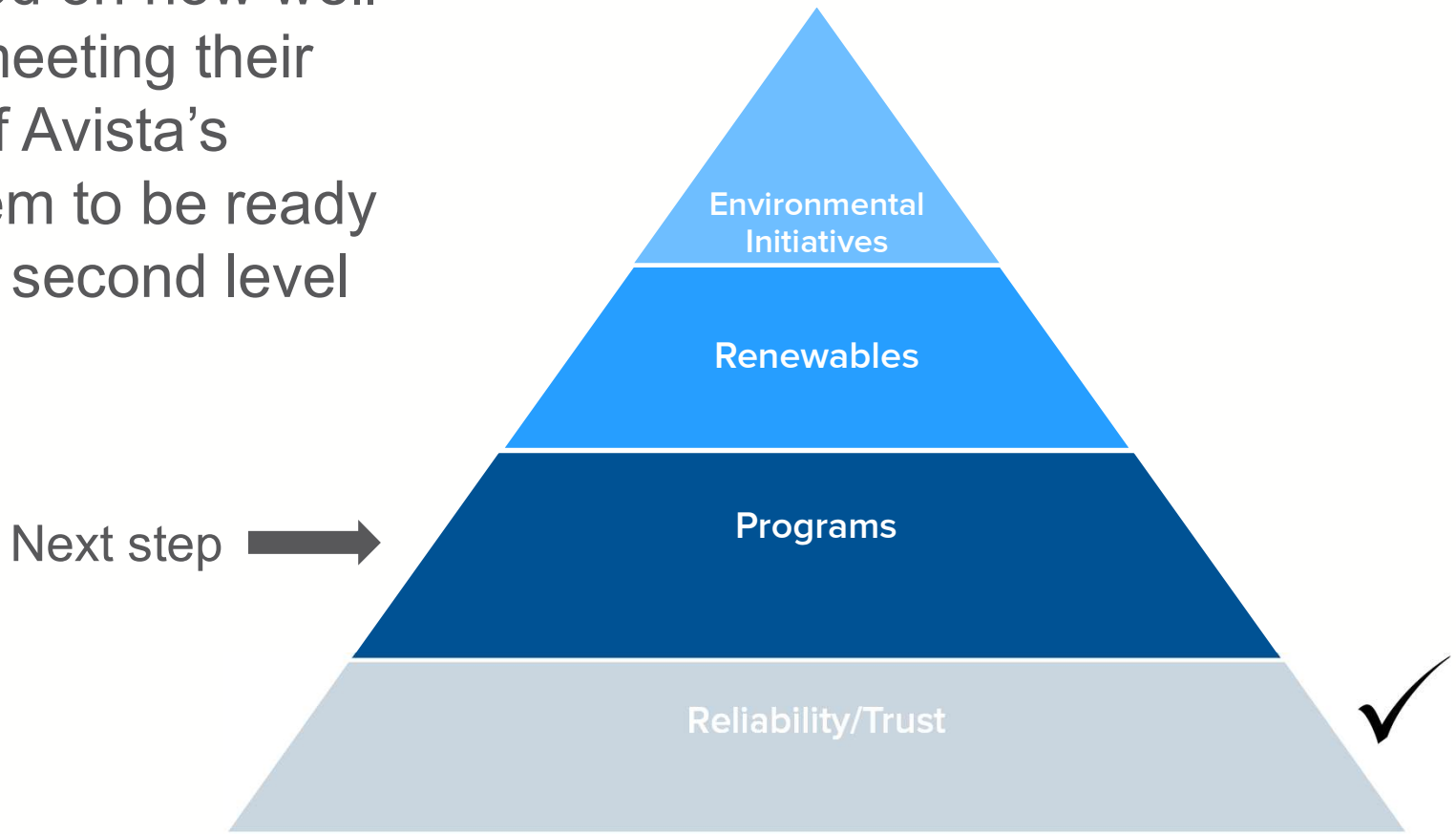
2 | Customer Perceptions of Avista

3 | Potential Program Evaluations

4 | Conclusion & Recommendations

Shelton Grp

Utility customers fall on a spectrum based on how well their utility is meeting their needs; most of Avista's customers seem to be ready to move to the second level with Avista



Shelton Grp

So which programs should Avista offer its SMB and large business customers?

Programs can be prioritized based on a variety of factors …

	Rankings		
	Likelihood to participate	Relevance	Brand lift
Energy Audit/Practices	1	3	1
Smart Business	2	2	4
Community Solar	3	5	3
RE Rate	4	6	6
RNG	5	9	10
Financing	6	7	5
Commercial EVs	7	10	9
Battery Storage	8	8	7
Rooftop Solar	9	1	2
Demand Response	10	4	8

Shelton Grp

Based on both qualitative and quantitative results, Shelton Group recommends the following program prioritization to gain maximum brand lift, while also balancing potential participation …

We recommend proceeding with the following 5 programs as top priority because:

- They encompass the top 5 programs with a positive impact on brand perception
- The energy audit and smart business programs were the top performers across all 3 metrics
- Community solar and financing offer additional brand lift with renters, one of Avista's at-risk groups
- While ranked low on participation, a rooftop solar program offering generates high brand lift and illustrates Avista's commitment to offering renewable energy

	Rankings		
	Likelihood to participate	Relevance	Brand lift
Energy Audit/Practices	1	3	1
Smart Business	2	2	4
Community Solar	3	5	3
Rooftop Solar	9	1	2
Financing	6	7	5

We recommend these 3 programs be considered medium priority and be revisited as future offerings because:

- The RE rate program had average appeal across the 3 metrics and offered additional brand lift for renters
- Demand response, while low on participation, is a service model utilities across the US are moving towards; it would be beneficial to train customers on this model sooner rather than later
- While it did not perform high across the metrics, Avista is already creating an EV program, and there is potential to pivot it as an informational resource for customers and as a charging equipment program rather than providing the EVs themselves (this would show Avista's commitment to creating the infrastructure needed for an EV future)

	Rankings		
	Likelihood to participate	Relevance	Brand lift
RE Rate	4	6	6
Demand Response	10	4	8
Commercial EVs	7	10	9

We recommend classifying these programs as low priority because:

- We believe price will be a large barrier to customer participation in RNG given the premium required to generate this type of gas
- Battery storage consistently ranked near the bottom across the 3 metrics – we believe other programs can offer more potential reward for Avista than battery storage

	Rankings		
	Likelihood to participate	Relevance	Brand lift
RNG	5	9	10
Battery Storage	8	8	7

These are our overall recommendations based on both the qualitative and quantitative research

	Rankings		
	Likelihood to participate	Relevance	Brand lift
Energy Audit/Practices	1	3	1
Smart Business	2	2	4
Community Solar	3	5	3
Rooftop Solar	9	1	2
Financing	6	7	5
RE Rate	4	6	6
Demand Response	10	4	8
Commercial EVs	7	10	9
RNG	5	9	10
Battery Storage	8	8	7

Directional market sizing for Avista customers (total)

Shelton Grp

	% Very likely (1/2)	% Likely (1/4)	Total	# Customers	# Premises
Free high-level audit	8.6%	8.5%	17.1%	3,780	7,411
Paid in-depth audit	1.8%	2.4%	4.2%	940	1,838
Usage compared to weather	5.4%	9.9%	15.3%	11,011	21,650
Virtual Energy Manager	5.0%	9.7%	14.7%	3,306	12,269
Energy usage via a mobile app	5.4%	7.4%	12.8%	2,855	5,584
Personalized alerts	4.2%	8.3%	12.5%	2,779	5,440
Usage per production unit	3.2%	6.5%	9.7%	2,169	4,240
Share data with Avista	2.8%	4.5%	7.3%	1,574	3,106
Community solar (SMB only)	3.2%	8.0%	11.2%	2,187	4,432
Renewable energy rate	3.6%	6.5%	10.1%	2,178	4,297
Renewable natural gas (RNG)	2.0%	4.2%	6.2%	1,314	2,604
Finance EE upgrades; payment made on utility bill (SMB only)	1.6%	2.8%	4.4%	1,543	3,126
Other EE financing loan features* (SMB only)	1.0%	2.1%	3.1%	605	1,227
Commercial EV	1.6%	2.8%	4.4%	974	1,908
Battery storage (no up-front facility expenses)	4.2%	3.4%	7.6%	1,604	3,183
Battery storage (up to $50,000 up-front expenses)*	0.8%	2.1%	2.9%	669	1,298
Rooftop – buy up front^	1.4%	2.7%	4.1%	597	1,130
Rooftop – finance^	0.8%	2.6%	3.4%	498	942
Rooftop – lease^	1.2%	2.8%	4.0%	596	1,123
Demand Response programs (net)*	1.5%	5.9%	7.4%	166	243

Directional market sizing for SMB Avista customers

	% Very likely (1/2)	% Likely (1/4)	Total	# Customers	# Premises
Free high-level audit	8.6%	8.5%	17.1%	3,339	6,766
Paid in-depth audit	1.8%	2.4%	4.2%	820	1,662
Usage compared to weather	5.4%	9.9%	15.3%	9,842	19,942
Virtual Energy Manager	5.0%	9.7%	14.7%	2,870	5,816
Energy usage via a mobile app	5.4%	7.4%	12.8%	2,499	5,065
Personalized alerts	4.2%	8.3%	12.5%	2,441	4,946
Usage per production unit	3.2%	6.5%	9.7%	1,894	3,838
Share data with Avista	2.8%	4.5%	7.3%	1,425	2,888
Community solar	3.2%	8.0%	11.2%	2,187	4,432
Renewable energy rate	3.6%	6.5%	10.1%	1,972	3,996
Renewable natural gas (RNG)	2.0%	4.2%	6.2%	1,211	2,453
Finance EE upgrades; payment made on utility bill	1.6%	2.8%	4.4%	1,543	3,126
Other EE financing loan features*	1.0%	2.1%	3.1%	605	1,227
Commercial EV	1.6%	2.8%	4.4%	589	1,741
Battery storage (no up-front facility expenses)	4.2%	3.4%	7.6%	1,484	30s07
Battery storage (up to $50,000 up-front expenses)*	0.8%	2.1%	2.9%	566	1,147
Rooftop – buy up front^	1.4%	2.7%	4.1%	456	925
Rooftop – finance^	0.8%	2.6%	3.4%	378	767
Rooftop – lease^	1.2%	2.8%	4.0%	445	902

*Extremely small sample size – proceed with caution
^Based on self-reported ownership of buildings

Directional market sizing for large Avista customers

	% Very likely (1/2)	% Likely (1/4)	Total	# Customers	# Premises
Free high-level audit	9.8%	10.1%	19.9%	441	645
Paid in-depth audit	1.0%	4.4%	5.4%	120	176
Usage compared to weather	5.2%	10.6%	15.8%	1,169	1,708
Virtual Energy Manager	7.2%	12.4%	19.6%	436	6,453
Energy usage via a mobile app	6.2%	9.8%	16.0%	355	519
Personalized alerts	5.2%	10.1%	15.3%	338	494
Usage per production unit	4.1%	8.2%	12.3%	275	402
Share data with Avista	2.1%	4.6%	6.7%	149	218
Renewable energy rate	2.6%	6.7%	9.3%	206	301
Renewable natural gas (RNG)	0.5%	4.1%	4.6%	103	151
Commercial EV	2.1%	3.1%	5.2%	115	167
Battery storage (no up-front facility expenses)	2.6%	2.8%	5.4%	120	176
Battery storage (up to $50,000 up-front expenses)*	2.1%	2.6%	4.7%	103	151
Rooftop – buy up front^	1.0%	5.9%	6.9%	141	206
Rooftop – finance^	1.0%	4.9%	5.9%	120	175
Rooftop – lease^	1.0%	6.4%	7.4%	151	221
Demand Response programs (net)*	1.5%	5.9%	7.4%	166	243

*Extremely small sample size – proceed with caution
^Based on self-reported ownership of buildings

By understanding customer mindsets and needs, Avista can better craft future program offerings moving forward

Shelton Grp

A key challenge to be aware of:

Some customer groups are less loyal than others, like SMB customers and renters, which is often due to a lack of ***information, control, and/or interaction with Avista***

*"I have **never heard** of any programs or have been notified of any programs pertaining to my business energy needs … This is actually the **first time** I've been really **contacted** about my business energy use."*

–Boulevard Coffee Company, S/M, Accommodation and Food Services

*"We need **financing and advisory assistance**. We seem large, but it is very **difficult to have the expertise** to know what's available and what makes sense … We know what we've done, but not **what we missed**."*

–Divine Corporation, S/M, Retail

Shelton Grp

Programs that increase empowerment and/or a feeling of partnership are important for improving brand perception and engagement with these customers

Programs that increase empowerment and/or a feeling of partnership are important for improving brand perception and engagement with these customers

What Avista can do moving forward:

- Offer programs that give business customers better control over their energy usage and allow them to participate in activities like renewables that may have been previously unavailable to them (Example programs that did this well: smart business; community solar; financing)
- Offer programs that foster a feeling of partnership with Avista by sharing some of Avista's expertise with customers (Example programs that did this well: energy audit; programs that provide informational resources for customers, like the EV information)

Shelton Grp

Even if customers are not at a point where they are willing to pay much for programs, there is still a benefit for Avista

Shelton Grp

Even if customers are not at a point where they are willing to pay much for programs, there is still a benefit for Avista

What Avista can do moving forward:

- Remember that customers consistently stated that knowing about the tested programs made them think more positively of Avista
- Consider free/low-cost program offerings as an investment in Avista's long-term brand reputation

Shelton Grp

In general, businesses want Avista to take most of the responsibility for any installation and maintenance involved in a program (rooftop solar, commercial EVs, and battery storage)

Shelton Grp

In general, businesses want Avista to take most of the responsibility for any installation and maintenance involved in a program (rooftop solar, commercial EVs, and battery storage)

What Avista can do moving forward:

- Leverage this mentality as an opportunity for Avista to demonstrate their willingness to “partner” with their business customers – if Avista has their skin in the game, then they’re more likely to be seen as being invested in helping their customers

Shelton Grp

Questions?

Renewable Natural Gas (RNG)

Purpose and objectives

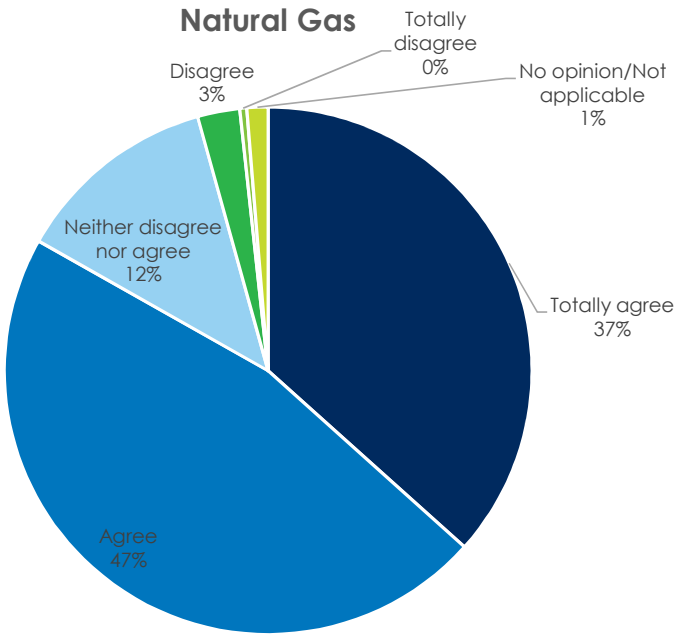
- Measure market awareness and interest (Q 1, 2, 4)
  - Desire and willingness to pay
  - Tiered approach is preferable, need to assess resource trade-offs
- Identify value drivers (Q 1, 2, 3)
  - Overall Reliability was ranked the most important attribute
  - Head to head, price was more important
- Understand willingness to pay (Q 5)
  - Customers indicate willingness to pay, actions do not always follow
- Inform adoption

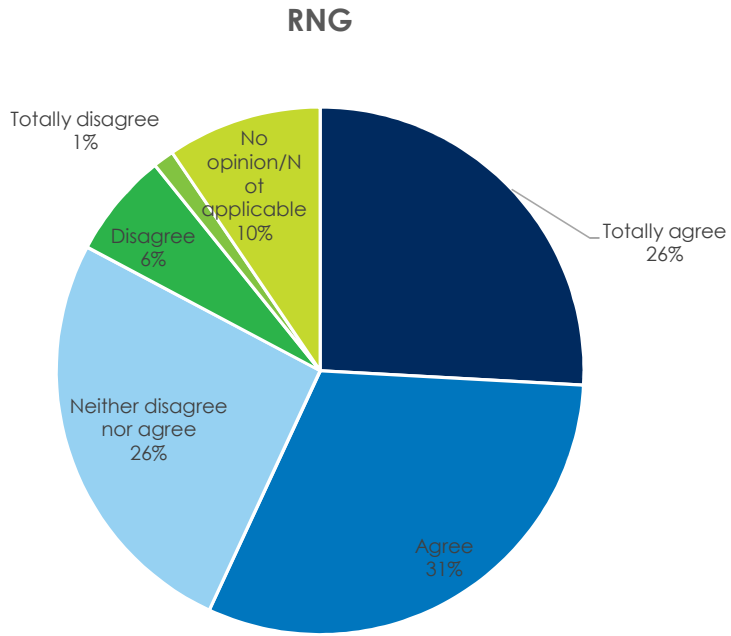
Results At-a-Glance

- Positive sentiment of natural gas
- Natural gas value ranked slightly higher than RNG in all major categories, including views low carbon resource
- Reliability ranked as most important energy attribute, except when compared directly with price
- Blended product option was most desirable (ahead of RNG or pure carbon offset); very apparent that there is a diverse customer set with conflicting needs and expectations

What does customer perception for natural gas and renewable natural gas look like today?

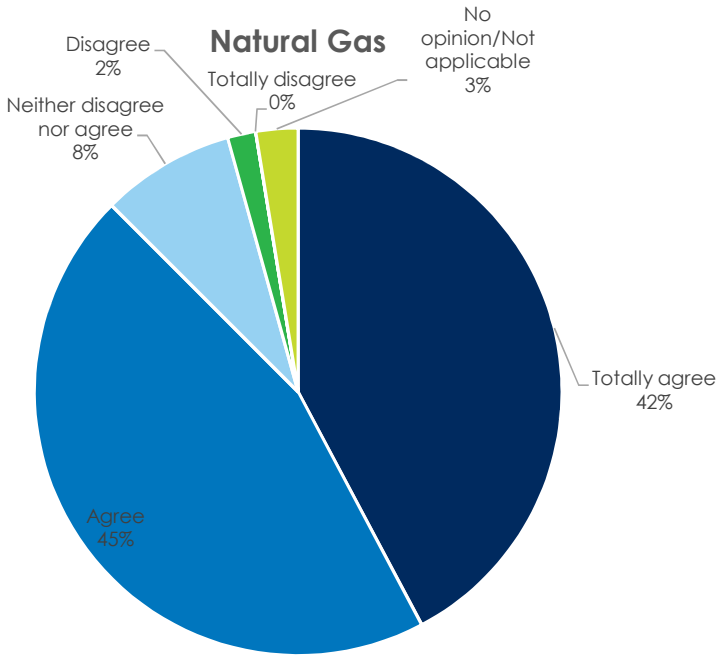
Majority View Both as a Low Cost Energy Source

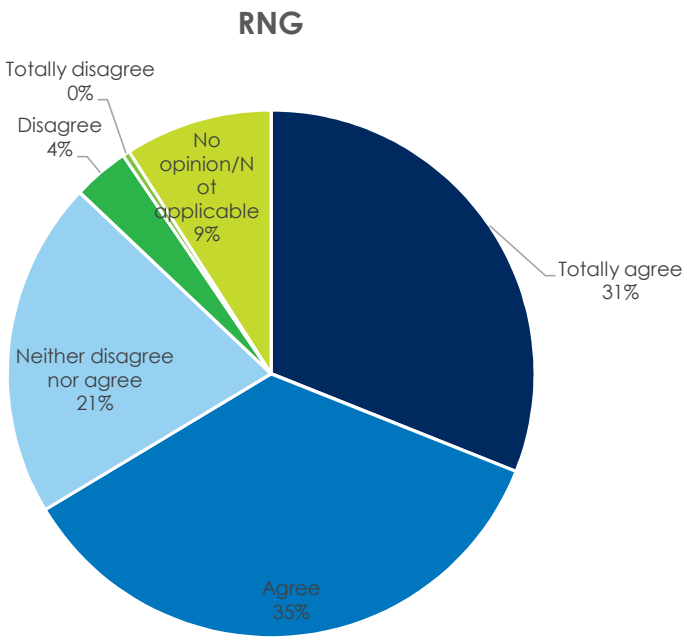




- 84% Agree or totally agree Natural Gas is low cost, compared to 57% sentiment for RNG

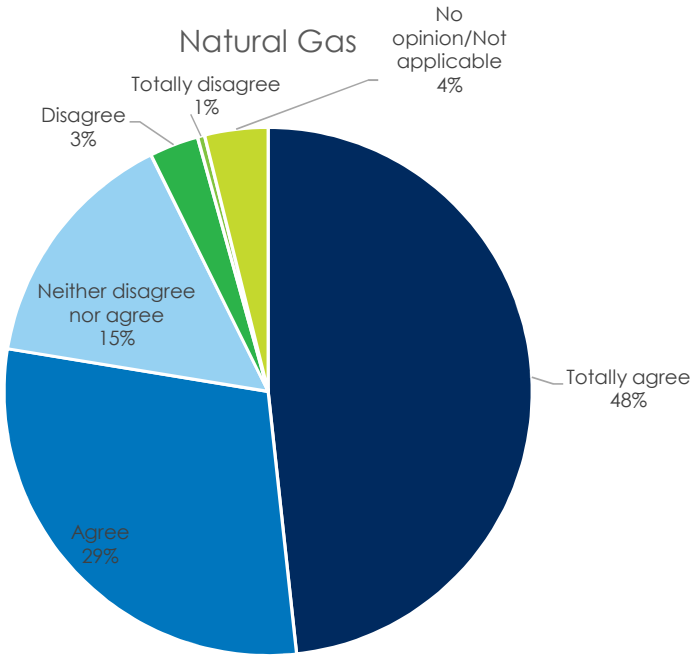
Majority view both as a RELIABLE energy source

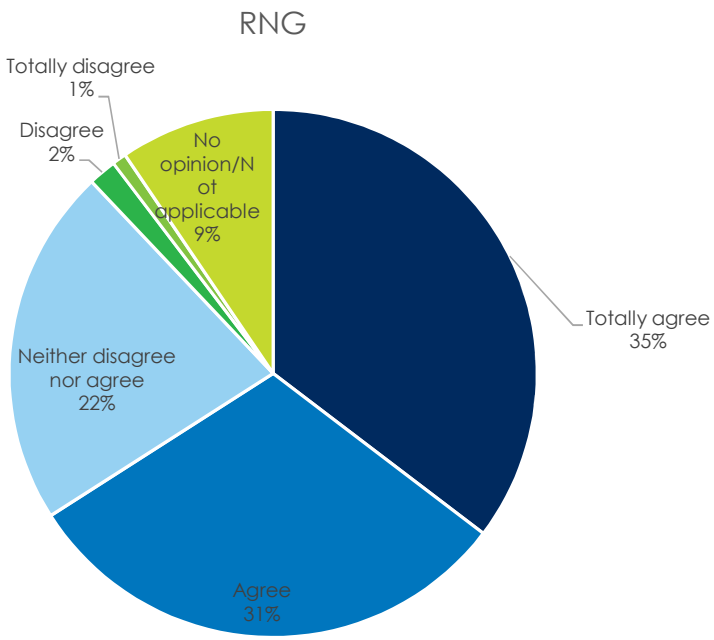




88% Agree or totally agree Natural Gas is reliable, compared to 66% sentiment for RNG

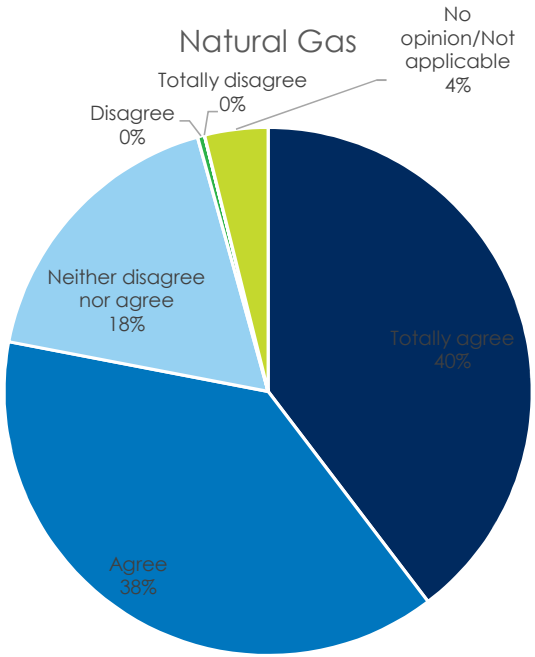
Majority View Both as a Preferred Heat Source Over Electric

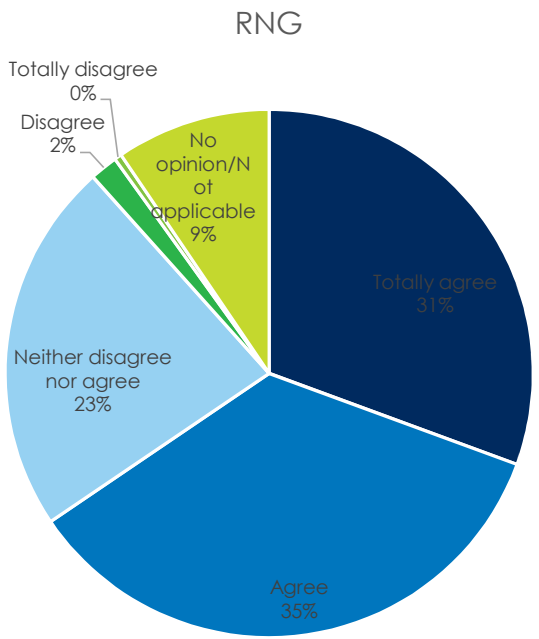




78% Agree or totally agree Natural Gas is preferred heat source over electric, compared to 66% sentiment for RNG

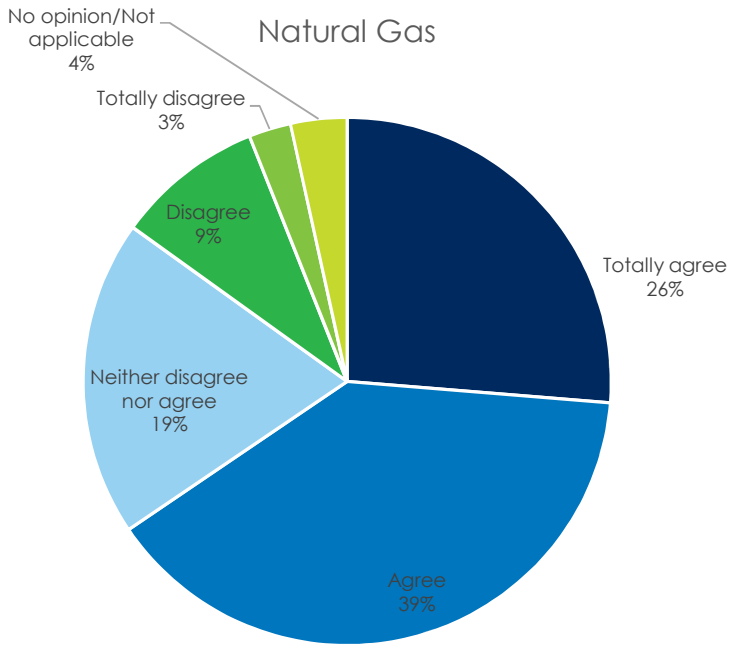
Both Offer a High Level Of Heating/Cooling Comfort

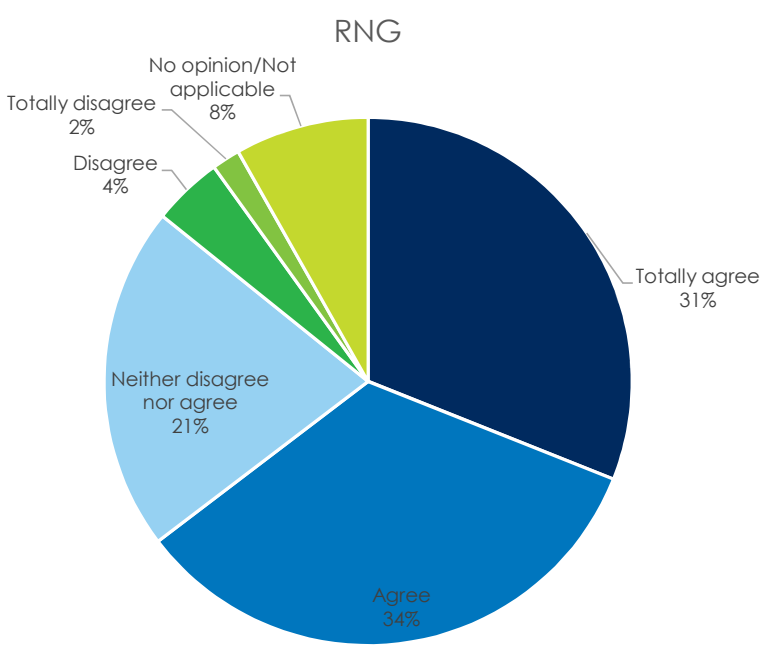




78% Agree or totally agree Natural Gas is offers high level of comfort compared to 66% for RNG

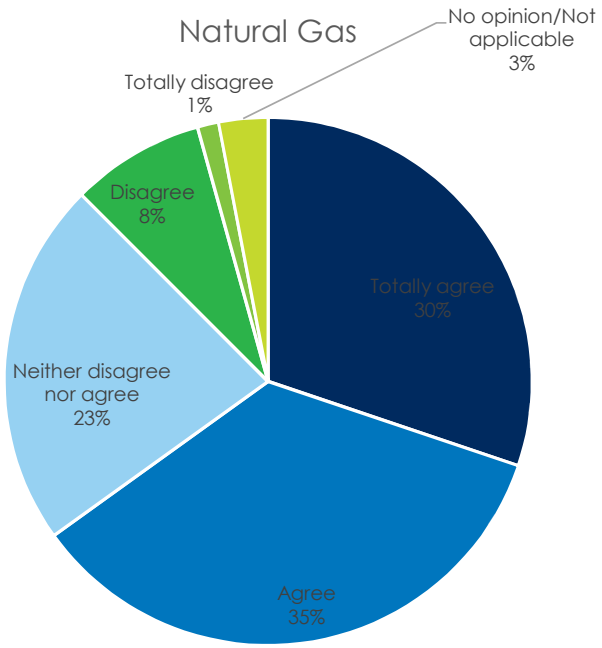
Low Carbon Energy Source

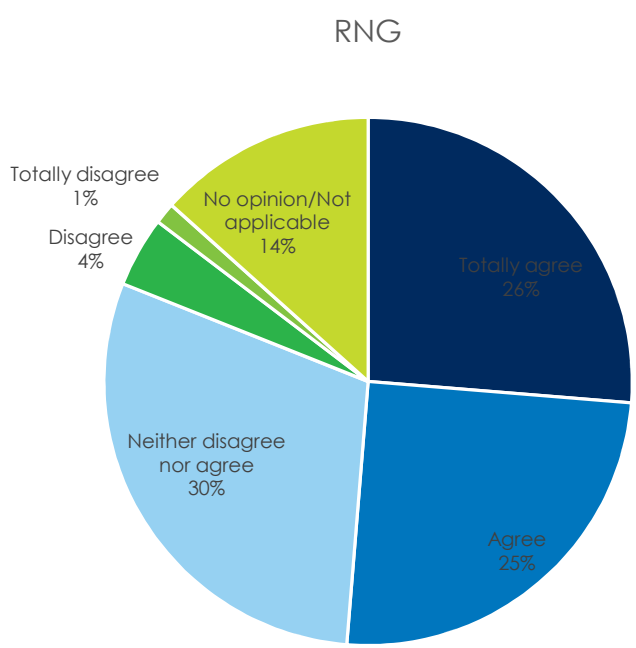




66% Agree or totally agree Natural Gas is low carbon, while just 65% indicated the same about RNG

Abundant Resource

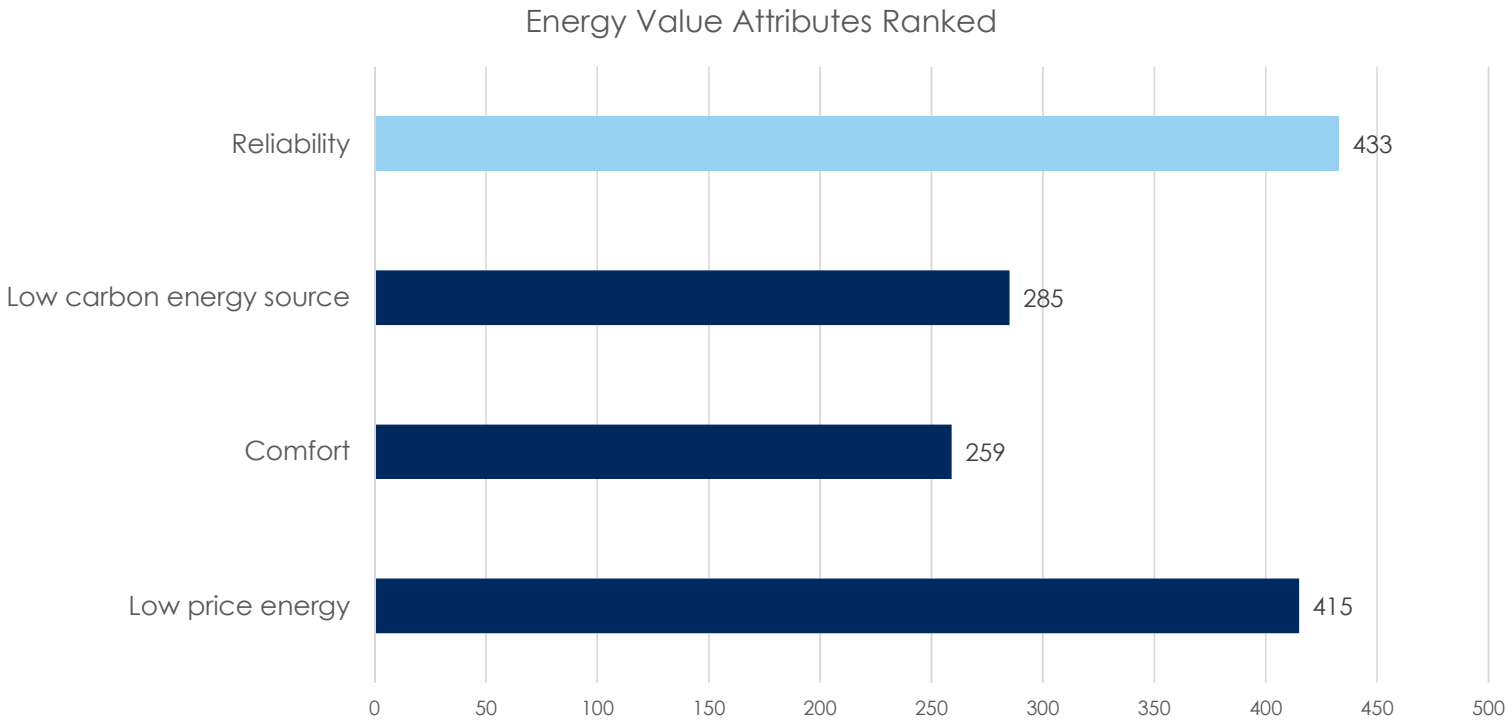




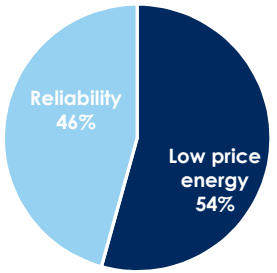
65% Agree or totally agree Natural Gas is an abundant resource, compared to 51% similar sentiment for RNG

What is the value that our customers place on specific product features?

Reliability Ranked Most Important, Just Above Price



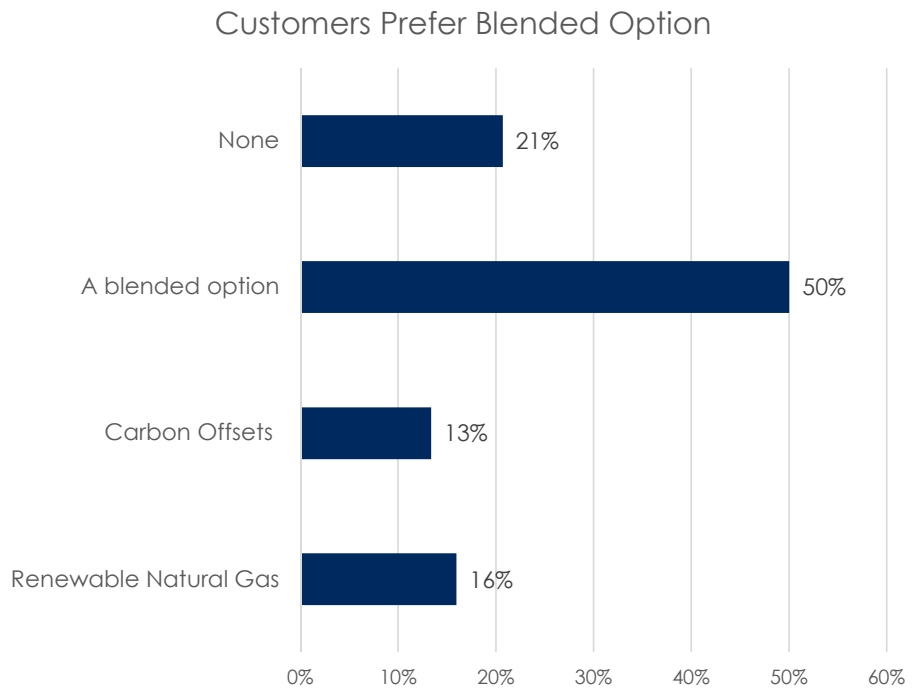
Direct comparison of price versus reliability conflicts with comprehensive results



Which product is of most interest and why?

Blended Product is the Preferred Product Option

- **Renewable Natural Gas (RNG)** comes from food waste, agriculture waste and landfills that capture methane and converts it into a useful output in the form of RNG. It is more expensive than conventional Natural Gas and likely more expensive than Carbon Offsets.
- **Carbon Offsets** benefit the environment in an indirect manner by planting trees or preserving forests. These actions are a lower-cost way to offset the Green House Gas (GHG) emissions associated with your Natural Gas use.
- A **blended** option that includes a combination of Carbon Offsets and Renewable Natural Gas to provide customers a mid-range price option to reduce your carbon footprint.



50% of respondents selected the Blended Option

- Underlying sentiment of mitigating potential risk is assumed long term commitment
- Customers have a natural tendency to gravitate towards the 'better' option in a good, better, best scenario
- Market is immature, many have very basic questions yet to be answered

"Hard to rely on just one thing. There could be advancement in the future that causes one to not be viable."

"Compromise may keep prices low and still result in environmental preservation. ."

"There needs to be a price point that people will accept or they will just go back to electricity."

"I don't know enough about renewable energy so I thought a blended option would be best."

16% of respondents favored RNG

Environmental Benefits Drove Preference for RNG

- 70% specifically sited environmental benefits as the reason for this choice
- Other factors included energy independence, the repurposing of landfill, and negative sentiment around offsets

"Reusing landfills as much as possible and possibly lowering landfills would be positive in my eyes."

"Offsets just feel like a tax."

13% of Respondents Preferred Carbon Offsets

- Lowest price point was the top reason cited for selecting carbon offsets
- Environmental issues and specifically the ideas of planting more trees was appealing to many
- Other responses included safety concerns associated with cleaning of RNG, natural gas leaks, and the 'healthy choice'

"Need more trees. They offset a lot of pollution as well as cool."

"Lowest cost."

"While I want to help the environment and my carbon footprint, it comes down to cost at this time."

70% Indicate Willingness to Pay $2 or More per Month

Today, both Renewable Natural Gas and Carbon Offsets cost more to deliver than Natural Gas.

How much more would you be willing to pay each month to maintain the value of Natural Gas while also lowering your carbon footprint?