EXH. CEG-1T
DOCKETS NOS. UE-240004/UG-240005
2024 PSE GENERAL RATE CASE
WITNESS: BRADLEY CEBULKO

BEFORE THE WASHINGTON

UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, **Complainant,** **v.** **PUGET SOUND ENERGY,** **Respondent.**	DOCKET NOS. UE-240004 and UG-240005 *(Consolidated)*

RESPONSE TESTIMONY (NONCONFIDENTIAL)

OF

BRADLEY CEBULKO

ON BEHALF OF

JOINT ENVIRONMENTAL ADVOCATES

August 6, 2024

JOINT ENVIRONMENTAL ADVOCATES

RESPONSE TESTIMONY (NONCONFIDENTIAL) OF BRADLEY CEBULKO

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I. Introduction

Q. Please state your name and business address.

A. My name is Bradley Cebulko. My business address is 528 N. Treat Ave. Tucson, AZ, 85716.

Q. On whose behalf are you submitting this response testimony?

A. I am submitting rebuttal testimony on behalf of the Joint Environmental Advocates.

Q. Please summarize your professional experience.

A. I am co-founder and Partner at Current Energy Group, which was founded in May 2024. Previously, I was a Senior Manager at Strategen Consulting from 2021 to 2024. At Strategen, I led the gas transition practice, as well as provided analysis on other utility regulatory issues including electric and gas long-term planning and new regulatory business models. Prior to joining Strategen, I worked at the Washington Utilities and Transportation Commission (UTC) for 8 years. From 2013-2016, I was an analyst with the UTC Commission Staff focused on electric and natural gas integrated resource planning (IRP), electric and natural gas energy efficiency programs, and new program design and implementation. From 2016-2021, I was an advisor to the UTC Commissioners. My C.V. is attached as Exhibit BTC-2.

Q. Have you testified before the Washington Utilities and Transportation Commission before?

A. Yes. While as a Regulatory Analyst with Commission Staff, I testified regarding service quality and reliability metrics in 2014 and 2015, and in 2016 on Puget Sound Energy's proposed appliance leasing program. At Strategen, I have submitted testimony on behalf of The Energy Project (TEP) in Avista and Puget Sound Energy's 2022 General Rate

Cases and in Pacific Power and Light Company's 2023 General Rate Case. A full list of my testimonies and docket numbers can be found in Exhibit BTC-2.

II. Purpose and Summary of Testimony

Q. What is the purpose of your testimony?

A. The purpose of my testimony is four-fold:

- First, I assess the Company's December 2023 Decarbonization Study Update, how it informs PSE's forthcoming electrification strategy, and state my concerns that it gives a skewed picture of electrification that could lead to an ineffective electrification strategy. I demonstrate that beneficial building electrification is a least cost, least regret resource for reducing emissions to meet the state's emissions reduction requirements and the Climate Commitment Act.
- Second, I discuss why Puget Sound Energy needs to transition immediately from small-scale electrification pilots to scaled-up electrification programs. I then propose a general electrification pilot that scales until 2030 and a performance incentive mechanism to incentivize the Company to exceed an electrification target.
- Third, I demonstrate that PSE's gas plant capital investment plan and long-term forecast is incompatible with state policy and the public interest. PSE's plans to make substantial long-term investments in the gas delivery system that will increase customer costs and exacerbate the Company's challenge meeting the state's policy goals. I conclude that the Commission must require PSE to demonstrate that it conducted an alternatives analysis for every gas capital investment.

- Fourth, as part of the Commission's effort to better align the utility's financial incentives with the public interest, I discuss why the Commission should reduce the ROE for two types of gas capital expenditures: new customer connections and capacity expansion. I collectively refer to these as growth-related capital investments. I find that expanding the gas delivery system is both costly and risky, particularly in a future with significantly less gas demand, and the Commission must change its regulatory approach.

Q. Will you please summarize your recommendations to the Commission?

A. Summary of recommendations:

- I recommend the Commission establish a target of electrifying 182,000 customers in PSE's gas service territory by the end of 2030.
- I recommend that the Commission order the Company to offer a General Electrification effort that includes three programs: New Construction, Existing customers who convert to all electric heating systems, and existing gas customers who convert to hybrid heating systems without adding a new gas furnace.
- I recommend that PSE pursue a target of electrifying at least 7,500 incremental customers in 2025 and 15,000 incremental customers in 2026, with the goal of additional scaling in subsequent years.
- I recommend the Commission establish a performance incentive mechanism, as described in my testimony, for PSE's achievement in its general electrification program target.
- I recommend the Commission order PSE to provide semi-annual progress reports on its General Electrification programs.

- I recommend that unless PSE can provide more detail about the need for its $2 million Targeted Electrification Strategy budget, this funding should instead be used to directly supplement the electrification Pilot efforts.
- I recommend that the Commission allow PSE to recover Phase 2 electrification costs through a separate rate adjustment for this case but recommend the Commission direct PSE to recover electrification costs after 2027 through base rates.
- I recommend the Commission reject the Company's $3 million Alternative Fuels Readiness Program as the Company has not met its burden to demonstrate that the project is in the public interest.
- I recommend that the Commission adopt a requirement that PSE has the burden to demonstrate that it considered alternatives to traditional pipeline investments as a condition of recovering additional investment in pipeline and distribution mains that are not emergency repairs.
- I recommend that the Commission set the ROE for customer request and capacity expansion projects 0.75 percent lower than its approved ROE for all other gas capital investments.

III. Beneficial Electrification for CCA Compliance

A. PSE's 2023 Decarbonization Study Update is Fundamentally Flawed

Q. What is the purpose of this section of your testimony?

A. In this section, I describe the Company's December 2023 Decarbonization Study Update, how it will inform PSE's forthcoming electrification strategy, and my concerns that it will

give a skewed picture of electrification that could lead to an ineffective electrification strategy.

Q. Has Washington state adopted statutes and policies to decarbonize the gas utility system?

A. Yes. At a high-level, the state set a statewide emissions reduction requirement to reduce overall greenhouse gas emissions 45 percent below 1990 levels by 2030, 70 percent below 1990 levels by 2040, and 95 percent below 1990 levels by 2050.[1] To help achieve the emissions reduction requirements, the state has passed several statutes and policies directed at the gas utility systems. First and foremost, the Climate Commitment Act is a statewide cap-and-invest program that sets an overall emissions limit for the state tied to the statutory requirements and then requires emitters, including gas utilities, to reduce emissions and obtain "emission allowances" equal to the entity's covered greenhouse gases. In addition to the CCA, the state has passed several other requirements including:

- State Building Code Council's 2021 residential and commercial building codes, which encourages the use of high-efficiency electric equipment for space and water heating in new residential and commercial buildings,
- Senate Bill 5295, which provides the Commission with the authority to approve multi-year rate plans (MYRPs) for gas and electric utilities and directed the Commission to investigate alternatives to the traditional cost of service regulatory paradigm,

[1] RCW 70A.45.020.

- House Bill 1589, which authorized PSE to file, and the Commission to approve, an integrated system plan for the Company's gas and electric systems. The legislature passed the legislation to help direct more resources toward decarbonizing residential and commercial heating loads, as "switching from fossil fuel-based heating equipment and other fossil fuel-based appliances to high-efficiency nonemitting equipment will reduce climate impacts and fuel price risks for customers in the long term."[2]

Washington state, like a growing number of other states[3] and studies,[4] has found that, to achieve the state's emissions reduction goals, it will require a significant amount of building electrification. The Washington state 2021 State Energy Strategy concluded that "decarbonizing the building sector requires the state to…[m]aximize electrification" and that an electrification scenario is lower cost than a scenario that relies primarily on alternative fuels.[5] The UTC's Energy Decarbonization Pathways Study concluded that

[2] ESHB 1589 Section (1)(4)

[3] Massachusetts Department of Public Utilities, *Order on Regulatory Principles and Framework*, No. 20-80-B at 70 (Dec. 6, 2023), https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/18297602, Colorado Public Utilities Commission, Decision C24-0397, No. 23A-0392EG ¶ 121 (approving a gasutility decarbonization plan that prioritizes and maximizes the use of building electrification and DSM,"which the record reflects are the most cost-effective clean heat resources" for meeting the utility's statutory decarbonization targets),

[4] Brattle Future of Gas Available at: https://www.brattle.com/insights-events/publications/the-future-of-gas-utilities-series/; Electric Power Research Institute Electrification Scenarios for Ameren's Illinoi' Energy Future. Available at: https://icc.illinois.gov/downloads/public/edocket/593256.PDF.

80-B at 70 (Dec. 6, 2023), https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/18297602, Colorado Public Utilities Commission, Decision C24-0397, No. 23A-0392EG ¶ 121 (approving a gas utility decarbonization plan that prioritizes and maximizes the use of building electrification and DSM, "which the record reflects are the most cost-effective clean heat resources" for meeting the utility's statutory decarbonization targets).

[5] Washington State Department of Commerce, *Washington 2021 State Energy Strategy* at 15 and 46 (Dec. 2020), https://www.commerce.wa.gov/wp-content/uploads/2020/12/Washington-2021-State-Energy-Strategy-December-2020.pdf; *see also* Washington State Department of Commerce, *2023 Biennial Energy Report* at 46 (March 2023).

"[d]emographic and economic shifts, as well as trends toward electrification of the buildings and transportation sectors, are expected to increase electricity demand relative to today, further compounding the decarbonization challenge."[6]

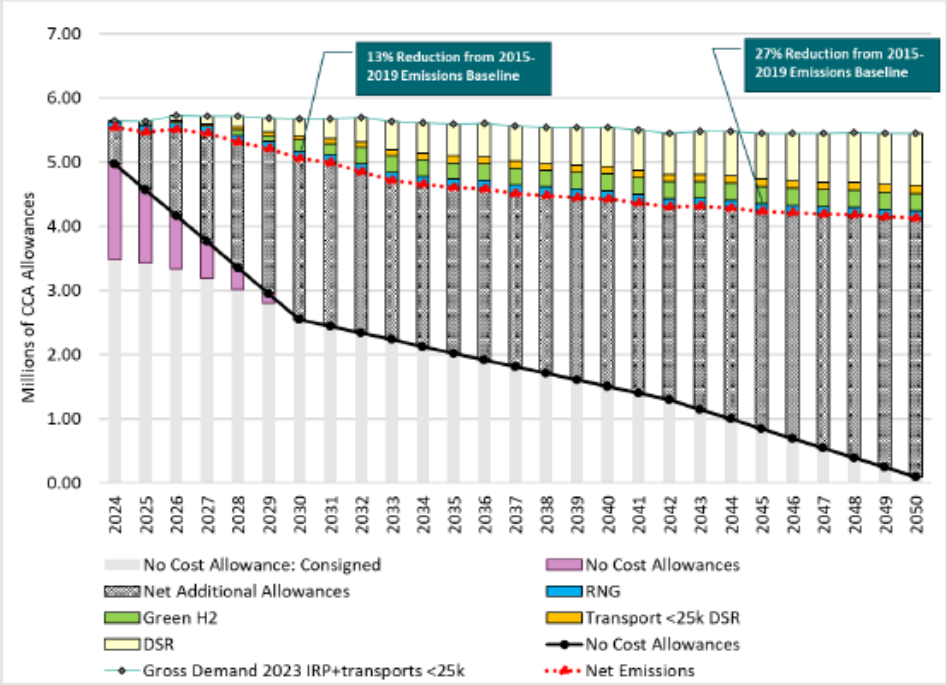
Q. How does PSE expect that it will reduce its emissions to meet the state's emissions reduction goals and comply with the CCA?

A. First, PSE does not anticipate making significant direct emissions reductions. As can be seen in Figure 1 below, PSE expects to only reduce its emissions 13 percent from its 2015-2019 baseline by 2030, and 27 percent by 2045. PSE states that it "has an aspirational goal to have net zero emissions on the gas system by 2045."[7] But this aspiration goal is not reflected in its IRP or other concrete planning documents. Instead, to comply with the CCA, PSE expects to principally rely on emissions allowances.

[6] Sustainability Solutions Group, *Energy Decarbonization Pathways* Prepared for Washington Utilities and Transportation Commission, Oct. 2023, page 83.

[7] Exh. BTC-3.

Figure 1: PSE Forecasted Climate Commitment Act Compliance[8]



Q. Does PSE expect to use building electrification as a method for reducing its emissions and comply with the CCA in the near term?

A. PSE is currently operating limited electrification pilots. However, as demonstrated by PSE's forecasted CCA compliance in Figure 1 above, those pilots will not significantly reduce PSE's gas system emissions.

Q. Has PSE developed a medium-term or long-term building electrification strategy?

A. No. However, PSE appears to be proposing to release its strategy in early 2025. As the Company explained in its direct testimony, "PSE will file the Targeted Electrification

[8] PSE 2023 Gas Utility Integrated Resource Plan, available at https://www.pse.com/en/IRP/Past-IRPs/2023-IRP, page 2.21, Figure 2.11.

Strategy for its electric service territory as a compliance filing in Dockets UE-220066, et al. by January 2025."[9]

Q. How does PSE plan to develop its long-term Targeted Electrification Strategy?

A. The Company's testimony states that, "[d]ata and analysis from the Targeted Electrification Study and Targeted Electrification Pilot will inform program costs, benefits, and recommendations within the Targeted Electrification Strategy."[10] Thus, my understanding is that the Company will develop a comprehensive set of strategies and recommendations for electrification to pursue over the long term that will be informed primarily by two recent efforts: 1) a Targeted Electrification Study and 2) the Targeted Electrification Pilot (i.e., the results of Phase 1). Furthermore, the Company explains that the first of these two items (i.e., the Targeted Electrification Study) was filed with the Commission on December 21, 2023 in Dockets UE-220066 & UG-220067.[11] From this explanation, it is apparent to me that what the Company refers to as its "Targeted Electrification Study" is actually synonymous with the Updated Decarbonization Study that was required as part of Stipulation O in the UE-220066 Settlement.

Q. Have you reviewed the Updated Decarbonization Study/Targeted Electrification Study that was filed on December 21, 2023, which PSE intends to rely upon for its future electrification strategy?

A. Yes. And hereafter I will refer to this study as the "2023 Decarbonization Study Update."

[9] Exh. JM-1CT, page 9.

[10] Id., page 10

[11] Id., page 3.

Q. Witness John Mannetti briefly discusses the 2023 Decarbonization Study Update filed in December 2023 as part of Stipulation O in the Settlement reached in the last GRC.[12] Will you please provide an overview of PSE's Updated Decarbonization Study?

A. Yes. As required by the Settlement, PSE conducted a decarbonization study that analyzed the costs, emissions, and infrastructure impacts to both the gas and electric systems through four scenarios.[13] The four scenarios examined the impacts of natural gas to electric fuel conversions using different technologies and as identified in Table 1 below.

Table 1: PSE Electrification Scenarios

Scenario	Description
Scenario 1 – ASHP Full	New and existing residential customers install air source heat pumps (ASHP)
Scenario 2 – CCHP Full	New and existing residential customers install cold climate heat pumps (CCHP)
Scenario 3 – HHP	New and existing residential customers install hybrid heat pump systems (HHP)[14] using an air-source heat pump and a gas furnace
Scenario 4 – HHP&CCHP	New and existing residential customers install hybrid heat pump systems (HHP)[15] using a cold climate heat pump and a gas furnace

Q. What were the high-level system results of the Company's net costs per scenario?

A. As can be seen in Figure 2 below, PSE found that Scenario 3 – HHP had the lowest net costs per scenario, and that Scenario 2 – CCHP had the highest net costs per scenario.

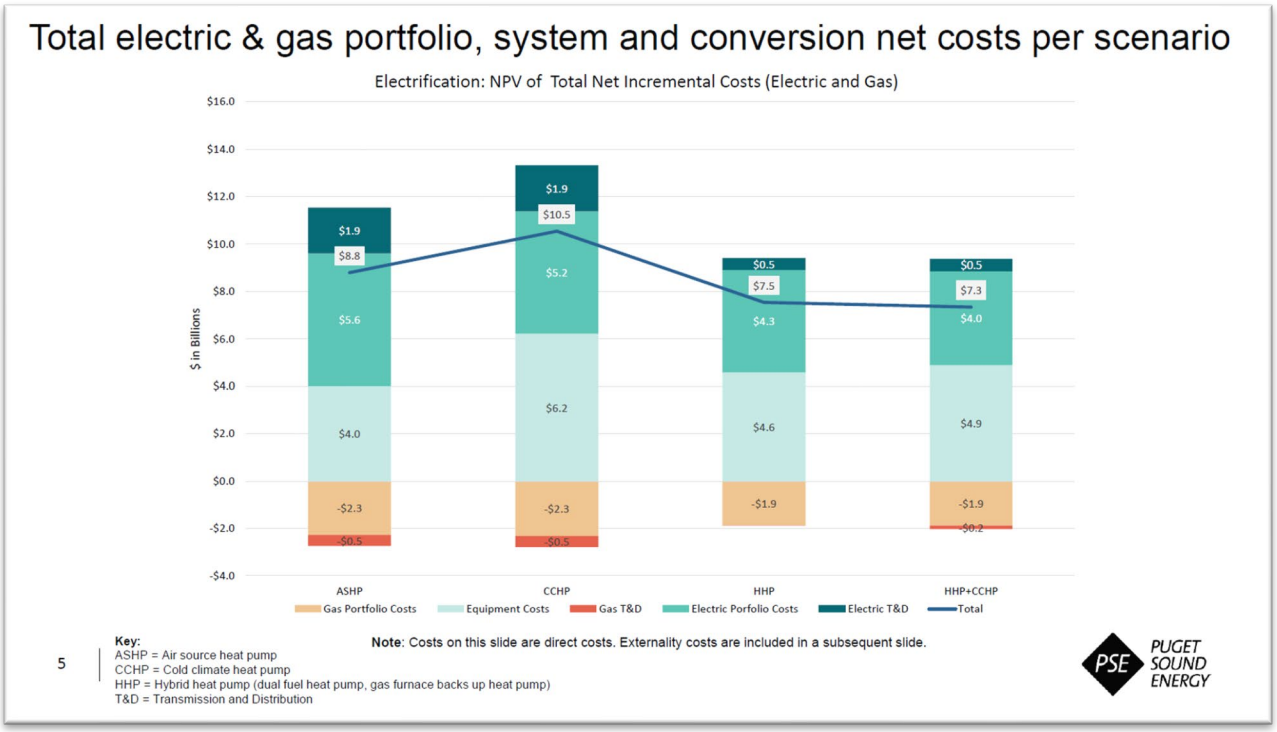
[12] Id., at 2:24 – 3:5.

[13] GRC Stipulation O, Updated Decarbonization Study (Dec. 22, 2023), Docket UE-220066, available at https://apiproxy.utc.wa.gov/cases/GetDocument?docID=3617&year=2022&docketNumber=220066.

[14] A "hybrid heat pump" is actually a heating system which uses both an electric heat pump and another heating sources, most often a gas or propane furnace.

[15] Id.

Figure 2: PSE Estimated Net Costs per Scenario[16]



Q. Do you recommend that the Commission and PSE rely on the 2023 Decarbonization Study Update for developing PSE's future electrification strategy?

A. No. I believe there are several flaws in the methodology and assumptions of the 2023 Decarbonization Study Update that could potentially lead PSE to develop a misguided or misinformed electrification strategy. There are two areas in which the study has major flaws: 1) the general approach or framework of the analysis, and 2) the specific input assumptions and methods used within that approach.

[16] PSE Updated Decarbonization Study, Dec, 22, 2023, page 5.

Q. Will you explain why the general approach or framework of the 2023 Decarbonization Study Update analysis is flawed?

A. Yes. As shown in Figure 2 above, PSE analytical approach was to develop four electrification scenarios, each of which includes incremental amounts of electrification using two space heat pump technologies relative to a "reference scenario" or "base case." All four electrification scenarios were then evaluated through a "cost-benefit" framework, whereby the incremental costs and benefits, as well as emissions levels, were quantified relative to the reference scenario.[17]

This general approach is fundamentally flawed because it implicitly assumes that the reference scenario is a viable option (i.e., a viable counterfactual) that PSE could pursue as an alternative to one of the four electrification scenarios. However, PSE's analysis provides almost no characterization of the reference scenario, and no justification for whether it is a feasible alternative against which electrification costs and benefits could be compared. In fact, based on a complete assessment of PSE's study, I have concluded that the reference scenario is not a viable option. Therefore, any cost-benefit analysis that compares an electrification scenario against PSE's reference scenario is not valid.

Q. How did PSE characterize the reference scenario in its 2023 Decarbonization Study Update? And why do you believe this is not a valid scenario for comparison?

A. As mentioned, very little detail is given in the study materials. However, the emissions reduction section of PSE's 2023 Study alternately refers to the reference scenario as both

[17] Id., page 5.

"23 IRP Preferred"[18] and "23 Gas IRP Reference Case."[19] Presumably these refer to the Preferred Portfolio and the Reference Portfolio (respectively) as described in the Company's 2023 Gas IRP. It is not clear which of these two portfolios was specifically used in the 2023 Study analysis. However, both of those portfolios are fairly similar in that they both assume a relatively small amount of emissions reductions from demand-side reductions (i.e., energy efficiency), green hydrogen, and renewable natural gas (RNG), while assuming that a significant quantity of allowances (or emissions reductions) will be procured from unspecified sources. Neither appears likely to comply with the Climate Commitment Act (CCA).

Q. Why are the Preferred Portfolio and the Reference Portfolio unlikely to comply with the CCA?

A. PSE's Gas IRP scenarios assume it will be able to rely on the reserve auction, a stop-gap compliance mechanism, for long-term compliance with the CCA. Even if this was permissible under the terms of the CCA, the Company's approach is highly risky, costly, and is inconsistent with the design and intent of the CCA to reduce emissions.

Below are two figures developed by PSE in its 2023 Gas IRP showing the assumed emissions reduction and net allowances needed for both portfolios. As is readily apparent, both the Preferred Portfolio and Reference Portfolio assume a significant share of future emissions reductions will be met not with significant reductions in gas use or GHG emissions but with unspecified "Net Additional Allowances" as well as 100 percent of its "No Cost Allowances."

[18] Id., page 69

[19] Id., page 72

Figure 3: PSE Forecasted Emissions Reductions in the Preferred Portfolio[20]

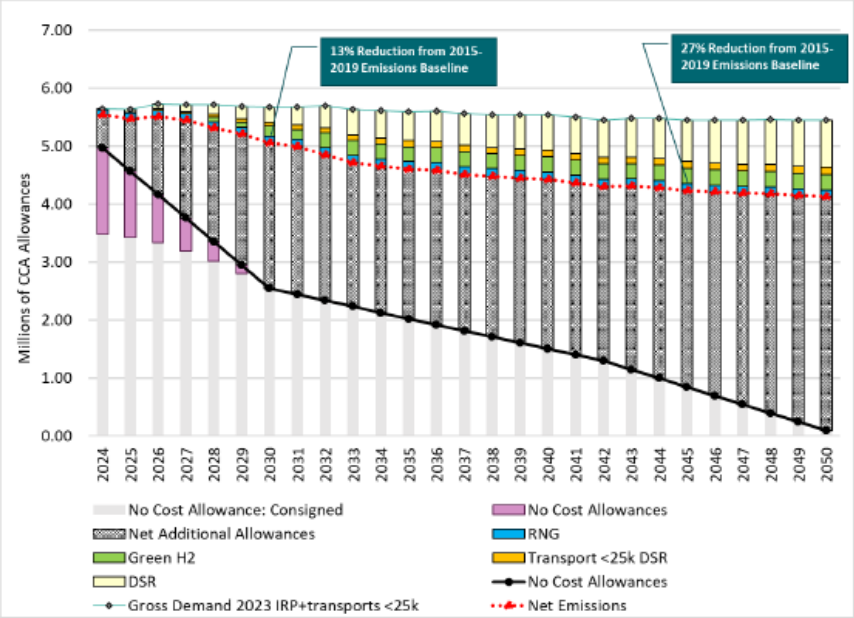
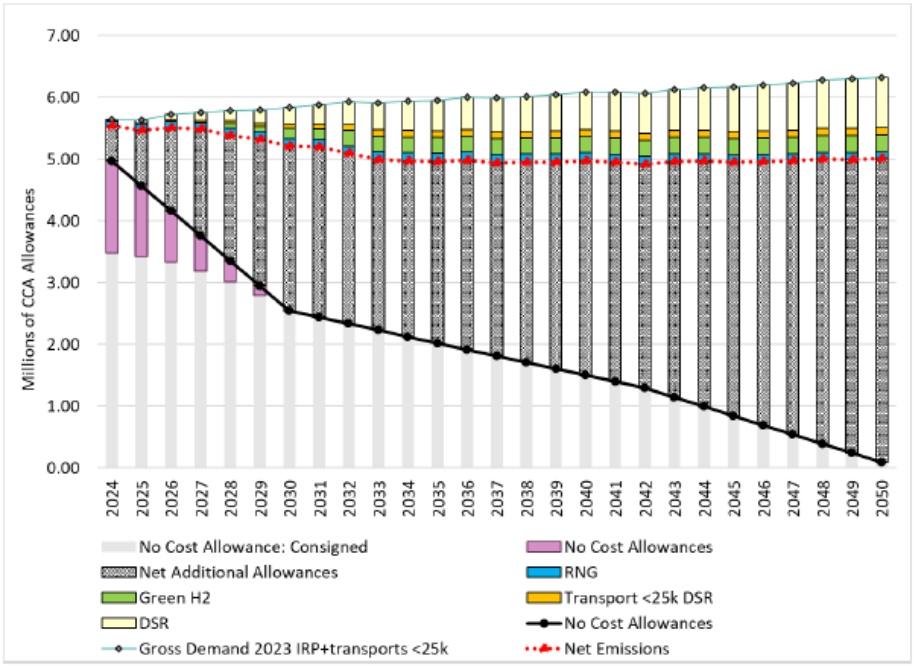


Figure 4: PSE Forecasted Emissions Reductions in the Reference Scenario[21]



[20] PSE Gas Utility Integrated Resource Plan, page 2.21. Figure 2.11

[21] PSE Gas Utility Integrated Resource Plan, page 6.13. Figure 6.7

Figures 3 and 4 show that the Preferred Portfolio will require approximately 2.5 million Net Additional Allowances by 2030, increasing to over 3 million allowances by 2040, and approximately 5 million by 2050. This equates to 21 percent of the total allowances statewide in 2040 and more than 100 percent of the statewide total in 2050. Presumably some portion of these Net Additional Allowances could be purchased economically, but it is likely that a significant portion of allowances will be purchased at the CCA allowance ceiling price.

As Sierra Club pointed out in its comments in the 2023 IRP proceeding, PSE's preferred portfolio relies on significant allowance purchases in excess of the purchase limits set forth in WAC 173-446-330(1). Generally, these purchase limit rules prevent any individual entity from buying more than 10 percent of the total available allowances."[22] (Under recent legislation, this 10 percent cap would increase to 25 percent of available allowances if the CCA is link to the California and Quebec carbon markets.)[23] Figure 5 below, produced by Sierra Club, shows that PSE's assumed amount of unspecific "additional allowances" may exceed the 10 percent purchase limit in the early 2030s. Once PSE's demand has exceeded the 10 percent limit, PSE would only be able to purchase additional allowances through the containment reserve auction at or near the ceiling price. If the allowance price containment reserve is exhausted of allowances, then Ecology must issue the number of price ceiling units for sale sufficient to provide cost protection for covered entities at the ceiling price.[24] Thus, it may be technically

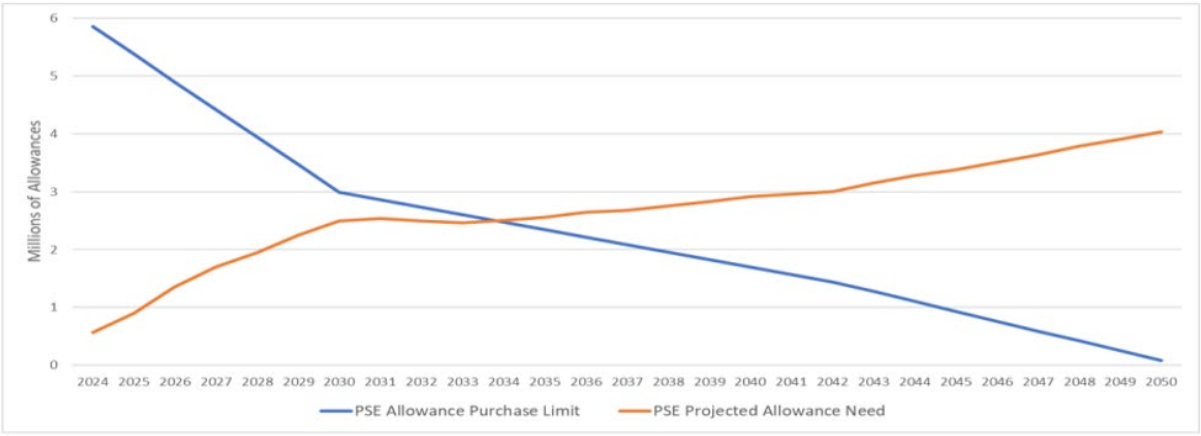
[22] Sierra Club Comments on Puget Sound Energy Final 2023 Gas Integrated Resource Plan. Available at: https://apiproxy.utc.wa.gov/cases/GetDocument?docID=102&year=2022&docketNumber=220242.

[23] ESSB 6058 (2024), available at https://lawfilesext.leg.wa.gov/biennium/2023-24/Pdf/Bills/Session%20Laws/Senate/6058-S2.SL.pdf?q=20240806115416.

[24] RCW 70A.65.160.

possible for an entity like PSE to procure additional allowances through this emergency mechanism, however it is not clear that this was intended as a primary compliance tool. Furthermore, reliance on emergency ceiling price units could increase the cost of compliance substantially.

Figure 5: PSE Required Allowances Compared to 10 percent CCA Purchase Limit[25]



Q. You have identified why PSE's approach will be more costly than it assumes in its IRP. Why do you say that PSE's approach is also highly risky and inconsistent with design and intent of the CCA to reduce emissions?

A. I am not offering a legal opinion as to whether PSE's planned long-term reliance on the reserve auction is legally permissible. I can say that it is not consistent with the design and intent of the CCA as the mechanism is clearly designed to be issued as a last resort. From the customers' perspective, it is also highly risky.

By relying on expensive allowances for compliance, PSE will just continuously delay actual emissions reductions at exorbitant prices while also exposing the Company to the risk that the state changes the rules of the CCA and requires direct and/or

[25] Sierra Club Comments on Puget Sound Energy Final 2023 Gas Integrated Resource Plan. Available at: https://apiproxy.utc.wa.gov/cases/GetDocument?docID=102&year=2022&docketNumber=220242.

immediate emissions reductions. As such, the Preferred Portfolio is not a reasonable "alternative" to a portfolio that achieves meaningful direct emissions reductions. Moreover, it is not a reasonable basis for comparing the costs and benefits of the four electrification scenarios.

Q. Previously you mentioned that PSE assumes that it will use 100 percent of its No Cost Allowances for compliance. Is it certain that PSE will be able to use 100 percent of its No Cost Allowances towards CCA compliance, as it has assumed in its IRP?

A. No. A portion of allowances issued to PSE from Ecology are "consigned allowances." As PSE explains in its IRP, "[c]onsigned allowances are no-cost allowances provided to PSE by Ecology that must be sold at auction. The CCA law restricts the use of the associated auction allowance revenue to certain actions that benefit customers."[26] Thus, it appears that PSE is unable to use these allowances directly for compliance, or even use the proceeds to purchase additional allowances. This means that PSE would need to purchase an even greater number of allowances than what is assumed in their Preferred Portfolio. This further demonstrates that any portfolio that does not include substantial direct emissions reductions, and instead relies primarily on allowances (e.g., PSE's Preferred Portfolio), may lead to significant cost and risk to PSE customers.

Q. Did PSE's 2023 Gas IRP include any portfolios that were designed to limit "Net Additional Allowances" to lower levels?

A. Yes. The 2023 Gas IRP included two electrification scenarios that had significantly reduced contributions from unspecified "Net Additional Allowances." The IRP analysis

[26] Puget Sound Energy 2023 Gas Utility Integrated Resource Plan, page 3.1.

also analyzed a "Limited Emissions" sensitivity, that is characterized as follows: "This sensitivity minimizes greenhouse gas emissions with the resource options in the gas model before it purchases above the no-cost allowance trajectory under the CCA to fill the gap with additional allowance purchases at the floor price."[27] Notably, all three of these scenarios included a significant amount of electrification and resulted in "Net Additional Allowance" needs that were significantly below the reference case. Moreover, the two electrification scenarios had additional allowance needs that were below the 10 percent limit described above. The table below compares these allowance needs in 2040 relative to the 10 percent purchase limit.

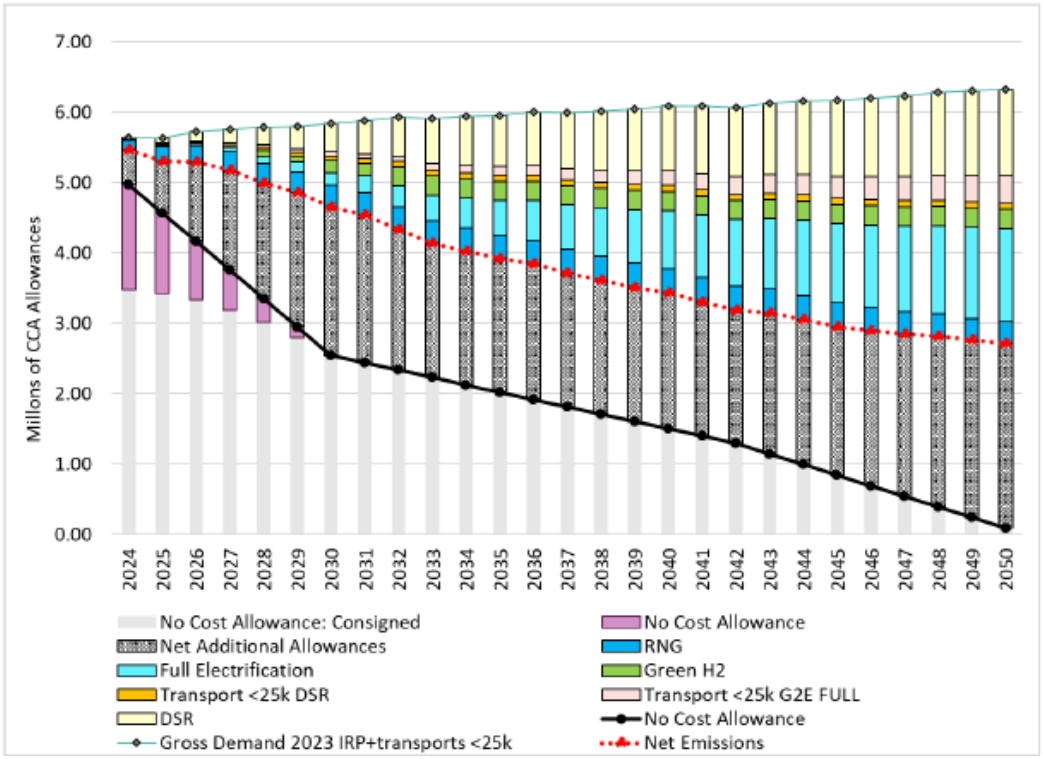
Table 2: PSE 2023 Gas IRP Scenario Comparison of Net Additional Allowances Need in 2040

PSE 2023 Gas IRP Scenarios	**Net Additional Allowance Needs in 2040**
10% Purchase Limit	*~1.7 million*
Reference	~3.5 million
Limited Emissions	~2 million
Electrification (Full Electrification)	~0.5 million
Electrification (HHP adoption)	~1 million

All three of these scenarios are more feasible for compliance with the CCA, in my opinion. Thus, all three of these would be better suited as the "reference case" for the 2023 Decarbonization Study Update.

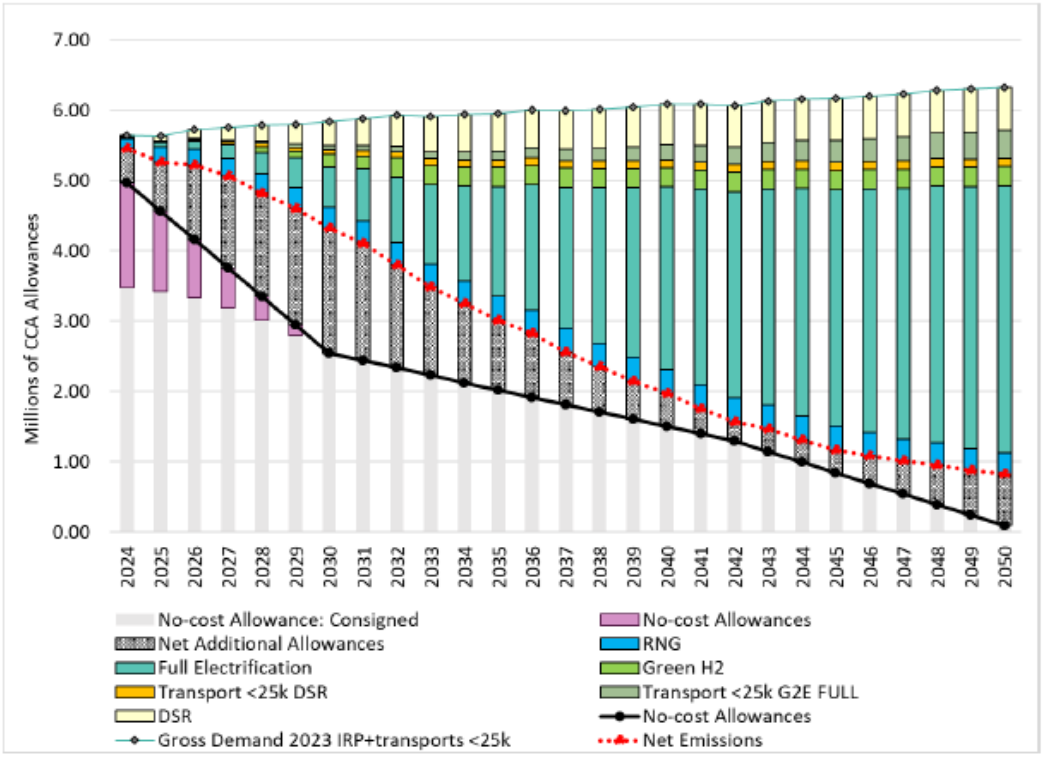
[27] 2023 Gas IRP, page 6.16.

Figure 6: PSE Forecasted Emissions under Limited Emissions Sensitivity[28]



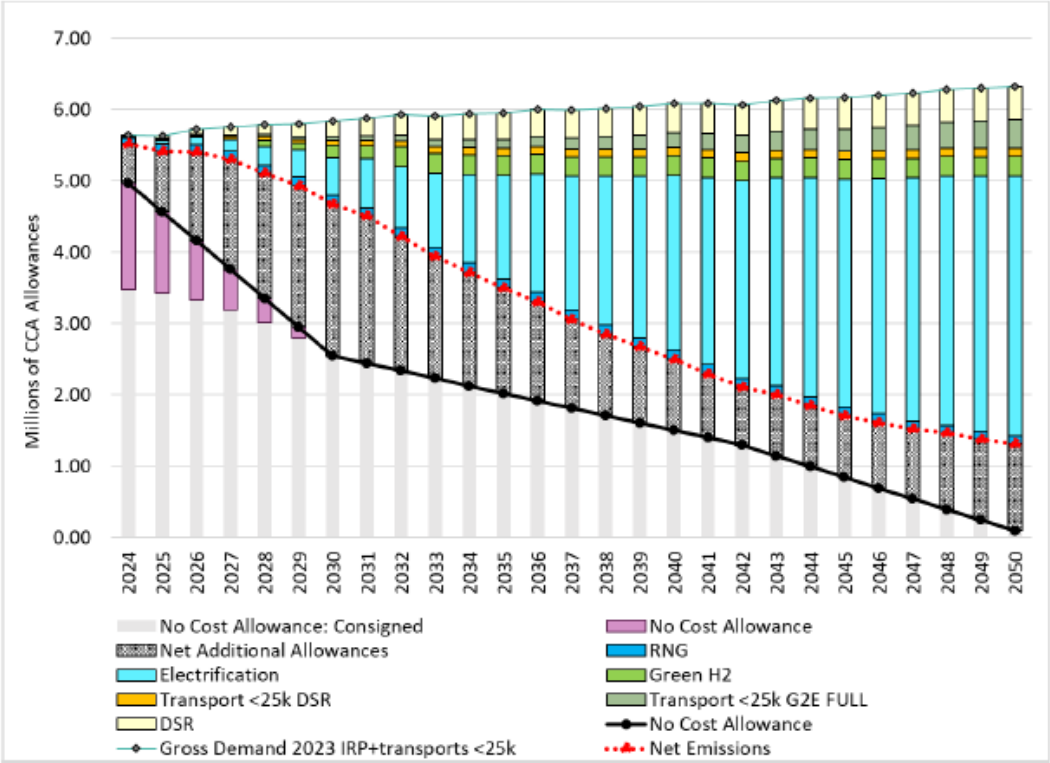
[28] Id., page 6.17, Figure 6.8.

Figure 7: PSE Forecasted Emissions under Electrification Scenario[29]



[29] Id., page 6.23, Figure 6.11.

Figure 8: PSE Forecasted Emissions under Hybrid Heat Pump Adoption Policy[30]



Q. At a high level, what should the Commission conclude from these observations regarding PSE's CCA compliance needs?

A. PSE's CCA compliance plan is most likely more costly than PSE is projecting, highly risky, and does not conform to the intent of the CCA. The most reasonable pathways for compliance include a meaningful level of electrification, which are not present in the reference and base cases. Electrification should not be seen as an optional feature to be weighed against other compliance options because there are no other options that are readily available at the quantities needed. Rather, it is the key ingredient necessary for achieving any and all CCA compliance pathways.

[30] Id. Appendix F, page F.27, Figure F.21.

Given this fact, PSE's analytical framework in the 2023 Decarbonization Study Update is fundamentally flawed, and it is inappropriate to compare the four electrification scenarios to a reference case that does not include any electrification. In other words, it does not make sense to ask *whether* electrification should be pursued in the first place, and then address that question through a traditional "cost-benefit" lens, as PSE has done. As a threshold matter, electrification clearly *must* be pursued under any reasonable CCA compliance pathway and for meeting the state's emissions reduction targets. Electrification should be viewed as more akin to installing pollution controls on a power plant to meet NOx/SOx limits. Adding pollution controlling equipment adds costs, and there may not be any scenario where the added equipment is deemed "cost-effective." However, some piece of equipment (and its attendant costs) must still be installed to comply with emissions limits. There may be opportunities to minimize the cost of the equipment by selecting among different technologies or vendors, but the choice to install something is not optional.

Similarly, the correct approach to electrification in PSE's case is to assume that a substantial level of electrification must occur to meet statutory standards, and then to evaluate the relative costs and benefits of different approaches to achieving that level of electrification.

Q. Does PSE's 2023 Decarbonization Study Update have any value from the standpoint of comparing between different electrification approaches?

A. Yes. The study is not helpful for addressing the question of whether electrification should be pursued, however, it does shed some light on an approach to electrification that could minimize costs.

PSE's study concludes that Scenario 4 is the lowest cost of the four electrification scenarios analyzed. This scenario includes both the installation of hybrid heating solutions (HHPs) for existing gas customers, as well as all electric solutions (CCHPs) for new customers. In both cases, the Company is installing heat pumps in gas customers' homes. Unfortunately, PSE's Phase 2 pilot does not include either of these elements – that is, there is no effort focused on hybrid solutions for existing gas customers nor is there any effort focused on new customers. Instead, PSE's proposed efforts are limited just to electrification of existing gas customers.

Q. Are you suggesting that the Company should pursue a hybrid approach that installs both electric heat pumps and new gas furnaces?

A. No. There is an opportunity for PSE to install electric heat pumps in existing buildings where a customer has a functioning gas furnace and seeks to maintain it. However, I would not recommend the Commission incentivize the hybrid solutions that require PSE to install new gas appliances or expand gas service. Even when used as backup heat, gas equipment imposes untenable consumer, utility system, and climate costs, and therefore should not be incentivized.

B. PSE's 2023 Decarbonization Study Update Contains Flawed Assumptions that Skew the Results, and Falsely Portray Electrification to be More Costly than it is.

Q. You have described how PSE's overarching analytical framework is flawed. Setting that aside for a moment, are there other problems with the 2023 Decarbonization Study Update?

A. Yes. Even if one were to accept PSE's analytical framework (which as I explained, is fundamentally flawed), there are numerous problems with the study's assumptions that skew the results. These skewed results give the false impression that electrification is a

much more costly solution than it actually is. If these assumptions were corrected, I believe electrification would appear to be much more cost-effective than what PSE has portrayed. In fact, the study's assumptions are problematic enough that they call into question several of the study's key findings.

Q. What are the major cost drivers PSE identified under each of the four electrification scenarios when compared to the reference case?

A. According to the charts in PSE's study, under PSE's assumptions the net incremental costs of the four electrification scenarios ranges from $7.3 to $10.5 billion (NPV).[31] These incremental costs are primarily the result of the following components:

- Equipment Conversion Costs, which comprise 45%-67% of the incremental cost, depending on the scenario used, and
- Electric Portfolio Costs, which comprise 50-63% of the incremental cost, depending on the scenario used.

Q. Did the Study materials and supporting work papers initially provided by PSE include the detailed net present value (NPV) calculations for the Equipment Conversion Costs and Electric Portfolio Costs for each scenario?

A. No. While PSE did provide several workpapers that appear somewhat related to these, none of the workpapers provided include the specific calculation of these NPV values. As such it was difficult to assess all the inputs and assumptions that may have affected these summary results. Based on my review of the workpapers that were made available, as well as additional workpapers obtained through discovery, I am concerned that PSE has used inputs and assumptions that have significantly inflated both of these costs.

[31] 2023 Decarbonization Study, Slide 5

Q. What are your concerns regarding the possible inputs and assumptions PSE used for calculating Equipment Conversion Costs?

A. I have several concerns about PSE's inputs and assumptions for calculating Equipment Conversion Costs, some of which are listed below:

Program costs versus total costs: According to PSE, "equipment costs represent the full cost of the new electrification appliances" (e.g., the total cost to install a new heat pump),[32] rather than the incremental cost relative to a baseline (e.g., the difference between a new heat pump and a new gas furnace), or the program cost incurred by the utility (e.g., the cost of a rebate applied towards a new heat pump). PSE's use of the total appliance cost is inappropriate since it does not accurately represent the net cost to PSE or the customer to achieve electrification, and inflates the overall equipment cost estimate considerably. From PSE's perspective, the net additional cost would simply be the amount of the rebate provided through the electrification program plus any administrative costs. From a customer's perspective, the net additional cost would be the incremental cost versus an alternative appliance that would otherwise be installed upon burnout, during new construction, or for a new end use (e.g. new cooling system where there previously was none).

For purposes of PSE's CCA compliance, the most important consideration is the program cost since it is most relevant to Company's decisions regarding which CCA compliance resources to pursue. Evaluating electrification efforts based on utility program costs would not be unprecedented at the UTC. Previously, the Commission

[32] Exh. BTC-4.

adopted the utility cost test as the primary cost-effectiveness test for gas energy efficiency programs.

Finally, information about the cost-effectiveness of electrification is reasonable, but should not be used to determine whether or how PSE complies with the CCA for two reasons: (1) Washington's legislature and policymakers have already made the determination that decarbonization is a priority, and utilities' assessment of whether decarbonization is cost-effective from a societal perspective shouldn't be used to second-guess that determination; and (2) CCA compliance is a responsibility of PSE's gas business, not of individual customers who can make their own choice about whether to take advantage of any BE incentives that PSE offers. Rather, PSE and the Commission should identify the lowest reasonable cost compliance pathways for reducing emissions.

Heat pump cost assumptions may be inflated: As shown in Figure 9, which was included as Attachment I in the Study, PSE's analysis appears to assume that heat pump installations ranged in cost from approximately $20,093 to $25,292 depending on the type of unit installed.

Figure 9: PSE's Estimated Costs of End-Use Appliances

2030				
End Use	Air Source Heat Pump	Cold Climate Heat Pump	Hybrid Heat Pump	Gas Furnace
Heat Pump	20,093	25,292	13,740	13,740
Gas Furnace			6,555	6,555
Total	20,093	25,292	20,295	20,295
Term Year	10	10	10	10
Interest Rate	8%	8%	8%	8%
Annual Amoritization				
Heat Pump	2,994	3,769	2,048	2,048
Gas Furnace	-	-	977	977
Total	2,994	3,769	3,025	3,025

These cost assumptions appear significantly higher than those provided in Cadmus' report to PSE shown in Figure 10 below. As part of its Decarbonization Study, PSE hired Cadmus to evaluate the potential for gas-to-electric conversions, review heat pump technology, assess the impacts of the Inflation Reduction Act on electrification, and evaluate the impacts of heat pump technologies on customers.[33] The Cadmus' report was included as an attachment to PSE's Decarbonization Study, and appears to be a thorough independent assessment of the costs of electrification appliances. However, I was unable to determine from PSE's workpapers (including those obtained through discovery) whether or how the Cadmus report was used to inform PSE's equipment cost assumptions. According to the Cadmus report, the base cost for a heat pump ranged from approximately $11,277 to $19,425 even before considering potential IRA tax credits and rebates. If these additional tax credits and rebates were applied, the initial cost could be as low as $5,443 per unit. Notably, this is even lower than PSE's assumed cost for a new gas furnace of $6,555 and thus, the incremental Equipment Conversion Cost to PSE could actually be negative in some instances.

[33] Docket UE-220066, Decarbonization Study, Attachment B. Dec. 21, 2023. *Comprehensive Decarbonization Study Report* A Cadmus Report prepared for Puget Sound Energy, Aug, 18, 2023.

Figure 10:Cadmus Estimated Potential Impacts of Tax Credits on the Cost of Heat Pumps[34]

Table 11. Potential Impact of 25C Tax Credit and HEEHRA Rebate on Cost of Heat Pumps (80% to 150% AMI)

Equipment	Base Cost Estimate	Est. 25C Tax Credit Value	Est. HEEHRA Rebate [a]	Net Cost
Centrally Ducted ASHP				
Centrally Ducted ASHP – Base	$14,800	[b]	[b]	$14,800
Centrally Ducted ASHP – Dual Stage	$17,175	[b]	[b]	$17,175
Centrally Ducted ASHP – ENERGY STAR	$17,800	$2,000[c]	$8,000	$7,800
Centrally Ducted ASHP – Cold Climate	$19,425	$2,000[c]	$8,000[d]	$9,425
Centrally Ducted ASHP – Dual Fuel	$11,277	[b]	[b]	$11,277
Centrally Ducted ASHP + Furnace – Dual Fuel	$16,250	[b]	[b]	$16,250
Ductless Mini-Split Heat Pump (assumed 3 tons)				
Ductless Mini-Split Heat Pump – Base	$13,443	[b]	[b]	$13,443
Ductless Mini-Split Heat Pump – ENERGY STAR	$14,886	$2,000[c]	$7,443	$5,443
Ductless Mini-Split Heat Pump – Cold Climate	$15,246	$2,000[c]	$7,623[d]	$5,623

Sources: 26 C.F.R. § 25C; *An Act to provide for reconciliation pursuant to title II of S. Con. Res. 14*, Public Law 117-169 (2022): 1817–2090. https://www.congress.gov/117/plaws/publ169/PLAW-117publ169.pdf

[a] While this table shows the HEEHRA rebate estimate for residents making 80% to 150% of AMI, residents making less than 80% AMI would be expected to receive the full $8,000 for all qualifying heat pumps, given the cost estimates used.

[b] Equipment is not assumed to meet the efficiency criteria for ENERGY STAR or for CEE Tier 3.

[c] Equipment meeting ENERGY STAR or different CCHP specifications may not meet CEE Tier 3 criteria.

[d] Equipment meeting CCHP specification may not qualify for ENERGY STAR designation.

Baseline installation cost may be too low: Even if PSE correctly performed its calculation based on incremental costs, it is not clear that the baseline unit used to perform this calculation is correct. For example, many homeowners might choose to install a new heat pump for cooling purposes, rather than upon burnout of an existing heating appliance. In such an instance, the incremental cost would be that relative to an alternative cooling appliance, such as a standard air-conditioner. In such instances, the incremental cost (or corresponding rebate amount) is likely to be much smaller (i.e., <$3,000) than when comparing to PSE's assumed incremental cost versus a gas furnace (i.e., >$13,000). Furthermore, it appears that PSE may have based its assumed cost of a gas furnace on the gas component of a hybrid unit. This suggests that the furnace might be undersized relative to what would be typical for a standalone unit, and thus the

[34] Docket UE-220066, Decarbonization Study, Attachment B. Dec. 21, 2023. *Comprehensive Decarbonization Study Report,* A Cadmus Report prepared for Puget Sound Energy, Aug. 18, 2023, page 26.

counterfactual equipment cost might be too low (which would make the incremental cost too high).

Q. What are your concerns regarding the possible inputs and assumptions PSE used for calculating Electric Portfolio Costs?

A. I have several concerns about PSE's inputs and assumptions for calculating Electric Portfolio Costs, some of which are listed below:

No change to other compliance options: None of the four electrification scenarios appear to consider any reduction to the CCA compliance solutions included in the reference case. For example, the reference case includes substantial amounts of RNG and green H2. Both are relatively costly solutions that might be displaced, either in part or in full, by pursuing the higher levels of electrification included in the four scenarios. Furthermore, in the case of green H2, if generated through electrolysis this resource will create a significant increase in demand for the electric system, and a corresponding increase in marginal emissions. Thus, by displacing some of the hydrogen included in the reference case, each of the electrification scenarios could substantially improve their emissions profile and increase the social cost of greenhouse gases benefit. However, this benefit does not appear to be captured in PSE's analysis.

Electric system expansion costs may be inflated: Some of the results of the electric system modeling do not logically follow from the differences between the scenarios and raise significant questions about how the electric portfolio modeling was conducted. For example, Scenarios 3 and 4 include the addition of new nuclear resources that are not found in Scenarios 1 and 2, or the reference scenario.

Table 3: PSE Cumulative Resource Additions by 2045[35]

Portfolio	Nuclear Additions (MW by 2045)	Biodiesel Peaker Additions (MW by 2045)	2045 Increase in Peak Demand (vs. Reference)
Reference Portfolio	0	711	--
Scenario 1 - ASHP	0	3,055	2,027
Scenario 2 - CCHP	0	3,081	1,731
Scenario 3 - HHP	250	1422	435
Scenario 4 - HHP + CCHP	250	1896	390

This result is not logical because the overall level of demand is highest for Scenarios 1 and 2. Thus, it is not clear why the model would select relatively expensive new resources (such as nuclear) in Scenarios 3 and 4. Another logic-defying result is the fact that the four electrification scenarios include biodiesel peaker plant additions that are 2-5 times greater than those included in the reference portfolio. While it makes sense for the electrification scenarios to include a larger capacity resource buildout, the magnitude of these peaking resource additions is significantly larger than would be suggested simply by the level of increase in peak demand. Both of these examples suggest that certain model parameters may have differed between scenarios in ways other than simply the increase in demand from electrification.

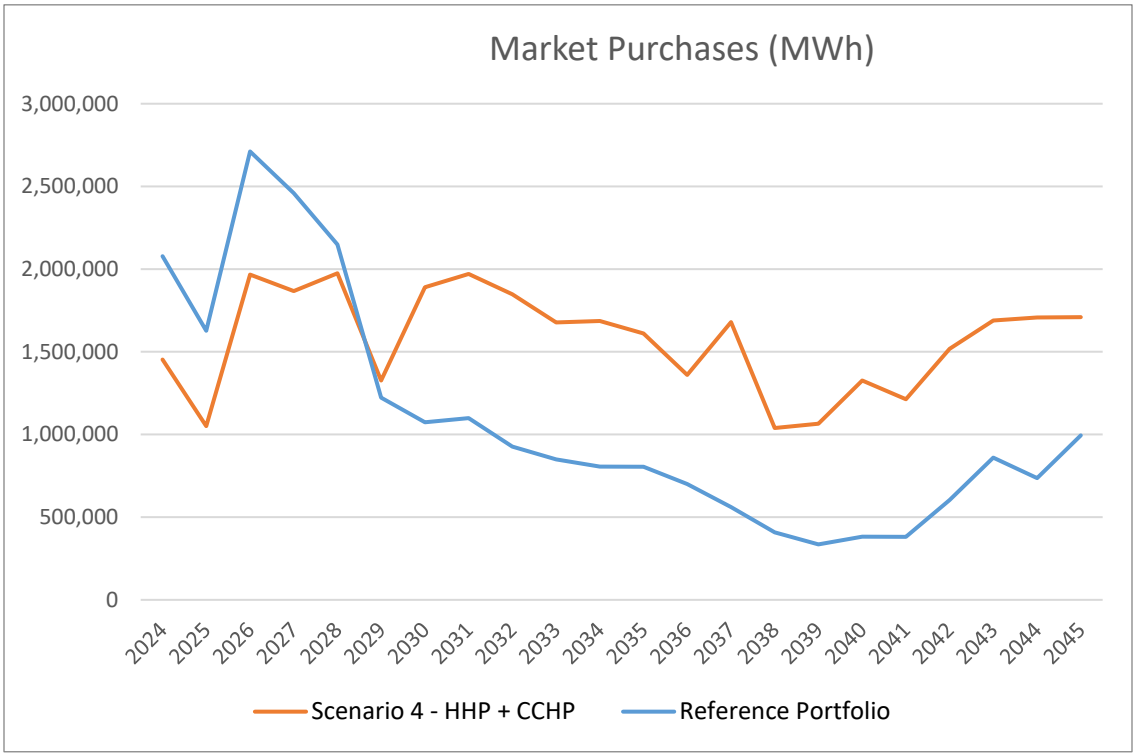
Finally, there are unexplained discrepancies in the supporting materials provided in the study appendices and subsequent discovery responses. For example, I was unable to reconcile the resource additions shown in Attachment G (Electric Portfolio Output Summary) of the Decarbonization Study with those provided by PSE in response to a

[35] Decarbonization Study, Attachment G Electric Portfolio Output Summary, tab *Resource Builds summary*.

request for the underlying workpapers used to calculate the NPV of the Electric Portfolio Costs.[36]

Market purchases and related emissions are skewed: Another problematic feature of PSE's electric system modeling is the fact that there is a significant discrepancy in the level of market purchases between the reference case and the four electrification scenarios.

Figure 11: PSE Assumed Electric Market Purchases by Scenario[37]



In the early years (including the first year), the level of market purchases is significantly higher in the reference case. This result does not seem reasonable since the difference between the scenarios should be negligible in the first few years while

[36] Exh. BTC-5.

[37] Decarbonization Study, Attachment G Electric Portfolio Output Summary, tab *Emissions Detail_WECC Rate*.

electrification levels are still low. In the later years, the level of market purchases is significantly higher in the electrification scenarios – often by a factor of 2x or more. While it makes sense for the results to show a slightly higher amount of market purchases, a 2x increase does not seem reasonable in a case such as Scenario 4 which includes only a 7 percent increase in peak demand. These discrepancies also have an impact on the emissions levels achieved in each scenario and likely lead to a skewed result whereby the electrification scenarios have a reduced emissions benefit.

Q. In addition to the equipment conversion costs and electric portfolio costs, are there other areas of the decarbonization study you are concerned about?

A. Yes. I believe the Gas Portfolio benefits due to avoided costs on the gas system may be underestimated. One reason for this is the fact that PSE assumes that new customers installing cold climate heat pumps (CCHPs) (e.g., in Scenario 4) would still connect to the gas system to receive gas service for gas cooking, fireplaces, BBQs, backup generators, and dryers.[38] This means that PSE is assuming that even in scenarios with significant CCHP deployment, there would still be significant need for gas service line extensions and main extensions. These costs could be avoided altogether if PSE had assumed that these customers were fully electrified instead of receiving gas service.

C. Alternatives Fuels Cannot Scale to Substantially Meet the Company's Emissions Reduction Goals

Q. PSE states that it intends to use alternative fuels, including RNG and hydrogen, for decarbonizing its gas utility. What is the Company's Alternative Fuels Readiness Program?

[38] Exh. BTC-6.

A. PSE is proposing a $3 million Alternative Fuels Readiness Program for blending alternative fuels into the gas delivery systems. Although the Company provides little testimony supporting the program, witness Landers testifies that the primary benefit of the program is to learn and develop efficient transformation of the pipeline system.[39]

Q. Do you have concerns with PSE's proposed Alternative Fuels Readiness Program?

A. Yes. As already discussed in this testimony, PSE does not anticipate it will actually reduce emissions all that much for meeting the CCA. Figures 3 and 4 above show that the Company intends to mostly rely on allowances for complying with the CCA. To the extent that PSE expects to use alternative fuels for decarbonization, I have several concerns.

To start, the Company provides limited testimony describing the program and how it can be scaled to be a meaningful solution for decarbonizing the gas utility. The Company states that the primary benefit of the Alternative Fuels Readiness program is to learn and develop efficient transformation of the pipeline system.[40] But nowhere does the Company describe the objectives of the program, how it will implement the programs, or what PSE means by an "efficient transformation of the pipeline system." Although the Company extensively discusses the role it is playing in the Pacific Northwest hydrogen hub,[41] the Company does not explain the role and benefit of hydrogen blending in the gas distribution system or wrestle with or explain how hydrogen can scale as a gas blending technology. The Company does not explain what tests it will conduct for its hydrogen

[39] Exh. DJL-1Tr, at 26, Table 5.

[40] Id.

[41] Exh. JM-1CT, at 45.

blending. With respect to RNG, Witness Mannetti describes PSE's RNG program but does not acknowledge or explain how RNG fits within the program or some of the technical challenges PSE's is studying.

It is not reasonable for the Commission to approve a proposal that does not provide basic details.

Q. Do you agree with PSE that alternative fuels are a long term decarbonization reasonable?

A. To the extent described by PSE in testimony, no. There is an opportunity cost to investing in alternative fuels. The utility has limited capital, so investing in one area means not investing in other areas. Furthermore, investments in alternative fuels are also a continued investment in the delivery system as it justifies the continued investment in the delivery system, prolonging dependence on the gas delivery system. While there may be a place for using RNG in the immediate-term for reducing emissions, neither RNG nor hydrogen are meaningful long-term solutions for decarbonizing the gas utility.

Q. What does PSE say in its testimony about the role of RNG for decarbonizing its gas utility business?

A. Witness Joshua Jacobs testifies that RNG is a "key component of PSE's decarbonization strategy" because it reduces emissions and is one of the few tools within PSE's control.[42] PSE estimates that it will provide 2.7 million Dth of RNG in 2024 through its PGA and another 82,000 Dth through its voluntary RNG program.[43] PSE testifies that the incremental RNG cost is 3.8 percent for 2024 suggests that the legislature should expand

[42] Exh. JJJ-1Tr, 32:4 – 9.

[43] Id., at 32:10 – 18.

the RNG cost cap ceiling to allow higher amounts of RNG to be blended into the system.[44]

Q. In your opinion, is RNG a scalable, decarbonization resource for gas utilities?

A. No. There is both a technical limit to the amount of RNG that is available, as well as an economic limit. A national RNG inventory study conducted by ICF for the American Gas Association found that RNG and synthetic gas could replace at most 5 to 12 percent of the country's natural gas use. A review of the ICF study by NRDC estimates RNG could only replace 2 to 5 percent, and synthetic gas could replace another 1 to 2 percent.[45] Regardless, both studies agree that RNG's technical potential is limited. Moreover, approximately half the RNG potential in the study is derived from thermal gasification, a process that the ICF study authors recognize is not yet commercially viable because the process creates a residual tar which fouls the methanization equipment.[46]

Q. What are the economic limitations of RNG?

A. There is substantial competition from other sectors of the market for RNG, primarily the transportation sector, who has a high willingness to pay. RNG is widely used by the transportation industry for compliance with the California Low Carbon Fuel Standard (LCFS) and the Federal Renewable Fuels Standard. Nationally, 89 percent of all RNG produced in the country is injected into the gas transmission system, and of the RNG

[44] Id., at 32:19 – 21.

[45] "'*Renewable' Gas – A Pipe Dream or Climate Solution*?" NRDC, June 15, 2020. Available at: https://www.nrdc.org/bio/merrian-borgeson/report-renewable-gas-pipe-dream-or-climate-solution.

[46] *Renewable Sources of Natural Gas: Supply and Emissions Reduction Assessment. An American Gas Association Study Prepared by ICF*. Dec, 2019, page 29. https://gasfoundation.org/wp-content/uploads/2019/12/AGF-2019-RNG-Study-Full-Report-FINAL-12-18-19.pdf.

injected into the transmission system, 90 percent flows to transportation.[47] Compliance entities in California can procure the environmental attributes associated with RNG from anywhere in the country through an account method called book-and-claim. A 2017 Washington State University study of the Economics of RNG valued the LCFS and Federal RFS credits at ~$43/MMBtu, more than ten times the typical cost of natural gas.[48] It is possible the California Air Resources Board (CARB) could amend its LCFS to restrict book-and-claim in the future.[49] CARB is considering restricting book-and-claim for natural gas vehicles beginning in 2041. However, even if CARB was to restrict the future use of book-and-claim, it would likely not occur for another 16 years, there will still be demand for Pacific Northwest RNG from California and entities in Oregon and Washington who must comply with their states LCFSs, or for RNG that could be physically transported to California. Moreover, there is likely to be emergent demand from other sectors of the economy that are looking for a low-carbon fuel, including power generation and industry, that will compete with PSE for RNG and drive up its cost.

[47] Renewable Natural Gas Coalition, Economic Analysis of the US Renewable Natural Gas Industry" Dec. 2022. Available at: https://static1.squarespace.com/static/53a09c47e4b050b5ad5bf4f5/t/639b3e7fd137bc1175286d7d/1671118464387/RNG+Coalition+Final+Report+2022.pdf.

[48] *Promoting Renewable Natural Gas in Washington State: A Report to the Washington State Legislature*, Washington State University Energy Program and Department of Commerce, Dec. 2018, page 20. https://www.commerce.wa.gov/wp-content/uploads/2019/01/Energy-Promoting-RNG-in-Washington-State.pdf.

[49] Eastman, Andrew. *CARB Proposes New Emissions Reduction Rules,* Husch Blackwell, Jan. 2, 2024. Available at: https://www.climatesolutionslaw.com/2024/01/carb-proposes-new-emissions-reduction-rule/.

Q. Are you aware of any examples of a Pacific Northwest gas utility that has been unable to procure as much RNG as it had anticipated?

A. Yes. In June 2024, Northwest Natural Gas Company reported to the Oregon Public Utilities Commission that it has procured enough RNG to offset 0.91 percent of demand,[50] significantly lower than the 5 percent allowed by Oregon law.[51]

Q. What percentage of its gas utility emissions does PSE estimate RNG can reduce?

A. In its gas IRP reference scenario, PSE forecasts that RNG can reduce its emissions by 1.4 percent in 2024, 2.7 percent in 2037, and 2.2 percent in 2050.[52]

Q. What does PSE say in its testimony about the role of hydrogen for decarbonizing the gas utility?

A. PSE states that it is "is continuing to explore the possibility of green hydrogen blending into the PSE gas system between now and 2030."[53] PSE forecasts that it can blend approximately 3,460MDth/year by 2030.[54]

[50] Oregon Public Utilities Commission Docket RG 99, Northwest Natural Gas Company's Revised 2023 Renewable Natural Gas Compliance Report Confidential, June 28, 2024. Available at: https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=23388.

[51] Samayoa, Monica. *NW Natural once again missing its own targets to offset emissions with renewable natural gas,* Oregon Public Broadcasting, July 10, 2024. Available at: https://www.opb.org/article/2024/07/10/nw-natural-misses-own-targets-renewable-natural-gas/.

[52] Exh. BTC-7.

[53] Exh. JJJ-1Tr, 33:5 – 6.

[54] Exh. JJJ-1Tr, 33:9 – 11.

Q. Is hydrogen a scalable, cost-effective resource for blending into the gas distribution system?

A. No. PSE estimates that the technical limit for blending hydrogen into the gas distribution system is 15 percent by volume.[55] Because hydrogen has a 1/3rd of the energy density of natural gas, this means that PSE's technical limit for blending hydrogen is 5 percent by energy content. However, the upper limit for safely blending hydrogen is uncertain. A recent California study suggested a systemwide blending limit of 5 percent by volume (2 percent by energy) because, as hydrogen blends increase end-use appliances may need modifications, vintage pipe may experience increased susceptibility to leaks.[56] Similarly, National Regulatory Research Institute (NRRI) analysis of hydrogen-burning appliances has found that blend percentages greater than 5 percent by volume can result in unsafe ignition conditions for home appliances such as water heaters and stoves.[57] As such, PSE, like other natural gas utilities,[58] intends to start blending at much lower levels – 5 percent by volume (2 percent by energy).[59] Simply put, green hydrogen cannot substantially reduce PSE's emissions.

[55] Exh. BTC-8.

[56] A. Raju et al., *Hydrogen Blending Impacts Study*, Jul. 18, 2022, https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M493/K760/493760600.PDF.

[57] Jeff Loiter et al., *Green Hydrogen for Pipeline Injection in LDC Infrastructure*, the National Regulatory Research Institute, Oct. 12, 2022, corrected version Aug. 31, 2023, https://drive.google.com/file/d/1zC37DW0_uJBpjK9MjXHeNH3AzZNmpxyi/view.

[58] Public Service Company of Colorado's Clean Heat Plan proposal was to begin blending 4% by volume.

[59] Exh. BTC-8.

Q. Are there economic limitations for a gas utility to blend hydrogen into PSE gas distribution system?

A. Yes. To start, hydrogen – particularly clean hydrogen – is expensive. PSE forecast for the levelized cost of green hydrogen is $2.30/kg in 2025 and $2.00/kg in 2030, or approximately $20/MMBtu and $17/MMBtu in 2025 and 2030, respectively.[60] And PSE's estimates does not include the capital expenditure costs for dedicated pipe to move hydrogen from production to its delivery system, or for hydrogen storage, which is necessary for both the gas and electric systems.[61]

And like RNG, hydrogen is expected to be in high demand from other industries that are harder-to-decarbonize, some of which have few ready alternatives, in contrast with the residential and commercial heating customers. Examples include steel production, fertilizer and ammonia production, long-haul transportation, and fuel for the maritime and aviation industries. There may be specific use cases in which PSE is delivering hydrogen to a specific customer or groups of customers, but it is hard to see an economic case for broadly blending hydrogen into PSE's distribution system.

Q. Do you recommend the Commission approve PSE's proposed $3 million Alternative Fuels Readiness Program?

A. No, the Company has not met its burden to demonstrate that the project is in the public interest. PSE does not address basic details of the pilots, such as the objectives of each pilot, the design of the pilots, what challenges the Company is trying to overcome, what the funds would actually pay for, how these fuels will scale to help decarbonizing the gas

[60] Exh. BTC-9.

[61] Exh. BTC-9.

system, or how they'll inform customers of the risks and address issues with appliance compatibility. Moreover, there isn't a clear path for adopting alternatives fuels as scalable decarbonization resources. By investing in projects that cannot scale, PSE is foregoing an opportunity to further invest in better, scalable resources. The Commission should not approve a program that lacks the most fundamental of details and is not aligned with the public interest.

IV. PSE should expand its Phase 2 Targeted Electrification efforts to move beyond the "pilot phase"

A. Overview of PSE's Phase 1 and Phase 2 Electrification Efforts

Q. Please describe what PSE has proposed as the key elements for the second phase of its Targeted Electrification Pilot.

A. PSE is proposing to continue its Targeted Electrification efforts into a second pilot phase ("Phase 2"), which would extend through the end of 2026. There are six specific efforts proposed, in addition to overall marketing, overhead, and evaluation costs. Those six efforts include:

- Low-income heat pump direct installation pilot,
- Small business heat pump pilot in named communities,
- Multi-family heat pump rebate in named communities,
- Targeted electrification of natural gas-constrained geographic area pilot,
- Income-qualified heat pump rebate pilot, and
- Commercial and industrial targeted electrification grant pilot.

Q. How does this compare to PSE's Phase 1 Pilot?

A. Phase 2 differs from Phase 1 in several ways. For example, PSE:

- Discontinues the Home Electrification Assessment effort,

- Continues the Low-Income Heat Pump Direct Installation effort, but at a reduced annual budget and a lower assumed cost per install (~60% reduction),
- Continues the Fuel-Switching Heat Pump Rebate effort, but at a reduced annual budget and participation limited solely to income-qualified customers,
- Shifts focus of Multi-Family Building effort from 1-2 discrete projects to a rebate program targeting 500 customers per year,
- Continues Small Business Heat Pump Direct Installation effort, increased from 1-2 installs to 10 installs per year,
- Introduces a Commercial & Industrial Custom Grant effort, targeting 10 customers per year, and
- Introduces a Constrained NG Area effort, targeting 250 customers per year.

A summary of both phases can be seen in Table 4.

Table 4: A Comparison of PSE's Phase 1 and Phase 2 Targeted Electrification Programs

	Phase 1 (June 2023-December 2024)		Phase 2 (2025)		Phase 2 (2026)	
Effort	**Quantity (Projected)**	**Budget**	**Quantity (Projected)**	**Budget**	**Quantity (Projected)**	**Budget**
Home Electrification Assessments	10,000	$ 4,505,830	-	-	-	-
Low-Income Heat Pump Direct Installs	<50	$ 4,938,133	50	$2,000,000	65	$2,600,000
Fuel-Switching Heat Pump Rebates*	~670	$ 2,000,000	100	$400,000	200	$800,000
Multi-Family Building Projects	1-2	$ 200,000	-	-	-	-
Multi-Family Rebates	-	-	500	$1,000,000	500	$1,000,000
Small Business Heat Pump Direct Installs	1-2	$ 200,000	10	$500,000	10	$500,000
Commercial & Industrial Custom Grants	-	-	10	$3,000,000	10	$3,000,000
Constrained NG Areas Focus	-	-	250	$2,000,000	250	$2,000,000
Development, Overhead, Administration, Evaluation, and Marketing	1	$ 607,239	1	$1,750,000	1	$1,750,000
Total		***$ 12,451,202***		***$ 10,650,000***		***$ 11,650,000***

**Phase 1 quantity estimated assuming a $3,000 average rebate level. Phase 2 limited to income-qualified customers.*

Q. How many customers does PSE estimate the proposed Phase 2 pilot will reach?

A. Based on the quantities provided in Table 3 of the Direct Testimony of John Mannetti, there will be approximately 920 customers targeted in 2025 and 1,035 customers targeted in 2026. Thus, the amount of electrification targeted in each year accounts for approximately 0.1 percent of PSE's customer base.

B. PSE's Phase 2 efforts are insufficient for meeting CCA compliance needs

Q. Are the number of customers being targeted by the Phase 2 Pilot commensurate with the amount of electrification PSE needs to achieve to meet its CCA compliance obligations?

A. No. As I will explain further below, the number of customers that will need to electrify (including both full electrification and hybrid solutions) to achieve PSE's CCA requirements is at least an order of magnitude higher than what the Company has proposed through its Phase 2 Pilot.

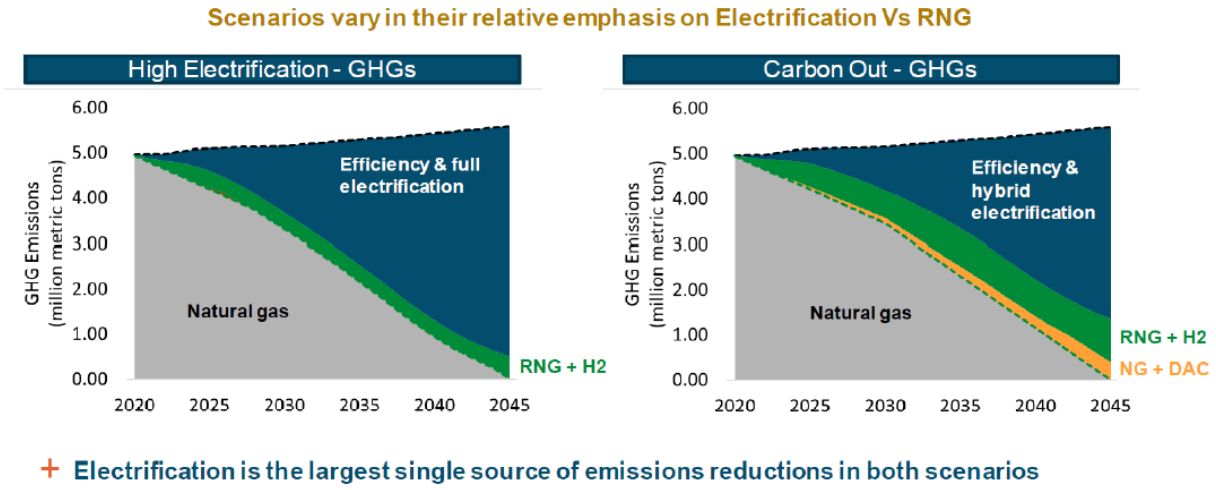
Q. What level of electrification will be needed to meet PSE's CCA requirements?

A. PSE's own analysis suggests that significant amounts of electrification will be necessary to achieve CCA compliance under a wide range of scenarios, even those that include ambitious amounts from other solutions such as RNG and H2. This is illustrated in the chart below from PSE's 2021 decarbonization study (conducted by E3), which includes the observation that "[e]lectrification is the largest single source of emissions reductions in both scenarios."[62] This is in part due to the fact that electrification solutions (such as

[62] Docket UE-220066 and UG-220067 Joshua Jacobs Direct, Exh. JJJ-5, https://apiproxy.utc.wa.gov/cases/GetDocument?docID=633&year=2022&docketNumber=220066.

heat pumps) are readily commercially available today, whereas, as I explain in this testimony, there is a limited supply of RNG and H2 that is commercially available.

Figure 12: PSE 2021 Decarbonization Study Emissions Reduction by Scenario[63]



Q. Does PSE's updated decarbonization study continue to suggest a significant role for electrification?

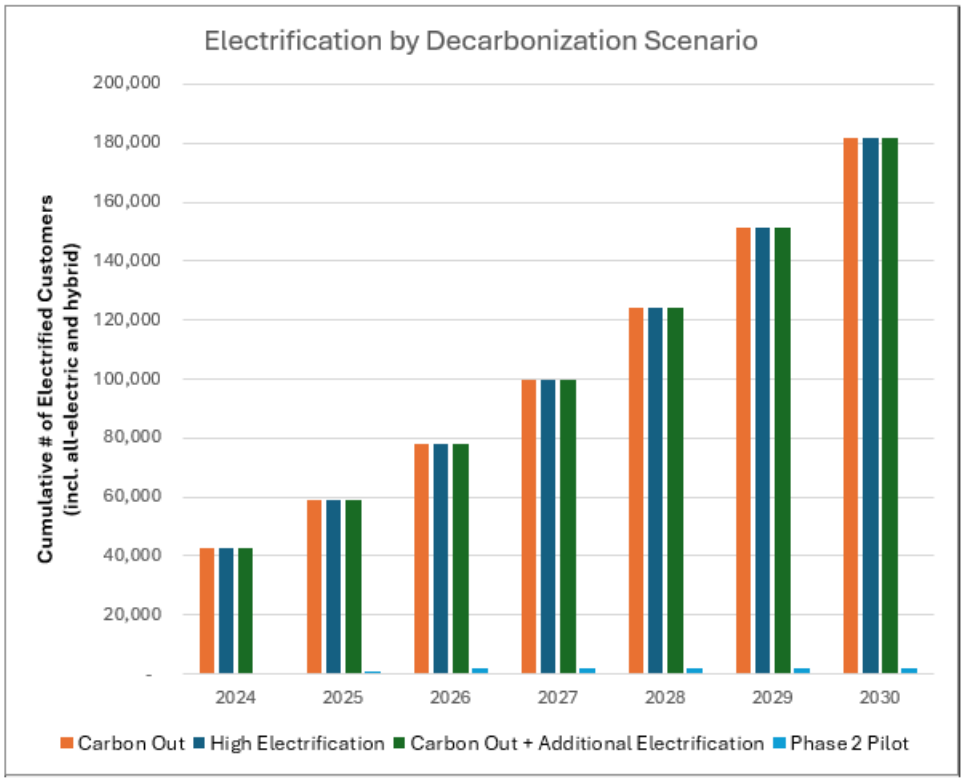
A. Yes. Consistent with the 2021 Decarbonization Study, PSE's most recent update examined four electrification scenarios, each of which provides a significant contribution towards meeting the emissions limits of the CCA, as illustrated in Figure 12. To my knowledge, the updated study did not analyze or describe any scenarios that achieved the CCA requirements without a significant amount of electrification. As Figure 12 shows, electrification contributes the lion's share of required physical emissions reductions under each scenario. Meanwhile, PSE assumes that the remainder of its compliance obligation will be met primarily through the purchase of allowances.

[63] Docket UE-220066 and UG-220067 Joshua Jacobs Direct Testimony Exh. JJJ-6.

Q. In PSE's decarbonization studies, how many customers are assumed to install electric appliances?

A. Based on the workpapers from PSE's 2021 Decarbonization Study, approximately 182,000 customers will need to be electrified by 2030 in order to comply with the CCA targets.[64] This equates to about 22,000 customers per year on average from 2024-2030, or about 22 times the number of customers targeted by PSE's proposed electrification pilot in 2025 and 2026. Figure 13 illustrates this discrepancy.

Figure 13:CEG Comparison of the Number of Electrified Customers in Phase 2 Pilot as Compared to PSE Decarbonization Study Scenarios[65]



[64] Dockets UE-220066 and UG-220067, Burgess Direct, Exh. EAB-7-7-28-22.xlsm. PSE does not explicitly identify the number of electrified customers in its 2023 decarbonization study. However, based on PSE's discovery responses, it appears that the Company assumes approximately 160,000 customers would need to be electrified by 2030 in order to comply with the CCA targets. Exh. BTC-3 and UE-220066 Decarbonization Study Appendix F-Gas System Results.xlsx.

[65] Id.

Q. Do you think PSE's overall electrification efforts are sufficient to meet its decarbonization goals as required by the CCA?

A. No. While PSE should be commended for its initial foray into electrification vis a vis the Phase 1 Pilot, this represents only a small step in the direction of what ultimately needs to be achieved. PSE's Phase 2 Pilot largely continues the level of effort pursued under Phase 1 which also had pilots for low-income direct install, multi-family, and small business. As Company Witness Manetti explains, "PSE intends that its Targeted Electrification Pilot Phase 2 will provide heat pump incentives to sustain current customer offerings, assess whether targeted electrification can alleviate the need to expand the natural gas delivery system in a capacity constrained area, and broaden the customer reach of the first phase."[66]

However, a close examination of PSE's Phase 2 proposal shows that the Company plans to significantly shrink or eliminate several current customer offerings rather than sustain them. Furthermore, the Company's testimony is unclear what additional learnings PSE will take from this additional pilot phase, which has a similar design to Phase 1, or when the Company plans to scale up its electrification efforts as necessitated by the CCA and as indicated is necessary by their own analysis. I am concerned that PSE's proposal is indicative of a general approach by the Company to only pursue small scale pilots indefinitely.

Q. Do you support PSE's proposed Phase 2 pilots?

A. PSE's proposed Phase 2 pilot includes many elements that I'm supportive of and recommend be approved – particularly the Targeted Electrification of natural gas-

[66] Exh. JM-1CT page 15.

constrained geographic areas. However, the proposal does not go far enough, and is too limited for a two-year MYRP. Of particular note, is Phase 2's omission of any efforts targeted towards mass market adoption of electric heating appliances.

C. The Commission should establish an overall electrification target for PSE that is consistent with its CCA requirements

Q. What goals or objectives should guide the design and implementation of PSE's electrification efforts?

A. First and foremost, PSE's efforts should be guided by the objective of reaching electrification levels consistent with its decarbonization requirements under the CCA. As explained previously, this means that PSE's efforts should reflect a credible pathway for ramping up to electrifying more than 22,000 incremental customers per year, and 182,000 cumulative customers in the 2030 timeframe (including both all-electric and hybrid solutions).

Q. Is PSE's proposal aligned with these objectives?

A. No. PSE's proposal targets relatively few installations (~1000 customers per year) compared to what's required in the 2024-2030 timeframe (~22,000 customers per year). The overall scale does not appear to be guided by any larger objective to reach a target number of customers consistent with the CCA. Instead, the proposed Phase 2 components appear to be cobbled together in a piecemeal fashion. Reaching the scale required by the CCA will require a more generalized and ambitious approach that encourages participation from a broader base of customers than what PSE has proposed.

Q. Should the Commission establish an overall electrification target or requirement for PSE?

A. Yes. A specific numerical electrification target appears to be necessary and appropriate for a few reasons listed below:

- *Overcoming utility disincentives for electrification*: Absent the constraints of the CCA and other state policies, PSE generally has a financial incentive to grow its gas customer base and delivery system. As such, the Company has a disincentive to encourage full electrification of new customers since this would by definition shrink or slow the growth of its gas customer base. It may also have a disincentive to electrify existing customers depending on the amount of the offsetting increase in electric revenue. To overcome this financial disincentive, it may be necessary to establish a concrete target or requirement to ensure accountability with the Company's CCA obligations. While in theory the CCA should be self-executing, there is still substantial risk of non-compliance over the long term unless appropriate near-term actions are taken.
- *Ensure appropriate scaling over the near-term and medium-term:* As described above, the levels of electrification proposed by PSE for Phase 2 were relatively modest and not commensurate with PSE's decarbonization analysis. An interim target can help ensure that each year's proposed electrification efforts over the near-term and medium-term are commensurate with the long-term needs dictated by the CCA. The target will help ensure that the sum total of all proposed electrification efforts in each year are appropriately scaled.

- *Utility portfolio targets or standards have been successful tools in other areas:* Over the last several decades, there has a been a successful track record of using analogous targets or standards to achieve clean energy goals. For example, many states have adopted Energy Efficiency Resource Standards (EERS) as a means of encouraging utilities to pursue greater levels of energy efficiency and demand-side resources. These standards are often similar in the sense that they establish a minimum expected level of achievement (i.e., annually, cumulatively, or both) over a period of time.
- *Can be coupled with incentives:* In addition to setting an expected minimum requirement, the level of achievement can also be incentivized through a financial incentive or reward. This "carrot and stick" approach has also been used successfully for other demand-side resources. For example, 28 states include a performance incentive as part of their utility energy efficiency program offerings, many of which also include an EERS.[67] As I explain later in my testimony, I am proposing to include a similar type of performance incentive for electrification.

Q. What level of target do you recommend?

A. I recommend the Commission establish a target of electrifying 182,000 customers in PSE's gas service territory by the end of 2030. This number is consistent with the results of multiple scenarios in PSE's 2021 Decarbonization Study analysis. Meanwhile, the Company has not presented a plausible alternative to this level of electrification for reaching its CCA requirements.

[67] *Energy Efficiency Trends in the Electric Power Industry: Top 10 Things You Should Know*, Edison Foundation, March 2024. https://www.edisonfoundation.net/-/media/Files/IEI/publications/EE-Top-10_March-2024.pdf

Q. Why is 2030 an appropriate year for setting an electrification target?

A. Establishing an interim target that is further out in time (i.e., beyond 2026), but not too far out (i.e. before 2045) provides a firm guidepost that can inform near-term action over the next two years. Meanwhile, it also gives PSE some flexibility from year to year in how it achieves the interim target.

D. PSE's Phase 2 electrification efforts should be modified to ensure they are on track to achieve the target level of electrification required by the CCA

Q. What modifications to PSE's Phase 2 proposal do you recommend?

A. First and foremost, PSE's proposal should be modified to include an overall target number of installations in each year that is appropriately aligned with the long-term trajectory of electrification necessary to achieve CCA compliance. Table 5 provides the trajectory of customers that need to be electrified through 2030 in accordance with the 2021 Decarbonization study. Notably, the study assumed a gradual ramp up starting in 2020, so the targets for 2025 and 2026 may need to be modified to account for a 5-year delay.

Table 5: Comparison of PSE's and CEG Proposed Electrification Targets

Year	PSE 2021 Decarb Study: Incremental Annual Customers Electrified	PSE 2021 Decarb Study: Total Cumulative Customers Electrified	CEG Recommended Target: Annual Incremental Customers	CEG Recommended Target: Cumulative Customers Electrified
2020	3,016	3,016	N/A	N/A
2021	6,144	9,161	N/A	N/A
2022	8,819	17,980	N/A	N/A
2023	11,183	29,163	N/A	N/A
2024	13,590	42,753	N/A	N/A
2025	**16,146**	**58,899**	**7,500**	**7,500**
2026	**18,867**	**77,765**	**15,000**	**22,500**
2027	21,701	99,467	25,000	47,500
2028	24,595	124,061	35,000	82,500
2029	27,458	151,520	45,000	127,500

2030	30,180	181,700	55,000	182,500

Q. How do you propose the electrification targets for 2025 and 2026 be adjusted from the decarbonization study levels?

A. There are two competing factors to consider. First, due to PSE's 5-year lag, the Company's electrification efforts are behind schedule for meeting the total number of electrified customers in 2030 and beyond. At the same time, there are practical limitations when considering the ramp up of any customer program that may suggest taking a more gradual approach. In other words, it may be challenging for PSE to immediately jump from ~1000 targeted customers to nearly 20,000 customers in a single year, even if that's what the Decarbonization Study suggests is required. Instead, it may be necessary to ramp up more slowly in the early years but reach higher levels of electrification in the medium to long term. As such, I recommend that PSE pursue a target of electrifying at least 7,500 incremental customers in 2025 and 15,000 incremental customers in 2026, with the goal of additional scaling in subsequent years.

Q. Even if these targets were established by the Commission, would PSE have an incentive to achieve them?

A. Not necessarily. Regarding new construction, PSE has a financial incentive to increase the number of gas customers connected to its system, even if full electrification of the new customer site was a superior option for the customer and for the public interest. I address this financial incentive in Section V and VI of my testimony. Additionally, for existing gas customer sites, PSE may not have a strong incentive to even partially electrify those customers due to reduced margins on sale of gas.

Q. Given the disincentive to electrify customers, how should the Commission encourage PSE to achieve your proposed electrification targets?

A. In addition to establishing these electrification targets, the Commission could also establish a Performance Incentive Mechanism (PIM) that is linked to the Company's performance in achieving them. This general approach is already fairly common practice in the industry for helping to overcome the utility disincentive for pursuing energy efficiency programs that are in the public interest. Furthermore, in PSE's 2022 general rate case, the Commission accepted a settlement which established a PIM for demand response.

Q. What level of PIM do you propose for PSE?

A. I propose a PIM equal to 5 percent of the annual electrification program budget if 100 percent of the target is achieved. However, the exact amount would scale based on PSE's performance relative to the target. Significant underperformance (i.e., below 90 percent of the target) will lead to no PIM being provided. Additionally, as a cost control mechanism, the PIM could be capped at 130 percent of the target. The table below provides more detail on how this mechanism could work for different levels of performance, assuming a 7,500-customer target in 2025 and an initial program budget of $25 million.

Table 6: Proposed PIM for the General Targeted Electrification Program

# of Customers Electrified	% of 2025 Performance Target	PIM (% of budget)	PIM (assuming $25M initial budget)
>9750	>130%	6.5%	$ 1,625,000
9000-9750	120-130%	6.0%	$ 1,500,000
8250-8999	110-120%	5.5%	$ 1,375,000
7500-8249 (target)	**100-110%**	**5.0%**	**$ 1,250,000**

6750-7499	90-100%	4.5%	$ 1,125,000
<6750	<90%	0%	$ 0

Q. Do you propose any penalty for under performance?

A. In performance-based ratemaking, it is often considered a best practice to include both a reward for overperformance on a specific metric as well as a symmetrical penalty for underperformance. In this case, since PSE's electrification efforts are still in their infancy, I am not proposing a specific penalty for underperformance at this time (other than potentially forgoing the PIM). However, I believe it could be appropriate to introduce a penalty mechanism at a later date as more information is gleaned about performance levels over time. For example, a $1 million penalty could be assessed if PSE fails to meet a lower threshold - such as 50 percent - of its electrification targets.

Q. Should contributions towards the overall electrification target be differentiated based on the type of customer being electrified and the manner in which they are electrified?

A. Yes. I think a differential contribution could be warranted for a couple of reasons. First, it could assist with aligning PSE's efforts to the state's overall policy goals. Second, it could help to overcome some of the disincentives that PSE faces for electrifying its customers. To accomplish this, I recommend that a multiplier be applied to the number of customers that are successfully electrified when computing the contribution to the overall target. The multiplier would be differentiated based on both a) the service area of the customer and b) whether the customer is a new or existing customer, and c) whether the customer is fully electrified, or a hybrid solution is used. Below is a set of multipliers that I propose using.

Table 7: Proposed PIM Multiplier by PSE Service Territory

Bonus Multiplier (count towards target)	New Customer – Install HP/CCHP (non-hybrid, no gas service)	New Customer – Install HHP (w/ new gas service)	Existing Customer w/ Gas Heat – Full Electrification (Install HP/CCHP, remove existing gas equipment)	Existing Customer w/ Gas Heat – Partial Electrification (Install HP, leave existing gas heat in place as backup)
Electric + Gas Service Area	1.25x	0x	1.25x	1x
Gas Only Service Area	1.5x	0x	1.5x	1.25x
Electric Only Service Area	0.75x	0x	0.75x	0.75x

Q. Can you explain how these proposed multipliers are intended to align with the state's policy goals and/or help overcome PSE's disincentives for electrification?

A. Yes. Several factors were considered in selecting these multipliers, which are summarized as follows:

- All-electric solutions (i.e., "Install HP/CCHP") are provided with a higher multiplier than hybrid solutions (i.e., "Install HHP"). This reflects the policy goal of minimizing expansion of the gas system as a means of limiting future gas system costs and emissions.
- Credit is still provided for HHP installed at existing gas customers' premise where the Company is not installing a new gas furnace, since their gas service can be considered a "sunk cost" while the hybrid solution makes a contribution towards CCA compliance.
- No credit is provided to HHP installed at a new customer's premises as a means to encourage focus on all-electric solutions, particularly in the case of new customers where gas system expansion can be readily avoided.
- Higher multipliers are provided for electrifying customers where PSE only provides gas service. This reflects the fact that, although electrifying these customers aids

towards CCA compliance, PSE faces a much greater disincentive for electrifying them due to the lack of off-setting electric system revenues.

- A partial credit is provided to customers who electrify in PSE's "electric only" service area. This reflects the fact that these customers do not directly assist with PSE's CCA compliance needs, but still assist with meeting the state's overall CCA targets. PSE electric customers still benefit from the increase in sales.

Q. How should performance be tracked so that the level of PIM could be determined? And how should these costs be recovered?

A. PSE should be required to provide a progress report twice a year (e.g., in July and January) that details the number of customers electrified through each of its efforts. The final progress report would be used to determine the level of annual performance relative to the annual target. Overall program costs, including the PIM, should be tracked and recovered through the Decarbonization Rate Adjuster (or equivalent mechanism in base rates). During the initial program year (i.e., 2025), no PIM costs would be included, however a true up would be applied in each subsequent year (starting in 2026) to recover the PIM based on actual performance from the prior year.

Q. How should PSE's Phase 2 electrification efforts be supplemented to achieve these targets in 2025 and 2026?

A. As mentioned above, the major missing piece from PSE's Phase 2 proposal is a generalized core program that targets a broad base of customers. In contrast, PSE's proposal appears to be headed in the opposite direction since the Company is proposing to significantly diminish the Heat Pump Rebate program it offered in Phase 1 and limit this offering only to income-qualified customers. Thus, PSE's electrification efforts

should be modified to not only continue, but to expand generalized rebate programs that would be available to all customers regardless of income or dwelling-type. The purpose of this "General Electrification" program is to provide a financial incentive for customers to switch to highly efficient space and water heating, including both all-electric and hybrid solutions. This is somewhat analogous to traditional utility demand-side management programs that provide rebates or incentives to all customers who purchase efficient appliances. The General Electrification program could be subdivided into efforts to target new and existing customers. It could also be differentiated to target both all-electric and hybrid solutions. However it is implemented, such a generalized effort is clearly necessary to achieve the electrification targets described above. While the Company should be encouraged to continue pursuing the more discrete and customized efforts included in its proposed pilot, this should not detract from the more generalized efforts needed to scale up electrification overall.

Q. How do you recommend the General Electrification program be structured?

A. The General Electrification program should build on PSE's experience with the Phase 1 Heat Pump Rebate program, which the Company described as follows: "Under the Fuel-Switching Heat Pump Rebate element of the Targeted Electrification Pilot, PSE will provide fuel switching rebates of between $2,400 and $4,000 to dual-fuel (active natural gas and electricity accounts) residential single-family customers of PSE that replace natural gas space heating with high efficiency heat pumps."[68]

According to PSE's website describing the program, "PSE customers with active natural gas provided by PSE and electric service provided by PSE, heating their homes

[68] Exh. JM-1CT at 5:4.

with a gas furnace or boiler can receive: $3,000 back when you switch to a qualifying ducted or ductless heat pump system."[69] The overall approach of offering customers rebates to install electric heat pumps to replace gas heating equipment is sensible, however PSE's Phase 1 effort was limited in several respects. Specifically:

- Only customers who receive gas *and* electric service from PSE were eligible (i.e., gas only customers are not eligible, even though their participation would benefit PSE's CCA compliance needs),
- New customers were not targeted (i.e., single-family new construction was not eligible),
- Multi-family buildings and commercial accounts could not participate,
- Gas heating equipment must be fully removed, and thus hybrid systems in which the Company installed a heat pump and the customer kept their existing gas furnace, were not eligible,
- Applications were discontinued on July 31, well before the 2024 winter heating season when most heating systems would be replaced,
- The projected budget for this effort was initially estimated at $2,000,000, which suggests an expected participation of approximately 667 customers (assuming rebate levels of $3,000). PSE recently confirmed that it actually exceeded these levels, completing 1,095 customer rebates as of June 30, 2024, at a total cost of $3,534,000.[70]

[69] *Go electric: Switch to a heat pump*, PSE Website. Last accessed Aug. 2, 2024. Available at: https://www.pse.com/en/rebates/Electric-Home.

[70] Exh. BTC-10.

I recommend that the General Electrification program be expanded and tailored to address each of these gaps in the initial Phase 1 approach. Notably, PSE's Phase 2 proposal does include a significant multi-family building rebate program, which may address that specific gap, but several others still remain. Specifically, I recommend the General Electrification program build upon the Phase 1 rebate program in the following ways:

- Continue offering rebates to **existing customers** who replace gas heating equipment with **all-electric** heating systems beyond July 31, 2024. If rebate levels can be reduced somewhat while maintaining sufficient uptake (for example, by combining PSE rebates with funds available through the IRA or Washington's HEAR program), this could allow the program to reach more customers with the same budget. This would be available to all customers regardless of income but could be supplemented by a higher rebate level for Income Qualified customers.[71]
- Offer rebates to **new construction** customers who install all-electric heating systems.
- Allow **multi-family** and **commercial** accounts to participate. As mentioned, PSE has proposed a multi-family rebate program targeting 500 customers annually. This could be supplemented with similar commercial rebate offerings.
- Offer rebates to **existing customers** who install **hybrid heat pump** systems. These rebates should be relatively smaller than those offered for all-electric systems, reflecting hybrid systems' relatively lower value in achieving decarbonization targets

[71] PSE's Phase 2 proposal already includes an Income Qualified Fuel Switching HP Rebates, with a proposed rebate level of $4,000.

and allowing portfolio dollars to reach more customers in pursuit of PSE's electrification targets.

- Allow customers who receive **only gas** service or **only electric** service from PSE to be eligible. As I will discuss later in my testimony, a differentiated incentive can be applied in these instances.
- The **budget** should be scaled to be commensurate with the electrification targets described above.

Q. How do you recommend differentiating the rebates offered through the General Electrification program?

A. I propose that three differentiated efforts be pursued under the General Electrification framework. Each of the following would be supplemental to what PSE has proposed for Phase 2: 1) a General Electrification effort targeted towards New Construction customers, 2) a General Electrification effort targeted towards existing gas customers who convert to all-electric heating systems (effectively continuing the Phase 1 rebate program rather than discontinuing it), and 3) a General Electrification effort targeted towards existing gas customers who convert to hybrid heat pump systems (without adding a new gas furnace) but retain their gas furnace as a backup. For the first two of these efforts, I recommend continuing to offer a rebate at the $3,000 level that PSE has offered to date. For the third effort (i.e., hybrid heat pumps), I believe a smaller incentive is warranted since hybrid systems would still contribute to some amount of emissions from gas combustion and are thus less effective at meeting CCA compliance. However, it may be particularly attractive for customers who are interested in adding air conditioning and do not need as large of an

incentive.[72] The hybrid effort should also target customers looking to install new air conditioning systems but might consider a heat pump instead as a source of both cooling and heating. An incentive at the $1,500-2,000 level may be sufficient to bridge the gap between a heat pump and traditional air-conditioning unit. This lower incentive level would also allow the program budget to stretch further across the already-large existing customer base.

Q. How many customers should be targeted by each of these three supplemental General Electrification efforts?

A. For the General Electrification New Construction effort, I recommend targeting 2,000 customers in 2025 and ramping up to 4,000 customers in 2026. This appears reasonable to me compared to PSE's baseline scenario (i.e., no electrification) which projects over 9,000 new gas customers to be added in each year. For the General Electrification – Electric Conversion effort, I recommend targeting 1,000 customers in 2025 and 2,000 in 2026. This appears reasonable to me based on the fact that PSE's Phase 1 rebate program targeted approximately 667 customers and achieved 1095 as of June 30, 2024.[73] Additionally, PSE has an existing gas customer base of nearly 900,000. Assuming a 15-year life for a gas furnace, approximately 60,000 customers will seek to replace that appliance each year and could be targeted for this effort. Finally, for the General Electrification Existing Customer -- Hybrid HP effort, I recommend targeting 4,000 customers in 2025 and 8,000 customers in 2026.

[72] Ryan, John, *Seattle in now an air conditioning town*. KUOW, May 14, 2024. Available at: https://www.kuow.org/stories/seattle-is-now-an-air-conditioning-town.

[73] Exh. BTC-10.

With these additional elements includes, I estimate that PSE could achieve electrification for 7,920 customers in 2025 and 15,035 customers in 2026, which would be consistent with the targets I recommended earlier.

Q. Have you estimated the change to the Company's Phase 2 budgets for 2025 and 2026 from including the General Electrification program?

A. Yes. The table below summarizes both PSE's Phase 2 proposal and the additional elements I recommend adding.

Table 8: Proposed General Electrification Program Overlayed onto the Company's Phase 2 Proposal

	Phase 2 Element	Year	Unit Cost	Quantity	Budget
PSE's Initial Phase 2 Proposal	Low-Income Heat Pump Direct Installs	2025	$40,000	50	$2,000,000
		2026	$40,000	65	$2,600,000
	Constrained NG Areas Focus (Duvall)	2025	$8,000	250	$2,000,000
		2026	$8,000	250	$2,000,000
	Income Qualified Fuel Switching HP Rebates	2025	$4,000	100	$400,000
		2026	$4,000	200	$800,000
	Small Business Direct Installs	2025	$50,000	10	$500,000
		2026	$50,000	10	$500,000
	Multi-Family Rebates	2025	$2,000	500	$1,000,000
		2026	$2,000	500	$1,000,000
	Commercial & Industrial Custom Grant Pilot	2025	$300,000	10	$3,000,000
		2026	$300,000	10	$3,000,000
	Marketing	2025/2026	$1,000,000	1	$1,000,000
	Overhead and Evaluation	2025/2026	$2,500,000	1	$2,500,000
	Total	2025		920	$ 10,650,000
		2026		1035	$ 11,650,000
Additional Elements	General Electrification - New Construction	2025	$3,000	2000	$6,000,000
		2026	$3,000	4000	$12,000,000
	General Electrification - Existing Customers (Hybrid HP)	2025	$1,500	3500	$5,250,000
		2026	$1,500	7000	$10,500,000
	General Electrification - Existing Customers (All Electric)	2025	$3,000	1500	$4,500,000
		2026	$3,000	3000	$9,000,000
	Total	2025		7,920	$ 26,400,000
		2026		15,035	$ 43,150,000
	Total + PIM (assuming 100% of target achieved)	2025	n/a		$ 26,400,000
		2026	5% of prior year		$ 44,470,000

Q. Earlier you mentioned that the General Electrification program could be differentiated to target new versus existing customers, as well as hybrid versus all-electric solutions. Can you explain this further?

A. Yes. I recommend that the rebates or incentives offered be differentiated to reflect each category's contribution to the overall target. As I explained earlier, for existing customers, all-electric solutions should be awarded a higher contribution to the target versus hybrid solutions, and as such a higher rebate level is warranted as a means to increase overall customer participation. Additionally, for new customers, no contribution to the target should be awarded for hybrid solutions where the mCompany installs both a heat pump and a new gas furnace, and as such no rebate should be offered.

Q. Do you believe this increased level of expenditures on electrification is reasonable and in the public interest?

A. Yes. The increased adoption of electric appliances by PSE customers will yield direct benefits in terms of avoided CCA compliance costs. As I described earlier, PSE's Reference Scenario as described in its 2023 Gas IRP relies extensively on acquiring Net Additional Allowances which will need to be purchased, potentially at the ceiling price depending on availability. Meanwhile, the Electrification Scenario studied in the IRP would require significantly fewer Net Additional Allowance purchases in each year. In fact, I estimate that the reduced allowance purchase costs from pursuing the Electrification Scenario could be as high as $25 million in 2026 and $44 million in 2027.[74] This is roughly commensurate with the 2025 and 2026 budget levels I have proposed above. These annual savings from reduced allowance purchases would escalate

[74] The high estimates assume PSE purchases allowances at the ceiling price.

to more than $100 million per year in the 2030s, and more than $1 billion per year by the year 2050. From now through 2050, I estimate that the savings from avoided allowance purchases under the electrification scenario could amount to $3.4 billion (NPV) in benefits to PSE gas customers.

As a secondary issue, and as general policy matter, I believe the increased level of expenditures to support electrification efforts is warranted to help animate the market for electric appliances in the region (e.g. modern heat pumps), which will aid the state's overall climate goals and is therefore in the public interest. Furthermore, I support several offsetting adjustments to PSE's proposed revenue requirement that should serve to reduce or potentially eliminate any near-term bill impact to customers from this expanded program budget.

Q. Can you describe the offsetting adjustments to PSE's proposed revenue requirement that you support?

A. Yes. First, as described in Section III.C of my testimony, I support the elimination of the Alternate Fuels Readiness program, for which PSE is proposing $3 million in capital investment during the MYRP period. Second, I support the modifications to PSE's proposed depreciation schedule as described in the Response Testimony of Will Gehrke. Third, as I describe in Section VI, I propose reducing the return on equity for growth-related gas capital investments. Each of these will have the effect of reducing the revenue requirement in the 2025-2026 period and will help to offset the Phase 2 expenses. Additionally, while the revenue requirement impacts are more difficult to quantify in the near-term, there are other cost reductions likely to occur from this expanded electrification effort due reduced need for investment in the gas delivery system.

E. Electrification Program Cost Recovery

Q. How does PSE propose to recover the costs of its Phase 1 electrification efforts?

A. As described in the Company's direct testimony: "PSE requests recovery of its investment in the Targeted Electrification Activities in the amount of $15 million in base rates."[75]

Q. Does this $15 million request match PSE's Phase 1 spending to date or projected level of spending on Phase 1 pilot efforts through 2024?

A. No. In terms of spending to date, the Company confirmed that as of June 30, 2024, it had spent approximately $8.7 million on Targeted Electrification Activities as summarized in the table below.[76]

Targeted Electrification Pilot Phase 1	**Initial Projected Budget**	**Amount spent ($), June 30, 2024**
Home Electrification Assessments	$4,505,830	$2,960,000
Fuel-Switching Heat Pump Rebates	$2,000,000	$3,534,000
Low-Income Projects	$4,938,132	$161,740
Small Business Direct Installs	$200,000	-
Multi-Family Direct Install	$200,000	-
Evaluation	$154,000	$36,038
Overhead/Labor	$453,239	$121,124
Marketing	(incl. in above)	$58,311
Decarbonization Study	$573,798	$578,584
Targeted Electrification Strategy	$1,975,000	$1,236,856
TOTAL	**$15,000,000**	**$8,686,653**

A. The Company projects spending $15 million through 2024, but only ~$12.5 million would go towards pilot efforts. The $15 million total also includes ~$0.6 million on an Updated Targeted Electrification Study and ~$2 million on a Targeted Electrification Strategy.

[75] Exh JM-1CT, page 13.

[76] Exh. BTC-10.

Q. Do you support the Company's request to recover $15 million for targeted electrification activities?

A. Yes, but only on two conditions. First, it is not clear to me what the purpose is of the $2 million reserved for a "Targeted Electrification Strategy" or what additional information will be gained that is not already being determined from the Targeted Electrification Study. While $2 million may be a reasonable budget for developing this strategy, the materials in PSE's application are not sufficient for me to confirm that it is a reasonable budget. It is also possible that the staffing needs to develop the strategy can be met with existing staff whose compensation is already incorporated into base rates, without the need for additional budget. As such, I recommend that unless PSE can provide more detail about the need for its $2 million Targeted Electrification Strategy budget, some or all of this funding request should instead be used to directly supplement the Pilot efforts. Second, to the extent there are unspent funds from this $15 million at the conclusion Phase 1 (i.e., December 2024), I recommend that these be used to offset the costs of PSE's Phase 2 efforts.

Q. Do you think there are likely to be unspent funds from Phase 1 at the end of 2024?

A. Yes. To date, PSE does not appear to be on track to fully spend funds budgeted for several Phase 1 efforts, including Low-Income Projects, Small Business Direct Installs and Multi-Family Direct Installs. Meanwhile, the most significant area of spending to date has been the Fuel-Switching Rebate effort, for which PSE has spent over $3.5 million versus an initial budget of $2 million. In general, this can be viewed as a demonstration of success for the rebate effort since it has yielded significant customer participation, even beyond PSE's initial expectations. However, PSE has arbitrarily set

July 31, 2024 as the final date for customers to apply for rebates through this program, meaning that the $3.5 million in expenditures reported in June are not likely to increase significantly for the remainder of the year.[77] Since participation in the rebate effort has been discontinued, and there has been little uptake in the other efforts, I think it's reasonable to expect some portion of the $15 million Phase 1 budget will remain unspent and could be carried over to Phase 2. Based on spending levels to date, I expect these unspent funds could amount to approximately $3 million or more.

Q. How does PSE propose to recover the costs of its Phase 2 electrification efforts?

A. As described in the Company's direct testimony,[78] PSE proposes to implement a new Decarbonization Rate Adjustment (Schedule 141DCARB) that would be applied to both gas and electric customers. At present, the only costs the Company proposes to be recovered through this adjustment mechanism are the proposed Phase 2 electrification pilot costs, comprising $11,150,000 annually in both 2025 and 2026. The detailed calculation of this adjustment is provided in Exhibits SEF-23, CTM-6, and JDT-5. SEF-23 provides the allocation between gas and electric customers, CTM-6 provides the calculation of the adjustment for electric customer classes, and JDT-5 provides the calculation of the adjustment for gas customer classes. The Company also proposes that "a 30-day filing will be made once a year to true-up amounts from prior periods and to set the rate for the next rate period."[79]

[77] See PSE's website *Go electric: Switch to a heat pump*. Available at: https://www.pse.com/en/rebates/Electric-Home. Last accessed August 2, 2024.

[78] Exh. SEF-1T, pages 23-25; Exh. CTM-1T, pages 60-64; Exh. JDT-1T, pages 30-31.

[79] Exh. SEF-1T, page 24.

Q. Do you agree that the costs of PSE's Phase 2 electrification efforts should be recovered through a separate adjustment mechanism, rather than through base rates?

A. Yes, but only as a temporary approach in this particular case. In the long run, I recommend the program costs are recovered through base rates. The main goal of PSE's electrification efforts is to achieve the Company's decarbonization requirements under the CCA. In fact, electrification is the primary tool that exists for the Company to achieve these requirements for its gas system. Thus, to the extent that the decarbonization adjuster is intended to recover any incremental costs of CCA compliance, then it may be appropriate to include the costs of electrification efforts, as well as any other compliance related costs (e.g., RNG procurement, some portion of allowance purchases, etc.). However, a better approach may be for the majority of these costs to be recovered through base rates.

Q. Why is it better for Phase 2 electrification costs to be recovered through base rates rather than a separate adjuster mechanism?

A. There are at least 5 reasons why I recommend that these costs be recovered through base rates, rather than a separate adjuster mechanism.

- *Simplicity*: The Company's proposal to recover Phase 2 costs is to calculate a very simple volumetric rate (i.e., $/kWh or $/therm) that would be added to the other charges on customer bills. However, I see no reason why this volumetric charge could not simply be included as part of the base volumetric rates the Company is already proposing for its electric and gas customers. This would aid simplicity by reducing the number of additional charges presented on customer bills.

- *Transparency*: The Company has suggested that a separate adjuster is needed for greater transparency in tracking decarbonization costs. However, a separate adjuster is not the only tool, or necessarily the best tool, for providing this additional transparency. As I recommended earlier, a twice-yearly progress report on electrification activities could easily provide the necessary transparency on program costs. Moreover, the Company has testified that the relevant costs are purely operating expenses with no capital expenditures considered. Thus, the accounting for these costs should be relatively straightforward, and could be readily provided in the progress reports.
- *Consistency*: PSE is already proposing to recover Phase 1 costs in base rates. There is no reason to deviate from this approach. Continuing to recover costs in this manner would provide a level of consistency across program phases.
- *Fair evaluation*: PSE suggests that isolating costs through a separate adjustor will assist in a fair evaluation of decarbonization costs over time. However, I am concerned that this could do the exact opposite and instead draw unwarranted attention to a relatively small bill component that is generally needed to address a compliance requirement. Isolating costs in this manner can also be misleading since no context or counterfactual is given. By PSE's logic, the Company should also be proposing adjuster mechanisms for every conceivable compliance cost, including (but not limited to) generation resources added to meet NERC reliability standards, pollution controls added to meet criteria pollutant standards, cybersecurity requirements, etc. Since the Company is not proposing separate adjusters for these

other costs, it does not seem fair nor logical to propose a separate adjuster for the Phase 2 electrification costs.

- *Timely cost recovery*: PSE has proposed an annual true-up of the decarbonization adjuster, presumably to ensure timely cost recovery of these costs. However, the implementation of such a true-up does not require that all of the costs be recovered through an adjuster mechanism. Alternatively, only the trued-up amount could be calculated and recovered in this fashion, while the bulk of costs are still recovered in base rates.

Q. How does PSE propose to allocate its Phase 2 electrification costs between gas and electric customers?

A. According to the Company's testimony, "PSE allocated the costs between electric and natural gas using the Company's 4-factor methodology that is commonly used to allocate general and common expenses and plant." This methodology resulted in an allocation of 65 percent of costs to electric customers and 35 percent to gas customers.[80]

Q. Do you agree with PSE's proposed allocation between gas and electric customers?

A. I disagree with PSE's underlying rationale for how it allocates the Phase 2 costs between the gas and electric systems. At its core, PSE's electrification efforts are primarily a means of complying with the CCA requirements of the Company's gas distribution system, not its electric system. As such, it is not appropriate to consider these costs as "general and common expenses" between the two systems. As a starting point, it might even make sense to allocate 100 percent of these costs to the gas system. However, there

[80] Exh. CTM-1T, page 63.

are two countervailing factors that may warrant substantial, and even preferential allocation to the electric system. First, one goal of electrification is to reduce gas throughput for compliance with the CCA and meeting state emissions reduction targets. This will put increased cost pressure on the remaining gas customer base. Thus, as a policy matter, it may make sense to place a larger burden of these costs on the electric system, which will be growing, rather than shrinking, in tandem with decarbonization efforts.

Second, a result of successful electrification efforts will be greater throughput on the electric system. This can yield benefits to existing electric system customers by putting downward pressure on rates as the fixed costs of the electric system are spread onto more kWh. Thus, as a policy matter, it may make sense for electric system customers to subsidize a greater portion of the costs of electrification. Taking into account these two factors, I believe allocating costs equally between the two systems is more reasonable, rather than allocating all of the costs to the gas system.

Q. How does PSE propose to allocate its Phase 2 electrification costs among customer classes?

A. According to the Company's testimony, "PSE allocated based on 50 percent customer counts and 50 percent margin revenue from the test year to apportion the revenue requirement to all customer classes."[81] Upon initial review, I have no reason to dispute this approach.

[81] Id.

Q. Using PSE's methodology, have you recalculated the Decarbonization Rate Adjustment to include the additional components you have recommended including in the Company's Phase 2 electrification efforts?

A. Yes. I have provided these calculations in Exhibits # and # attached to my testimony. The incremental rate impacts to residential customers are also summarized in the table below.

Table 9: Calculated Incremental Rate Impacts to Residential Customers

	Residential Electric Energy Charge ($/kWh – First 600 kWh)	**Residential Gas Delivery Charge ($/therm)**
Year	2025	2025
PSE Current Rate	$0.08944	$0.4561
PSE Proposed Energy/Delivery Charge	$0.11652	$0.6993
% Increase (Energy/Delivery)	30.3%	53.3%
PSE Proposed DCARB Rate	$0.00059	$0.0061
PSE Proposed Rate (Energy/Delivery + DCARB)	$0.11711	$0.7054
% Increase (Energy/Delivery + DCARB)	30.9%	54.6%
CEG Proposed DCARB Rate	$0.00094	$0.0183
Total Rate (PSE Energy/Delivery + CEG DCARB)	$0.11745	$0.7177
Incremental change vs. PSE proposal	0.3%	1.7%

As shown in the table above, if my proposal is adopted it would lead to a 0.3 percent incremental increase above PSE's proposed 30.9 percent increase in volumetric rates for residential electric customers in 2025. Similarly, there would be at most a 1.7 percent incremental increase above PSE's proposed 54.6 percent increase for gas

customers in 2025. However, this modest increase does *not* reflect the simultaneous decreases in retail rates due to three factors:

- An adjustment to the depreciation schedule as recommended by witness Will Gehrke. According to PSE witness Allis, shortening the gas plan depreciation expense by 5 years is $43.8 million less than the 10 years proposed by PSE.[82]
- A reduction to the return on equity for growth-related gas capital expenditures that I propose in Section VI.
- Decrease in CCA compliance costs, which as I described above could be in the tens of millions of dollars each year.

V. Demonstration of Consideration of Alternatives for Gas Plant Capital Investments

A. PSE's Capital Investment Plan is Not Aligned with Customer Interests and Achieving State Policies

Q. What is the Company's proposed investment in gas infrastructure over the course of the MYRP?

A. Figure # below shows that PSE plans to invest $416.5 million in gas distribution infrastructure, and $3.6 million in shared (electric and gas) infrastructure over the next two years.[83]

[82] Exh. NWA-1T at 29:22.

[83] Exh. DJL-1Tr, 24:3 – 6.

Figure 14: PSE Expected Gas Capital Expenditures from 2025 - 2026 by Category[84]

Exhibit	Investment Category	Example Programs	Capital Investment ($ Millions)	Primary Benefits
Customer and Public Safety	Emergency Repair	• Emergent Repairs	56.6	• Customer satisfaction • Operations safety
	Gas Maintenance	• Distribution Integrity Management • PRP • Enhanced methane emissions reduction	207.2	• Increased safety • Risk mitigation
	Public Improvement	• Relocations • Franchises	62.4	• Risk mitigation
Customer Growth and Service Needs	Customer Requests	• Customer requests	52.1	• Customer satisfaction
Pipeline Reliability and Monitoring	Pipeline Digital Monitoring	• Pipeline Digital Monitoring	5.4	• Reliability and safety by reducing response time
	Pipeline System Reliability	• Pipeline System Reliability	29.7	• Reduction in customer outages
	Alternative Fuels Readiness	• Alternate Fuels Readiness	3.0	• Learning and developing efficient transformation of the pipeline system

The largest category of spending, nearly half of the capital investments, is classified as "Gas Maintenance." The Company identifies seven programs as "Gas Maintenance" including its Distribution and Transmission Integrity Plans, older vintage pipeline replacement, and buried meter set mitigation.[85] Half of the Company's Gas Maintenance programs costs can be attributed to the Company's Pipeline Replacement Plan (PRP), the most recent of which was filed in June 2023.

Q. How many programs are in the Company's PRP?

A. The current PRP includes four programs that address various pipeline integrity risks, one of which is new to the PRP. The Company also moved two programs from the PRP to the multi-year rate plan (MYRP).

[84] Exh. DJL-1Tr, 26, Table 5.

[85] Exh. DJL-1Tr, 34:11 – 18.

Table 10: PSE Pipeline Integrity Risk Programs/Assets

Program/Asset	Pipeline Integrity Risk	Program Status
DuPont Aldyl "HD" Plastic Pipe	High consequence of fusion failure and brittle like cracking	Master Plan Active
Buried Meters	High consequence of external corrosion failure in close proximity to a building wall	Master Plan Active
Sewer Cross Bores	High likelihood of failure and consequence of gas migration directly into a structure	Master Plan Active
No Record Facilities	High likelihood of outside force damage failure in close proximity to building wall	New
Older Vintage wrapped steel mains	Elevated risk reduced through implementation of master plan	Removed from PRP
Older Vintage wrapped steel services	Elevated risk reduced through implementation of master plan	Removed from PRP

Q. What are the forecasted near- and long-term costs of PSE's PRP?

A. The Company plans to spend approximately $70 million annually through the PRP over the two-year duration of the plan.

Table 11: Programs included in PSE's 2023 Pipeline Replacement Program Plan[86]

Year	Aldyl ("HD") Plastic Pipe	Buried Meter Remediation	Sewer Cross Bore Remediation	No Record Facilities Remediations	Total
2024	$56.4 million	$6.2 million	$4.7 million	$0.5 million	$67.8 million
2025	$57.6 million	$6.5 million	$4.7 million	$2.0 million	$70.8 million
2024 – 2025 Total	**$110. 4 million**	**$12.7 million**	**$9.4 million**	**$2.5 million**	**$138.6 million**

The most significant program included in the PRP is the replacement of the DuPont Aldyl "HD" Plastic Pipe. Over the next 20 years, PSE plans to replace 435 miles

[86] Puget Sound Energy Pipeline Replacement Program Plan, June 2023: Dockets UG-230419 and UG-120715.

of this vintage pipe for an estimated cost of $1.048 billion in 2023 dollars (and not including AFUDC).[87]

Table 12: PSE Forecast of Costs and Time to Replace DuPont Aldyl "HD" Plastic Pipe Replacement Schedule, Miles, and Estimated Expenditures

Program Years	Total Planned Replacement Miles	Estimated Expenditures[1]
1 – 12	245 Miles	$500.4 million
12 – 20	190 Miles	$547.6 million
Total	**435 Miles**	**$1,048.0 million**

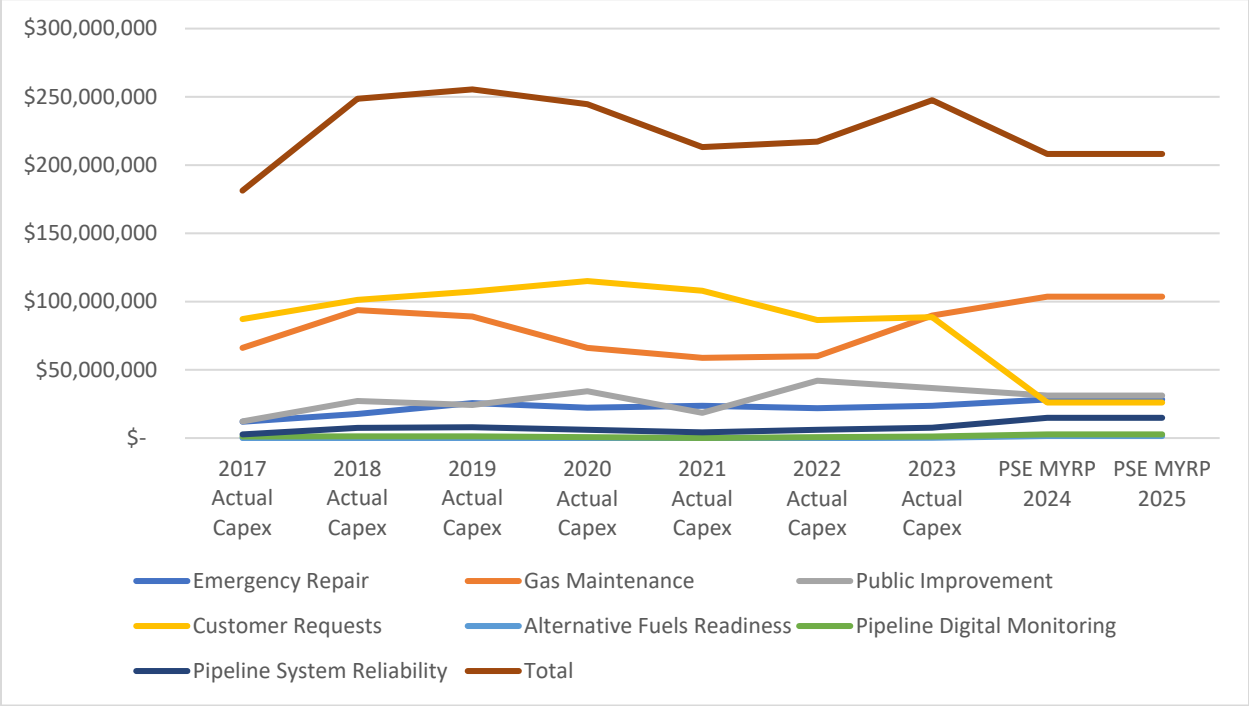
1 Estimated expenditures are in 2023 dollars and do not include AFUDC

Q. Turning back to the Company's gas plant capital expenditures in this MYRP. How does PSE's proposed capital expenditures compare to the Company's historic pace of capex spending?

A. The Company's proposed gas capital expenditure spending in this MYRP is in line with the past 7 years of historic spending. From 2017 to 2023, PSE spent approximately $229 million annually on gas capital expenditures. PSE's proposal in this MYRP is approximately $208 million annually, or 10 percent less than the 7-year average. Programmatic spending has been relatively consistent except for two recent changes: the Company is forecasting a steep decline in customer request spending - previously the single largest category - but an increase in "gas maintenance" costs.

[87] Puget Sound Energy Pipeline Replacement Program Plan, June 2023: Dockets UG-230419 and UG-120715. Page 9, Table 5.

Table 13: PSE Annual Gas Capex Spending from 2017 – 2023 and Proposed 2024 and 2025 MYRP Spending[88]



Q. What types of costs are included in the category "Gas Maintenance?"

A. PSE identifies the programs as Distribution, Integrity Management, Transmission Integrity Management, the Pipeline Replacement Program Plan, and "Enhanced Methane Emissions Reduction."[89] Based on my understanding of PSE's classification and categorization of gas capital expenditures, these programs are some of the best candidates, although not the only, for alternatives analysis that look to pipeline repair, nonpipeline alternatives (NPAs), and electrification in lieu of pipeline replacement to minimize costs, emissions, and long-term risks to customers. I will further address this issue later in my testimony.

[88] Exh. BTC-11.

[89] Exh. DJL-1Tr, at 33:Table 6.

Q. Why is the Company forecasting a decline in customer requests?

A. I do not know for certain, but I assume that it is in part driven by state policies such as the State Building Code Council's update to the building codes that went into effect in March 2024. The building code updates incentivize the installation of heat pumps for heating over emitting-end-use appliances. PSE states that it is accounting for all building codes and building decarbonization policies that were known at the time it developed its load forecast.[90] However, although PSE assumes that new customers would not run furnaces or water heaters with gas, PSE assumes that new residential customers will connect for gas cooking, fireplaces, BBQ, natural gas for backup generators, and dryer. As I explain later, investments made to connect new, non-heating service customers like gas cooking and fireplaces are riskier to PSE than space and water heating connections and avoiding them should be a primary objective of PSE's efforts to encourage all-electric new construction.

Q. Do you have concerns about the Company's short-, medium- and long-term investment plans in its gas distribution system?

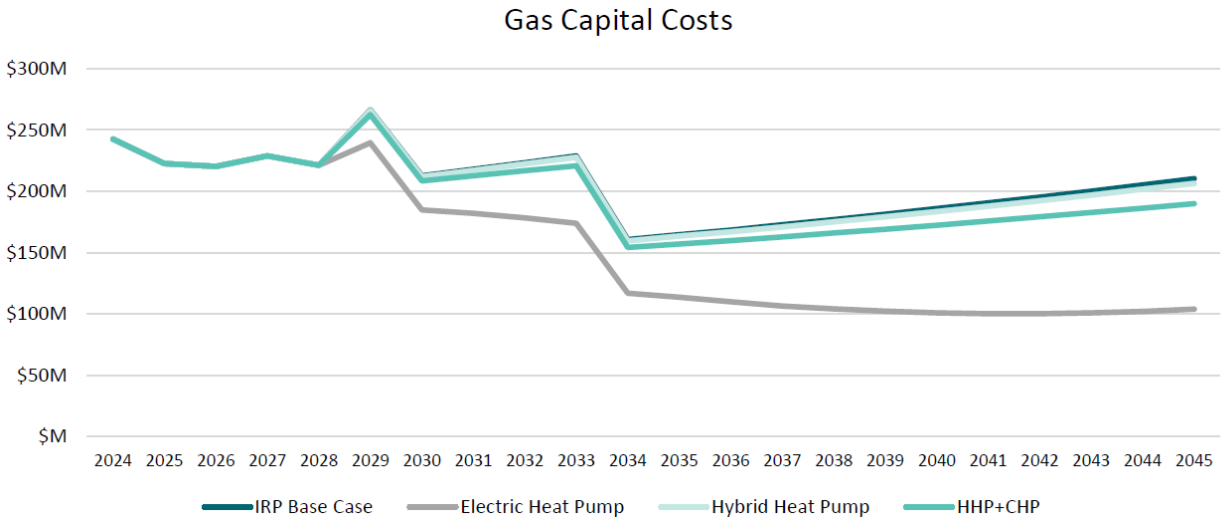
A. Yes. As shown in this testimony, the Company has aggressive requirements for complying with the CCA and meeting the state's emissions reduction targets. In 2024 the Washington state legislature passed ESHB 1589, which was designed to specifically help PSE chart a course for transitioning both its electric and gas systems to a clean, affordable, and reliable energy future. The legislature was particularly focused on decarbonizing residential and commercial heating loads to high efficiency, non-emitting equipment. To aid in achieving these state policy goals, the legislature instructed PSE to

[90] Exh. BTC-6.

file a single, integrated system plan and instructed the Commission to depreciate all gas plant in service by July 1, 2024, to a date no later than January 1, 2050.[91] The legislature was sending a clear signal to PSE and the Commission that building electrification would be a core component of the transition.

My concern is that the Company's gas investment plan does not seem to reflect this new paradigm. Indeed, the Company has stated that it intends to continue investing in its capital infrastructure at essentially the same pace through 2033 in all scenarios expect in an Electric Heat Pump scenario, in which the Company only begins to slowly decrease its spending in 2028. There is no real difference in the Company's plan under a Hybrid Heat Pump Scenario and the Company IRP's base case, which as I discussed earlier, may not comply with the CCA.

Table 14: PSE's Forecast Gas Capital Expenditures by Scenario[92]



[91] ESHB 1589 Sec 7(1). https://lawfilesext.leg.wa.gov/biennium/2023-24/Pdf/Bills/Session%20Laws/House/1589-S.SL.pdf?q=20240716063923.

[92] Updated Decarbonization Study, GRC Stipulation O, Dec. 22, 2023, page 80.

Q. What is the risk to customers of the Company's gas capital expenditure plan?

A. The near-term risk to customers is rapidly increasing customer rates. The long-term risk to customers is that some, or possibly many, of the assets will be underutilized in the medium-term and stranded in the long-term. The legislation is clear that gas plant installed prior to July 1, 2024, must be fully depreciated by 2050. The legislature's intent is to minimize the harm and risk to customers from declining throughput and departure of gas customers and ease the transition to a more electrified building sector. However, the more PSE invests in its gas system going forward increases the costs and risks to customers. For example, gas distribution pipe can have an average service life as long as 60 years.[93] The Company is planning to invest in that program at least through 2043, which means many of the investments could have service lives beyond 2100. The legislation is unclear as to when gas capital investments made after July 1, 2024, must be depreciated. But in any case, it is clear that additional investments increase the costs and risks to customers.

Q. Will all gas customers be equally impacted by PSE's gas capital investments?

A. No. Low-income customers are the least likely to be able to afford the costs of electrification. As wealthier gas customers partially or fully electrify, annual gas throughput is likely to decline. Given that PSE intends to maintain a robust gas system in all scenarios, rates must necessarily increase as the costs of maintaining the same gas system are spread over fewer therms of gas. Low-income customers will be disproportionately impacted. This is a concept that is often lost when we look at the societal costs of various scenarios. The number of customers varies in each scenario. A

[93] Exh. NWA-1T at 28:15 – 16.

high electrification scenario will have fewer individual customers than a hybrid heating scenario than a scenario with no electrification, all else equal. So, while the societal costs of the system may appear equal across scenarios, the individual customer impact will be felt differently based on the number of customers in each scenario. Moreover, it is difficult to forecast how the individual rate impact will influence a specific customer's behavior (their individual elasticity of demand). For example, if a customer who primarily relies on an air source heat pump for space heating only uses their backup gas furnace for three days a year, but still pays $100/month for maintaining a connection to the gas system, the customer may be incentivized to find an alternative cost-competitive backup source of heat. That type of analysis is not examined through an analysis that only estimates the societal cost of various pathways.

Q. ESHB 1589 allows PSE to propose a merger of its electric and gas rate bases in the future. Will a combined rate base help minimize the cost impacts to remaining gas customers?

A. It may. However, there are two caveats. First, the legislation only permits PSE to propose a merger and the Commission to approve a merger. It does not say when this will occur. Prior to a merger, remaining gas customers, who are likely to be disproportionately low-income, will be carrying the costs of a gas system PSE continues to invest in as if it is business as usual.

Second, merging the rate bases creates a new cost shift from gas customers to electric customers. It does not address the underlying problem that PSE is planning to continue to spend on its gas delivery system in all scenarios.

The best path for mitigating long-term rate impacts is for PSE to stop spending money on expanding its gas delivery system, and minimize the cost of maintaining a safe and reliable system through the use of alternatives to pipeline replacement (where applicable) that allow it to avoid gas system investments, or minimize the cost of the investments, and reduce its gas rate base.

Q. Are other state public utility commissions re-examining the pace and scope of gas utility pipeline replacement plans?

A. Yes, there are three examples from Illinois, D.C., and California. In November 2023, the Illinois Commerce Commission (ICC) disallowed $265 million from the 2024 gas pipeline replacement program, called the Safety Modernization Program, in the Peoples Gas Light and Coke Company and North Shore Gas Company (PGL). The ICC ordered PGL to pause the implementation of the program, opened a new investigation into the effectiveness of the program, and ordered the initiation of a statewide Future of Gas proceeding.[94] In its discussion on why the ICC found that the PGL provided inadequate record justification for its proposed spending level, the ICC noted several times that the Company did not examine alternatives to the gas utility's current SMP approach.[95]

In June 2024, The District of Columbia Public Service Commission rejected Washington Gas Light Company's $672 million Pipes3 and ordered the Company to file a new plan.[96] The Commission found that the Company's pipeline replacement program

[94] Dockets 23-0068,23-0069 North Shore Gas Company and The Peoples Gas Light and Coke Company Proposed general increase in rates and revision to service classifications, riders, and terms and conditions of service (tariff filed January 6, 2023). Order, November 16, 2023.

[95] Id., pages 25 – 30.

[96] DC Public Service Commission Says No to $672 Million Gas Pipe Replacement Program, Sierra Club Press Release, June 13, 2024. https://www.sierraclub.org/dc/blog/2024/06/dc-public-service-commission-says-no-672-million-gas-pipe-replacement-program.

needs to be revised to better align with federal and District climate initiatives and "balance the need to replace leak-prone, highest-risk pipe segments… while minimizing the stranded assets as the District continues to undergo the energy transition."[97]

Finally, in California, PG&E, Ava Community Energy, Gridworks, Environmental / Justice Solutions, and E3 conducted a project that explored targeted building electrification and gas system decommissioning in California.[98] The principles found that in all 11 sites evaluated, all 11 projects would show net benefits from a lifecycle total cost perspective. E3 also developed a benefit-cost analysis framework for evaluating candidate sites for use in other jurisdictions as well.[99]

B. A Requirement and Framework for Evaluating Alternatives to Gas Capital Investments

Q. Previously you identified the need for PSE to conduct alternatives analysis that primarily looks to pipeline repair, NPAs, and zonal electrification in lieu of pipeline replacement to minimize costs, emissions, and long-term risks to customers. Will you start by describing pipeline repairs?

A. Yes. Cutting out and replacing a segment of pipe is expensive. Pipeline repair is the process by which the gas utility repairs rather than replaces a segment of pipe. There are

[97] Public Service Commission of the District of Columbia, Formal Case No. 1154, In the Matter of Washington Gas Light Company's Application for Approval of ProjectPipes2 Plan, and Formal Case No. 1175, In the Matter of Washington Gas Light Company's Application for Approval of ProjectPipes3 Plan, and Foma Case No. 1179, In the Matter of the Investigation into Washington Gas Light Company's Strategically Targeted Pipe Replacement Plan. Order No. 22003, page 17.

[98] *A New E3 Benefit-Cost Analysis of Targeted Electrification and Gas Decommissioning Shows Potential for Cost Savings*, Energy and Environmental Economics, Inc. (E3), Dec. 7, 2023, https://www.ethree.com/a-new-e3-benefit-cost-analysis-of-targeted-electrification-and-gas-decommissioning-shows-potential-for-cost-savings/.

[99] Aryeh Gold-Parker, et al., *Benefit-Cost Analysis of Targeted Electrification and Gas Decommissioning in California*, Energy and Environmental Economics, Inc. (E3), 2023, https://www.ethree.com/wp-content/uploads/2023/12/E3_Benefit-Cost-Analysis-of-Targeted-Electrification-and-Gas-Decommissioning-in-California_u.pdf.

a variety of methods for repairing a natural gas pipeline. For example, one repair method is to wrap the leaking segment of pipe with a "sleeve."[100] Repairing, rather than replacing the segment of pipe, can be quite cost-effective. A 2023 study conducted by Gas Safety USA, submitted to the Public Service Commission of the District of Columbia on behalf of the District of Columbia Government, found that pipeline repair can cost between one tenth and one hundredth of the cost of pipeline replacement.[101] Repairs can safely extend the serviceable lives of the existing pipe without making an additional investment in new pipe that, in the case of a new main, has a depreciable life of approximately 30 years. One benefit of pipeline repairs is that they often have a shorter depreciable life, which may better match the useful life of that segment, and the costs to the benefits received by customers, in a rapidly decarbonizing gas utility service territory.

Q. Does PSE use pipeline repairs?

A Yes, although it spends significantly less on repairs than on pipeline replacement. PSE states that they do not repair polyethylene pipe (PE) – PSE will only replace PE.[102] However, the Company will repair steel mains. The Company has 13,100 miles of main, 30 percent of which is steel.[103] PSE states that it relies on its engineering and field personnel to evaluate and determine whether to perform a replacement or choose a repair method.[104] During the

[100] Nicholas Newman, *Appropriate Methods for Repairing Pipelines,* Dec. 12, 2020, https://pgjonline.com/news/2020/12-december/appropriate-methods-for-repairing-pipelines.

[101] Ackley, B. et al, *Strategic Electrification in Washington, D.C.: neighborhood Case Studies of Transition from Gas to Electric-Based Building Heating*. Washington, D.C., Department of Energy and Environment. Dec. 14, 2022. Available at: https://edocket.dcpsc.org/apis/api/Filing/download?attachId=186471&guidFileName=a9254ec8-d08f-46ed-af0e-31b28d707139.pdf.

[102] Exh. BTC-12.

[103] Exh. BTC-13.

[104] Exh. BTC-14.

2025 – 2026 MYRP, PSE forecasts spending an average of $21 million annually on pipeline repairs.[105] For reference, PSE anticipates spending approximately $160 million annually on pipeline replacements.[106]

Q. What are nonpipeline alternatives?

A. NPAs in the gas sector are the equivalent of the electric sector's "non-wires alternatives" and refer to activities or investments that delay, reduce, or avoid the need to build or upgrade traditional gas system infrastructure such as pipelines, storage, and peaking resources.[107] An NPA can consist of a single demand- or supply-side resource, but more often it is a portfolio of resources. The specific costs and benefits of NPA opportunities depend on the nature of the utility's pipeline system, capacity needs, types of customers, and the state's policy goals. Typical NPA resources include demand response, energy efficiency, electrification of heat, behavioral programs, and on-system gas supply, such as compressed or liquified natural gas. NPAs can help achieve several policy goals including cost reductions, risk reductions, and emissions reduction.

Q. What are some of the potential benefits of NPAs?

A. There are numerous benefits of NPAs, particularly NPAs that rely on energy efficiency and electrification, which can improve participating customers comfort and air quality. However, there are three primary benefits: Cost reduction, risk reduction, and emissions

[105] Exh. BTC-15.

[106] Id.

[107] *Part 1 | Non-Pipeline Alternatives to Natural Gas Utility Infrastructure, An Examination of Existing Regulatory Approaches*, A Strategen Report prepared for the Lawrence Berkeley National Laboratory.

reduction.[108] First, as PSE forecasts with its own Targeted Electrification Pilot in Duvall, NPAs can be less expensive than traditional utility capital projects. In Duvall, PSE forecasts the NPA to cost $4 million, while the traditional solution would cost $11 million.[109] Second, NPAs can reduce two types of risk: risk that an asset becomes stranded, and in the case that the NPA relies on demand-side resources, reduces customers' exposure to volatile natural gas prices. Finally, NPAs can enable emissions reductions and thus compliance with the CCA.

Q. Are other states requiring gas utilities to examine NPAs to traditional capital investments?

A. Yes. Most recently, the Massachusetts Department of Public Utilities completed its Future of Gas investigation and identified NPA analysis as a requirement for all capital investments going forward. The DPU found that "[g]oing forward, [local distribution companies] will have the burden to demonstrate the consideration of NPAs as a condition of recovering additional investment in pipeline and distribution mains."[110]

Several other states have required NPA analysis for certain capital projects. For example, in Colorado, gas utilities are required to conduct NPA analysis for all capacity

[108] *Non-Pipeline Alternatives: A Regulatory Framework and a Case Study of Colorado, Leading Practices in the Screening and Evaluation of NPAs,* October 2023. A Strategen Report prepared for the Lawrence Berkeley National Laboratory.

[109] Exh. BTC-16.

[110] Massachusetts Department of Public Utilities, Docket 20-80, *Investigation by the Department of Public Utilities on its own Motion into the role of gas local distribution companies as the Commonwealth achieves its target 2050 climate goals.* Order on Regulatory Principles and Framework. Dec. 6, 2023. Available at: HTTPs://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/18297602.

expansion and new business projects over $3 million.[111] Rhode Island set a cost threshold at $0.5 million.[112] New York did not set a specific threshold, rather it created separate small and large project thresholds for each gas distribution company (typically greater or less than $2 million).[113] In Oregon, Avista agreed through a rate case settlement to conduct NPA analysis on all capital investment projects over $1 million.[114]

Q. In addition to repairs and NPAs, you identified zonal electrification as an alternative to traditional pipeline investment. Will you please explain?

A. Yes. Zonal electrification (often referred to as neighborhood electrification) is the strategic decommission of a segment of the gas system through full electrification of a specific area, or "zone." Using zonal electrification, a utility can electrify a neighborhood or several streets that are linked by the same distribution pipelines. Decommissioning a segment of the gas network reduces both capital investments, in the form of avoided asset replacement, and operational & and maintenance (O&M) expenses. Zonal electrification aligns the size of the system to the customer base, ultimately leading to savings for customers that remain on the system. Zonal electrification is akin to a non-pipeline alternative project in which the only demand-side resource used is electrification.

[111] *Part 1 | Non-Pipeline Alternatives to Natural Gas Utility Infrastructure, An Examination of Existing Regulatory Approaches*, A Strategen Report prepared for the Lawrence Berkeley National Laboratory. Nov. 2023.

[112] Id.

[113] *Non-Pipeline Alternatives to Natural Gas Utility Infrastructure: An Examination of Existing Regulatory Approaches,* A Strategen Consulting Report Prepared for Lawrence Berkeley National Laboratory, Nov. 2023.

[114] Oregon Public Utilities Commission Docket No. UG 461, Order No. 23-384, Oct, 26, 2023. Available at: https://apps.puc.state.or.us/orders/2023ords/23-384.pdf.

Q. Are you aware of any zonal electrification programs across the country?

A. There are several examples of zonal electrification projects including Pacific Gas and Electric (PG&E)'s proposed electrification of the California State University (CSU) Monterey Bay and the Public Service Company of Colorado's (PSCo) Pearl Street Mall project. IN 2022, PG&E filed a $17.2 million program to fully electrify buildings on the CSU Monterey Bay campus and decommission six miles of distribution lines.[115] PG&E expects that the project will reduce emissions by 2,278 metric tons of CO2 and produce a 1.07 benefit to-cost ratio (a benefit-to-cost ratio above 1.0 yields net societal benefits).[116]

In Colorado 2023, PSCo proposed the electrification of the Pearl Street Mall as a NPA in the Company's initial Gas Infrastructure Plan (GIP).[117] The Company analyzed NPA resources for a segment of pipe deemed high-risk by the Company's Distribution Integrity Management Program.[118] The Company assessed that it would need to replace the existing distribution pipelines at a cost of $6.7 million in order to be in compliance with PHMSA Codes.[119] The full electrification of the 66 customers served by the pipeline, on the other hand, could avoid a traditional pipeline solution. PSCo evaluated the electrification program costs, emissions reductions, electric system impacts, and other factors in a benefit-cost analysis. The Company determined that the electrification NPA

[115] CPUC U 39 G, Amended Application of Pacific Gas and Electric Company (U 39 G) For Approval of Zonal Electrification Pilot Project at page 2, Dec. 19, 2022. https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M500/K435/500435462.PDF.

[116] Rachel Kuykendall, *PG&E Long-Term Gas Planning and Decarbonization Vision. PG&E.,*https://drive.google.com/file/d/1qojLSmnmJcRSGbvr2-pPnsFtp7nS_0pX/view.

[117] CO PUC 23M-0234G, Attachment B.8.

[118] Id., page 3.

[119] Id., page 1.

program cost to be $3.2 million, $3.5 million less than the traditional program costs.[120] The NPA project also resulted in greater net benefits than the traditional infrastructure solution, according to the Company's benefit-cost analysis, and thus PSCo proposed to implement the project.[121]

Q. PSE has an obligation to serve gas customers, which means that PSE cannot force a gas customer to electrify. Will this impact the cost-effectiveness of zonal electrification?

A. Yes. The full benefits of zonal electrification are only realized if all customers participate. If a customer remains on that segment of the gas system, the Company must maintain the bulk of that portion of the system depriving the utility of realizing the benefits of decommissioning that portion of the network. For this reason, a recent paper from RMI and National Grid emphasized that the most achievable opportunities would require only a handful of participants (1 – 5 customers).[122] I agree with RMI and National Grid that smaller projects are the most achievable, however, I do not think that PSE nor the Commission should foreclose the opportunity for larger projects should the right opportunity arise.

[120] Id., page 17.

[121] Id.

[122] RMI and National Grid, *Non-Pipeline Alternatives: Emerging Opportunities in Planning for U.S. Gas System Decarbonization,* May 2024, page 1, https://www.nationalgridus.com/media/pdfs/other/CM9904-RMI NG-May-2024.pdf.

Q. Why is now the time for the Commission to require, and PSE incorporate, an alternatives analysis framework for evaluating opportunities to implement pipeline repairs, NPAs, and zonal electrification?

A. We are in the midst of a global energy transition, and Washington state is at the forefront of this transition. The state has passed nation leading climate policies and programs including the Clean Energy Transformation Act, Climate Commitment Act, and industry leading building codes. The legislature passed ESHB 1589 to ease the clean energy transition specifically for PSE. The legislature also recognized that the Commission may need to modify its regulatory approach, and so authorized the Commission to approve MYRPs and use alternatives to the traditional cost of service rate making.[123]

PSE has a state-mandated obligation to dramatically reduce emissions from its gas utility by 2050. Each incremental traditional investment in gas system infrastructure makes it harder and more costly for PSE and its customers to achieve those targets. The Commission needs to modify its regulatory approach to ensure that PSE meets the state's goals while minimizing the costs to ratepayers.

Q. What is your recommendation to the Commission?

A. Similar to the Massachusetts Department of Public Utilities in its Future of Gas order, I recommend that the Commission adopt a requirement in this Order that sets an expectation that PSE has the burden to demonstrate that it considered alternatives(repairs, NPAs, and zonal electrification) to traditional pipeline investments as a condition of

[123] SB 5295 (2021), available at https://lawfilesext.leg.wa.gov/biennium/2021-22/Pdf/Bills/Session%20Laws/Senate/5295-S.SL.pdf?q=20240806121143.

recovering additional investment in pipeline and distribution mains that are not emergency repairs as a condition for recovering any pipeline investment.

Requiring a utility to demonstrate that it conducted an alternatives analysis is not a new concept – rather it is a standard expectation and a hallmark of planning. Not all projects would have a commercially available alternative, and my expectation is that in some cases, particularly in the near-term, zonal electrification and NPAs would not be suitable. Nevertheless, the Commission and the utility must shift how they think about the gas system and not simply continue investing in the gas system business as usual. By adopting this requirement today, PSE may be able to avoid many of the planned investments that will not occur for 10 to 20 years from now.

Q. Is there an NPA framework that you recommend PSE adopt?

A. I encourage the Company to review the existing literature and work with its conservation and IRP advisory groups to develop a framework that is suitable for the needs of PSE. NPA framework discussions include:

- Strategen's NPA review for Lawerence Berkeley National Laboratory Colorado Public Utilities Commission,[124]
- RMI and National Grid's Report on Emerging Opportunities for Non-Pipeline Alternatives,[125]

[124] *Part 1 | Non-Pipeline Alternatives to Natural Gas Utility Infrastructure: An Examination of Existing Regulatory Approaches*, A Strategen Consulting Report for Lawrence Berkeley National Laboratory, 2023. Available at: https://www.strategen.com/strategen-blog/non-pipeline-alternatives-natural-gas-utility; *Part 2 | Non-Pipeline Alternatives: A Regulatory Framework and a Case Study of Colorado" A Strategen Consulting Report for Lawrence Berkeley National Laboratory*, 2023. Available at: https://www.strategen.com/strategen-blog/non-pipeline-alternatives-framework.

[125] *Non-Pipeline Alternatives: Emerging opportunities in Planning for U.S. Gas System Decarbonization*" RMI and National Grid, May 2024. Available at: https://www.nationalgridus.com/media/pdfs/other/CM9904-RMI_NG-May-2024.pdf.

- Oregon Public Utilities Commission Staff's NPA Framework for Avista.[126]

Q. You identify an exemption for emergency repairs from the alternatives analysis. Why are you exempting emergency repairs?

A. A safe gas system is paramount. The Company has an obligation to maintain a safe and reliable system. Typically, emergency repairs are responding to Grade 1 leaks which represent existing or probable hazards and require prompt action.[127] As PSE describes it, emergency repairs require immediate repairs and the projects do not go through the Integrity Management risk prioritization process. The Company also notes that all emergency repairs are 100 percent replacement of the unit of property.[128]

Q. Are you concerned that exempting emergency repairs would incentivize the Company to change how it classifies distribution projects?

A. Yes, however that is a preferrable problem then the issue we are facing today. Commission Staff, Public Counsel, and other intervening parties will have to closely monitor the Company's capital investment expenditures to ensure costs are appropriately classified.

Q. How would you expect PSE to implement this requirement?

A. It begins with planning. I would expect that PSE will incorporate the requirement into its Distribution Integrity Management Plan, its Transmission Integrity Management Plan, its Gas Operating Standard, Integrated System Plan, and any other relevant plans to incorporate this requirement. The Company will need to align its planners, engineers, and

[126] Exh. JAD-4, Oregon PUC, Order No. 24-156, No. LC 81 at Appendix A, page 71.

[127] WAC 480-93-18601.

[128] Exh. BTC-14.

related teams on frameworks for evaluating alternatives for different types of projects. I would also expect that PSE's resource planning team, through its forthcoming integrated system plans and other analysis, would evaluate the potential for implementing NPAs and zonal electrification to avoid new capacity needs, for compliance with the CCA, and for opportunities to minimize long-term customer costs through the strategic decommissioning of certain sections of the system. When the Company comes in for rate recovery, I would expect that PSE would provide a demonstration of its analysis and justify its conclusions and actions. I would encourage the Company to consult with Commission Staff, Public Counsel, and other relevant industry professionals as it develops its alternatives analysis framework.

Q. The Company is proposing a targeted electrification program in Duvall that it hopes will avoid the need for a capacity expansion project in that area. Is the Company's targeted electrification proposal an NPA?

A. Yes. PSE has identified a segment of its gas delivery system in Duvall Washington that needs a capacity expansion to serve growing load. The Company states that the need was identified in 2018 and since then the Company has been relying on "cold weather actions" to meet demand.[129] PSE's cold weather actions since 2018, such as the use of mobile trailers to inject compressed natural gas, is a form of NPA. The Company's cold weather actions is an example of a supply-side NPA. However, with this pilot, PSE is proposing an all-demand-side NPA. PSE will incentivize dual-fuel customers to convert space and water heating from gas to electric, in addition to offering targeted energy

[129] Exh. BTC-16.

efficiency and conservation at those customers.[130] PSE forecasts that the pilot will impact 500 customers and cost approximately $4 million.

Q. Do you agree with PSE's pursuit of the targeted electrification pilot for this capacity constrained geographic area?

A. Yes, I agree that this is a worthwhile pilot. To start, PSE estimates that a traditional pipeline solution would cost approximately $11 million.[131] Thus, the business case for an electrification-focused NPA is very strong. As the Company has shown by using mobile CNG trucks, NPAs are not new solutions – gas utilities have been using supply-side resources to avoid additional pipeline capacity for many years. In this instance, I appreciate the Company's focus on demand-side resources as the cornerstone of the NPA because demand-side resources reduce costs, emissions, and long-term risks. As demonstrated in this testimony, electrification is a "least regret" resource for decarbonization and compliance with the CCA. While I think the Company's proposal is laudable in this case, I would expect to see the Company scale these types of programs in its next MYRP to meet its decarbonization goals and minimize costs and risks to customers.

Q. The Company's Duvall project is intended to relieve the need for a capacity expansion of the system. Are there other types of projects in which PSE should be proposing NPAs and zonal electrification projects?

A. Yes. I do not see a policy reason why the Commission should limit the types of projects considered for NPAs or zonal electrification except for emergency repairs. For example,

[130] Exh. JM-1CT, 18:18 – 19:7.

[131] Exh. BTC-16.

it is plausible that an NPA or zonal electrification alternative could be feasible as an alternative to a mandatory relocation or other public improvement project. Not all projects will have a suitable, cost-effective alternative, but the only investment category that should be excluded entirely is emergency repairs.

VI. Realigning PSE's Financial Incentives for Meeting State Policies

Q. Your testimony has highlighted PSE's challenge for complying with state emissions policies. Do you have a recommendation on how the Commission can modify its regulatory structure to better align the Company's financial incentives with their customers interests and state policy goals?

A. Yes. I recommend that the Commission reduce the return on equity for projects associated with connecting new customers and expanding the gas system. The traditional cost-of-service regulatory structure has a capital expenditure bias, whereby utilities are incentivized to pursue capital investments that grow the gas system. The utility does not necessarily have a bias towards one programmatic category – they all earn the same rate of return. However, as I have demonstrated in my testimony, the continued expansion and growth of the gas system is no longer in the public interest and contrary to the state's goals for reducing greenhouse gas emissions. The Commission reached the same conclusion when it reduced gas utilities line extension allowances in 2021.[132] Customer requests and capacity expansion projects are amongst the riskiest gas capital investments as these projects will have long-lives that stretch well beyond 2050 and are at an elevated risk of becoming stranded in the future. The Commission can better align the utility's

[132] Docket UG-210729 *In the Matter of Chair Danner's Motion to Consider Whether Natural Gas Utilities Should Continue to Use the Perpetual Net Present Value Methodology to Calculate Natural Gas Line Extension Allowances.* Order 01, Authorizing and Requiring Tariff Revisions.

financial incentives with public policy by reducing the return on equity for projects that contradict state policy, such as growth-related gas capital investments.

Q. Is there a category of capital investments that are associated with connecting new customers?

A. Yes. Figure 14 on page 65 shows PSE's expected gas capital expenditures for the MYRP. An investment category is called "customer requests" and reflects costs associated with connecting new customers to the system.

Q. Which capital investment categories or programs are associated with an expansion of the system?

A. Capacity expansion projects refer to new investments that are necessary for maintaining reliability attributable to increasing customer demand from either existing or new customers that otherwise are not classified as related to customer requests. The Public Service Company of Colorado defines it as including "individual projects and sets of inter-related facilities needed to maintain system reliability and meet a specified capacity expansion need, including for new customers or facilities that are not otherwise new business projects, or for reliability and growth related to existing customers."[133] An example of a PSE capacity expansion project is the Targeted Electrification of Natural-Gas Constrained Geographic Area Pilot in Duvall Washington. In Duvall, PSE is experiencing increasing customer demand whereby the Company must either increase their ability to deliver energy or reduce customers' energy demand to maintain system reliability.

[133] Colorado Public Utilities Commission, Proceeding No. 24AL-0049G. Direct Testimony of Company Witness Gardner (HE 105) at 62:5-9.

Q. Have investments in customer requests been increasing or declining?

A. PSE's expected costs associated with customer requests is down significantly in the MYRP relative to the recent past. From 2017 – 2023, PSE spent approximately $100 million per year on customer request.[134] PSE is forecasting only $52.1 million in customer request expenditures during the two-year MYRP.[135]

Q. What does PSE assume is driving customer connection requests over the next twenty years?

A. In its 2022 load forecast, which is the basis of the Company's IRP and 2023 Decarbonization Study, PSE assumes that "new customers would not run furnaces or water heaters with gas, but would still connect to the PSE gas system, where allowed, to run gas cooking, fireplaces, BBQ, natural gas for backup generators, dryers, etc."[136]

Q. Do you have any observations about PSE's assumptions of factors that will drive new customer connections?

A. Yes. The uses that PSE identified, namely gas cooking, fireplaces, BBQs, and dryers, have considerably lower replacement costs than the end-uses PSE assumes will not be connected to the system, space and water heating. As I have explained in this testimony, as gas throughput declines faster than the reduction to gas capital expenditure investments, customer rates will increase as more of the fixed costs of the system are recovered over fewer therms of gas. This will change how customers perceive the value of remaining connected to the gas system and increases the chances the customer will

[134] Exh. BTC-11.

[135] Exh. DJL-1Tr, 26: Table 5.

[136] Exh. BTC-6.

exchange a gas appliance for an alternative. Particularly so for customers who are only connected to the gas system for gas cooking, fireplace, or another lower capital cost appliance. The costs and barriers for converting to alternatives are substantially less than space and water heating. PSE's investments to connect these customers are at a relatively higher risk of being stranded before PSE has fully recovered the costs of investment.

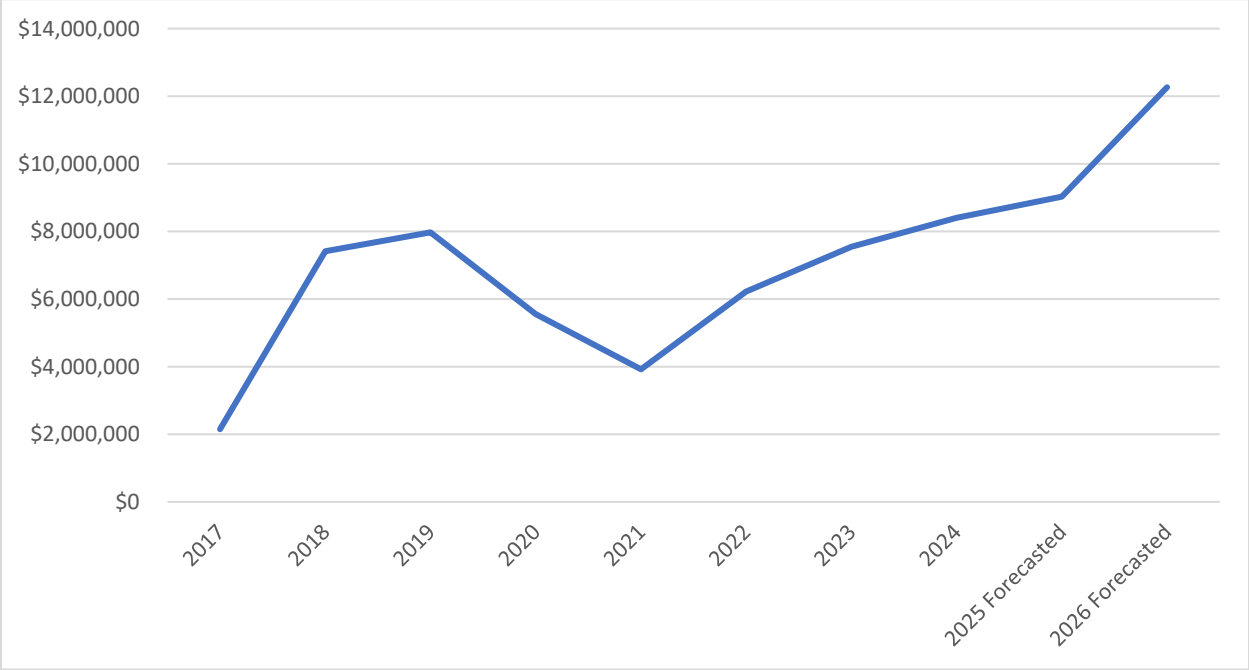
These end-use connections produce fewer benefits for the Company and customers because they use relatively little gas (as compared to space and water heating). Because a portion of the fixed cost of the gas delivery system is recovered through the variable rate, appliances that use small amounts of gas contribute less overall to the system and to the benefit of other customers.

Q. How much does PSE anticipate spending on capacity expansion projects during the MYRP?

A. PSE did not separately identify capacity expansion projects during the MYRP in its testimony. On discovery, the Company stated that approximately $21.3 million of the $29.7 million costs in the Pipeline System Reliability program could be classified as capacity expansion project.[137] As shown in Figure 15, PSE expects to increase its spending on capacity expansion projects during the MYRP.

[137] Exh. BTC-17; Landers Direct, Exh. DJL-1Tr, 26: Table 5.

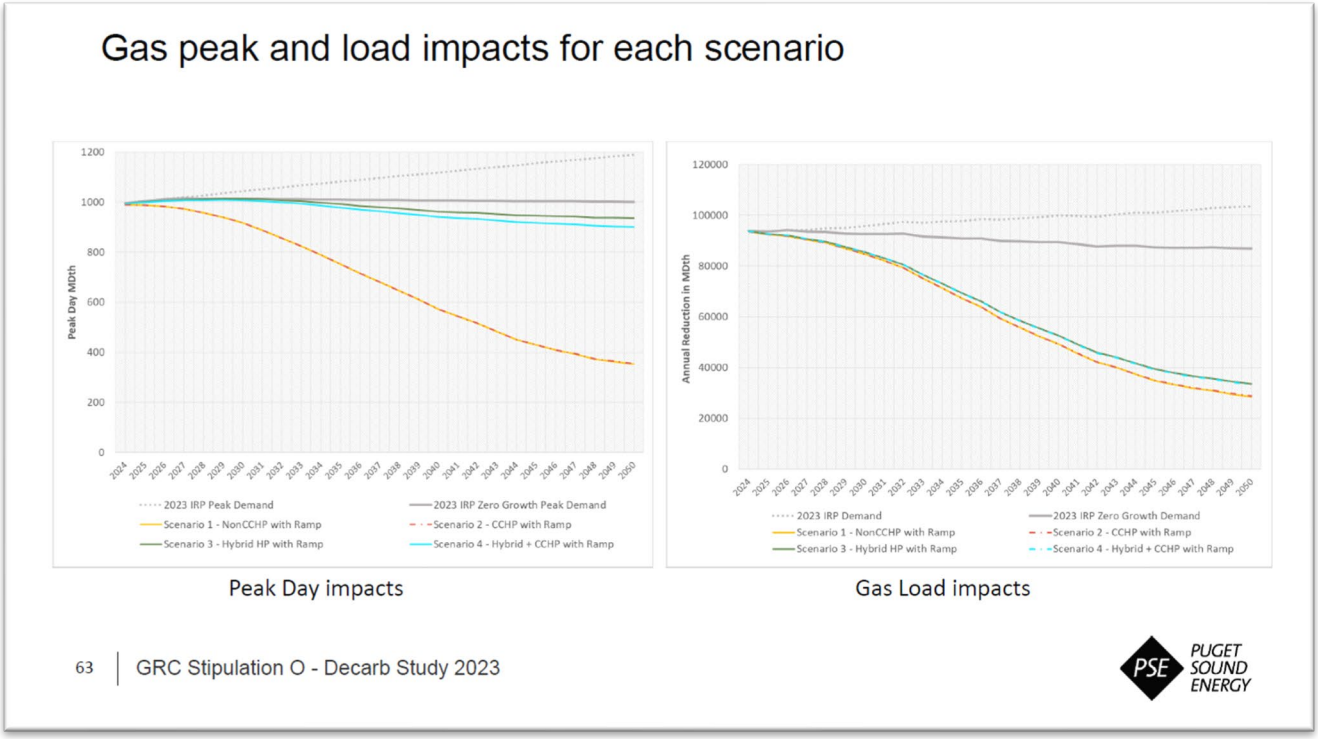
Figure 15: PSE Gas Capacity Expansion Spending by Year



Q. Are capacity expansion projects, like new customer connections, also relatively riskier investments?

A. Yes. As can be seen in Figure 16 below, in each of the four electrification scenarios PSE identified in its 2023 Decarbonization Study, total throughput and peak demand will decrease over the long run particularly in the scenarios in which customers are adopting cold climate heat pumps without gas. Although we do not know the exact pace of the energy transition and the future size of the gas delivery system, it is clear that any capacity expansion investment today is at risk of being underutilized or stranded in the long run. The state legislature told the Commission to depreciate all PSE capital assets in place prior to July 1, 2024, by 2050. Clearly, the state is preparing for a situation in which there is a dramatic decline in gas demand. In any case, as shown in Figure 16, PSE is forecasting a decline in peak demand in all scenarios, which means that there should be more situations in which alternatives to capacity expansion would be cost-effective.

Figure 6: PSE's Decarbonization Study Gas Peak and Load Impacts by Scenario[138]



Q. Will you please discuss how your proposal for a reduced ROE is aligned with the Commission's shift towards performance-based ratemaking?

A. Yes. In 2022, the Washington state legislature passed SB 5295, which directed the Commission to conduct a proceeding to develop a policy statement addressing alternatives to traditional cost of service ratemaking, including performance-based measures or goals, targets, performance incentives, and penalty mechanisms. In April 2024, the Commission issued its Interim Policy Statement.[139] In its Policy Statement, the Commission stated that performance-based regulation "provides a framework that includes a suite of tools intended to better align utilities' financial interest with state

[138] PSE Decarbonization Study, GRC Stipulation O, page 63.

[139] Docket U-210590, *Interim Policy Statement Addressing Performance Measures and Goals, Targets, Performance Incentives, and Penalty Mechanisms*. April 12, 2024.

policy, and both customer and societal interests. These tools are needed to incentivize or discourage behavior, address a utility lack of action, or to achieve cost containment goals."[140] The Commission currently employs several of the most common PBR tools including multi-year rate plans, revenue decoupling, deferrals and cost trackers, performance metrics, and performance incentive mechanisms.[141]

Differentiating the ROE for certain types of investments that are not aligned with state policy is fully within the scope of the Commission's PBR framework. Indeed, reducing the ROE for investments related to expanding the gas system and connecting new customers would better align the utility's financial interests with state policy goals by reducing the utility's financial incentive to pursue those projects, and complement the Commission's PBR framework for PSE.

Q. You are proposing only a reduced ROE on certain types of plant but not an ROE adder for other types of investments. Please explain your rationale.

A. As the Commission said in its Policy Statement, PBR tools are needed to incentivize or discourage behavior. An appropriately structured PBR framework includes a suite of tools that address the utility's performance and addresses the utility capital expenditure and throughput bias, which are not necessarily aligned with customers.[142] At present, the Company has several tools that protect its financial interests (e.g., cost trackers,

[140] Docket U-210590, *Interim Policy Statement Addressing Performance Measures and Goals, Targets, Performance Incentives, and Penalty Mechanisms*, April 12, 2024, page 7.

[141] Elaine Prause & Jessica Shipley, *Performance-Based Regulation: Considerations for the Washington Utilities and Transportation Commission, Regulatory Assistance Project*, 2022, Available at https://apiproxy.utc.wa.gov/cases/GetDocument?docID=35&year=2021&docketNumber=210590. .

[142] Elaine Prause & Jessica Shipley, *Performance-Based Regulation: Considerations for the Washington Utilities and Transportation Commission, Regulatory Assistance Project*, 2022, page 5. Available at https://apiproxy.utc.wa.gov/cases/GetDocument?docID=35&year=2021&docketNumber=210590.

decoupling, multi-year rate plans) and reduces the utility's throughput incentive (e.g., decoupling). The Commission has also adopted a performance incentive mechanism for PSE. In the last rate case, the Commission approved a settlement which included an asymmetrical reward-only PIM in which PSE earns if it achieves a certain level of demand response. In this rate case, I propose another asymmetrical, reward-only PIM for PSE to earn additional profit for meeting electrification targets. Those reward-only PIMs are reasonable and in the public interest even if they do not have a penalty associated with them, as they are incentivizing utility actions that are aligned with the public interest.

A. It is similarly reasonable and appropriate for the Commission to approve a reduced ROE for growth-related investments in this rate case without a corresponding ROE adder for other types of investments. Not all incentives need to be symmetrical. In this case, the incentive is to deprioritize certain investment categories, not prioritizing one investment category over another. Moreover, I am not convinced the Company needs an additional incentive beyond its Commission-approved ROE for other types of investments as the utility already has a financial incentive to pursue those categories of investments.

Q. Would a reduced ROE for growth-related investments jeopardize the safety and reliability of the system?

A. No. The Company would continue to earn the same ROE for all other categories of investments including emergency repair, mandatory relocations, and reliability projects. Furthermore, the Company would still earn a return on its equity for the investments that it makes in the affected categories, albeit at a slightly lower profit. The idea is to

incentivize the Company to consider if could better deploy its funding to other projects that have a higher ROE.

Q. Does PSE actually have control over a customer's request to connect to the system or expand the system to meet demand?

A. PSE does not have complete control, however, neither is it powerless to influence customer demand. PSE has significant control over the types of programs it offers customers (i.e., demand-side resources including incentives for building electrification) the types of alternative investments it considers, and ultimately, which investment it makes. PSE has control of its program designs, program marketing, and program execution. The purpose of a reduced ROE for certain growth-related investments is to incentivize PSE to prioritize alternatives to capital expenditures that make long-term investments in the gas delivery system that are expensive, risky, and not aligned with the public interest.

Q. Are you concerned that a reduced ROE for growth-related investments would incentivize the Company to change how it classifies projects?

A. Yes. However, like I stated earlier in my testimony when discussing exempting emergency repair investments from an alternatives analysis, this is a preferrable problem than the perverse incentive to overbuild we are facing today. Commission Staff, Public Counsel, and other intervening parties will have to closely monitor the Company's capital investment expenditures to ensure costs are appropriately classified.

Q. What is your recommended level of ROE for customer request and capacity expansion investments?

A. Determining the appropriate ROE in a rate case involves some level of judgment. The Commission examines the health of the Company, the Company's capital structure, interest rates, the relative risks facing the industry, the health of the economy, customer affordability, and peer utility returns when it makes a decision on the appropriate ROE. The Commission will need to consider each of these factors as well when it determines the appropriate reduced ROE for customer requests and capacity expansion projects.

The Company's cost of debt represents the lowest cost financing option available to the Company. The Commission should consider this the floor. PSE has an obligation to maintain a safe and reliable system, as well as connect new customers who request connections. Therefore, the Company should be entitled to an ROE no less than the cost of debt. However, reducing the ROE for customer request and capacity expansion projects from the cost of equity to the cost of debt is significant and likely too disruptive. It is my understanding that this Commission has a preference for gradualism when making policy decisions. In the 2022 MYRP, the Commission set the cost of debt at 5 percent and the cost of common equity at 9.4 percent.[143] I recommend that in this case the Commission begins by setting the ROE for customer request and capacity expansion projects 0.75 percent lower than its approved ROE for all other capital investments.

[143] Exh. CGP – 1CT, 3:9.

Q. Are you familiar with any other cases in which this Commission, or another state commission, has approved a different ROE for a certain class of assets?

A. I am aware of state public utility commissions and the Federal Energy Regulatory Commission approving ROE adders to incentivize certain types of investments. For example, FERC allows a 50-basis point adder on transmission facilities that participate in a regional transmission organization.[144] I am unaware of any PUC or FERC decision that reduces a ROE to disincentivize investment in a certain category. However, in July 2024, Colorado Public Utilities Commission (CoPUC) Staff proposed that the Colorado Public Utilities Commission reduce the Public Service Company of Colorado's ROE for new growth and capacity expansion projects (growth investments) in the gas utility business.[145] CoPUC Staff recommended that the reasonable range of ROE for growth investments ranges from the costs of debt to the minimum of the range of the overall company ROE. In that specific case, Colorado PUC Staff recommended an overall ROE of 9.00 and an ROE of 7.71 for growth investments.

VII. Conclusion

Q. Will you please restate your recommendations to the Commission?

A. Yes, I recommend the following:

- The Commission establish a target of electrifying 182,000 customers in PSE's gas service territory by the end of 2030.

[144] Docket No. ER24-1614-000 Orange and Rockland Utilities, Inc. New York Independent System Operator, Inc. Order on Tariff Filing, Establishing Paper Hearing Procedures, and Establishing Hearing and Settlement Judge Proceedings. May 24, 2024.

[145] Proceeding No. 24AL-0049G, In the Matter of Advice No. 1029-Gas of Public Service Company of Colorado to Revise its Colorado PUC No. 6-Gas Tariff to Increase Jurisdictional Base Rate Revenues, Implement New Base Rates for all Gas Rate Schedules, and Make Other Proposed Tariff Changes Effective February 29, 2024. Answer Testimony of Erin T. O'Neill, July 11, 2024.

- The Commission order the Company to offer a General Electrification effort that includes three programs: New Construction, Existing customers who convert to all electric heating systems, and existing gas customers who convert to hybrid heating systems without adding a new gas furnace.
- PSE pursue a target of electrifying at least 7,500 incremental customers in 2025 and 15,000 incremental customers in 2026, with the goal of additional scaling in subsequent years.
- The Commission establish a performance incentive mechanism as described in my testimony, for PSE's achievement in its general electrification program target.
- The Commission order PSE to provide semi-annual progress reports on its General Electrification programs.
- Unless PSE can provide more detail about the need for its $2 million Targeted Electrification Strategy budget, the Commission direct this funding to directly supplement the Pilot efforts.
- The Commission allow PSE to recover Phase 2 electrification costs through a separate rate adjustment for this case, but recommend the Commission direct PSE to recover electrification costs after 2027 through base rates.
- The Commission reject the Company's $3 million Alternative Fuels Readiness Program as the Company has not met its burden to demonstrate that the project is in the public interest.
- The Commission adopt a requirement that PSE has the burden to demonstrate that it considered alternatives to traditional pipeline investments as a condition of

recovering additional investment in pipeline and distribution mains that are not emergency repairs.

- The Commission set the ROE for customer request and capacity expansion projects 0.75 percent lower than its approved ROE for all other gas capital investments.

Q. Does this conclude your testimony?

A. Yes.