EXH. CAK-6Tr
DOCKETS UE-190529/UG-190530
UE-190274/UG-190275
2019 PSE GENERAL RATE CASE
WITNESS: CATHERINE A. KOCH

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, **Complainant,** **v.** **PUGET SOUND ENERGY,** **Respondent.**	**Docket UE-190529** **Docket UG-190530 (*Consolidated*)**
In the Matter of the Petition of **PUGET SOUND ENERGY** **For an Order Authorizing Deferral Accounting and Ratemaking Treatment for Short-life IT/Technology Investment**	**Docket UE-190274** **Docket UG-190275 (*Consolidated*)**

PREFILED REBUTTAL TESTIMONY (NONCONFIDENTIAL) OF

CATHERINE A. KOCH

ON BEHALF OF PUGET SOUND ENERGY

REVISED
JANUARY 29, 2020

JANUARY 15, 2020

PUGET SOUND ENERGY

PREFILED REBUTTAL TESTIMONY (NONCONFIDENTIAL) OF CATHERINE A. KOCH

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I. INTRODUCTION

Q. Are you the same Catherine A. Koch who submitted prefiled direct testimony on June 20, 2019, as revised on August 22, 2019, on behalf of Puget Sound Energy ("PSE") in this proceeding?

A. Yes.

Q. What is the purpose of your rebuttal testimony?

A. My testimony responds to intervenor testimony regarding PSE's implementation of Advanced Metering Infrastructure ("AMI"), most specifically Paul J. Alvarez's response testimony on behalf of Public Counsel, Exh. PJA-1T. Mr. Alvarez makes several superficial arguments regarding the costs and benefits of AMI all the while missing the critical reason for the AMI investment which was to address the growing obsolescence of PSE's existing Automated Meter Reading ("AMR") system. I address why his arguments are wrong and reiterate how PSE's decision to transition to AMI was based on strong technical and engineering analysis. Additionally, I respond to his testimony and that of Carla A. Colamonici, Exh. CAC-1CT, on behalf of Public Counsel regarding stakeholder engagement and its applicability to AMI. I also address the testimony of Michael P. Gorman, Exh. MPG-1T, on behalf of the Alliance of Western Energy Consumers ("AWEC") regarding AMI benefits in relation to the attrition adjustment per the Prefiled Direct Testimony of Ronald J. Amen, Exh. RJA-1T, and explain how these

benefits will be realized and why there are no savings to include in the attrition adjustment. Finally, I discuss the programmatic nature of the pro forma investments and provide an update regarding the on-going investments described in my prefiled direct testimony, Exh. CAK-1Tr, through November 30, 2019, and also highlight the additional investments expected by June 1, 2020.

II. RESPONSE TO PUBLIC COUNSEL WITNESS ALVAREZ'S RECOMMENDATION REGARDING PSE'S AMI INVESTMENT

Q. What does Public Counsel witness Paul J. Alvarez recommend regarding PSE's AMI investment?

A. Mr. Alvarez recommends that PSE's request for recovery for its AMI investment be denied because Mr. Alvarez believes that the "incremental cost of PSE's AMI deployment will exceed the benefits to customers by a wide margin because PSE's AMI business case dramatically understates costs and dramatically overstates benefits."[1] Mr. Alvarez also believes a "less costly option was available to secure the outcomes PSE claimed from AMI, including conservation voltage reduction and the resolution of problems with the existing metering system."[2]

Q. What is your response to Mr. Alvarez?

A. Mr. Alvarez is wrong about his suggestion that the cost of AMI will exceed the benefits "by a wide margin" and that a less costly option was available to secure the benefits that AMI will provide. But more concerning about Mr. Alvarez's

[1] Alvarez, Exh. PJA-1T at 5:1-3.
[2] *Id.* at 5:4-6.

testimony is his complete disregard for the obsolescence of AMR and his characterization of PSE's decision to replace its existing meters as "discretionary."[3] He fixates entirely on the financial costs and benefits of the AMI transition while completely ignoring the fact that PSE's AMR system is obsolete. The reality, however, is new AMR equipment is largely unavailable today, PSE's AMR system is operating on refurbished equipment, and PSE's service provider will no longer be servicing AMR or producing replacement equipment in the near future, further diminishing PSE's ability to maintain its system. In other words, the AMR obsolescence concern discussed in the 2016 AMI Business Case, Exh. CAK-4, Appendix A ("AMI Business Case"), has greatly worsened and AMR is not a viable long-term option. The AMR–AMI transition is not simply the math problem Mr. Alvarez believes it is; from an engineering and operations standpoint, to ensure that PSE's operations are running properly and reliably, PSE must transition to AMI like countless utilities have already done.

I address each of Mr. Alvarez's arguments in more detail below.

A. Alvarez Fails to Address AMR Obsolescence

Q. What is your concern with Mr. Alvarez's testimony regarding the obsolescence of AMR?

A. My primary concern is the fact he never addresses this important issue. Mr. Alvarez's testimony and recommendation that PSE's recovery for its AMI

[3] *Id.* at 7:13.

investment be denied is based solely on Mr. Alvarez's analysis of the monetary costs and benefits of the transition from AMR to AMI but he never discusses the obsolescence of AMR. Instead, he suggests based on incorrect data that PSE's AMR failure rates are acceptable and implies that PSE should continue with AMR, both of which are unreasonable.

Q. Why is the obsolescence of AMR an important issue?

A. AMR obsolescence was the primary reason for PSE's decision to transition to AMI. As detailed in my prefiled direct testimony and the AMI Business Case, the obsolescence of AMR was an acute issue. The situation is now worsening, further confirming PSE's 2016 analysis, and requires immediate action. The problem is characterized by:

- Failing system meters, modules and network equipment, which require constant replacement and reverting to manual meter reading where replacement is not possible;
- Inability to obtain new electric replacement equipment as they have been discontinued and the reliance on a limited number (less than 250,000), of refurbished equipment;
- Inability to efficiently replace network equipment with like equipment as they have been discontinued, and the need to perform reprogramming of devices because different network equipment must be installed;
- Inability to acquire gas modules and network equipment as they will soon be discontinued by service providers. Within four to five years, gas

modules will be discontinued, and within two to three years, AMR network devices will be discontinued.

Mr. Alvarez is silent on the diminishing supply of available AMR equipment and he never addresses these critical issues which were fundamental to PSE's decision to transition to AMI. AMR is simply not a viable long-term solution to PSE's meter reading requirements the fact of which Mr. Alvarez ignores.

Q. Does Mr. Alvarez address the failure rates associated with AMR?

A. Yes. Mr. Alvarez discusses briefly AMR failure rates and takes the surprising position that the AMR failure rates are acceptable based on a flawed understanding of the data provided in the AMI Business Case. Mr. Alvarez states that the AMR electric and gas nodes were failing at a rate of four percent annually and that the electric meters were failing at a rate of only 1.6 percent annually. This is incorrect because Mr. Alvarez did not consider the complete failure rate data provided and he applies the incorrect failure rate standard. First, Mr. Alvarez selectively pulls two performance rate statistics from the AMI Business Case that do not fully reflect the total AMR network failure rate. The AMI Business Case, page 18, documents several additional higher failure rates that Mr. Alvarez ignores, including the fact that commercial meters are failing at 11 percent, that 36 percent of gas batteries are reaching end of life between 2016 and 2021, and that battery replacements plus the failure rates for gas modules yield an annual module attrition rate between 8.5 to 20 percent for 2016-2020. Mr. Alvarez also fails to acknowledge that, as noted in the AMI Business Case, page 19, because the AMR network is failing and deficient, it requires 50,000-60,000 meters to be

manually read monthly, which is an additional monthly expense that would not be required for a properly functioning system.

Second, as discussed in my prefiled direct testimony and the AMI Business Case, in 2014, PSE hired an expert third party, Maintenance and Test Engineering LLC, to perform a failure analysis. This was provided in Appendix B to Exh. CAK-4. As noted on page 3 of the analysis, 0.5 percent is the expected failure rate by utilities, which is much lower than the rate Mr. Alvarez suggests. The AMR failure rates collectively far exceed that standard, a fact which Mr. Alvarez disregards.

Q. Is Mr. Alvarez's claim that PSE's existing AMR system will last 20-30 years accurate?

A. No. Mr. Alvarez was asked in PSE's Data Request No. 003 what the basis for this statement was and he responded that, from his limited experience, since AMI depreciation life was 15-20 years, traditional meters must be longer.[4] He further cites references to information regarding traditional electro-mechanical meter life that is typically 30 years. Mr. Alvarez's answer to PSE's data request is unconvincing because he ignores the manufacturer information regarding PSE's existing AMR system that documents a design life of 15 years, which PSE's equipment life is now well past. Moreover, PSE's electric meters are not traditional electro-mechanical meters, but instead solid state and embedded with AMR equipment. Therefore, his suggestion that PSE's AMR system will last 20-

[4] This document is provided as Exh. CAK-7.

30 years is wrong, not only based on the manufacturer information, but as evidenced by the fact the AMR system is failing now.

Q. Does AMR have the capability of adapting to new technologies and requirements that may be necessary due to new legislation, other industry requirements, or customer needs?

A. No. AMR technology is limited in its ability to broadly support advanced reads such as that for net metering, demand charges, and load/interval profile data as well as the ability to collect voltage data, perform proactive positive outage and perform restoration verification, and remote services such as disconnect/ reconnect. Mr. Alvarez apparently agrees with this as stated in his book Smart Grid Hype & Reality, where he explains that "[m]ost AMR systems only automate routing monthly meter reads" and that "[r]elative to AMI, AMR offers a drastically reduced feature set."[5] Setting aside the obsolescence issues, by not transitioning to AMI as all of PSE's neighboring utilities have done and 52 percent of the industry (as of 2017) has done, PSE is behind in its ability to meet growing customer expectations, new technology requirements, and grid changes that are needed in light of recent legislation, including the Clean Energy Transformation Act ("CETA"). For example, Commission Staff witness Jason L. Ball discusses how the deployment of AMI supports pricing pilots. He suggests that PSE begin them now and that the Commission provide guidance for them.[6]

[5] Paul J. Alvarez, Smart Grid Hype & Reality, A Systems Approach to Maximizing Customer Return on Utility Investment, 53-54 (2d ed. 2014).

[6] Ball, Exh. JLB-1T at 40:4-53:11.

As explained by Mr. Ball, "The granular data about electrical consumption gathered by AMI infrastructure allows utilities to improve price signals and by extension the customer experience."[7] This, along with the ability to support CETA, demonstrate the value to customers AMI will bring as PSE leverages this technology in ways that were not possible with AMR.

Q. What is your reaction to Mr. Alvarez's suggestion that PSE should continue with AMR?

A. Today, it is even more clear that it is not possible to continue with AMR. PSE has provided detailed evidence regarding failure rates, dwindling equipment supply, and unnecessary costs tied to these challenges. Not only is AMR unable to adapt to new technologies, it is now unable to perform even basic functions such as meter reading as PSE has had to augment its failed AMR meters with manual meter reading. Frankly, it is surprising Public Counsel would advocate for reliance on a system that is clearly obsolete and failing, and that Public Counsel supports adopting a higher failure rate than what is acceptable for utilities. From a reliability standpoint, such an outcome is unacceptable for PSE and its customers.

[7] *Id.* at 53:2-3.

B. Alvarez's Suggestion That the Incremental Cost of AMI Will Exceed the Benefits to Customers is Incorrect

Q. How is Mr. Alvarez wrong about his suggestion that the incremental cost of AMI will exceed the benefits to customers "by a wide margin"?

A. Mr. Alvarez believes that the incremental cost of PSE's AMI deployment will exceed the benefits to customers by a wide margin because he contends that "PSE's AMI Business Case dramatically understates costs and dramatically overstates benefits."[8] Both of these theories are wrong as I explain below.

1. The AMI Business Case does not "dramatically" understate costs

Q. Mr. Alvarez believes the AMI Business Case "dramatically" understates meter costs because "PSE did not include almost $127 million in legacy meter equipment book value." Is Mr. Alvarez correct?

A. No, he is wrong for several reasons. Mr. Alvarez incorrectly attributes the $127 million book value to "legacy equipment replaced" as of "June 30, 2019."[9] However, as shown in PSE's First Revised Response to Public Counsel Data Request No. 070,[10] the $127 million book value represented the undepreciated value as of June 30, 2018, not 2019, of both retired AMR equipment as well as AMR equipment that will be retired with the AMI transition. Per Exh. CAK-4, electric meter deployment began in March 2018 and gas module deployment began in June 2018, which means that a significant portion of PSE's AMR meters

[8] Alvarez, Exh. PJA-1T at 5:2-3.
[9] *Id.* at 7:2-3.
[10] Alvarez, Exh. PJA-4.

and modules along with the AMR network were still in service. As PSE transitions to AMI, PSE must operate aspects of its AMR system and the AMI system in parallel and assets will continue to be in service until the transtion is completed in 2022-2023. Moreover, by the time PSE completes the transition, the book value of AMR assets will be a much different number than Mr. Alvarez suggests.

Q. Why else is Mr. Alvarez incorrect regarding the book value?

A. Mr. Alvarez suggests that PSE's AMI decision is discretionary, and equipment is being removed from service prematurely which makes adding the undepreciated book value of the retired assets to the cost of the new assets highly relevant to the decision.[11] I disagree with this. First, as previously discussed, PSE's AMR system is obsolete and failing and therefore the decision to transition to AMI is not discretionary. Second, PSE's AMI transition timing and implementation plan thoughtfully maximized the AMR system life so that assets are not being removed from service prematurely. As explained above, PSE's AMR system is at end of its design life, so retirement is not premature. Third, if we assume Mr. Alvarez's reference to "premature" is because undepreciated book value remains after retirement, he does not understand that replacing large groups of assets almost always result in overlapping book value simply due to the logistics. It would be unrealistic to expect a transition plan of this magnitude to be perfectly timed with full depreciation of this mass asset. This would require PSE to install the AMI

[11] Alvarez, Exh. PJA-1T at 8:17-19.

system all in one day after the AMR mass asset is fully depreciated in order to maintain reliable metering for customers which is an unrealistic expectation. The AMR obsolescence and failure complicates this theoretical one-day implementation plan because as equipment fails, instead of replacing it, PSE would need to manually read meters until the assets were fully depreciated, which would create significant reliability and billing accuracy challenges for customers. PSE's aggressive six-year AMI transition plan is thoughtfully timed considering end of life and logistics in order to minimize premature retirement and undepreciated book value of retired assets. Adding the undepreciated book value of the retired asset to the cost of the new asset as a result of failure or simply implementation logistics is not common practice. The Massachusetts case that Mr. Alvarez cites[12] pertains to regulatory requests for grid modernization plans where AMI was being installed for reasons other than obsolescence. Additionally, the Prefiled Rebuttal Testimony of John J. Spanos, Exh. JJS-4T, discusses examples of allowed return on AMR legacy equipment.

Q. Mr. Alvarez also suggests that PSE's AMI Business Case dramatically understates meter costs because he alleges PSE did not include carrying costs. Do you agree?

A. No. Contrary to Mr. Alvarez's suggestion, carrying costs are included in the capital investment of AMI. PSE's calculation of the overall cost to customers of

[12] *Id.* at 9:3-10.

$258 million included carrying costs as provided in ~~Appendix D~~New-PSE-WP-CAK-4_Financial model.xlsx to Exh. CAK-4, which is the financial model associated with the AMI Business Case.

Q. Are carrying costs accounted for relative to the book value of the legacy metering system?

A. Yes. The rebuttal testimony of Mr. Spanos, Exh. JJS-4T, describes how Commissions handle recovery of legacy assets for which depreciable lives have not fully recovered the asset's value, which is to include their undepreciated balance as a regulatory asset.

Q. Does not including the AMR "book value" unfairly bias the decision to implement AMI?

A. No. If book value were included in calculations when evaluating alternatives, it would need to be applied to all the alternatives and as a result would elevate the costs of all the alternatives. In other words, it would have little impact on differentiating the costs of the alternatives and would be of limited use. Even the alternative of remaining with the AMR system will result in undepreciated book value because of replacement required due to failure before full depreciation. The alternative chosen, implementing AMI, would still be the best benefit and cost for PSE's customers over other alternatives as described in the AMI Business Case. Thus, PSE has not understated the estimated meter costs. The meter costs estimated by PSE in its AMI Business Case are an accurate reflection of the metering costs.

2. The AMI Business Case does not "dramatically" overstate benefits

Q. Mr. Alvarez believes PSE has "dramatically" overstated certain AMI benefits including Conservation Voltage Reduction ("CVR") and the avoidance of $230 million associated with continued operation required to operate the AMR system. Is Mr. Alvarez correct?

A. No. I explain below.

i. Alvarez's incorrectly calculated a CVR benefit of only $20.07 million

Q. Why does Mr. Alvarez believe that PSE has overstated the CVR benefits claimed by PSE?

A. Mr. Alvarez believes PSE has overstated the CVR benefits because he believes the CVR benefits claimed by PSE could have been achieved by less meters than those that will be installed by PSE.

Q. Does Mr. Alvarez disagree with PSE's estimated CVR benefit calculation from a full AMI meter deployment of $436.41 million?

A. No. Mr. Alvarez does not challenge the full AMI deployment benefit of $436.41 million. However, he believes PSE should be able to claim only a fraction of the $436.41 million benefit. The premise behind Mr. Alvarez's argument is, even though the total (undisputed) estimated CVR benefit is $436.41 million, PSE should only be able to claim the 4.6 percent incremental difference between what he determined to be PSE's estimated 1.14 percent reduction in energy use from CVR based on a full AMI meter deployment as compared to a 1.09 percent

reduction in energy use from a partial CVR deployment. Thus, according to Mr. Alvarez, if the total CVR benefit is $436.41 million, PSE should be able to claim only 4.6 percent of that (or $20.07 million) as the benefit associated with implementing AMI. Mr. Alvarez asserts that the remainder ($416.34 million) is overstated.

Q. Do you disagree with Mr. Alvarez's calculation?

A. Yes, I have several significant concerns with Mr. Alvarez's reasoning and his argument should be dismissed in its entirety.

First, the fact that a similar CVR benefit could be achieved with less AMI meters is irrelevant to this calculation. Mr. Alvarez's argument only makes sense if the sole purpose of PSE's AMI deployment was to achieve CVR. If PSE were implementing AMI only to achieve CVR, then PSE would have engaged in a comprehensive analysis to determine the requisite number of AMI meters needed to economically achieve the best CVR outcome. That is not the case here and Mr. Alvarez's analysis is based on a situation that simply does not exist. PSE is implementing AMI because AMR is obsolete and must be replaced in its entirety. CVR is one among many associated benefits resulting from AMI and the $436.41 million estimated benefit is correct.

Second, even if you assume Mr. Alvarez's calculations are correct (which they are not), reducing the total benefit by 95.4 percent (or $416.34 million) is wrong because it assumes that customers have already gained the 1.09 percent savings benefit and then assumes there is only a small incremental benefit of 0.05 percent

energy savings left to be gained. PSE customers are not benefiting and cannot benefit from CVR with PSE's existing AMR system.

Finally, Mr. Alvarez's math is flawed because he uses old data and is comparing information inappropriately. The 1.14 percent energy savings figure is based on preliminary data from 2010/2011 used to develop the initial AMI feasibility analysis from November 2013. Not only is that data outdated, but it does not reflect all of the CVR energy savings or peak/capacity savings generated from a full AMI deployment as the 1.14 percent energy savings is only one of four savings numbers that contribute to the total savings percentage from CVR. In addition, after the initial feasibility analysis began, PSE conducted several AMI pilots, including the pilot completed in 2014 that had a CVR savings rate of 1.09 percent, which Mr. Alvarez incorrectly uses as his savings rate for a "partial" AMI deployment.[13] Neither of these figures (the 1.14 or the 1.09) represent a "full" or "partial" AMI deployment and there is no analysis that compares a "partial" AMI deployment CVR savings versus a "full" AMI deployment CVR savings because that was never the purpose of PSE's deployment of AMI.

PSE supplied the complete CVR energy savings data and calculations associated with the AMI Business Case in Appendix ~~DG~~ to Exh. CAK-4, tab "AMI Global Tab (C)," cells "I54-T54" and "B73-B76." For the final AMI Business Case, energy and peak savings data were supplemented by CVR implementations on

[13] Alvarez, Exh. PJA-7, as provided by Mr. Alvarez, does not have an attachment and appears to be regarding Post Test Year Adjustments responded to by Susan Free on September 5, 2019, so the wrong support data is provided.

additional substations in 2014/2015. Mr. Alvarez chose not to use this complete data and as a result, the basis of his math calculation is inaccurate. The data from the early pilots are simply not appropriate or accurate models by which to calculate energy savings rates for a full versus partial AMI deployment.

Q. Why else were the pilots relied on by Mr. Alvarez not approriate models for full CVR implemenation?

A. The pilots that Mr. Alvarez is basing his conclusion on were specific and unique for testing purposes and should not be assumed scalable to the full implementation of CVR. First, the 2013/2014 pilot was very small and short, as one to three AMI meters were deployed at the end of each circuit and monitored for less than a month. The network equipment was modified with a radio system that allowed for both one-way AMR meters and two-way AMI meters to communicate and a parallel command center software was installed to manage just the AMI data. Second, the specific AMI meter type that communicated with that command center software and the network radio equipment used are no longer sold by the vendor as this is not the technology the industry is deploying. Third, the pilot reduced the voltage with a safety factor because of installing so few meters. As noted in Attachment A to PSE's Response to Public Counsel Data Request No. 085, page 9, "PSE has implemented a safety factor in order to ensure the voltage does not drop outside the 114V lower ANSI limit . . . since not all customer voltages are being monitored."[14] So, while the pilot was successful, the approach

[14] Alvarez, Exh. PJA-6.

would not be advisable in a full CVR implementation model as PSE would not be able to set the voltage to its optimum setting for energy savings by installing only a few meters at the end of each circuit. The apparent potential that that energy savings could be greater by installing more AMI meters, was not a calculation or assumption made by PSE as discussed previously.

Q. What are the operational challenges of deploying a full CVR program the way the pilot was implemented?

A. With the plan to install CVR at 164 substations serving half of PSE's circuits, operational challenges would be more than that experienced with the seven substation pilots. PSE would need to install and operate a separate AMI network in parallel with the AMR network potentially throughout the territory, which would include two command center software platforms, data storage equipment for both systems, and two operating and maintenance processes due to the differences in technology. If PSE were to only install a few meters at the end of circuits, more network equipment would be needed on those circuits to ensure data is transmitted reliably due to the inability to leverage the "mesh" network that allows data to be transmitted from meter to meter if needed. Processes relative to outages, materials management, billing, and security would need to appropriately respond to some customers being on AMI while most would be on AMR making day to day operations more complicated. In summary, PSE would experience significant operational challenges in implementing a full CVR program the way the pilots were implemented which also ignores the fact that PSE is not installing AMI for CVR only.

Q. How did PSE estimate the total CVR benefits?

A. In contrast to Mr. Alvarez's approach, PSE evaluated the voltage savings and energy savings using a method that is common in the industry, known as the Simplified Voltage Optimization Measurement and Verification Protocol which determines savings in the context of energy reduction expected at the substation accounting for all customers fed by the respective circuits. PSE's approved energy efficiency programs follow this same methodology relative to calculating and reporting energy savings from CVR. Based on this process, PSE correctly estimated that the total CVR benefit of AMI is $436.41 million

ii. Mr. Alvarez's conclusions regarding the $230.2 million avoided AMR investment benefit are incorrect

Q. What are Mr. Alvarez's arguments regarding the avoided AMR benefit?

A. Mr. Alvarez argues that PSE should not have included the cost to continue the existing AMR system as an avoided cost benefit. Instead, Mr. Alvarez argues that PSE should have considered the continuation of AMR as a "stand-alone basis." Mr. Alvarez's argument is nonsensical considering the obsolescence of AMR.

Q. Please explain what the avoided AMR investment benefit is.

A. As part of the AMI Business Case, PSE evaluated the cost of continuing to maintain the AMR system. This analysis is documented in Exh. CAK-4, Appendix ~~D~~G, tab "MM Repl Benefit." That analysis evaluated the ongoing maintenance and capital that would be needed with continuing the AMR system or the AMI system. For both systems, PSE considered the need to provide equipment for new customer additions along with the replacement of failing

equipment and compared the results over 20 years. The replacement of failing equipment becomes the key difference in maintenance over time due to the failure rates of the AMR system over the AMI system. A lower cost of AMI equipment than AMR contributes to the savings as well. The result was that PSE would spend $230.2 million more over 20 years maintaining the AMR system as opposed to the AMI system. Thus, PSE avoids making that additional investment by moving forward with AMI.

Q. Why does Mr. Alvarez claim it is inappropriate to consider the avoided AMR investment as a benefit?

A. Mr. Alvarez believes incorrectly that the $230.2 million avoided AMR investment benefit is the cost of continuing with the AMR system and tries to compare this as an "apples-to-apples" cost to the cost of deploying an AMI system ($472.7 million). He attempts to treat these as comparable alternatives and his conclusion is to remove the avoided AMR investment benefit as a way of creating an "apples-to-apples" comparison.

Q. Why is this not correct?

A. The $230.2 million is not the cost of continuing with AMR so it cannot be compared "apples-to-apples" with the cost of deploying AMI. As explained above and set forth in Exh. CAK-4, Appendix ~~D~~G, the $230 million is the mathematical difference between maintaining the failing AMR system which would cost $378 million and a new AMI system which would cost $148 million.[15] Because of this,

[15] $378 million - $148 million = $230.2 million.

the $230.2 million is not comparable to $472.7 million for the AMI installation and neither represent the total cost of ownership. Moreover, the "apples-to-apples" comparison Mr. Alvarez recommends would require alternatives to be realistic options and as discussed previously, with emerging reality that continuing with AMR is not possible, a stand-alone infeasible AMR alternative compared to the AMI alternative is a meaningless, theoretical exercise.

Q. Did PSE evaluate continuing with AMR as compared to AMI?

A. Yes, extensively. Mr. Alvarez fails to acknowledge the lengthy process of analysis from 2013 to 2016 that is described in Exh. CAK-4, Appendix C of Exh. CAK-4, and several workpapers. This thorough and complex analysis included initial exploration of options for continuing with AMR under various management scenarios. Many alternatives were considered through this process. However, as analysis continued, given the operational risk of continuing with AMR, it became apparent transitioning to AMI was the only feasible option.

Q. Should the avoided AMR investment benefit be removed from the analysis?

A. No. First, the failure of AMR has a financial impact that if allowed to occur will cost more than what PSE has historically experienced prior to failure and the avoidance by replacing this system is in fact a benefit that cannot be ignored. Second, even though I disagree with Mr. Alvarez's alternative comparison theory, his comparison is inaccurate as the comparison would be a $378 million cost to maintain the AMR system versus a $620.7 million cost to implement AMI, which is the summation of $472.7 million for AMI installation plus $148 million in ongoing AMI maintenance costs. Applying Mr. Alvarez's benefit to cost

approach, the continuation of the AMR system would bring $0 benefits while the AMI system would bring $436.41 million due to CVR plus the qualitative benefits described in the next section. The final alternative analysis would be $378 million for the AMR system compared to $184.29 million for the AMI system ($620.7 million – $436.41 million) which would still show that AMI is the better decision.

iii. Alvarez selectively ignores other benefits from AMI

Q. Are there other benefits from AMI that Mr. Alvarez did not address?

A. Yes. Mr. Alvarez silently acknowledged the Distribution Automation over AMI benefit that was included in the AMI Business Case.[16]

In addition, completely absent from Mr. Alvarez's testimony is any discussion of the important non-monetized benefits from AMI which should not be ignored. My prefiled direct testimony, pages 21-22, and the AMI Business Case, pages 8-10 and 30-32, describes the benefits that will be possible with this foundational technology such as remote disconnects and reconnects associated with move-ins and move-outs, future demand response enablement, and reduced billing exceptions.

[16] Alvarez, Exh. PJA-1T at 13, Table 2 (calculated $20.07 million CVR benefit + PSE's $1.5 million Distribution Automation over AMI benefit = $21.6 million).

III. PSE'S DECISION TO IMPLEMENT AMI WAS PRUDENT AND ITS DECISION-MAKING PROCESS WAS THOROUGH, COMPREHENSIVE, AND CORRECT

Q. Mr. Alvarez suggests that PSE's decision-making process to implement AMI had "fundamental deficiencies." What is your response to this?

A. I strongly disagree. First, Mr. Alvarez's "fundamental deficiencies"—the alleged $189 million in abandoned AMR equipment, the overstating of CVR benefits, and the failure to conduct a "stand-alone cost-benefit analyses for the AMR continuation option"—are all unfounded as described above.

Second, Mr. Alvarez's suggestion that PSE's decision-making process was deficient is baseless. PSE's decision to implement AMI spanned years in which numerous engineering analyses, studies, and pilots were performed to evaluate AMI. Exh. CAK-4, pages 4-14, provide a detailed summary of this process. The AMI Business Case, pages 3-5, details the need and drivers to address the failing and growing obsolescence of the AMR system. Further, on pages 18-19, it explains the risks relative to maintenance, performance, and competition. Alternatives were evaluated as early as 2013, as detailed through the initial feasibility analysis, Exh. CAK-4, Appendix C, and were enhanced further by the understanding of the significant failure rates documented in the Weibull study, Exh. CAK-4, Appendix B. The estimated costs and benefits of an AMI transition were detailed in Exh. CAK-4, Appendix ~~D~~G, including avoiding costs and saving energy. Finally, the decision-making process involved senior management and the PSE Board of Directors many times from 2014-2018. This entire process was documented and has been provided in this case. In sum, contrary to Mr. Alvarez's

opinion, PSE's decision to implement AMI was thoroughly researched, evaluated, tested, comprehensive, and documented, and ultimately resulted in a correct and prudent decision.

IV. RESPONSE TO AWEC WITNESS GORMAN'S RECOMMENDATION REGARDING PSE'S AMI INVESTMENT

Q. What are Mr. Gorman's conclusions regarding the impact of AMI on Mr. Amen's trending analysis?

A. Mr. Gorman argues that Mr. Amen's attrition analysis includes increased additions due to AMI but does not include "O&M savings" and therefore suggests the Commission should reject the unbalanced trending analysis.[17] He references my prefiled direct testimony as arguing the AMI investment will generate known and measurable savings.

Q. Why is Mr. Gorman's conclusion regarding "O&M savings" inaccurate?

A. Mr. Gorman's conclusion disregards how each benefit that I discuss in my prefiled direct testimony impacts the customers or the historical financial trends. First, relative to the CVR benefit, the energy savings customers experience is not an O&M expense but a power cost expense meaning PSE will potentially purchase less energy because customers use less energy. Any savings, not offset by growing load due to other drivers such as electric vehicle charging, will be realized in PSE's Power Cost Adjustment mechanism which is a separate accounting treatment not impacted by the attrition adjustment. Second, relative to

[17] Gorman, Exh. MPG-1T at 13:3-15:2.

the avoided AMR investment benefit, the increasing cost due to failure is a cost not reflected in not the historical O&M or capital expense but a cost that will be avoided in the future with PSE's successful transition to AMI before these long-term maintenance costs are experienced. Finally, relative to the Distribution Automation over AMI benefit, since PSE is just now implementing Distribution Automation, the alternative costs of installing communication equipment is not in PSE's historical expenses in a significant way and therefore no O&M expense "savings" exists. PSE will be able to roll out and fully implement Distribution Automation in the least cost manner moving forward.

V. PSE SUPPORTS STAKEHOLDER ENGAGEMENT

Q. Describe the claims or proposals regarding stakeholder engagement.

A. Public Counsel witnesses Mr. Alvarez and Ms. Colamonici have suggested that additional stakeholder engagement would have led to more transparency in the AMI decision-making process.

Q. Does PSE believe stakeholder engagement can be beneficial?

A. Absolutely. PSE frequently engages with stakeholders in a variety of scenarios such as in rule makings, inquiries, and project implementations. Many utilities are increasing their stakeholder engagement process as a result of grid modernization and distributed energy resources due the needed partnership with customers moving forward. Similarly, PSE is developing methods and processes to meet future requirements as a result of CETA and Integrated Resource Planning ("IRP") rulemaking.

Q. Would the AMI investment have benefited from stakeholder engagement?

A. No. PSE does not believe a broad stakeholder conversation about replacement options for AMR in the traditional sense would have value as the key AMI business case driver was based on the growing maintenance and obsolescence risk. It would be similar to asking stakeholders whether they think PSE should continue to use Microsoft Windows 7 after Microsoft no longer supports the operating system or move to the more current Windows 10.

Q. Should the Commission require a Distribution Planning Process and Advisory Group as suggested?

A. PSE supports the Commission's continuation of the transmission and distribution planning work associated with the IRP rulemaking, Docket U-161024, when appropriately timed in light of all the other rulemakings, to collectively vet planning process and stakeholder engagement expectations and rules.

VI. PSE'S PRO FORMA PLANT ADDITIONS ARE PROGRAMMATIC IN NATURE

Q. What concerns have parties raised regarding the inclusion of the delivery system infrastrucure plant additions in the pro forma adjustment?

A. Commission Staff witness Aimee N. Higby, Exh ANH-1T, discusses how plant additions should be included in a pro forma adjustment and suggests public improvement investments and high molecular weight ("HMW") cable investments should not be included as they do not meet the threshold based on her

suggested calculation.[18] Ms. Susan Free's rebuttal testimony, Exh. SEF-17T, discusses the appropriateness of the method and calculation and why programmatic work is appropriate for pro forma consideration irrespective of total program investment.

Q. Describe the program work included in the pro forma adjustment.

A. The delivery infrastructure program work that was placed in service between January 1, 2019 to June 30, 2019 (after the test year) and included in my prefiled direct testimony, page 56, was relative to public improvement, HMW cable replacement, and AMI. This work is a set of recurring projects that are programmatically managed to achieve the end objective.

The public improvement program is an annual set of non-discretionary, non-revenue generating investments that account for the relocation of electric and gas infrastructure required by jurisdictional franchise agreements associated with being located in the public right of way. The relocation work ensures that infrastructure can continue to be safely operated as jurisdictional transportation projects occur. This work occurs every year at an average investment of $30.7 million. In 2018, PSE spent just under $46 million in relocation work associated with gas and electric infrastructure and PSE anticipates this investment trend to continue.

The HMW cable replacement program is a defined asset population of 1,346 remaining miles as of the end of 2019 of direct bury HMW cable that is known in

[18] Higby, Exh. ANH-1T at 3:8-15, Table 1.

the industry to fail as PSE has experienced since 1998. Due to the thousands of miles of cable that must be replaced in order to prevent lengthy outages from impacting customers, a defined annual replacement plan is programmatically being completed. Irrespective of where this cable is, the replacement work is similar from project to project.

Ms. Higby does not explicitly discuss AMI; however, like HMW cable replacement, the AMI program has a defined plan that is implemented over six years due to the massive population of meters and modules that must be replaced. As described in this testimony, the completion of the program delivers metering and billing assurance at an on-going maintenance cost and lays the foundation to aggressively continue to implement CVR in support of customer's expectations and grid modernization.

VII. UPDATED ONGOING ACTUAL AND PROJECTED EXPENDITURES FROM JULY 1, 2019 THROUGH JUNE 1, 2020

Q. Why are you providing testimony on actual and projected expenditures from July 1, 2019 through June 1, 2020?

A. Several parties, including Commission Staff, Public Counsel, and AWEC, have challenged PSE's attrition analysis and have suggested it does not align with PSE's actual and projected post-test year expenditures. Below I provide updated totals for PSE's actual delivery system infrastructure investments from July 1 through November 30, 2019, which reflects significant work completed during the high construction season which has been placed into service and included in the

attrition adjustment. I will also provide updated totals for PSE's estimated delivery system investments from December 1, 2019, through June 1, 2020.

A. Delivery System Infrastructure Investments Placed in Service from July 1 Through November 30, 2019

Q. Has PSE invested in projects relating to the Delivery System after June 30, 2019?

A. Yes. As described in my prefiled direct testimony, PSE has invested in projects relating to the delivery system after June 30, 2019. From July 1, 2019 through November 30, 2019, PSE has invested $278.4 million in delivery system expenditures that have already been implemented and placed in service.

Q. Please describe the expenditures.

A. The expenditures PSE has incurred after June 30, 2019, are largely a continuation of expenditures incurred by PSE during the test year and pro forma periods in this case regarding core service, grid modernization, and pipeline safety. PSE has incurred costs associated with the following projects which have been placed in service as of November 30, 2019:

1) Core Services – PSE invested $120.4 million in work that support PSE's critical infrastructure obligations that are required in response to public improvement projects, customer and public safety, and customer growth and service needs. Specifically, PSE invested $16.9 million in public improvement work associated with relocating gas and electric infrastructure per jurisdictional franchise obligations. Additionally, work

progressed on several large projects as described in my prefiled direct testimony.

2) AMI – PSE invested $37.4 million as installation of electric meters, gas modules, and communication network equipment progressed towards 2022/2023 completion.

3) Grid Modernization – PSE invested $69.8 million in projects aimed at modernizing the grid and ensuring the ongoing reliability of PSE's systems, including addressing obsolescence and implementing necessary foundational and information technologies. Specifically, PSE invested $14.1 million in replacing failure prone HMW cable, $7.5 million in addressing the worst performing circuits, and $21.3 million in hardening the overhead system assets through inspection and remediating wood pole and substation assets, continued tree trimming, and an expansion of the TreeWatch program. Additionally, work progressed on several large projects including the foundational ADMS technology and new technology pilots as described in my pre-filed direct testimony. The Lake Hills – Phantom Lake 115 kV Transmission Line project discussed in my prefiled direct testimony was expected to be completed late 2019, but due to permitting is delayed to late 2020. The Bellingham Substation Rebuild was completed per the plan in July 2019, an investment of $27 million.

4) Pipeline Safety – PSE invested $42.4 million aimed at ensuring PSE's natural gas pipelines remain safe, continuing ongoing programs focused on damage prevention, identification and elimination of cross bores,

replacing Dupont pipe, remediating buried meter sets, mitigating pipeline integrity risk, and reducing C leaks in PSE's system.

Q. Are PSE's already placed in service expenditures related to the delivery system necessary and reasonable?

A. Yes. PSE's investment in non-discretionary core services is a direct result of customer requests, public safety and emergency response, and work required per franchise obligations and codes. PSE's programmatic investment in AMI and Grid Modernization is largely driven by infrastructure that is performing poorly, failure prone and growing obsolete, which must be addressed to maintain reliable service for customers. PSE's programmatic investment in pipeline safety is driven by public safety and the need to mitigate known pipeline integrity risks and address poor performing infrastructure that is failure and leak prone.

B. Anticipated Delivery System Infrastructure Expenditures From December 1, 2019 Through June 1, 2020

Q. Does PSE anticipate ongoing investments in projects relating to the delivery system that will be in service at the start of the rate year?

A. Yes. PSE continues to invest in the delivery system which are largely a continuation of investments described above and as described in my pre-filed direct testimony. Overall, PSE estimates an investment of $353.2 million from December 1, 2019 through June 1, 2020 associated with providing $122 million in core services, $53 million in AMI, $123.6 million in modernizing the grid, and

$54.6 million in ensuring pipeline safety. These are projected to be in service at the start of the rate year.

Q. Are PSE's anticipated expenditures from December 1, 2019 through June 1, 2020, related to the delivery system necessary and reasonable?

A. Yes. Similar to the discussion above, these investments are largely a continuation of non-discretionary core services and programmatic replacement of infrastructure that is performing poorly or poses pipeline safety risks.

VIII. CONCLUSION

Q. Does this conclude your rebuttal testimony?

A. Yes, it does.