

**EXH. CAK-7 (Apx. C)
DOCKETS UE-22 ___/UG-22 ___
2022 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-22 ___
Docket UG-22 ___**

**APPENDIX C (NONCONFIDENTIAL) TO THE SIXTH EXHIBIT TO THE
PREFILED DIRECT TESTIMONY OF**

CATHERINE A. KOCH

ON BEHALF OF PUGET SOUND ENERGY

JANUARY 31, 2022

PSE's AMI Benefit Implementation Plan

PSE General Rate Case

January 14, 2022



Purpose of this Plan

This plan introduces PSE's preliminary roadmap to implementing the initiatives that drive AMI benefits defined through the *Maximizing Customer Benefits Enabled by AMI* report authored by The Brattle Group. The AMI use cases that will be addressed include:

Tier 1	<ul style="list-style-type: none">• Time Varying Rates• Behavior-Based Programs• Load Flexibility Programs• CVR or Volt/VAR Optimization
Tier 2	<ul style="list-style-type: none">• Leveraging AMI Network for Smart Street Lighting• Remote Connect/Disconnect• Improved Outage Management• Lower Metering Costs for Customers with Distributed Generation
Tier 3	<ul style="list-style-type: none">• Improved Bill Generation• Avoided Metering Issues• Better Visibility into Asset Utilization• Improved DER Planning and Integration• Other Tier 3 Use Cases



How to Read the Plan

Each slide represents a group of Use Cases that will be implemented as describe in Brattle's AMI Report¹. There are eight types of information on each slide which capture the following information.

- Use Cases – Internal name of use cases and programs that have been grouped together in Brattle's AMI Report.
- Summary – Current status, objective, and launch elements of program.
- Total Benefit – The total avoided costs from deploying the group of identified use cases that results in reduced energy use. The Total Benefit is calculated through 2037 as described in Brattle's AMI Report.
 - For Tier 1 use cases, the avoided costs are calculated using the some or all of benefit categories of the avoided T&D capacity, avoided generation capacity, avoided energy costs, avoided emissions costs, and avoided T&D losses multiplied by estimated reduced energy use.
 - For Tier 2 uses cases, the avoided costs are calculated from benefit categories such as avoided administrative and maintenance costs, reduced truck rolls, reduced unauthorized energy use, customer impact from outages, and avoided additional metering equipment.
- Est. Full Benefit Realization Date – Estimated date program implementation will be able to support roll out to achieve meaningful benefits (i.e., pilot completed and activities needed for scaled program complete). Full deployment readiness date will depend on program pilots and other factors.
- Tracker Metrics – Assumptions used to calculate Total Benefit, some of which are a range from low to high that will ultimately impact benefit realization and are thus worth tracking.
- Owners – Primary organization(s) responsible for delivering use cases and benefits for each group of use cases.
- Reporting – Name of the external report that will include benefit performance and possibly some tracker metrics.
- 2022-2025 Timeline – Current plan for implementation activities including what will be accomplished and milestones.

Note 1: Sergici, Sanem, Exh SIS-3, Brattle Report on "Maximizing the Customer Benefits through PSE's Advanced Metering Infrastructure" ("Brattle AMI Report")

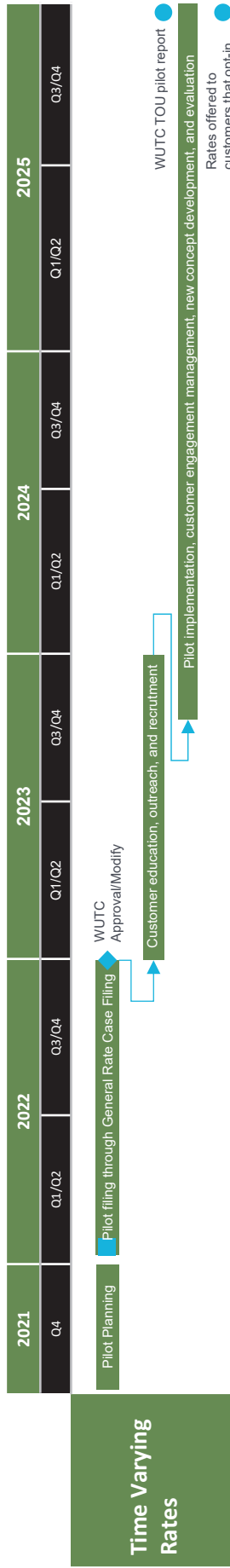
Time Varying Rates



\$111M
Total Benefit¹
(2027-2037)

1/1/2027
Est. Full Benefit
Realization Date

Use Cases <ul style="list-style-type: none"> Time of Use Rates (TOU) Peak Time Rebates (PTR) Three-Period Time of Use Rates (targeting EV owners) 	Summary <p>PSE is currently planning a time varying rates pilot that will test TOU, PTR and EV TOU rates through one pilot which will be fielded in winter of 2023, if approved by the Commission. PSE will target 7,500 customers in recruitment for the pilot. We assume that after piloting the rates in 2023 to 2025, the Company is likely to offer rates to the broader population in late 2026 on an opt-in basis if impact evaluation yields favorable results.</p>	Tracker Metrics^{1,2} <ul style="list-style-type: none"> Participation Rate Per customer peak reduction Load shifting
Owners <ul style="list-style-type: none"> Pricing & Cost of Service / State Regulatory Affairs 	Reporting <ul style="list-style-type: none"> UTC requirements of approved pilot Annual CEIP Status 	



Key

- ◆ Key Pivot Point
- Internal Milestone
- External Milestone
- Potential Milestone

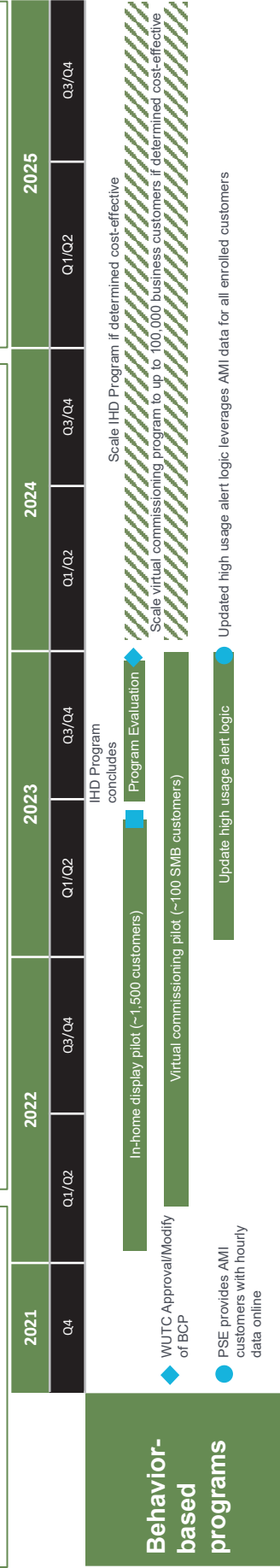
¹ Tracker metrics and benefits are based on base case assumptions from the Brattle AMI Report.
² PSE's proposed scorecard incorporates Demand Side Management metrics and targets aggregated to Peak Load Management Savings (MW), Peak Load Management Savings (MW) Attributable to Residential Customers, Annual Energy Efficiency Savings – Electric (MWh), Annual Energy Efficiency Savings – Gas (Therms), and Number of Customers Participating in Gas and Electric Energy Efficiency Programs who are from named communities. These KPIs of Time Varying Rates, Behavior Based Programs, and Load Flexibility Program may adjust to align with final commitments.

Behavior-Based Programs

\$25M
Total Benefit¹
(2023-2037)

1/1/2024
Est. Full Benefit
Realization Date

Use Cases	Summary	Tracker Metrics ¹	
<ul style="list-style-type: none"> Online Information Presentation (including load disaggregation) High Usage Notifications Virtual Commissioning Pilot (small business) In-home Display (IHD) Pilot Program (residential) 	<ul style="list-style-type: none"> PSE began to provide online information presentation of granular (1-hour) usage data for residential AMI customers in Q4 2021. Load disaggregation insights will be integrated when services are available. PSE currently issues high usage notifications for residential customers (both electric and gas). PSE to build sophisticated energy usage prediction models that can alert customers more accurately and provide personalized insights to manage their consumption and lower bills. PSE is launching a virtual commissioning and tune-up pilot program for small and medium business customers in 2022 with the goal of having 100 customers participate. PSE has launched an in-home display (IHD) pilot program. The information presentation is expected to yield behavior change and lead to conservation. PSE is planning on deploying 1,500 IHD units in 2022. The pilot will conclude in 2023, at which point PSE will evaluate the program's cost effectiveness and determine whether to proceed with full-scale deployment. 	<ul style="list-style-type: none"> Online information participation rate High usage participation rate High usage per customer energy conservation 	
Owners <ul style="list-style-type: none"> Energy Efficiency Customer Solutions 	Reporting <ul style="list-style-type: none"> Annual Energy Conservation Accomplishment Report 		



¹ Tracker metrics and benefits are based on base case assumptions from the Brattle AMI Report.

Load Flexibility Program



\$130M
Total Benefit¹
(2023-2037)

1/1/2025
Est. Full Benefit
Realization Date

<p>Use Cases</p> <ul style="list-style-type: none"> Smart thermostat (ST) programs for space heating Grid-interactive water heating (GIWH) load control System-wide behavioral demand response (BDR) Bainbridge Island Targeted DR pilot City of Duvall Targeted DR pilot 	<p>Summary</p> <ul style="list-style-type: none"> PSE is planning to pursue a system-wide load flexibility program with the goal of achieving 29 MW of capacity reduction by 2025 and 196 MW by 2031. Customer solicitation and acquisition are slated to begin in 2023 with 3,000 customers, expanding to 15,000 by 2025 and 100,000 by 2031. These programs include <i>smart thermostat</i> (ST) programs for space heating, <i>grid-interactive weather heating load control</i> (GIWH), and <i>behavioral demand response</i> (BDR). PSE has started the implementation of <i>Bainbridge Island Targeted Demand Response</i> (TDR) and will ramp up to a full-scale program by 2028, with 200-300 participants added annually. PSE is implementing the <i>City of Duvall TDR</i> to reduce winter peak natural gas usage by 30,000 MBH by 2029 through a residential and commercial smart thermostat pilot. The initial pilot will ramp-up by 50-70 participants added annually to full-scale program by 2028. 	<p>Tracker Metrics¹</p> <ul style="list-style-type: none"> ST Participation Rate ST per Customer Peak Reduction GIWH Participation Rate GIWH per Customer Peak Reduction GIWH load shifting BDR Participation Rate BDR per Customer Peak Reduction
<p>Owners</p> <ul style="list-style-type: none"> Energy Efficiency 	<p>Reporting</p> <ul style="list-style-type: none"> UTC requirements of approved pilot Annual Energy Conservation Report Annual CEIP Status 	

2021	2022		2023		2024		2025	
	Q1/Q2	Q3/Q4	Q1/Q2	Q3/Q4	Q1/Q2	Q3/Q4	Q1/Q2	Q3/Q4
System-wide RFP Issued	RFP Evaluation	Customer Recruitment (~3,000 customers)	Customer Recruitment (~9,000 customers)	Customer Recruitment (~15,000 customers)	Customer Recruitment (~15,000 customers)	Customer Recruitment (~15,000 customers)	Customer Recruitment (~15,000 customers)	Customer Recruitment (~15,000 customers)
Vendor selected	Bainbridge Island TDR pilot (200-300 customers)	Bainbridge Island TDR evaluation (400-600 customers)	Bainbridge Island TDR evaluation (600-900 customers)	Bainbridge Island TDR evaluation (800-1200 customers)	Bainbridge Island TDR evaluation (800-1200 customers)	Bainbridge Island TDR evaluation (800-1200 customers)	Bainbridge Island TDR evaluation (800-1200 customers)	Bainbridge Island TDR evaluation (800-1200 customers)
Vendor selected	City of Duvall TDR pilot (50-70 customers)	City of Duvall TDR evaluation (100-140 customers)	City of Duvall TDR evaluation (150-210 customers)	City of Duvall TDR evaluation (150-210 customers)	City of Duvall TDR evaluation (150-210 customers)	City of Duvall TDR evaluation (150-210 customers)	City of Duvall TDR evaluation (150-210 customers)	City of Duvall TDR evaluation (150-210 customers)

Key

- ◆ Key Pivot Point
- Internal Milestone
- External Milestone
- ◆ Potential Milestone

¹ Tracker metrics and benefits are based on base case assumptions from the Brattle AMI Report.

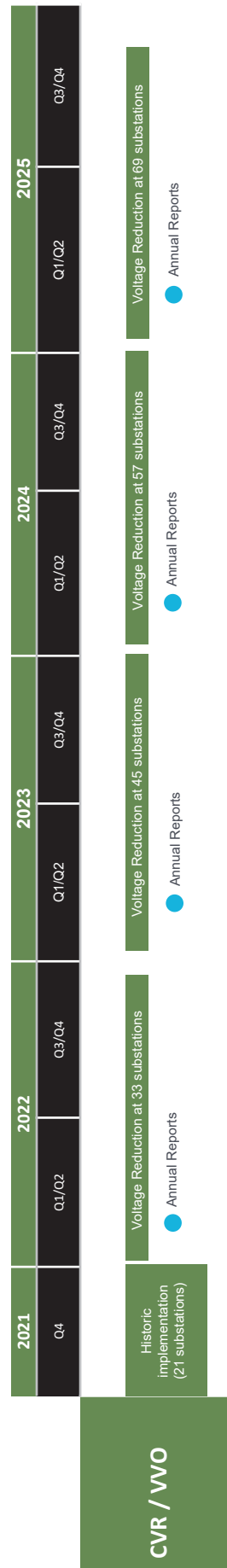
CVR or Volt/VAR Optimization



\$436M
Total Benefit
(2013-2037)

1/1/2022
Est. Full Benefit
Realization Date

<p>Use Cases</p> <ul style="list-style-type: none"> CVR or volt/VAR Optimization 	<p>Summary</p> <p>CVR or Volt / VAR Optimization, voltage reduction in general is referred to as Distribution Efficiency associated with PSE's Energy Efficiency Programs. PSE's Voltage Reduction plan started with the initial implementation pilots in 2013 and will ramp to 12 substations per year by 2022. PSE will target 158 substations for voltage reduction based on substations having 50 percent or greater mix of residential customers.</p>	<p>Tracker Metrics¹</p> <ul style="list-style-type: none"> Electric energy savings from voltage reduction (applied to substations in the previous year) Total energy conservation Total substations implemented
<p>Owners</p> <ul style="list-style-type: none"> Operations Program Management Energy Efficiency - reporting 	<p>Reporting</p> <ul style="list-style-type: none"> Annual Energy Conservation Report Annual SQI Report 	



Key

- ◆ Key Pivot Point
- Internal Milestone
- External Milestone
- 🚩 Potential Milestone

¹ Tracker metrics and benefits are based on the 2016 Business Case and Exh. CAK-7. Bold indicates metric is on the proposed scorecard as discussed by PSE's witness Mr. Lowry.

PSE is already implementing four Tier 2 benefits use cases, which ramp in value as more AMI meters are deployed

Use Case	Summary	Top Tracker Metrics ¹	Benefit ¹
Leveraging AMI Network for Smart Street Lighting	In the immediate term, PSE is developing a Smart Street Lighting program that leverages AMI to provide insight into the status and performance of the Company's approximately 100,000 street lights and to enhance the street light system's operational efficiency, reliability, and performance. PSE is preparing to deploy smart street light controls to 25,000 company-owned street lights by 2025. In the Base Case, the deployment rate of 5,000 installations will continue until the rollout is complete	<ul style="list-style-type: none"> Reduced maintenance expense (lower truck rolls) Reduced administrative expense 	\$27M (2021-2037)
Remote Connect and Disconnect	AMI provides utilities the capability to turn meters on and off to support changes in occupancy, reoccurring non-payment issues, and prepaid service offerings. Remote connect/disconnect was implemented at PSE in October of 2019 for customer-initiated requests, safety and customer move in/move out. PSE is currently working to implement the final phase of remote connect/disconnect once the disconnect moratorium ends.	<ul style="list-style-type: none"> Reduced operations and maintenance cost savings (number of service appointments, truck rolls, vehicle-miles traveled, avoided postage and delivery costs) Reduced unauthorized energy usage (UEU) 	\$192M (2018-2037)
Outage Management	Integrating AMI with real-time operating (such as the ADMS – Outage Management System improves utilities' situational awareness of unplanned system failures and enables utilities to provide customers with more accurate and timely information about the status and cause of outages. Greater situational awareness, which includes immediate awareness of power outages, leads to improved resource planning and overall response.	<ul style="list-style-type: none"> Earlier outage start times Reduced outage durations experienced by customers Reduction of single customer "false positive" outages Reduction in storm restoration times 	\$121M (2024-2037)
Lowering Metering Costs for Customers with Distributed Generation	The deployment of smart meters allows PSE to continue to serve customers adopting solar with the technology they need for net metering. Because bi-directional metering capabilities are necessary for net metering, customers with AMR meters normally would need to upgrade their meters. However, because all AMI meters are capable of measuring energy bi-directionally, when a customer with meter adopts rooftop solar PV, equipment exchange is no longer necessary to convert the customer to net metering. In addition, the AMR bi-directional meters that PSE purchased and deployed to new solar customers prior to 2019 are no longer available.	<ul style="list-style-type: none"> Reduced equipment exchanges for solar PV customers Increased accuracy 	\$18M (2021-2037)

¹ Tracker metrics and benefits are based on base case assumptions from the Brattle AMI Report.

Leveraging the Network for Smart Street Lighting



\$27M
Total Benefit¹
(2021-2037)

1/1/2026
Est. Full Benefit
Realization Date

<p>Use Cases</p> <ul style="list-style-type: none"> Leveraging the Network for Smart Street Lighting 	<p>Summary</p> <p>PSE has developed a Smart Street Lighting program that leverages AMI to provide insight into the status and performance of the Company's approximately 100,000 street lights and to enhance the street light system's operational efficiency, reliability, and performance. PSE is preparing to deploy smart street light controls to 25,000 company-owned street lights by 2025. In the Base Case, the deployment rate of 5,000 installations will continue until the rollout is complete</p>	<p>Tracker Metrics¹</p> <ul style="list-style-type: none"> Reduced maintenance expense (lower truck rolls) Reduced administrative expense
<p>Owners</p> <ul style="list-style-type: none"> New Product Development 	<p>Reporting</p> <ul style="list-style-type: none"> Annual AMI Report 	



Smart Street Lighting

Smart street light control initial deployment (~25,000 street lights)

Smart street light control continued deployment (~5,000 street lights/year)

¹ Tracker metrics and benefits are based on base case assumptions from the Brattle AMI Report.

Key

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- External Milestone
- 🚩 Potential Milestone

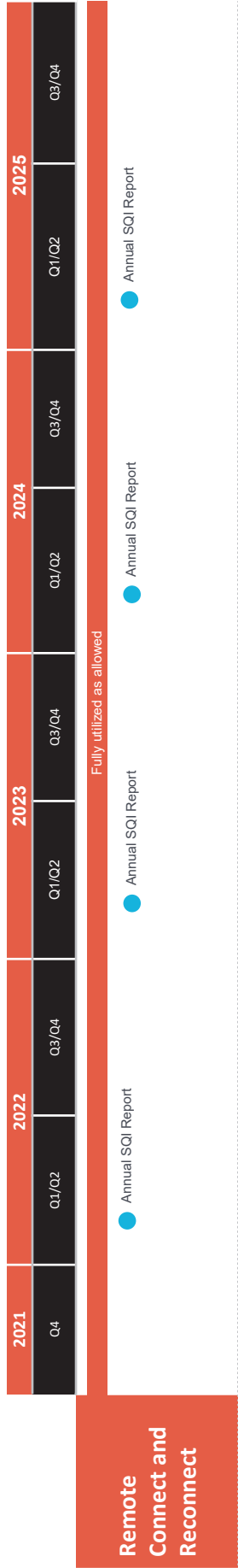
Remote Connect and Disconnect



\$192M
Total Benefit¹
(2021-2037)

1/1/2018
Est. Full Benefit
Realization Date

<p>Use Cases</p> <ul style="list-style-type: none"> Remote Connect and Disconnect 	<p>Summary</p> <p>AMI switch provides utilities the capability to turn electric meters on and off to support changes in occupancy, reoccurring non-payment issues, and prepaid service offerings. Remote connect/disconnect was implemented at PSE in October of 2019 for customer-initiated requests, safety and customer move in/move out.</p>	<p>Tracker Metrics¹</p> <ul style="list-style-type: none"> AMI Customer Initiated Remote Switch Success Reduced O&M cost savings (# service appointments, truck rolls, vehicle-miles traveled, avoided postage and delivery costs) Reduced unauthorized energy usage (UEU)
<p>Owners</p> <ul style="list-style-type: none"> Customer Solutions 	<p>Reporting</p> <ul style="list-style-type: none"> Annual SQI Report 	



Key

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¹ Tracker metrics and benefits are based on base case assumptions from the Brattle AMI Report. Bold indicates metric is on the proposed scorecard as discussed by PSE's witness Mr. Lowry

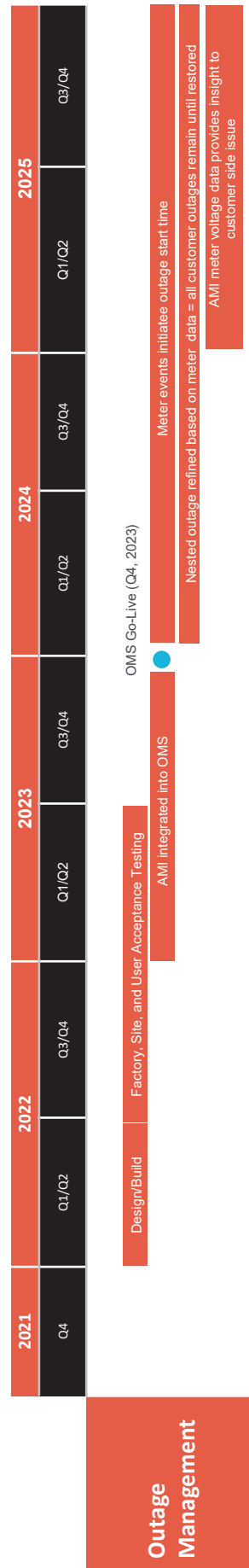
Outage Management



\$121M
Total Benefit¹
(2024-2037)

1/1/2024
Est. Full Benefit
Realization Date

<p>Use Cases</p> <ul style="list-style-type: none"> Outage Management 	<p>Summary</p> <p>Integrating AMI with real-time operating (such as the ADMS – Outage Management System) improves utilities' situational awareness of unplanned system failures and enables utilities to provide customers with more accurate and timely information about the status and cause of outages. Greater situational awareness, which includes immediate awareness of power outages, leads to improved resource planning and overall response.</p>	<p>Tracker Metrics¹</p> <ul style="list-style-type: none"> Earlier outage start times Reduced outage durations experienced by customers Reduction of single customer "false positive" outages Reduction in storm restoration times
<p>Owners</p> <ul style="list-style-type: none"> Electric Operations 	<p>Reporting</p> <ul style="list-style-type: none"> Annual AMI Report 	



¹ Tracker metrics and benefits are based on base case assumptions from the Brattle AMI Report.

Key

- ◆ Key Pivot Point
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- External Milestone
- 🚩 Potential Milestone

Lowering Metering Costs for Customers with Distributed Generation



\$18M
Total Benefit¹
(2021-2037)

1/1/2024
Est. Full Benefit
Realization Date

<p>Use Cases</p> <ul style="list-style-type: none"> Lowering Metering Costs for Customers with Distributed Generation 	<p>Summary</p> <p>The deployment of smart meters allows PSE to continue to serve customers adopting solar with the technology they need for net metering. Because bi-directional metering capabilities are necessary for net metering, customers with AMR meters normally would need to upgrade their meters. However, because all AMI meters are capable of measuring energy bi-directionally, when a customer with meter adopts rooftop solar PV, equipment exchange is no longer necessary to convert the customer to net metering. In addition, the AMR bi-directional meters that PSE purchased and deployed to new solar customers prior to 2019 are no longer available. Going forward, PSE anticipates adding 2,000 new net-metered customers per year. PSE plans to file a successor tariff with the WUTC in early 2024 in anticipation of reaching the net metering threshold of 4 percent of 1996 electric loads, or 179 MW in cumulative capacity.</p>	<p>Tracker Metrics¹</p> <ul style="list-style-type: none"> Reduced equipment exchanges for solar PV customers Increased accuracy
<p>Owners</p> <ul style="list-style-type: none"> New Product Development 		<p>Reporting</p> <ul style="list-style-type: none"> Annual CEIP Status

<p>Solar PV Metering Costs</p>	<p>2021</p> <p>Q4</p> <p>Net Metering additions (2000 annually)</p>	<p>2022</p> <p>Q1/Q2</p> <p>Q3/Q4</p> <p>Net Metering additions (2000 annually)</p>	<p>2023</p> <p>Q1/Q2</p> <p>Q3/Q4</p> <p>Net Metering additions (2000 annually)</p>	<p>2024</p> <p>Q1/Q2</p> <p>Q3/Q4</p> <p>Net Metering additions (2000 annually)</p> <p>File new successor tariff having reached net metering threshold</p>	<p>2025</p> <p>Q1/Q2</p> <p>Q3/Q4</p> <p>Net Metering additions (2000 annually)</p>
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¹ Tracker metrics and benefits are based on base case assumptions from the Brattle AMI Report.

Key

- ◆ Key Pivot Point
- Internal Milestone
- External Milestone
- 🚩 Potential Milestone

PSE will take advantage of four Tier 3 benefit use cases that will ramp in value as more AMI meters are deployed

Use Case	Summary	Est. Start Date
Improved Bill Generation	AMI improves the accuracy of meter readings by automating activities that otherwise would be conducted manually, minimizing human error and equipment failures. AMI-enabled bill generation can lead to fewer customer complaints about inaccurate bills and allows utilities to resolve billing disputes faster than before.	PSE's bill success is operating above 99% today. An SQL metric will report this annually.
Avoided Metering Issues	AMI system can help to detect instances of meter tampering and electricity theft by issuing alarms or notifications when irregularities in consumption activity are identified. AMI data can also help to identify faulty meters, register previously unregistered meters, and identify inactive meter or unoccupied premises.	In 2024, post full AMI deployment, PSE will begin evaluating algorithm improvements and benefit potential.
Better Visibility into Asset Utilization	AMI data can support monitoring and improving awareness of grid assets and help relevant teams make operational or design decisions. For example, AMI data can be used to estimate the load on service transformers with much greater precision and to identify transformers that are at risk of failure due to overload.	PSE is already leveraging AMI data to understand transformer load at risk (i.e., heat dome, EVs). PSE will roll out system wide plan when AMI is fully deployed (by 2024) to further define and calculate benefits.
Improved DER Planning and Integration	AMI provides accurate time-stamping of energy consumption information, helping utilities to implement time-varying rate (TVR) programs and analyze charging station usage and charging behavior based to inform future investment decisions. PSE will be able to forecast how increased adoption of electric vehicles might affect its system peak and overall demand and allow the company to locate EV charging in its service territory, incorporating knowledge into system planning efforts.	Sample AMI data has been piloted in the Feeder Load Forecasting tool. Data will be integrated as AMI is fully deployed to understand DER impacts to system infrastructure.
Other Tier 3 Use Cases	14 additional use cases. Examples of use cases already pursuing: <ul style="list-style-type: none"> • Hosting Capacity Analysis • Clean Energy Fund 3 – Tenino Battery + solar microgrid • Feasibility study for AMI load sheading non critical loads • Non-wire solutions 	<ul style="list-style-type: none"> • 1st map produced 2021/new tool 2023 • Pilot competed 2022/2023 • Study complete 2023 • Planning approach deployed today, full AMI use by 2024

PSE will keep the WUTC regularly informed about AMI benefit realization through existing and new reporting

Tier 1

- PSE will leverage the **Annual Report of Energy Conservation Accomplishment and Annual CEIP Status Report** to report on energy saving use cases, including the behavior-based programs, targeted DR pilots, and CVR/MVO optimization.
- PSE will provide a **TOU pilot** and **system-wide flexibility report** as part of those program filings in Q1 of 2026 to the WUTC.

Tier 2

- PSE will report 3 AMI metrics via annual **(Proposed) PSE Scorecard**.
- Annually, PSE will provide the WUTC with an **AMI Benefits Report**.

Tier 3

- PSE will report through annual **AMI Benefits Report** through end of rate plan.



Proposed AMI Performance Metrics to be included in the revised SQI Scorecard¹

#1 - AMI Bill Read Success Rate – Electric; AMI Bill Read Success Rate - Gas - The measure of a functioning system that delivers a meter read to PSE's data system, as expected each cycle and measured separately for gas and electric meters.

#2 - Customer Initiated Remote Switch Success - The measure of a total electric AMI switch and system success rate when a command is made from the “command center” by PSE. This is only measured relative to Customer initiated request.

#3 - Electric Energy Savings from Voltage Reduction - The measure of electric energy savings from lowering the voltage on a circuit at the substation that serves a circuit.

¹Prefiled direct testimony of Mark N. Lowry, Exh. MNL-1T provides scorecard mock up that includes these measures.



Proposed Metric #1 - AMI Bill Read Success Rate

Two metrics – AMI Bill Read Success Rate – Electric; AMI Bill Read Success Rate - Gas

2023 Target: No target until AMI is fully deployed

2024 Target: >99.5% each month

Population: Gas and Electric customer meters that are read monthly on an established cycle

Basis for Target: PSE’s contract with the vendor that performs meter read delivery has established this performance metric target.

- This means on any month, no more than approximately 10,000 reads on a monthly basis may not have received a billable read in the defined billable window on PSE provisioned meters. PSE will resolve any issues timely per required contract.

Calculation: Success rate(%) is calculated as the total number of meter reads received within a billing window within cycle¹ divided by the total number of meters in the respective billing cycle * 100. All cycles for a month are then aggregated to one performance measure each month. The calculation excludes exceptions: off-cycle or daily-meter services, skip meters, meters or modules that have been removed or not replaced, power outage to AMI meters, and endpoints that are not in “normal” status.

Sample Calculation

Actual reads in window divided by expected reads in the window * 100

For example: $1,150,000 / (1,200,000 - 100 \text{ exceptions}) * 100 = 96\%$

Measurement start: PSE will begin measuring in 2019 for monitoring. Before 2024, lower bill rate success may be indicators of implementation issues that are naturally addressed in a deployment such as this.

Note 1: There are 21 billing month cycles.

Proposed Metric #2 - Customer Initiated Remote Switch Success

2023 Target: >99% each month

Population: Electric AMI customers

Basis for Target: PSE's contract with the vendor that manages the command center that issues and receives switch function commands has established this performance metric target.

- This means that of 1000 commands that may be sent at any one time approximately 10 may not be successful. PSE will resolve these issues timely per required contract.

Calculation: Success rate(%) is calculated as the total number of confirmed receipts that disconnection or reconnection occurred within 120 seconds divided by the total number of a confirmed commands that were sent to a meter in normal status each month * 100. Calculation is limited to customer-initiated requests and limited by the internal protection mechanism of maximum of 1000 commands sent at any one time. Calculation excludes commands sent to a meter that is experiencing a power outage (i.e., not in "normal" status).

Sample calculation

Valid responses divided by valid requests * 100

For example: $900 / (1000 - 20 \text{ exceptions}) * 100 = 91.8\%$

Measurement start: PSE began measuring in 2020 with the completion of PSE's Meter Upgrade Projects associated with Get To Zero.

Note: To date PSE has performed 42,141 remote switch operations



Proposed Metric #3 - Reduced Energy Consumption from Voltage Reduction¹

2023 Target: 6,000,000 kWh

Population: Electric AMI customers

Basis for Target: PSE's CEIP establishes energy conservation targets to meet CETA requirements. Distribution Efficiency, PSE's voltage reduction program also called CVR/VVO in the future, is identified in PSE's Conservation Potential Assessment as a cost effective conservation program.

- PSE's 2022-2023 Biennial Conservation Plan set program annual target
- PSE's plan for voltage reduction deployment was established in the 2016 AMI Business Case
- Voltage reduction pace is maximized based on resources.

Calculation: Electric energy consumption savings(kWh) is calculated using a protocol from the Regional Technical Forum/Northwest Energy Efficiency Alliance² which is generally based the annual energy consumed for a circuit as measured at the substation multiplied by the conservation voltage reduction factor defined in the protocol multiplied by the percent change in voltage at a substation before voltage reduction and after voltage reduction. This is the first year of energy savings for the circuit. All substation circuits in which voltage reduction is deployed in a given year will be aggregated together for a total energy savings measure.

Sample calculation: $E_{\text{Saved}} = (\text{CVRfactor} \times E_{\text{Annual}} \times \% \Delta V)$

Measurement start: PSE began measuring in 2013 and reporting as part of PSE Biennial Conservation Plan.

Note 1: Voltage Reduction is referred to as Voltage Optimization in the context of energy efficiency.

Note 2: Regional Technical Forum (RTF) Simplified Voltage Optimization Measurement and Verification Protocol .

