EXH. CAK-4 (Apdx. A)
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 A (NONCONFIDENTIAL) TO THE THIRD EXHIBIT TO THE PREFILED DIRECT TESTIMONY OF

CATHERINE A. KOCH

ON BEHALF OF PUGET SOUND ENERGY

JANUARY 31, 2022

TARGETED CAPACITY UPGRADES

1. SHORT DESCRIPTION

This plan supports distribution electric capacity needs that have been evaluated using project benefits and achieve positive benefit-cost ratios.

2. BACKGROUND

In past years, the Reliability Road Map (RRM) Plan included both capacity and reliability projects and targeted the circuits outside of the WPC. In 2021, the RRM Plan has been split with the Targeted Capacity Upgrades and Targeted Reliability Upgrades Business Plans being created. Additional business plan for Reclosers, Fuse Savers, and Proactive UG Conversion have also been established.

PSE Planners must ensure that future load additions do not exceed the load limits of the conductor and equipment installed on the system, keeping in mind typical timeframes for the implementation of the possible solution strategies. At the same time, they must ensure that capacity related investments are prudent and cost-effective. Exceeding conductor and equipment ratings is the main reason for proposing capacity modifications on the distribution system. However, other capacity-related conditions like phase imbalance, low-voltage, and cold load pickup can also be reasons for capacity modifications.

PSE Planners perform adequacy screenings using winter and summer distribution substation and feeder peak load data. This screening can trigger a high level capacity assessment which evaluates whether there will be sufficient distribution system capacity within five years for feeders and laterals using the capacity limits outlined PSE's Distribution Planning Guidelines. The planning horizon allows for the expected window of time to design, permit, obtain easements, and build the project with the more complex substation projects taking longer. This assessment would include general localized growth assumptions and block load additions using PSE's county level forecast which includes draft conservation results from the 2021 IRP. Other triggers for a High Level Capacity Assessment could be any of the following:

- Awareness of a new potential block load or major development
- Review requests including design load approvals, public improvement, major account and new business opportunity, generation interconnection
- Operations concerns, such as phase imbalance, cold-load pickup, limited switching available, and ability to hold peak load.

If the High Level Capacity Assessment confirms a capacity need, a formalized Area Needs Assessment is be performed. This can result in a Targeted Capacity project.

Over the last few years, there has been an increase in load growth in certain targeted areas. For example, areas nearby to where the new light rail system is being built are seeing explosive growth and new developments, driving the loading of certain circuits beyond our Planning thresholds and require additional capacity to support new load and maintain reliability in a growing area.

Planning evaluates circuit performance annually at a system level and identifies circuits that trigger the need to study further, as it has surpassed the study triggers outlined in the Distribution Planning Guidelines. The table below shows that the number of circuits requiring a High Level Capacity Assessment has increased between 2018 and 2020, for both Winter and Summer seasons.

Table X: Number of Circuits triggered for Planning Study for Winter and Summer Peak

	Winter		Summer	
	2020	2018	2020	2018
Circuits over 85% utilization during peak	41	25	27	15

This increase in circuits identified between 2018 and 2020 shows the need to address capacity timely and proactively to ensure a grid that is highly reliable and can continually accommodate our future customers growing needs.

3. STATEMENT OF NEED

With exploding load growth in targeted areas, our customers' demand for increased flexibility and reliability of our grid, and Planning evaluations showing a higher utilization on specific circuit loadings, this program is needed to address system level growth and improve N-1 reliability to allow adequate capacity, reliability, operational flexibility and allow for future customers to safely and quickly connect to the grid.

3.1. NEED DRIVERS

- **Capacity** – System Upgrades support capacity needs in our system by upgrading laterals and adding new feeder capabilities to serve growing load.
- **Voltage** - System Upgrades support solving voltage needs in our system by addressing abnormal voltage across the system.
- **Grid Modernization –**
    - **Reliable** – Improving capacity concerns will allow for a more reliable system to provide operations personnel the ability to restore customers quickly.
    - **Resiliency –** System Upgrades can improve the ability of the electric system to withstand and recover from a major disruption, such as storm events, natural disasters, deliberate attacks, or accidents.
    - **Smart & Flexible** – System Upgrades support operational flexibility to allow for integration of Distributed Automation and other Grid Modernization plans.
    - **Safety** – System Upgrades improve system capacity by upgrading conductors/equipment that can be considered a safety risk.

3.2. INTEGRATED STRATEGIC PLAN (ISP) ALIGNMENT

This plan aligns primarily with the Processes & Tools category of the ISP:

- **System Integrity:** The main drivers for this plan are to support growing load, provide operational flexibility and overall improve the customer experience. The improvement to system capacity supports operational excellence and customer satisfaction.
- **Streamline processes to drive effectiveness and efficiency** – This plan drives effectiveness and efficiencies by addressing multiple benefit streams within the same scope of work. For example, new feeder and feeder upgrades address more than capacity. These projects may also help with improving data quality/information, aging infrastructure and safety.
- **Extract and leverage value from existing technology and assets** – When appropriate, each capacity project scope will utilize existing equipment to optimize the costs to attain the plan's goal and benefits.

4. PLAN DETAIL

4.1. PLAN SIZE/POPULATION

There is not a finite population of circuits to target. Instead, this plan addresses emerging capacity needs across PSE's entire population of ~1100 distribution circuits. Based on past capacity projects, the 2022-2026 projects are estimated to impact approximately 7% of the systems circuits.

4.2. PROPOSED COMPLETION DATE

This program is on-going and addresses emerging system needs. It is expected this program will go on indefinitely to account for the continual changes with system performance, physical plant and customer needs which will account for PSE's highest distribution capacity, voltage and operational flexibility system needs.

4.3. SUMMARY OF PLAN BENEFITS

PSE's highest distribution capacity needs will be targeted with this plan.

4.4. PRIMARY IDOT CATEGORIES

The primary iDOT Categories related to this plan are:

- Expected Unserved Energy: Addressing the need to have sufficient capacity to serve the increasing energy needs of customers.
- Energy Quality: Addressing specific customer inquiries regarding the customer's history of outage duration, outage frequency or power quality issues.
- Platform for Success – Flexibility: Improving the flexibility to utilize the grid, either for immediate use or creating an opportunity for a future project.

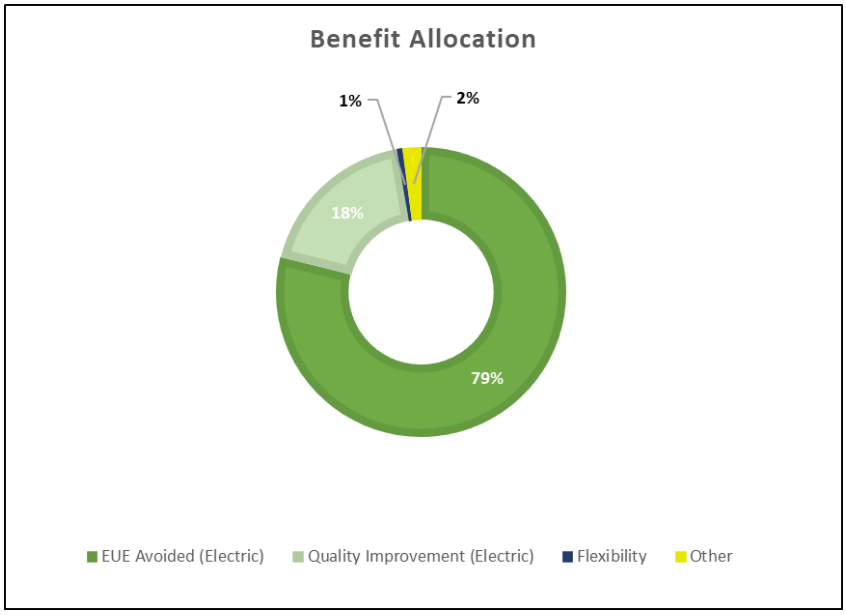
Table 1: Summary of Plan Benefits and Population

2022-2026	Non-MED CMI Saved (M)	Number of Locations	Budget ($M)[1]		NPV ($M)[2]	iDOT B/C Score[3]
			Capital	OMRC	Total Benefits	
Total	**0.2**	**76**	**50.6**	**1.5**	**419.3**	**10.1**

Note:

- Plan Dollars based on May 2021 Five Year Budget Plan
- B/C Score, MED CMI, NPVs based on 2018-2020 RRM Capacity Projects
- Customers Impacted based on average from 2018-2020 RRM Capacity Projects

Figure 1: Benefit Allocation[4]



[1] Budget indicate are sum of future year budget as it is allocated for that specific year
[2] Benefits indicated are Net Present Value (NPV) sum of future year benefits allocated for that specific year
[3] B/C Score uses NPV of Benefits and Budget
[4] Risk of not achieving budget and expected benefits is 5%

4.5. ESTIMATED TOTAL COSTS

Estimated costs are generated based off of historical costs on similar types of projects, allows for variations in project scope, increase in project cost due to inflation, and added contingency to account for unforeseen conditions associated with the project.

Costs will vary widely and some circuits may need more improvements than others due to variability of the type of improvements needed. For example, a specific project might require treewire reconductor, pole replacements, adding reclosers and partial underground conversion to name a few.

Plan Years	# of Circuits	Capital Cost ($M)	OMRC Cost ($M)
Actual 2018 to 2021	21	15.1	1.15
Estimated 2022 to 2026	75	50.6	1.5

5. FUNDING ALTERNATIVES

5.1. SOLUTION ALTERNATIVES

The risk of not pursuing a more aggressive approach is that existing plans alone will fail to adequately improve system performance enough to make any noticeable impact to the targeted customer's quality of service. With the development of each individual project within the plan, alternative solutions are considered. These solutions can include both maintenance options and a variety of different capital construction options. Typical alternatives considered are: enhanced vegetation management, bird/animal guards, tree wire, underground conversion, feeder ties, fuse savers, reclosers, and distribution automation. The solution that provides the highest cost benefit ratio is submitted as part of the plan.

No Action - There is a risk of customer dissatisfaction in areas experiencing frequent outages that could be reasonably addressed by this plan. Customers may experience power quality issues if capacity needs are not addressed. There is also the lost opportunity to restore power to a variety of feeder and lateral outages.

5.2. FUNDING ALTERNATIVES

Increased Funding from proposed - With increased funding, the triggers for identifying customer's capacity issues could be expanded to accommodate the needs of more customers.

Decreased Funding from proposed - Decreased funding would result in fewer circuits seeing overall circuit improvement in a relatively short period of time. There is also potential risk of customer dissatisfaction in areas experiencing frequent outages that could be reasonably addressed by this plan.

6. PLAN DOCUMENT HISTORY

The current version of the project summary supersedes all previous versions.

Date	Reason(s) for Update	Summary of Significant Change(s)	Modified By
5/18/2020	Original Program Documentation	Initial Program Document	Karen Pavletich
4/2/2021	2021 Updates	Data updated to reflect most recent 5 Year Plan Dollars	Karen Pavletich
5/6/2021	2021 Updates	Statement of need updated to reflect impacts of electrification and meeting N-0 and N-1 recommendations. Data updated to reflect additional changes to the 5 Year Plan Dollars	Karen Pavletich
5/7/2021	OMRC Update	Budget plan reflects latest estimate from Project Management	Karen Pavletich
7/9/2021	Used and Useful Policy guidance	Updated to current information; add alternatives and cost information	Karen Pavletich
12/1/2021	Annual Review	Minor words and format changes	Karen Pavletich

7. SUPPORTING DOCUMENTATION

Document Name
PSE DISTRIBUTION PLANNING GUIDELINES 2020