EXH. KCS-1CT
DOCKETS UE-22___/UG-22___
2022 PSE GENERAL RATE CASE
WITNESS: KYLE C. STEWART

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, **Complainant,** **v.** **PUGET SOUND ENERGY,** **Respondent.**	**Docket UE-22____** **Docket UG-22____**

PREFILED DIRECT TESTIMONY (CONFIDENTIAL) OF

KYLE C. STEWART

ON BEHALF OF PUGET SOUND ENERGY

REDACTED VERSION

JANUARY 31, 2022

PUGET SOUND ENERGY

PREFILED DIRECT TESTIMONY (CONFIDENTIAL) OF KYLE C. STEWART

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I. INTRODUCTION

Q. Please state your name, business address, and position with Puget Sound Energy.

A. My name is Kyle C. Stewart. My business address is 355 110th Ave. NE, Bellevue, WA 98009-9734. I am the Director of Enterprise Risk Management of Puget Sound Energy ("PSE" or the "Company").

Q. Have you prepared an exhibit describing your education, relevant employment experience, and other professional qualifications?

A. Yes, I have. It is Exh. KCS-2.

Q. What are your duties as Director of Enterprise Risk Management of PSE?

A. My responsibilities include oversight of the Enterprise Risk Management and Energy Risk Control departments. The Enterprise Risk Management department develops the standards, processes, and accountabilities to coordinate risk management oversight. The Energy Risk Control department engages in modeling and analysis that help PSE manage the risks inherent with energy trading.

Q. Please summarize the purpose of this prefiled direct testimony.

A. The purpose of my prefiled testimony is to outline the risk in the western energy markets and explain why PSE needs to reduce its reliance on bilateral Mid-Columbia ("Mid-C") trading to meet capacity requirements.

To address this, my testimony describes the assumptions used in resource adequacy planning that establish the basis for PSE's reliance on short-term energy markets. It also outlines the exogenous factors that result in reduced power market liquidity and establish the need for PSE to reduce its market reliance. I detail the market fundamentals driving supply-side risk that increase PSE's exposure during scarcity events and outline the actions PSE is actively taking to address these evolving risk factors.

II. NEED FOR REDUCED MARKET RELIANCE

Q. Please describe "market reliance" as it relates to PSE's current planning standard.

A. As it relates to PSE's resource planning standards, "market reliance" is the term used to describe the portion of PSE's capacity need that is satisfied by short-term Mid-C bilateral energy purchases that leverage Mid-C transmission contracts to deliver energy to PSE's system. Historically, PSE has credited 1,500 megawatts ("MW") of Mid-C transmission without associated firm energy as capacity

towards the resource adequacy requirement in the Integrated Resource Plan ("IRP").

Q. Is PSE able to continue treating Mid-C transmission as capacity?

A. No. Consistent with the Market Risk Assessment outline in PSE's 2021 IRP, which I provide as Exh. KCS-3, the assumption that Mid-C transmission without associated firm energy resources serves as a proxy for generation capacity can no longer be treated as a reliable source of capacity to meet resource adequacy requirements.

Q. Why not?

A. While a market environment with ample liquidity and oversupply of dispatchable resources could support the prior assumption, supply and demand fundamentals have tightened due to reduced regional capacity and a growing capacity share attributable to variable energy resources ("VER"). As outlined in the market reliance analysis documented in PSE's 2021 IRP shown in Exh. KCS-3, supply volatility is being impacted by a net reduction of over 1,100 MW in generation capacity since 2015. At the same time, the Pacific Northwest, Desert Southwest, and California have retired almost 19,000 MW of dispatchable resources since 2015 while adding just under 18,000 MW of VER during that same time period.

Even in periods of flat or low load, these dynamics naturally act to tighten regional supply and demand fundamentals that result in more frequent

occurrences of reduced market liquidity, heightened price volatility, and increased risk for those companies, like PSE, that rely on the market for capacity needs.

Q. Have customers benefitted in the past from this reliance on Mid-C transmission?

A. Yes. PSE customers have historically benefited in the form of lower energy costs from the Company's ability to rely on surplus regional generation sourced primarily from market purchases at Mid-C to meet periods of peak load demand in lieu of investing in incremental capacity resources to meet this demand. However, as seasonal supply and demand fundamentals tighten due to reduced capacity and increasing load, continued reliance on significant amounts of market purchases increases the risks of service disruptions and rate volatility to customers.

III. FACTORS CONTRIBUTING TO THE MARKET RELIANCE RISK

Q. Is the net reduction in regional capacity impacting Mid-C power market liquidity?

A. Yes. This reduction in regional capacity and changing energy supply mix observed since 2015 is constraining power market liquidity at the Mid-C trading hub. As outlined in PSE's 2021 IRP, provided as Exh. KCS-3, Intercontinental Exchange ("ICE") Mid-C average day-ahead heavy load traded volumes have declined in excess of 70 percent since 2015.

Q. How does wind generation in the region contribute to the increasing risk associated with market reliance?

A. As wind resources account for a larger share of the regional energy supply mix, the variable nature of the energy output from these resources increases the demand on balancing resources to manage loads. This results in increased exposure to market, particularly during times of above average loads, for companies like PSE that may be reliant on market to balance wind energy production that is significantly below forecast or average capacity values.

The nature of regional weather patterns can also impact the propensity and magnitude these occurrences have on an energy portfolio. Independent analysis from Ansergy's *WECC Markets Summer 2021 Report*, provided as Exh. KCS-4, speaks to this point, showing that average wind output is significantly lower on average during periods of highest energy demand as compared to periods of lower or average demand. Specifically, the report findings show that the Pacific Northwest's wind production is on average about 45 percent lower on the days with the highest 10 percent of energy demand as compared to the production during the days with the lowest 50 percent of energy demand. This is demonstrated in Table 1 below.

Average Wind Output on Top 10% Load Days Versus Average Output on Bottom 50% Load Days

Region	Shoulder	Summer	Winter
Northern California	-41.17%	-28.29%	-14.90%
Pacific Northwest	-42.69%	-41.81%	-50.60%
Rockies	7.94%	-30.53%	-6.35%
Southern California	-53.26%	-31.65%	-54.18%
Desert Southwest	10.19%	3.86%	-8.52%
WECC	-17.82%	-26.25%	-16.65%

Source: Ansergy: *WECC Markets Summer 2021 Report*

Ansergy's analysis covers approximately four years of market observance for the regions listed, starting in January of 2018 and running through the summer of 2021. This is relevant for PSE as wind energy accounts for 772 MW of nameplate capacity of the Company's generation portfolio. In practice, and consistent with Ansergy's analysis, PSE regularly experiences scenarios where above average energy loads correspond with periods of significantly low wind production increasing reliance on market during these periods. Given the geographical proximity of other regional operated wind projects, it would be reasonable to infer that other load serving entities in the Pacific Northwest are simultaneously impacted during periods of high load and low wind production, thus increasing the demand and price of alternative energy sources available in the market.

Q. Does the need to reduce market reliance only apply to the winter peaking season?

A. No. The Pacific Northwest is experiencing increased risk associated with the summer demand season due to region demand. Observed Western Electricity

Coordinating Council ("WECC") peak system load during the third quarter of 2021 was 20.9 gigawatts ("GW") greater than the peak system load observed during the first quarter of 2021. While PSE's seasonal peak loads remain marginally higher during the winter, regional demand across the west places a greater strain on existing energy resources during these months, increasing the risk to PSE and its customers of carrying market reliance during summer months when aggregate WECC load is highest.

IV. MARKET EXPOSURE AND ENERGY PRICE RISK

Q. How are current market fundamentals impacting energy prices and market exposure to PSE and its customers?

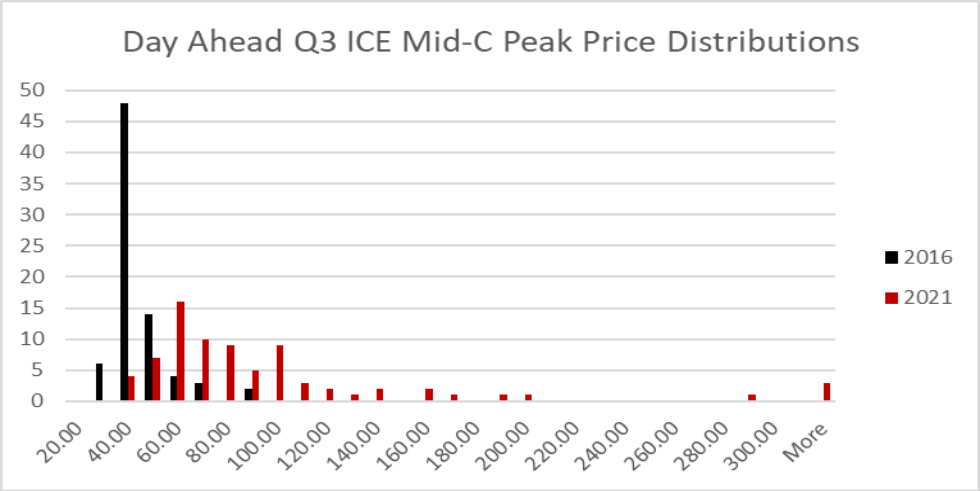
A. Customer exposure to market risk and variability in energy costs is increasing in magnitude and frequency as a result of the tightening of regional energy market supply and demand fundamentals. This is particularly evident during the summer months where the western region energy demand is highest. Summer day-ahead Mid-C heavy load price distributions reflect this risk, trending towards greater frequency high price occurrences as evident in the higher skew values measured in recent years as shown in Table 2 below. Other notable trends in summer pricing include a trend towards higher average peak energy prices and a wider range of price observances as depicted by higher standard deviation measures for the day-ahead price observances.

Table 2. Day-Ahead Q3 ICE Mid-C Peak Price Statistics (2016-2021)

Day-ahead Q3 ICE Mid-C Peak Price Statistics						
Year	Skew	Mean	Median	Min	Max	Stdev
2016	2.31	31.58	28.24	19.90	76.76	11.15
2017	2.60	37.29	27.37	17.70	137.43	23.69
2018	2.57	57.65	33.42	16.59	300.52	57.39
2019	2.08	31.17	30.01	21.60	68.04	7.53
2020	3.52	31.98	24.95	2.69	195.26	28.92
2021	3.86	92.49	63.35	26.50	583.04	101.95

The histogram in Figure 1 below provides a depiction of the impact of these statistical measure showing the wide range of higher price observances in the third quarter of 2021 as compared to the same period for 2016.

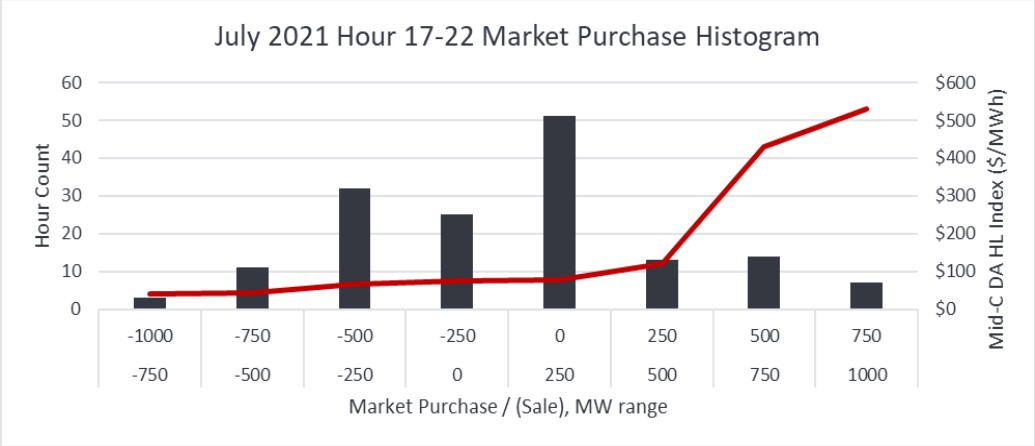
Figure 1. Day-Ahead Q3 ICE Mid-C Peak Price Statistics (2016-2021)



The chart in Figure 2 below shows the relationship of price occurrences from July 2021 to PSE's position in the market. This example shows a correlation of day-ahead power prices to periods of increased market reliance for the Company, and exponentially higher price observances during periods where PSE's portfolio balancing needs surpassed 500 MW of market supplied energy. Using the 500-

750 MW bin in the table as an example: During July 2021, PSE observed 14 hours where net market purchases were between 500-750 MW for those hours and the average index price over those same periods were in excess of $400/MWh.

Figure 2. July 2021 Heavy Load Market Purchases and Price Relationship



Q. Are there other risk factors that should be considered?

A. The lack of an integrated western energy market and consistent planning standard exacerbate the risk of market reliance in the near-term. To that point, PSE is evaluating participation in the Northwest Power Pool ("NWPP") Western Resource Adequacy Program ("WRAP"). Please see the Prefiled Direct Testimony of Paul K. Wetherbee, Exhibit PKW-1CT, for a further discussion of the WRAP and PSE's plan to evaluate the costs and benefits of the Company's participation.

WRAP will establish common planning standards and increase transparency into the regional capacity needs. The first non-binding forward showing for winter 2022-2023 is due in March 2022. As a participant in the forward showing, PSE

would be required to demonstrate adequate capacity to meet its loads. Under WRAP, market purchases tied to firm Mid-C transmission and not tied to specified resources with a known qualifying capacity contribution will not count as capacity, contrary to the historical planning standard used by PSE.

Q. What action should PSE take to address these risks?

A. In addition to the capacity needs articulated in the 2021 IRP, PSE needs to acquire short-term, fixed priced capacity to address the growing risk of market reliance and market price exposure. In doing so, PSE will continue to need to evaluate market fundamentals and adjust how the energy portfolio is managed to balance mitigation costs against the risk market reliance places on its customers.

V. RISK MITIGATION ACTIONS

Q. Does PSE plan to reduce reliance on energy purchases at the bilateral Mid-C trading hub to meet capacity requirements?

A. Yes. To address the growing risk of market reliance, PSE is taking the following actions: On Oct 28, 2021, the Energy Management Committee ("EMC") approved a strategy to implement a supplemental capacity book to address the growing risk that market reliance poses to utility customers. The supplemental capacity book establishes a target threshold and tracking mechanism for PSE to reduce market purchases and exposure associated with 1,500 MW of firm Mid-C transmission to approximately 500 MW consistent with the need outlined in the

All-Source RFP issued by PSE in April 2021, and which I have provided as Exh. KCS-5.

The 2021 IRP issued by PSE outlines a glide path that serves as an indicative trajectory for the Company to reduce market purchases to approximately 500 MW by 2027 and outlines that actual timing of resource acquisition will serve to maximize customer benefits through least cost risk mitigation. To accomplish this, PSE must equally consider the acquisition of capacity resource offerings not submitted into its All-Source RFP. The capacity book serves as a tracking mechanism for the integration of new resources into the energy portfolio and to inform coordinated resource acquisition decisions across PSE's energy procurement functions inclusive resource acquisition, strategic energy initiatives and energy supply merchant.

The mitigation strategy approved by the EMC also acknowledges the need to expedite the trajectory of near-term resource acquisition, considering the market risks previously outlined in my testimony and establishes an explicit portfolio need for PSE's merchant function to evaluate existing capacity resources not bid into PSE's RFP.

Q. Does this strategy include any actions that will mitigate market exposure in advance of achieving the target 1,000 MW of market reliance reduction?

A. Yes. The second element to the market reliance risk mitigation strategy is the establishment of a unit commitment cap for the natural gas generation resources

currently in PSE's energy portfolio. The unit commitment cap retains the least economic 1,000 MW of PSE's natural gas thermal capacity to satisfy the 1,000 MW market reliance short position within the capacity book, consistent with the 1,000 MW of market reliance reduction by 2027 as identified in the Company's 2021 IRP. In practice, the unit commitment cap acts to retain 1,000 MW of generation, irrespective of unit economics, for the portfolio to hold as dispatchable capacity to manage peak load events going forward and ratably reduce the overreliance on market purchases.

Based on historically observed heat-rates, the strategy has a de minimis impact in the shoulder seasons of spring and fall where heat rates are relatively low and the modeled thermal generation within the portfolio is minimal. In the winter and summer seasons, high heat-rates can drive periods of stochastically modeled economic gas fired generation ("GFG") capacity in excess of 1,800 MW. Unconstrained, this GFG length (economically modeled unit dispatch) is committed in PSE's risk model towards satisfying the demand of the Base Load Book,[1] limiting the ability of the portfolio to cover incremental demand during periods of high-side load variances or unplanned unit outages with PSE owned generation. The result is greater exposure to market reliance during these periods.

Because PSE owned GFG unit dispatch is economically modeled based on current market prices, it represents the marginal MW cost within the portfolio, serving as

[1] Base load book refers to the Company's official load forecast presented as average on and off peak monthly load profile, updated annually, and used as the demand baseline for PSE's risk model.

a call option to satisfy the capacity requirement until new resources can be acquired to satisfy the capacity need. As new resources are acquired and reflected in the capacity book, the 1,000 MW of thermal unit commitment retained will be released back to the Base Load Book equal to the position that is offset by the new capacity acquisitions.

Q. What governance controls has the Company put in place to evaluate new resource acquisitions under the proposed strategy?

A. Resource acquisitions under the new strategy are required to be covered under the existing authorized transaction schedules and delegations of authority as defined by PSE's Energy Supply Hedging and Procedures Manual, or submitted for review and approval by the EMC if outside the established delegations of authority. Materials presented to the EMC in support of the market reliance risk mitigation strategy are provided as Exh. KCS-6C.

Q. What other actions has PSE taken more broadly to address evolving market risks factors?

A. Recognizing the growing risk in western energy markets, in 2020, PSE undertook an assessment of the trading controls covering the Company's commercial operations and as a result revised the Energy Risk Management Policy ("Policy"), which outlines the governance model and objectives for energy supply management, and Energy Supply Hedging and Procedure Manual ("Procedures"), which covers the specific roles and responsibilities of employees covered under

the policy as well as the specific schedules outlining delegations of authority and authorization pursuant to management of the energy portfolio.

The policy updates address the evolving market dynamics and risk apparent to PSE's customers by updating the governance and control standards for the Company's energy supply merchant and oversight functions. Additions to the Policy and Procedure documents include more explicit financial risk mitigation objectives, updated delegations of authority, and integration of standards for risk measurement and reporting. The EMC formally adopted the revisions to the Policy and Procedures in September 2021. The updated policy documents are provided Exh. KCS-7 and Exh. KCS-8C.

Q. Are there RFPs or other capacity offerings that PSE plans to participate in to address the market reliance capacity need?

A. Yes. In alignment with the market reliance risk management strategy approved by the EMC, PSE participated in a summer capacity RFP issued by Powerex in November of 2021. The results of this RFP are detailed in Mr. Wetherbee's testimony, Exh. PKW-1T. PSE is [redacted]

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VI. CONCLUSION

Q. Does this conclude your prefiled direct testimony?

A. Yes it does.