



# EXECUTIVE SUMMARY

## CHAPTER ONE



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# 1. Introduction

Puget Sound Energy (PSE) is Washington State’s largest and oldest utility, serving 1.5 million customers in ten counties over 6,000 square miles. History reflects how PSE has shared customers’ environmental concerns over the years while balancing expectations for uncompromised reliability, affordability, and safety. Puget Sound Energy was an early leader in clean energy — from our oldest hydroelectric facility, Snoqualmie Falls built in 1898, to our first wind facility, Hopkins Ridge, developed in 2005, to establishing a pathway to remove coal-fired generation by the end of 2025. Our commitment to clean energy and reducing greenhouse gas emissions has only strengthened in recent years, as evidenced by our support of the passage of the Clean Energy Transformation Act (CETA) and the Climate Commitment Act (CCA).

In this 2023 Electric Progress Report (2023 Electric Report or report), we identified the need to build and/or acquire a significant amount of resources to comply with the CETA and meet resource adequacy requirements — more than 6,700 megawatts (MW) of nameplate capacity by 2030. This report outlines the resources and actions to get us there.

## **A Series of Firsts**

This document is PSE’s first electric progress report. A product of the CETA, it is designed to streamline reporting as we work toward our clean energy goals. This report is also our first opportunity to reinforce the commitments in PSE’s 2021 Clean Energy Implementation Plan (CEIP), which includes eliminating coal-fired resources by 2025, achieving greenhouse gas neutrality by 2030, and supplying 100 percent renewable and non-emitting electric energy by 2045.

This is the first resource plan to incorporate climate change temperature predictions in the analysis, and this made an unmistakable mark on our resource needs. As a result of this analysis, we learned that even though the summer peak is increasing, PSE is still a winter peaking utility. Although our most significant peak demand will still occur in winter, we must also account for summer peaks. The resources we rely on to get us through cold winter nights will not be the same as those that get us through hot summer days.

This report also expands our approach to quantifying customer benefits in the analysis to ensure a more equitable transition to clean energy. The resulting resource plan is far more diverse and relies more on clean, intermittent resources such as wind, solar, and storage. The plan also reduces market reliance compared to prior resource plans because we recognize that recent significant changes in the wholesale electric market make it increasingly risky and unreliable to rely on the market. Although markets will continue to play a critical role in optimizing PSE’s portfolio, we can no longer rely on traditional energy markets to meet peak capacity needs.

## **An All-of-the-above Approach**

All these factors drove us to look at our portfolio of resources in new and diverse ways. The portfolio builds a wide range of new renewable and storage resources — an all-of-the-above approach — at an unprecedented scale and pace. The amount of new, non-emitting generation resources PSE will need by 2030 is more than we have accumulated in



our 100-year history. It will require us to develop resources rapidly while we adhere to our procurement principles and policies to meet our CETA goals.

Our analysis also revealed that we will need significant grid improvements that allow increasing amounts of intermittent resources to work in concert. The grid will require considerable development in transmission capacity to bring utility-scale wind and solar to our region and allow the rapid advancement of new and emerging technologies such as green hydrogen.

Our plan illustrates significant investment in wind and solar resources combined with energy storage will shape the foundation of the energy system of the future. We also assume that technologies emerging over the coming 15 years will help us maintain a reliable system. We are not pursuing a single long-term technology solution but will explore multiple emerging technologies in the coming years. We will take a pragmatic, diversified approach and engage with others in the region to take concrete steps to move multiple technologies forward. We will work together to ensure that future resources are available to maintain the reliability and affordability our customers expect as we create a cleaner and more equitable system.

### **Mitigating Risk**

There is a risk that some of these technologies will not emerge as viable at the pace we need. We are mitigating that risk in several ways. For example, we assumed multiple fuel options for peaking facilities. We are active partners in establishing Washington as a green hydrogen leader, which includes working with Fortescue Future Industries and other regional interested parties to explore the development of a hydrogen production facility at the former Centralia coal mine in Centralia, Washington.<sup>1</sup> Although not part of the preferred portfolio, we see advanced nuclear reactors as potentially a necessary part of our region's future energy supply mix and will continue to investigate the technology as a potential fit for future PSE resource needs. Puget Sound Energy and the region will need emerging resources like hydrogen hubs and/or advanced nuclear reactors to become commercially viable to help integrate renewables and ensure a reliable grid in the future. For that reason, PSE intends on taking an active role in exploring such technologies to help ensure progress is made toward meeting the needs of our customers and successfully meeting the requirements of state policy.

We are proud to be the Pacific Northwest's largest utility producer of renewable energy, but we know that our journey toward an equitable clean energy future has only begun. The resource plan included in this 2023 Electric Report is another critical next step highlighting the opportunities for PSE to continue leading the way on renewable energy for our state and region.

## **2. Resource Planning Foundations**

This 2023 Electric Report is an update to the 2021 Integrated Resource Plan (IRP) required under Washington Utilities and Transportation Commission (WUTC) rules for electric investor-owned utilities as of December 2020.<sup>2</sup> Those changes require electric utilities to file an electric IRP every four years and an update, or progress report, two

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<sup>1</sup> <https://ffi.com.au/news/centralia/>

<sup>2</sup> [WAC 480-100-625](#)



years later. This 2023 Electric Report is a planning exercise that evaluates how PSE will meet customer electric supply needs. The analysis considers policies, costs, changing economic conditions, and the existing energy system to develop a plan to meet the needs of our customers at the lowest reasonable cost over the next 20+ years.

Throughout the resource planning process for this report, we focused on the following key objectives, which lay the foundation for this and all future resource plans:

- Build a reliable, diversified power portfolio of non-emitting resources
- Ensure an equitable clean energy transition for all PSE customers
- Ensure resource adequacy while delivering a clean energy transition
- Ensure resource planning aligns with PSE's Clean Energy Implementation Plan (CEIP) to meet our interim targets and CETA obligations

Recognizing that the 2023 Electric Report does not make resource or program implementation decisions is important. The report is a long-term view of what resources appear to be cost-effective while maximizing benefits and minimizing burdens, based on the best information we have today about the future. The forecasts and resource additions in the 2023 Electric Report will change in future IRPs as technology advances, customer use patterns change, clean fuel options evolve, resource costs change, the wholesale energy market evolve, and new policies are established.

## 3. Change Drivers

We developed this report during a time of extraordinary change as policymakers, the utility industry, and the public confront the challenge of climate change and the necessity to transition to a clean and equitable energy future. The following describes four areas of focus that impact the resource plan described in this report.

### 3.1. Address Regulatory Changes

The 2023 Electric Report includes updates in response to new legislation enacted since the 2021 IRP. These updates include the Climate Commitment Act, updates to CETA rules, Washington State building code efficiency improvements, and portions of the Inflation Reduction Act (IRA). We incorporated as much of the IRA as possible, resulting in an estimated savings of approximately \$10 billion over the next 20+ years from production and investment tax credits. However, because the law was enacted late in our planning process, we could not consider all the nuances of the bill, nor could we incorporate the policies and rules the federal government has not developed yet to implement the IRA. We will continue to analyze and integrate the impacts of the IRA for the 2025 IRP.

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→ A complete discussion of the legislative policy updates is in [Chapter Four: Legislative and Policy Change](#).

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## 3.2. Embed Equity

The 2023 Electric Report represents our continued progress in a journey to embed equity into the resource planning process. We began incorporating equity in 2021 by assessing highly impacted communities and developing initial customer benefit indicators. Since then, we've made progress by defining vulnerable populations and creating customer benefit indicators with input from interested parties, including the Equity Advisory Group (EAG) formed during the 2021 CEIP process. We recognize this is one step of many toward ensuring an equitable clean energy transition. Equity is complex to measure and assess, especially in energy system planning. However, we continue to refine our analysis and work with interested parties to embed equity throughout the resource planning process.

CETA requires that all customers benefit from the transition to clean energy through the equitable distribution of energy and non-energy benefits and the reduction of burdens to vulnerable populations and highly impacted communities.

For this report, we expanded the 2021 IRP approach to building a preferred portfolio to include a portfolio benefit analysis using customer benefit indicators (CBIs) developed for the 2021 CEIP with extensive input from the EAG. Our goal in using customer benefit indicators (CBIs) is to identify a preferred portfolio that balances customer benefits with portfolio costs while reducing burdens to vulnerable populations and highly impacted communities. Our approach is evolving and will continue to improve and develop for the 2025 IRP and future CEIP cycles.

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→ Details on the portfolio benefits analysis are in [Chapter Five: Key Analytical Assumptions](#).

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## 3.3. Incorporate Impacts of Climate Change

The 2023 Electric Report incorporates climate change in the base energy and peak demand forecast for the first time. We heard from interested parties that it is vital to incorporate climate change because it affects future demand, and we agree. We included climate change in the base demand forecast, the resource adequacy analysis, and stochastic scenarios. Before this report, PSE used temperatures from the previous 30 years to model the expected normal temperature for the future. This approach was a common utility practice but did not recognize predicted climate change impacts on temperatures. We used climate change projections, modeled recently by climate change scientists for the region in time for this 2023 Electric Report, to calculate a normal temperature assumption that reflects climate change. No industry standards or best practices for incorporating climate change into a demand forecast exist. Including climate change in this report for the first time is a significant milestone, but we recognize this methodology needs to be refined and will evolve in future planning efforts.

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→ Please refer to [Chapter Six: Demand Forecast](#) for details regarding how we incorporated climate change into our demand forecast.

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## 3.4. Reduce Market Reliance

The supply and demand fundamentals of the wholesale electric market have changed significantly in recent years. The availability of dispatchable generation resources is declining, and market power prices and volatility are increasing. These factors make reliance on the Western Interconnect market increasingly risky, so we plan to decrease market reliance during high demand peak hours, from almost 1,500 MW to zero MW by 2029.

For decades, PSE's customers have benefitted from an over-supplied market. Under such conditions, firm capacity was available at a low cost. The market outlook is different today. While markets will continue to play a critical role in optimizing PSE's portfolio, we can no longer rely on traditional energy markets to meet peak capacity needs.

The future of electricity consists of a diversified portfolio of non-emitting resources. A diverse portfolio reduces vulnerabilities due to market price, supply fluctuations, and political unrest. Having multiple, reliable generating resources allows a utility to continue to provide power without disruption if one energy source fails. A diverse energy portfolio reduces environmental impacts, improves reliability, and promotes innovation to meet our customers' needs. Resource diversity is the key to reducing emissions while preserving reliability and affordability.

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→ We provide more details on the various portfolios considered in [Chapter Eight: Electric Analysis](#).

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## 3.5. Accessibility and Plain Language

While creating the 2023 Electric Progress Report, we took measures to improve the accessibility of our written documents, public meetings, and website content. In this and future documents, we are committed to removing participation barriers and attracting more members of the public into the resource planning process. We are continuously evaluating our content and working to improve readability and accessibility for all while encouraging interested members of the public to get involved in our planning processes.

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→ [Appendix A: Public Participation](#) contains additional detailed information about public feedback in this IRP cycle.

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## 4. Preferred Portfolio

The preferred portfolio, which requires over 6,700 MW of new generation by 2030, is a portfolio of diverse resources that can fulfill our CETA commitments and achieve carbon neutrality by 2030 and a carbon-free electric energy supply by 2045. As described in Table 3.1, this portfolio significantly increases conservation, demand response, renewable resources, and energy storage. However, given the large amounts of variable energy resources such as wind and solar, and energy-limited resources such as energy storage, we rely on newer technologies, specifically hydrogen,



as a fuel to meet peak energy needs to achieve a carbon-free energy supply by 2045 while maintaining reliability and resource adequacy.

We acknowledge the risk of relying on an uncertain fuel source, so we intentionally diversified this portfolio to reduce risk. Additionally, in future IRP cycles, we will continue to evaluate and consider emerging technologies, including green hydrogen and advanced nuclear small modular reactors (SMR).

Table 1.1: Electric Preferred Portfolio, Resource Additions (Nameplate Capacity)

Resource Additions (Nameplate MW)	Total by 2030	Total by 2045
<b>Demand-side Resources</b>	<b>618</b>	<b>1,265</b>
Conservation <sup>1</sup>	281	818
Demand Response	337	446
<b>Distributed Energy Resources</b>	<b>739</b>	<b>2,392</b>
DER Solar	552	2,124
<i>Net Metered Solar</i>	284	1,393
<i>CEIP Solar</i>	79	79
<i>New DER Solar</i>	189	652
DER Storage <sup>2</sup>	187	267
<b>Supply-side Resources</b>	<b>5,360</b>	<b>11,174</b>
CETA-compliant Peaking Capacity <sup>3</sup>	711	1,588
Wind	1,400	3,650
Solar	700	2,290
Green Direct	100	100
Hybrid (Total Nameplate)	1,450	1,748
<i>Hybrid Wind</i>	600	800
<i>Hybrid Solar</i>	400	398
<i>Hybrid Storage</i>	450	550
Biomass	-	-
Advanced Nuclear (SMRs)	-	-
Standalone Storage	1,000	1,800
<b>Total</b>	<b>6,717</b>	<b>14,830</b>

Notes:

1. Conservation in winter peak capacity includes energy efficiency, codes and standards, and distribution efficiency.
2. Distributed Energy Resources (DER) storage includes CEIP storage additions, non-wires alternatives, and distributed storage additions.
3. CETA-qualifying peaking capacity is functionally like natural gas peaking capacity but operates using non-emitting hydrogen or biodiesel fuel. We describe CETA-qualifying peaking capacity in [Chapter Five: Key Analytical Assumptions](#) and present alternative fuel assumptions in [Appendix D: Generic Resource Alternatives](#).

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→ Please see [Chapter Three: Resource Plan](#) for a complete description of the preferred portfolio.

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