Creating a Better Energy Future

David Mills,
Senior VP Policy & Energy Supply
Puget Sound Energy; Washington’s Oldest Utility

Employees: 2700

Company founded in 1873

Service Territory:
• 6,000-square mile service area
• 1.1 million electric customers
• 61,332 Bellingham customers served
PSE Operates Under Regulation of the UTC

LOWEST REASONABLE COST— PSE must meet its system demand with a “lowest reasonable cost mix of energy supply resources and conservation.” (WAC 480-100-238)

FAIRNESS – PSE rates, terms or conditions must be “fair, just, reasonable and sufficient” (WAC 480-54-060)

Environmental benefits are not considered when the UTC judges PSE’s decision-making and performance around utility service.

PSE has been innovative in creating customer-specific solutions such as Green Direct, for customers willing to pay extra for renewable energy, and therefore not impacting rates that other customers pay.
What’s on the Horizon

• PSE has made a commitment to significantly reduce our carbon footprint.
  • Investing in community solar
  • Electric Vehicle Pilot Program
  • All Source RFP

• PSE is working with the WA Legislature on Clean Electricity:
  • No coal in rates after 2025
  • Carbon neutral by 2030
  • Goal of carbon-free by 2045

• PSE Integrated Resource Plan
  • Retiring thermal resources likely replaced by renewables
  • A combination of transmission (to source remote renewables) and DER will likely be needed
A Few Electricity-Related Terms

- "**Energy**" is the total amount of kW or MW delivered over a defined set of cumulative hours, measured in kWh or MWh.
- "**Capacity**" is the amount of kW or MW delivered on an instantaneous (hourly) basis, measured in kW or MW.
- "**Capacity Factor**" is the average percentage of time a generating resource will generate electricity.

\[
\text{Capacity} \times \text{Time} = \text{Energy}
\]

Example:

\[
10\text{MW} \times 8760 \text{ hours} = 87,600\text{ MWh}
\]

**Typical Capacity Factors:**
- Wind = 29 percent
- Solar = 30 percent
- CCCT = 70 percent
- Hydro = 70-80 percent
City of Bellingham Electricity Demand

61,332 PSE customers in Bellingham (53k res, 8k com, 200 industrial)
- 5,660 Bellingham customers are PSE Green Power customers
- Bellingham has 11% of our total Green Power Customers

951,432 MWh consumed in 2018 (109 aMW)

130 MW peak demand in Feb 2018

Top employers:
- City of Bellingham, Green Direct Customer
- Western Washington University, Green Direct Customer
- Peace Health's St. Joseph Medical Center
- Bellingham School District
100% Clean Electricity Supply

PSE is working to reduce emissions without impacting reliability and affordability for our customers.

100% clean electricity has its challenges.

Affordability
Reliability
Resource Adequacy
Holistic & Regional Approach

PSE is currently engaged with utilities and environmental partners across the state analyzing a regional approach to reduce GHG emissions across the electric grid
Natural Gas and Hydro Resources Deliver Dispatch-able and Reliable Capacity

Despite 60 GW of installed renewable capacity in the 80% reduction scenario, gas and hydro are needed during low generation periods.

Gas & hydro ramp up to fill renewable void.
Removing Natural Gas Generation Creates a Capacity Deficit

Without gas, the system is capacity deficient during prolonged stretches of low wind and solar production.

10 Day Cold Stretch In January

80% GHG-Free Case No Gas
Mitigating that Capacity Deficit Requires Significant Overbuilding Renewable Resources

100% GHG-Free Case No Gas

10 Day Cold Stretch In January

Significant renewable overbuild is required to provide energy during periods of low renewable production
California is already experiencing the effects of over-build of renewables

Net load - March 31

- Ramp need
  ~13,000 MW in three hours

Potential over generation
Significant GHG Reductions Can be Achieved at Reasonable Cost

Achieving 100% GHG reductions leads to exponential cost increases and is impractical due to massive renewable overbuild.
Customer Renewable Options

**Retail Renewable Energy**

- **GREEN POWER** SCH 135, 136
  - PNW REC purchases
  - 40,000 customers
  - Residential, commercial, municipal

- **SOLAR CHOICE** SCH 135
  - Solar RECs WA and ID
  - 2700 customers
  - Residential and small commercial

- **BULK REC PURCHASES**
  - Excess PSE wind RECs
  - 10,000,000 kWh
  - Large business

- **GREEN DIRECT** SCH 139
  - Long-term partnership with PSE for dedicated energy resources
  - Launched 2017
  - Large commercial, municipal

**Customer Generation**

- **NET METERING** SCH 150
  - Up to 100 kW
  - Full retail compensation
  - ~6,000 customers
  - Residential, commercial, municipal, community solar

- **SMALL POWER PRODUCERS** SCH 91, 152
  - 100 kW – 5 MW
  - 15 year pricing based on avoided cost
  - Small developers
Questions