CIAC
Energy Supply 2020 Update

The single most important action we can do to reduce GHGs and alleviate the devastating impacts of climate change is to convert to carbon-free electricity.

Cynthia Mitchell and Jim Lazar

July 3, 2020

Backgrounds

Cynthia Mitchell

- 40 years energy economist, utility consumer advocate
- Utility resource planning; EE, DR, DER
- Consultant since 1990 to state consumer advocates; 20 years with CA TURN
- Bellingham WA April 2016

Jim Lazar

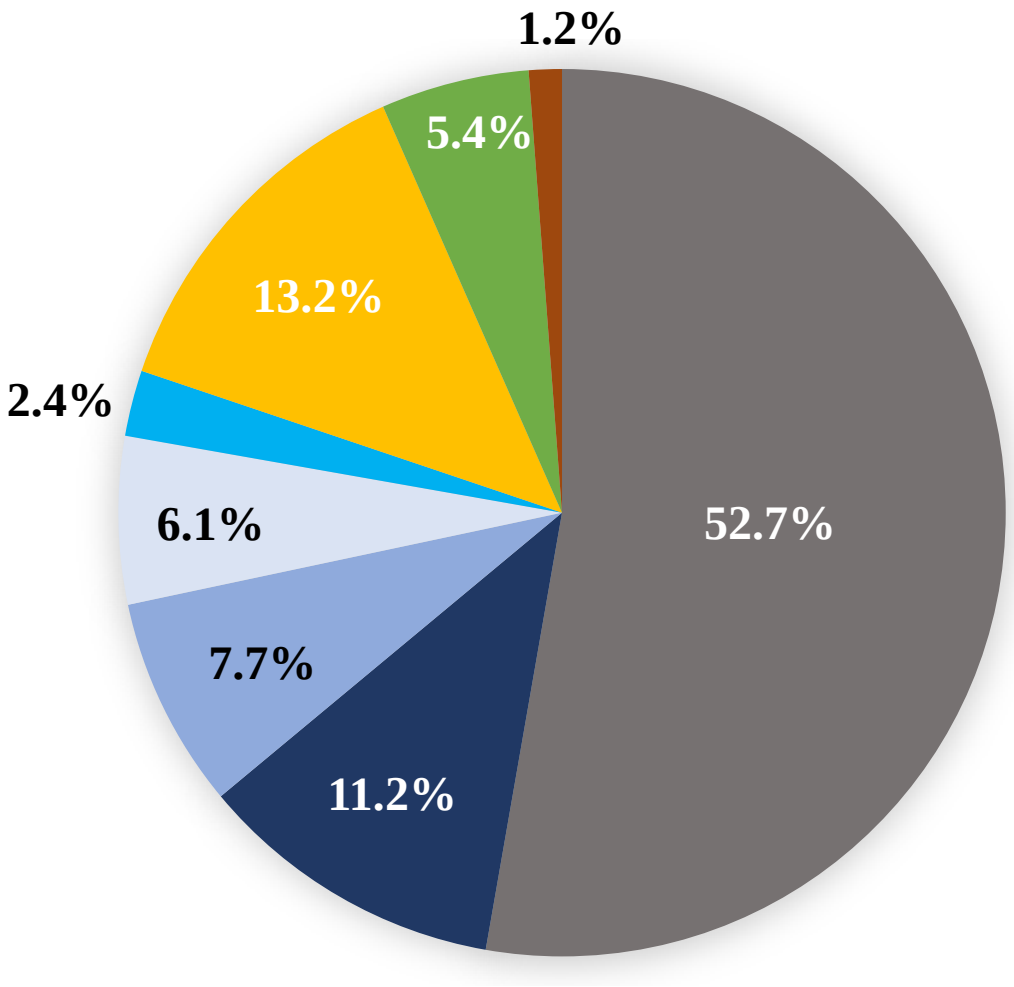
- WWU Graduate, 1974
- Olympia since 1977
- Consultant in electric utility regulation, rates, and resource planning since 1982
- Former Thurston PUD Comissioner

Key Takeaways for this Presentation

1. The National trend for carbon-free electricity is the kingpin to reducing GHG emissions.
2. Without more information, PSE appears to be on a path that will not get us to zero GHG emissions nor CETA compliance.
3. Public utility power in Washington state is over 90% carbon free and offers an alternative to private utility power.

Our overarching goal should be to develop a resilient, sustainable electric grid that is based on carbon-free electricity.

2017 Communitywide GHG Emissions*

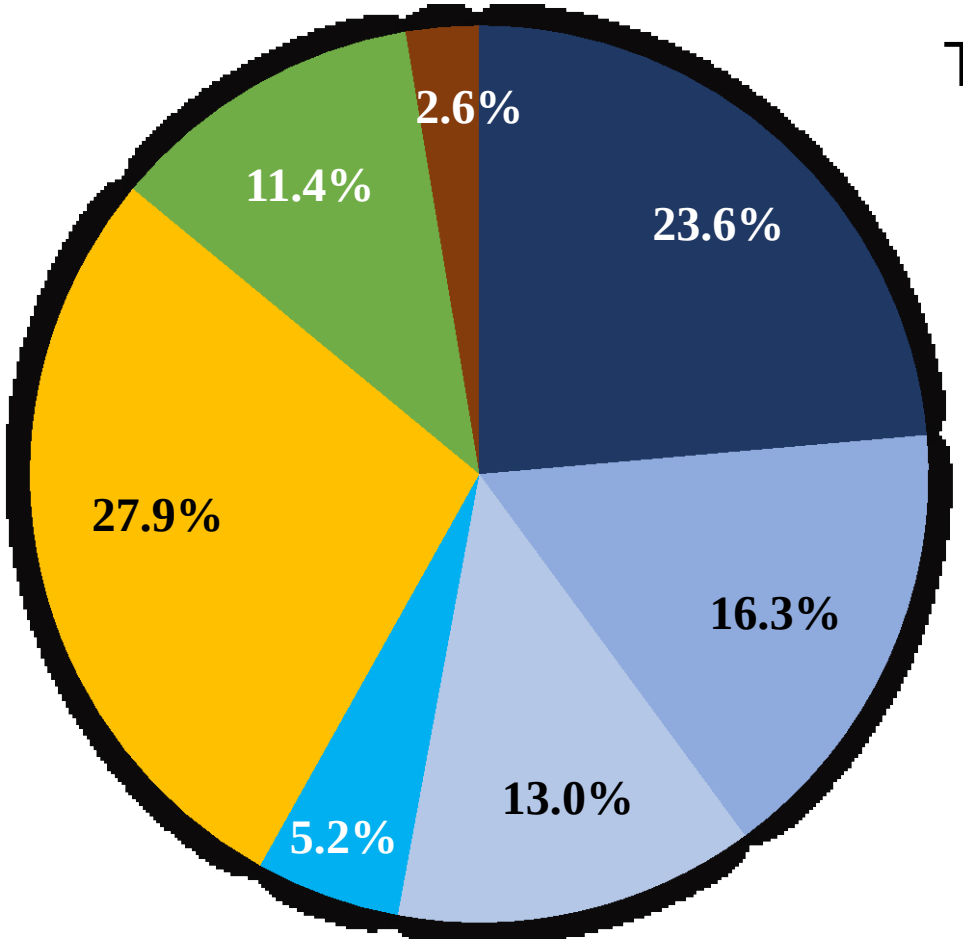


Total GHG Emissions:
7,583,578 metric tons CO_2e

- Industrial Point Source
- Industrial Energy
- Residential Energy
- Commercial Energy
- Fugitive Emissions & T&D Losses
- Transportation
- Agriculture
- Solid Waste, Water, Wastewater

**All GHG Emissions in this presentation are draft, not final.*

2017 Communitywide GHG Emissions Excluding Industrial Point Source Emissions

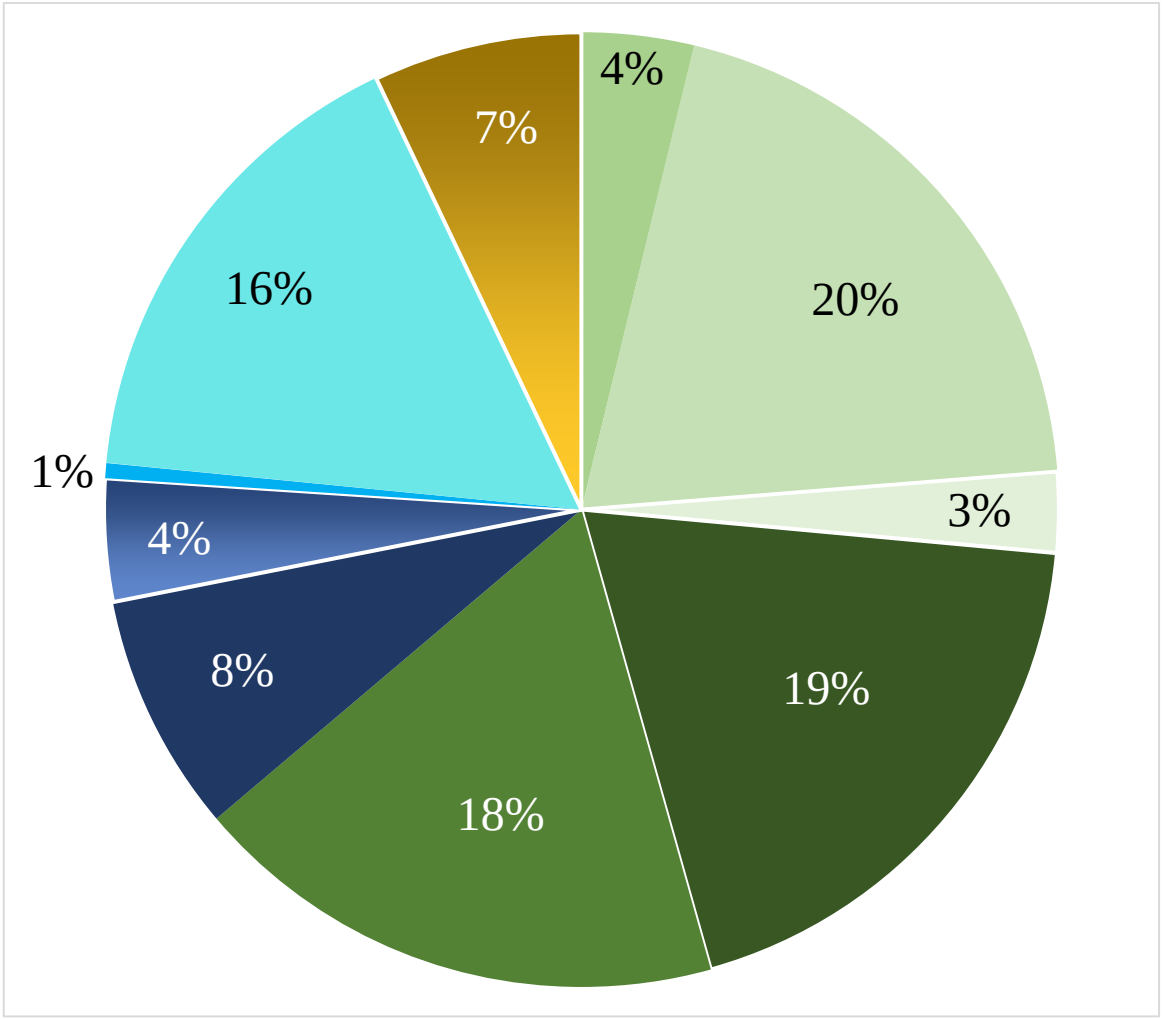


Total Emissions: 3,444,982 metric tons CO_2e

- Industrial Energy
- Residential Energy
- Commercial Energy
- Fugitive Emissions & T&D Losses
- Transportation
- Agriculture
- Solid Waste, Water, Wastewater

86% of community GHG emissions could be impacted with carbon-free electricity

2017 Communitywide Buildings
(Electricity & Natural Gas)

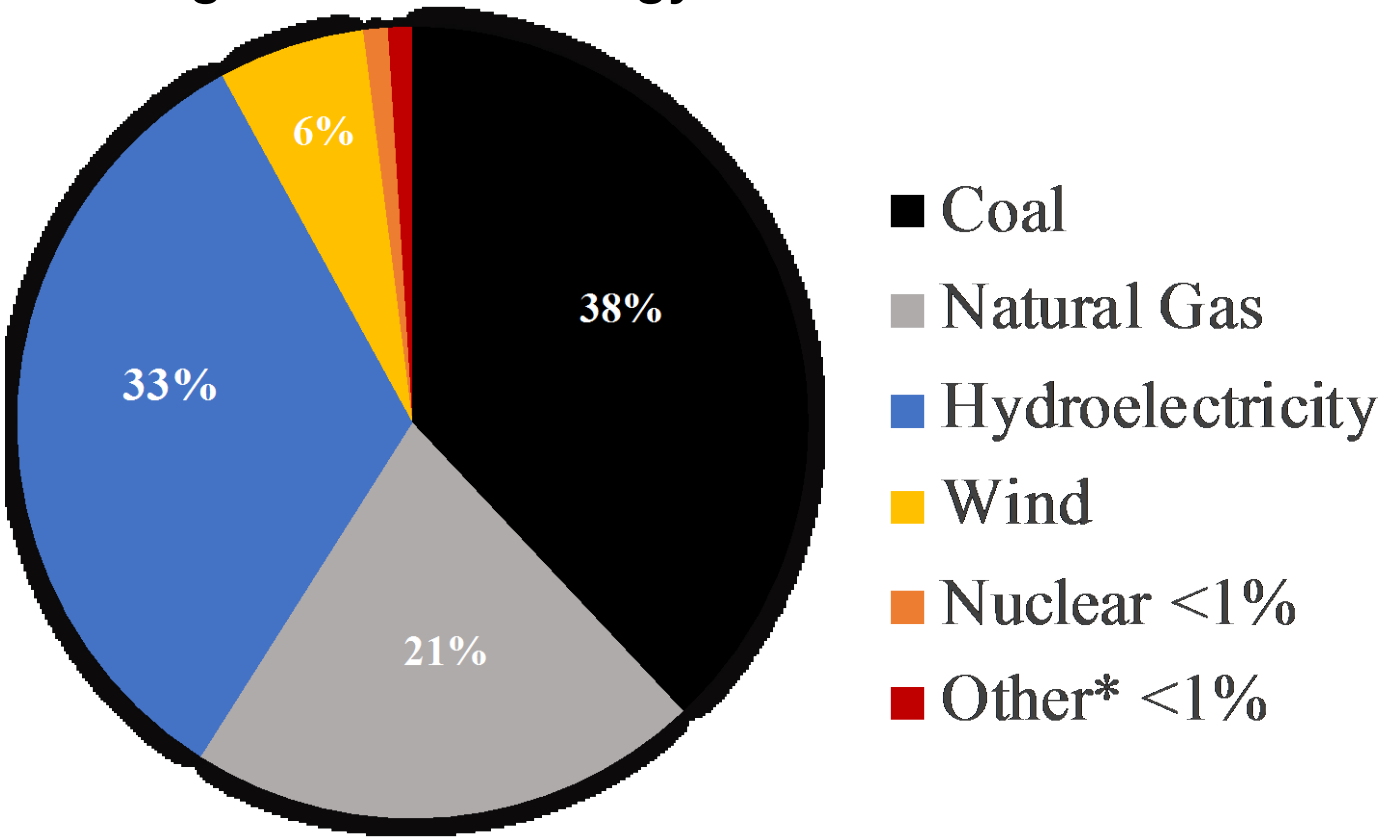


Total Emissions: 2,162,300 metric tons CO_2e

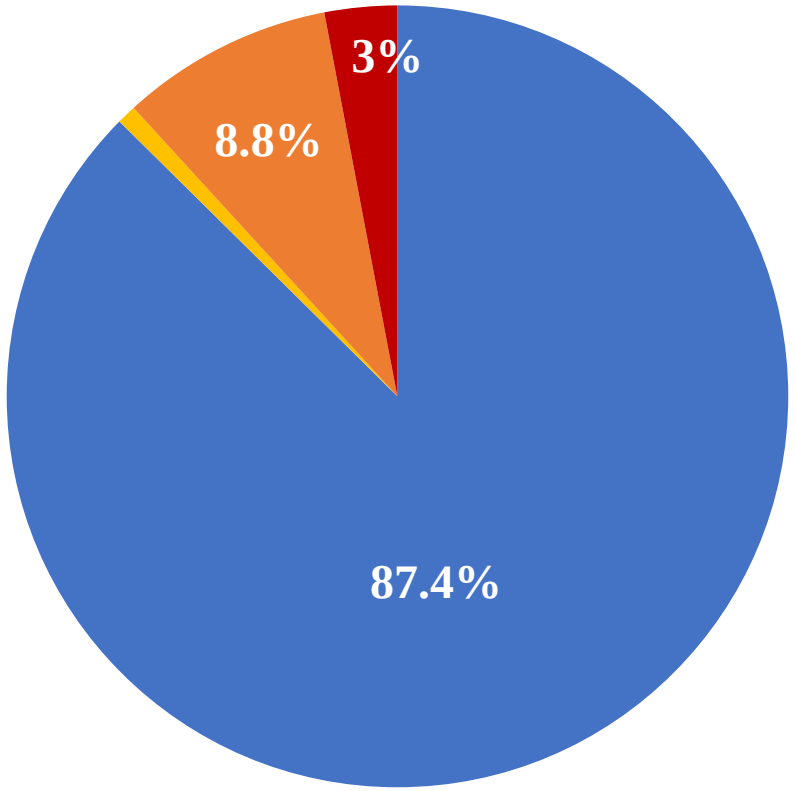
- Electricity – Industrial
- Electricity – Industrial transport (spot market)
- Electricity – T&D Losses
- Electricity – Residential
- Electricity – Commercial
- Natural Gas – Residential
- Natural Gas – Commercial
- Natural Gas – Industrial
- Natural Gas – Industrial transport
- Fugitive Gas Emissions/Other Stationary Fuel/ Other Process

The Fuel Mix (2017) for Electricity Generation Has A Major Impact on Overall Emissions

Puget Sound Energy



Bonneville Power Administration



*Bonneville Power Administration sells power to public utilities like Whatcom County PUD #1, Sumas, Blaine

Key Takeaway 1: Electricity is the kingpin to reducing GHG emissions

Through a combination of:

1) Renewable energy, conservation and a modernized grid,
2) Decentralized or local distributed energy resources (DER), i.e. energy efficiency, demand response, solar PV with energy storage, (EE, DR, PV, ES).
3) Electrification of transportation, water and space heating, and commercial and industrial processes.

Climate Change Requires Rapid Change in the Paradigm of Electricity Supply and Use

- Global emissions will need to be cut by more than 7% each year over the next decade* to avoid the most devastating impacts of climate change. *(about same reduction as caused by Covid-19!)*
- ***Electricity Use***: Reduced winter peaks due to reduced heating demand. Increased summer peak loads for day-time cooling.
- ***Electricity Supply***: Hydropower increases in winter due to precipitation shift from snow to rainfall. Large growth in solar in southwestern U.S. is resulting in the export of excess electricity.

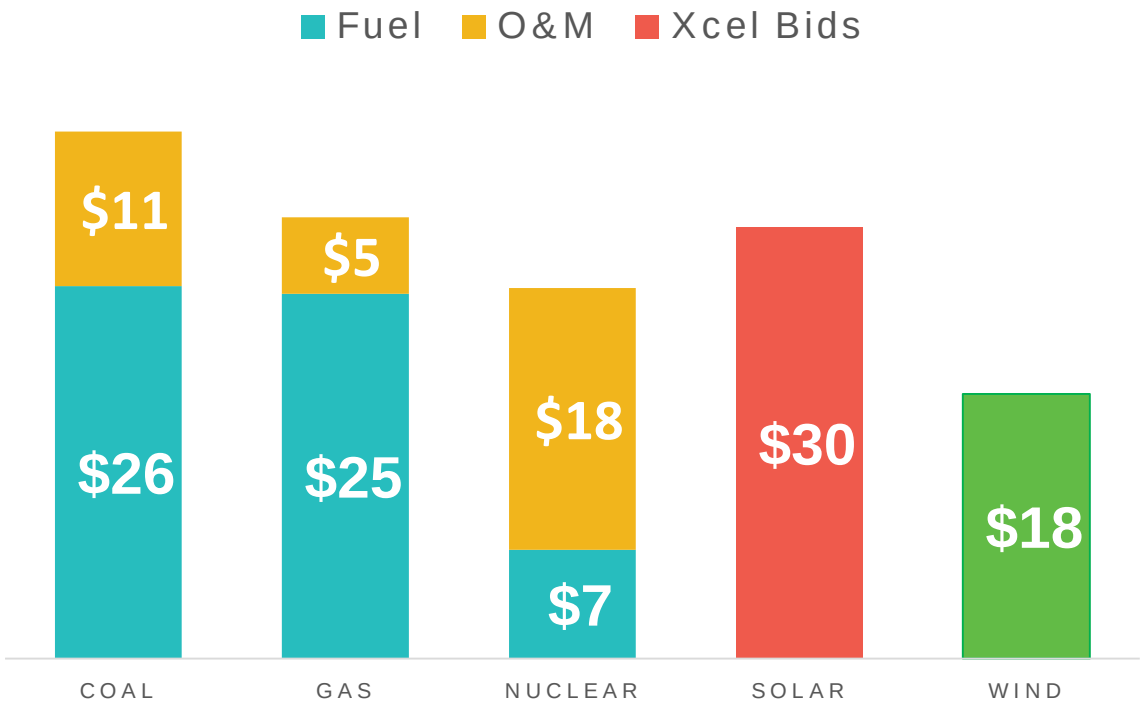
*UN Press Release on 7.6%/yr reduction to 2030 to meet Paris Agreement: https://www.unenvironment.org/news-and-stories/press-release/cut-global-emissions-76-percent-every-year-next-decade-meet-15degc

Washington State is a Net Exporter of Electricity (we import our fossil fuel).

- Pacific DC Intertie ships energy both directions between The Dalles, OR to north of Los Angeles – represents almost half of LA electrical system's peak capacity.
- Typically, WA ships power to the south in the summer; however, this is changing due to excess solar production in CA.

Renewable Energy is Cost Effective

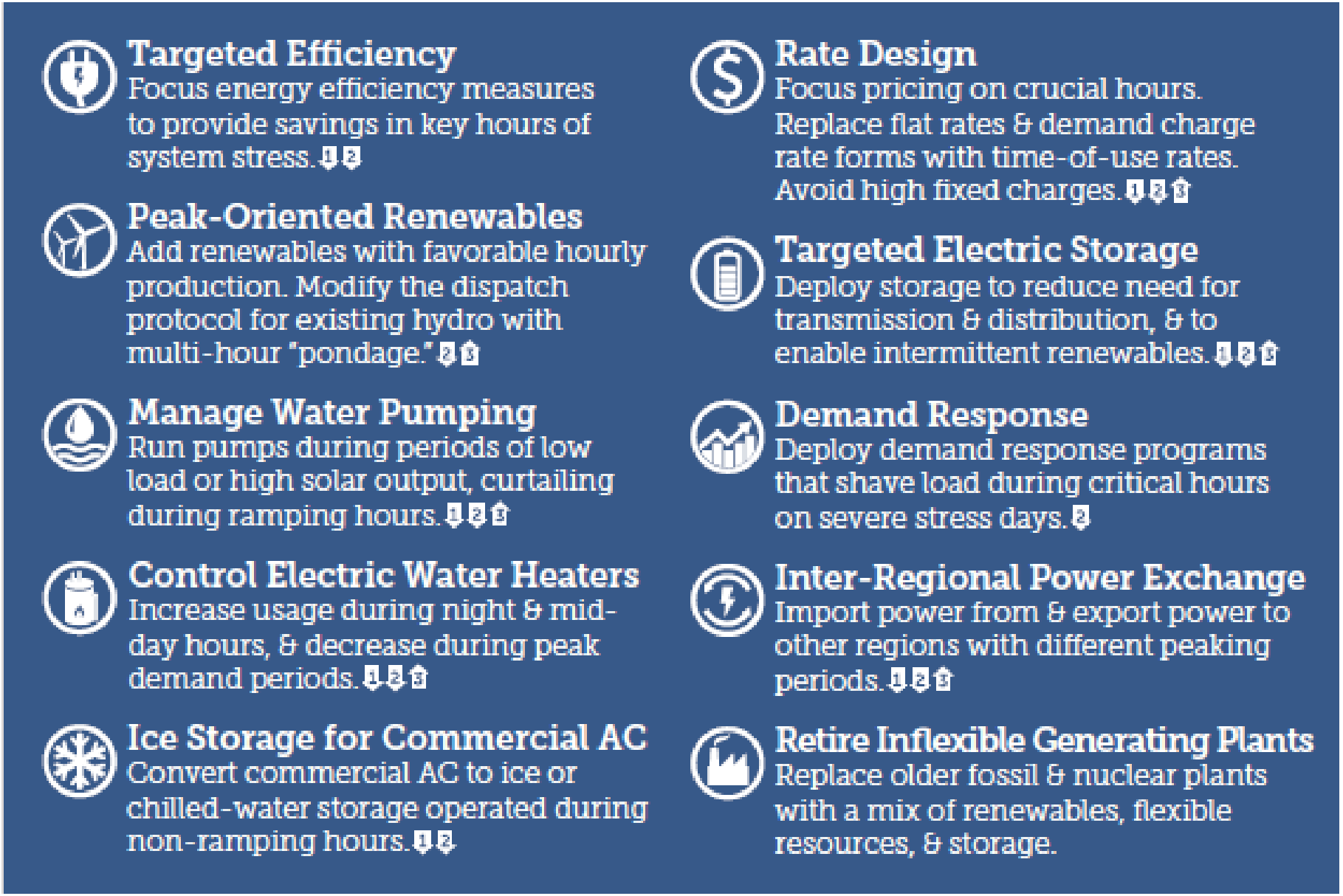
- Wind and solar projects generally cost less than the operating cost of gas generation
  - Colorado Excel results RFP competitive bid solicitation December 2018
    - Existing Gas Generation O&M + Fuel $30/MWh
    - Solar $30/MWh Wind $18/MWh



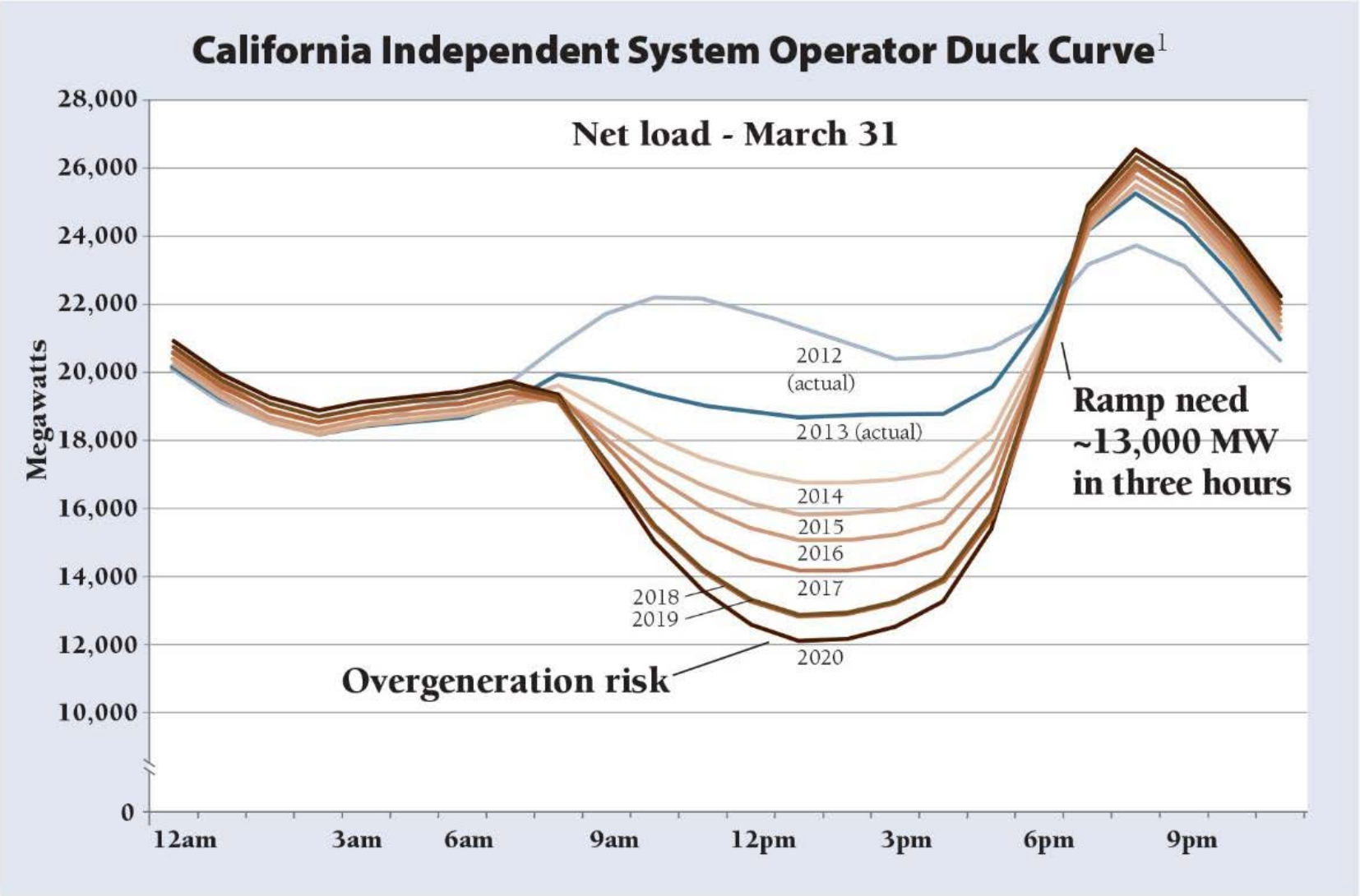
Renewable Energy with Storage is Cost Effective(con't)

Project	Size MW	Cost/MWh With Storage
Battle Mountain (NV)	100	$30.94
Dodge Flat (NV)	200	$34.03
8 Minute Solar (CA)	400	$39.65
Buena Vista (TX)	100	~$30.00
Arroyo (NM)	300	~$30.00

Ten Strategies



What's a "Duck Curve?"



Teaching the Duck to Fly

Requesting Permission for Take-Off

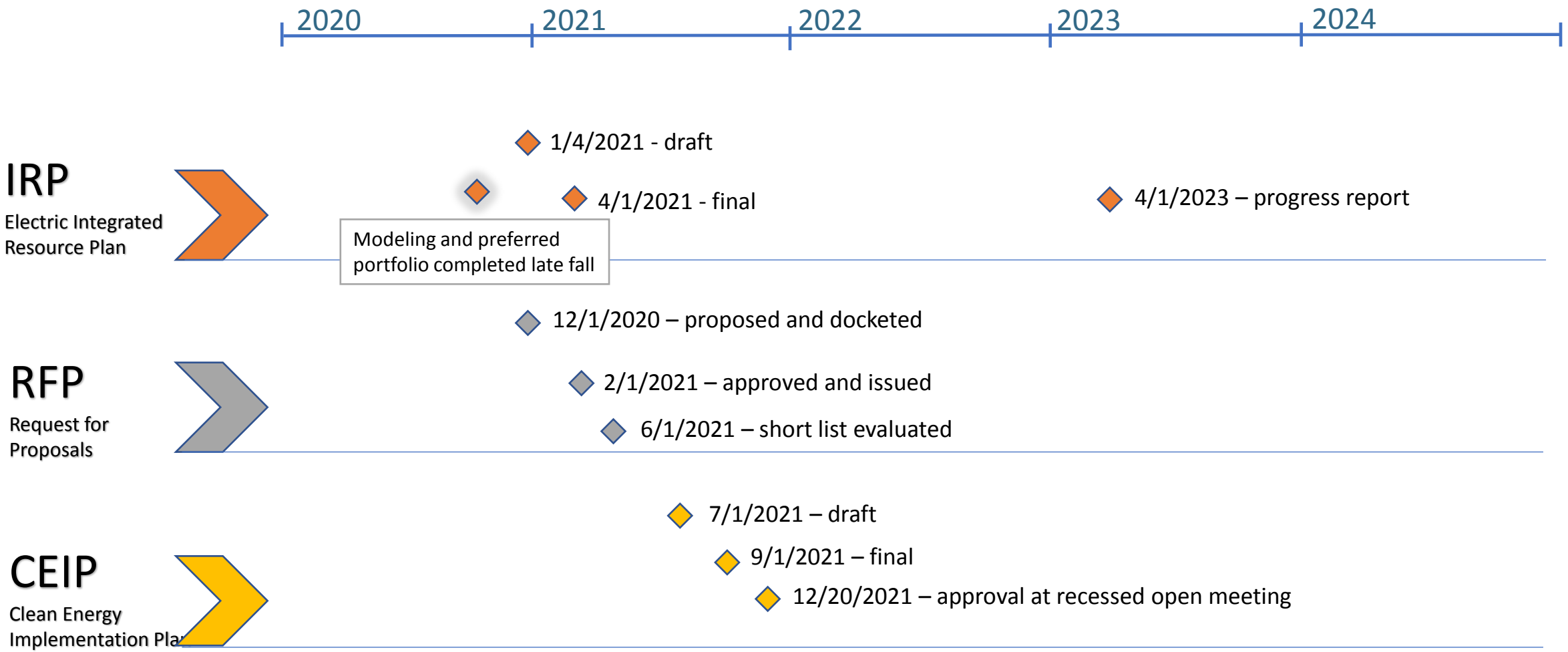
Characteristics of PSE Electric System

- PSE is winter peaking with electric loads about two times year-round load requirements.
- PSE projects to be resource short for peaking requirements only, and otherwise resource rich for year-round requirements.
- PSE's winter peak is due to extremely cold weather conditions, with increasing extreme summer weather conditions driving up PSE's electric summer peak.
- Simply stated, **the winter peak is** of limited duration, generally driven by extreme weather and thus generally predictable, and most importantly, **managable.**

WA's Clean Energy Transformation Act (CETA)

- Eliminate coal 2025
- Electricity GHG neutral 2030, offsets for gas generation
- Electricity GHG zero 2045, eliminate gas generation
- Alternative compliance of $60/MWh beginning 2027
- Compliance waived if fossil fuels (ie. gas generation) is necessary for system reliability and safety.
- There is a cost cap on CETA compliance, that if exceeded, could jeopardize compliance.

Developing CETA Process



Key Takeaway 2: PSE appears to be on a path that will not get us to zero GHG emissions nor CETA compliance

- As PSE transitions out of coal, it appears that the company intends to retain most or all existing gas generation and add significant new gas generation.

- Based on PSE's latest position, PSE appears to not consider wind and solar, coupled with energy storage, or distributed energy resources (demand response, energy efficiency, PV, ES) as meaningful viable resource options.

Key Takeaway 2 (cont)

- Without knowing how PSE intends to comply with CETA, individual city and county efforts to reduce building and energy supply GHG emissions may be difficult to achieve and could fall far short of desired outcomes.

- The cities and counties served by PSE need to work together to achieve individual community clean energy goals.

PSE Forecast New Resources 2017 IRP: relying on the wholesale market to meet future electricity requirements

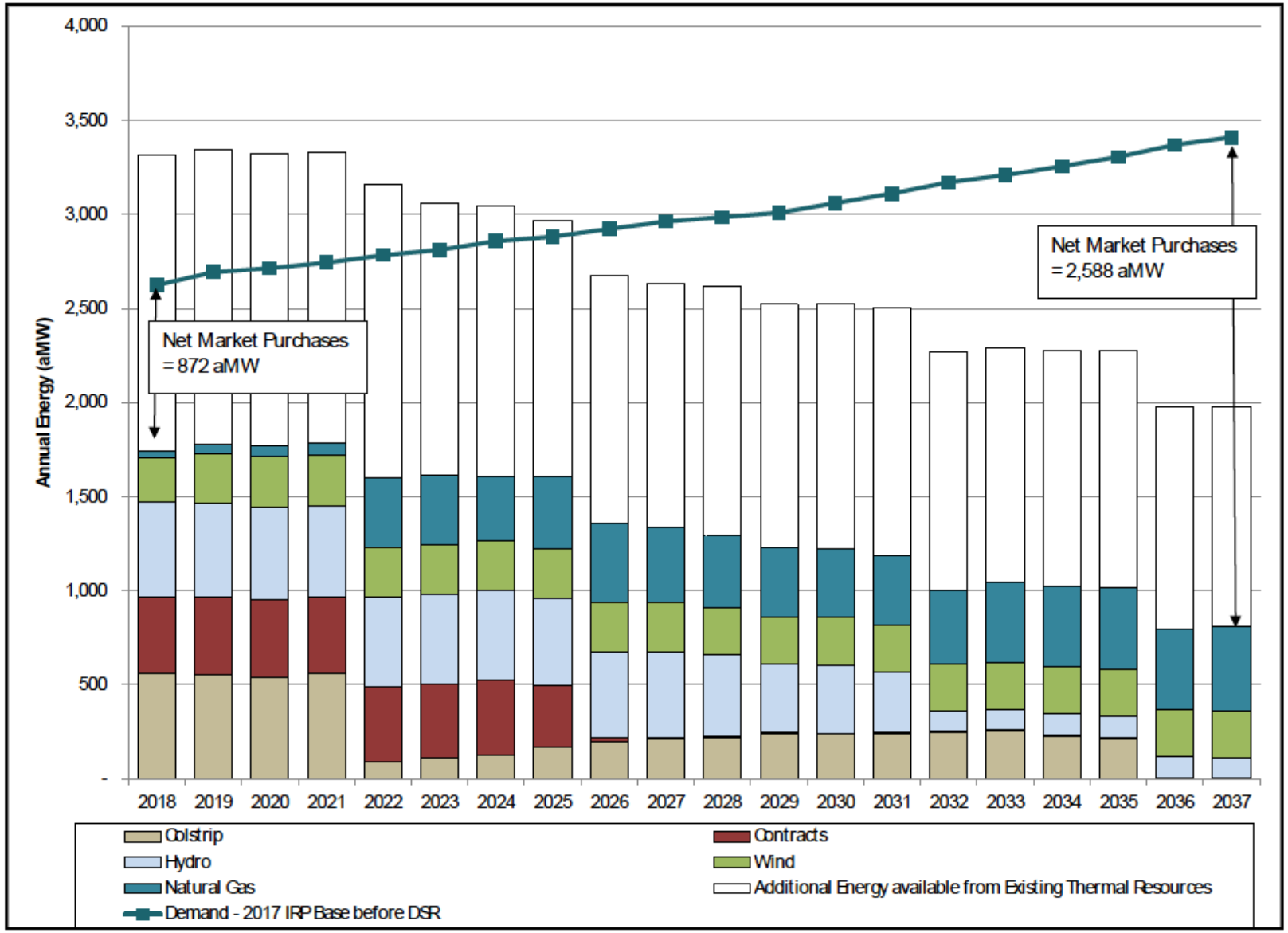
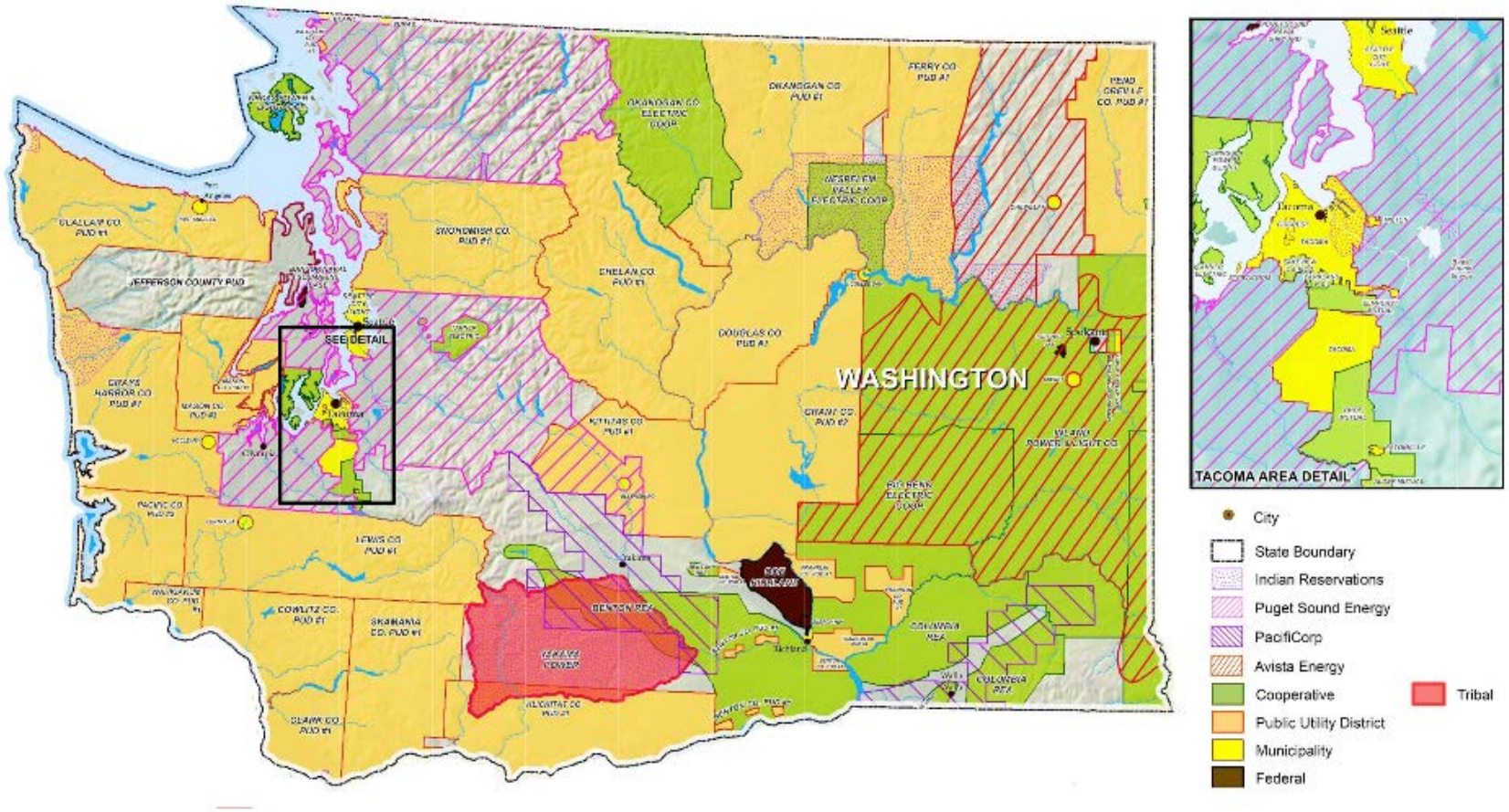


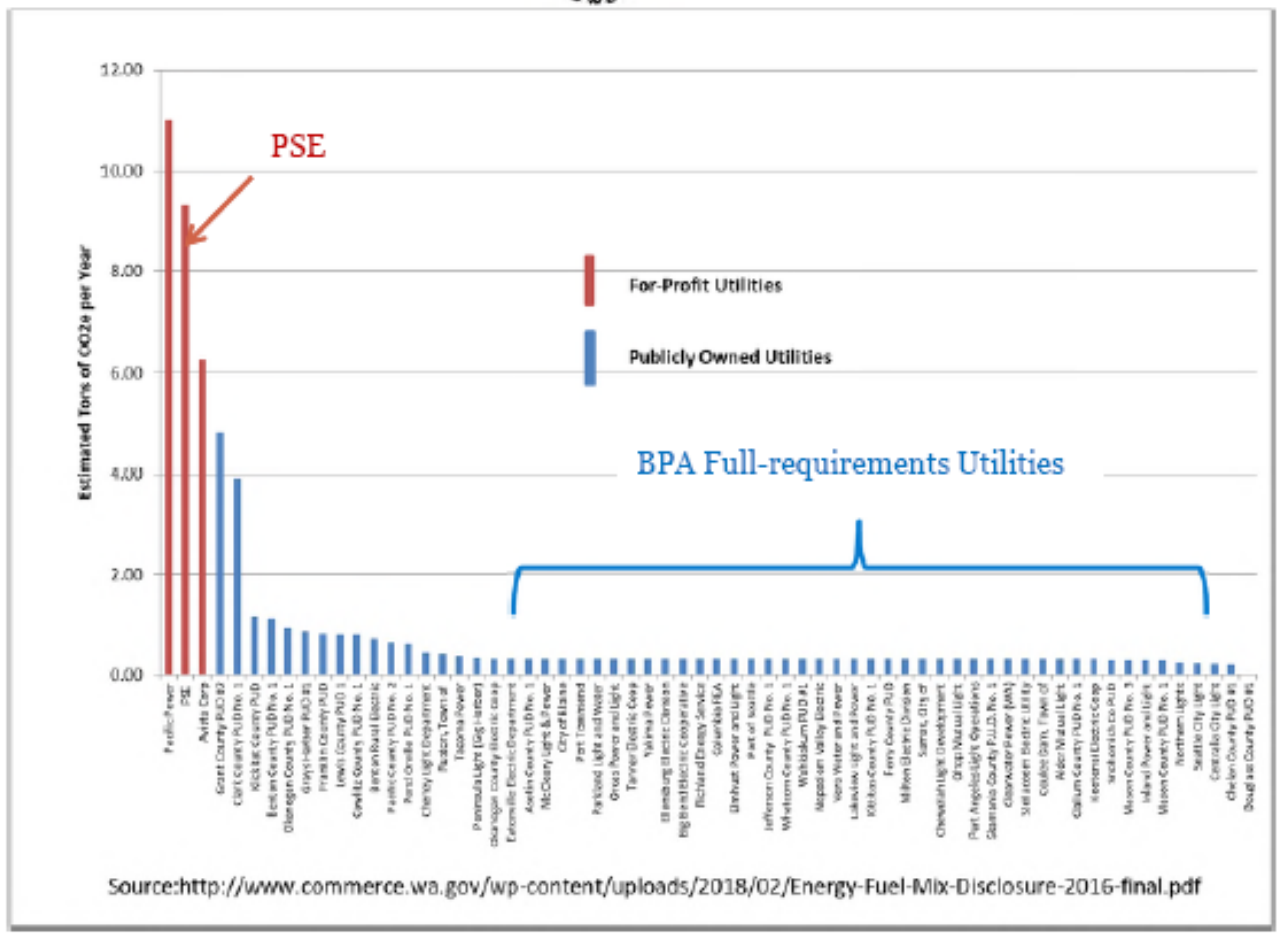
Fig. 6-8: Annual Energy Position Resource Economic Dispatch from Base Scenario

Key Takeaway #3: Public utility power in Washington state is over 90% carbon free and offers an alternative to private utility power.

There are 54 electric utilities in Washington state.



PSE produced 15 times more carbon pollution on a per-customer basis than BPA full-requirements utilities in 2016.



14

Source: www.commerce.wa.gov/wp-content/uploads/2016/09/Energy-FMD-2016-final.pdf

Key Takeaways for this Presentation

1. The National trend for carbon-free electricity is the kingpin to reducing GHG emissions.
2. Without more information, PSE appears to be on a path that will not get us to zero GHG emissions nor CETA compliance.
3. Public utility power in Washington state is over 90% carbon free and offers an alternative to private utility power.

Our overarching goal should be to develop a resilient, sustainable electric grid that is based on carbon-free electricity.