EWEB's Electricity Future

February 5, 2020

Frank Lawson, CEO/General Manager

Agenda/Topics

EWEB Update Presentation

- Energy Overview
- Regional Priorities
- EWEB's Climate Policy/Actions
- Electricity Supply Planning (IRP)
- Customer Programs (Conservation/Efficiency)
- Strategic Plan – Future New Products

350 Eugene / Facilitated Questions

Steve Mital
Board President
Wards 1 & 8
2013 - 2020

Mindy Schlossberg
Board Vice President
At-Large
2019 - 2022

John Brown
Wards 4 & 5
2007 – 2022

Dick Helgeson
Wards 2 & 3
2013 - 2020

Sonya Carlson
Wards 6 & 7
2017 - 2020

EWEB Climate Change Policy

1. Electric power portfolio utilizing low-carbon, renewable resources

2. Mitigate carbon emissions – energy sector

3. EWEB Operations – reduce GHG emissions

4. Assist customers with carbon reductions

5. Prepare for impacts – EWEB's water/electric supply

Five Key Decarbonization Strategies

Transitioning the Northwest to a low-carbon energy system relies on five decarbonization strategies:

1. **Energy Efficiency:** reducing energy consumed to provide an energy service
2. **Electricity Decarbonization:** reducing the emissions intensity of electricity generation
3. **Fuel Decarbonization:** reducing the emissions intensity of liquid and gaseous fuels
4. **Electrification:** switching end uses from fuel to electricity
5. **Carbon Capture:** capturing CO_2 from a facility or removing CO_2 from the atmosphere

Source: 2019, Clean Energy Transition Institute

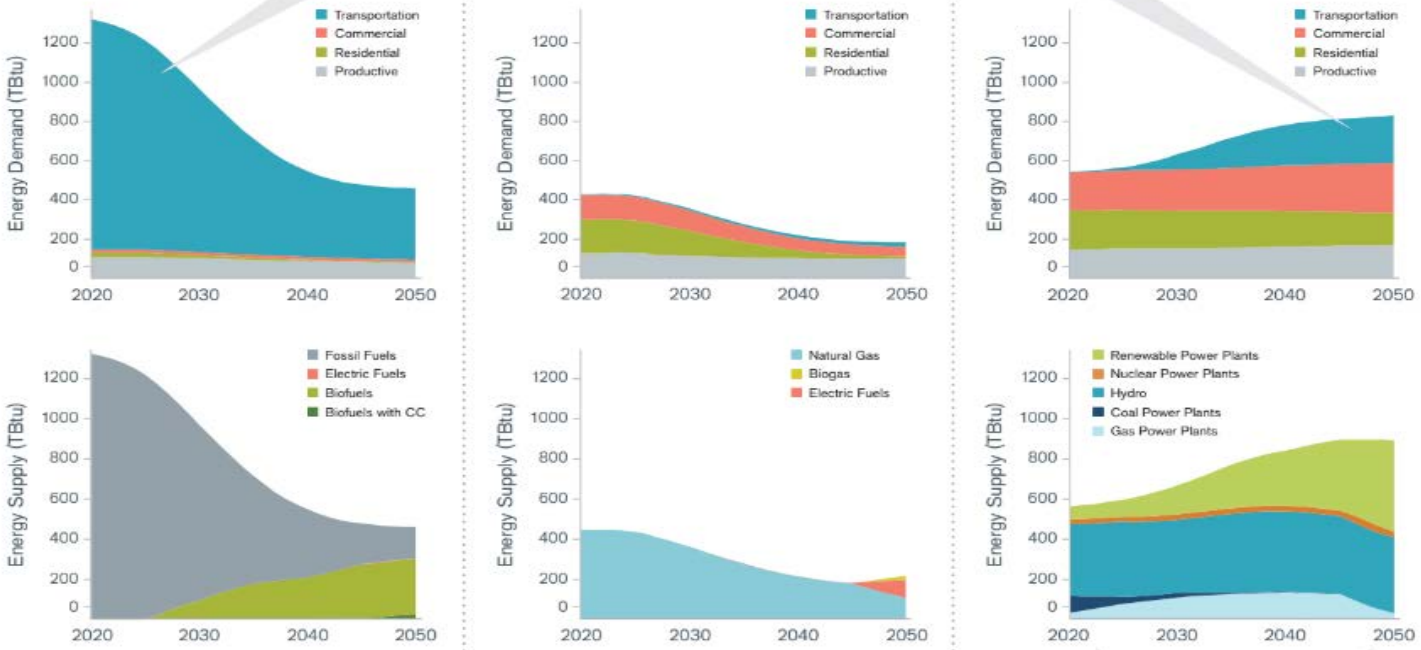
Decarbonization Strategy

Liquid Fuels emissions reductions achieved with electrification and biofuels

Pipeline Gas emissions reductions achieved through electrification and electric fuels

Electricity emissions reductions achieved through coal retirement and deployment of renewables

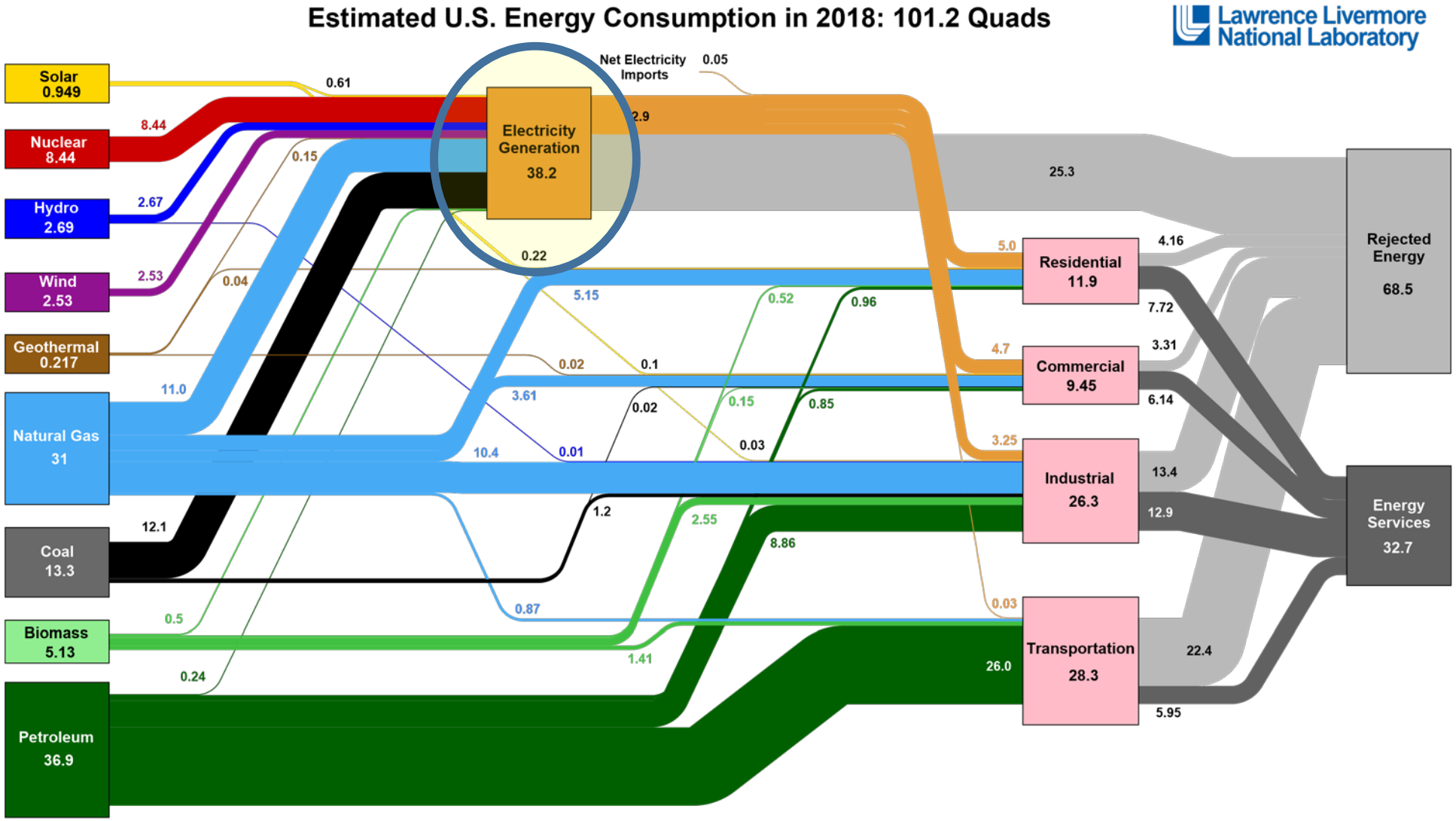
Liquid fuels for transportation largely replaced by efficient electricity and some biofuels



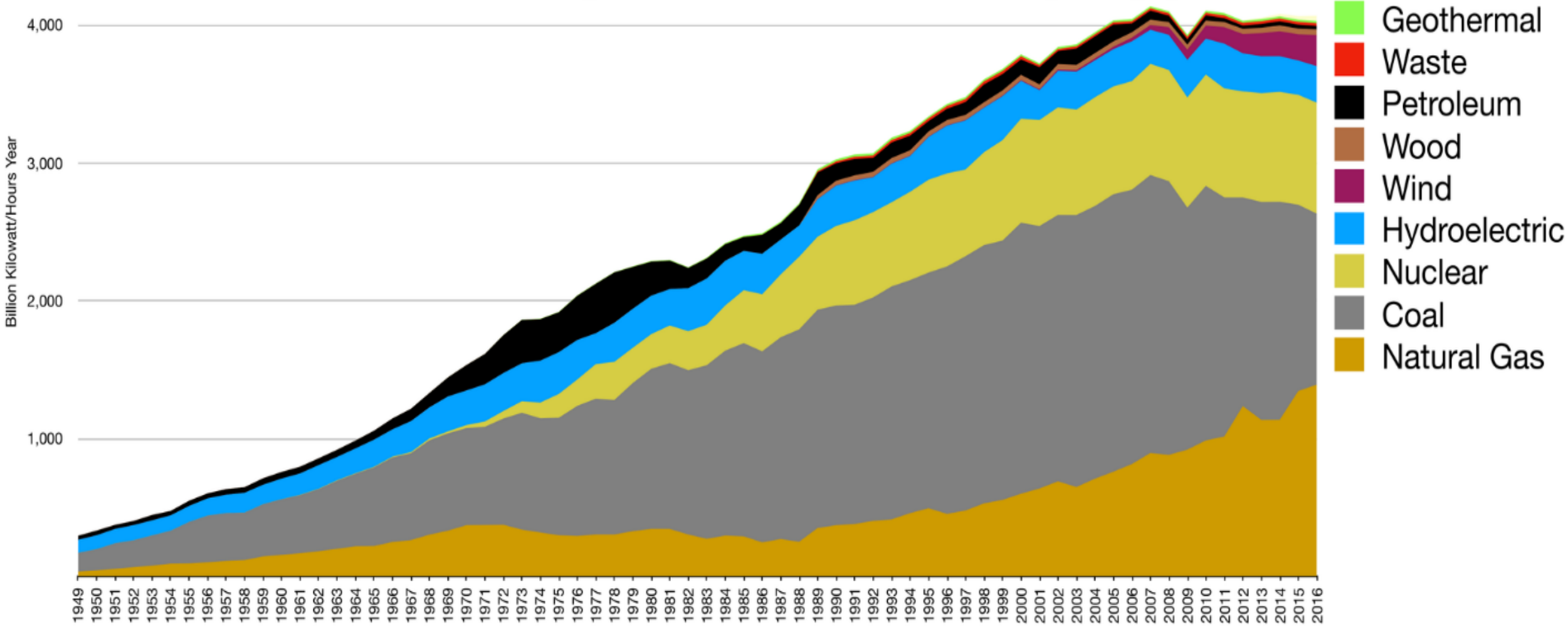
Electricity goes from 79% clean to 96% clean

Source: Northwest Deep Decarbonization Pathways Study, May 2019, Evolved Energy Research, page 66.

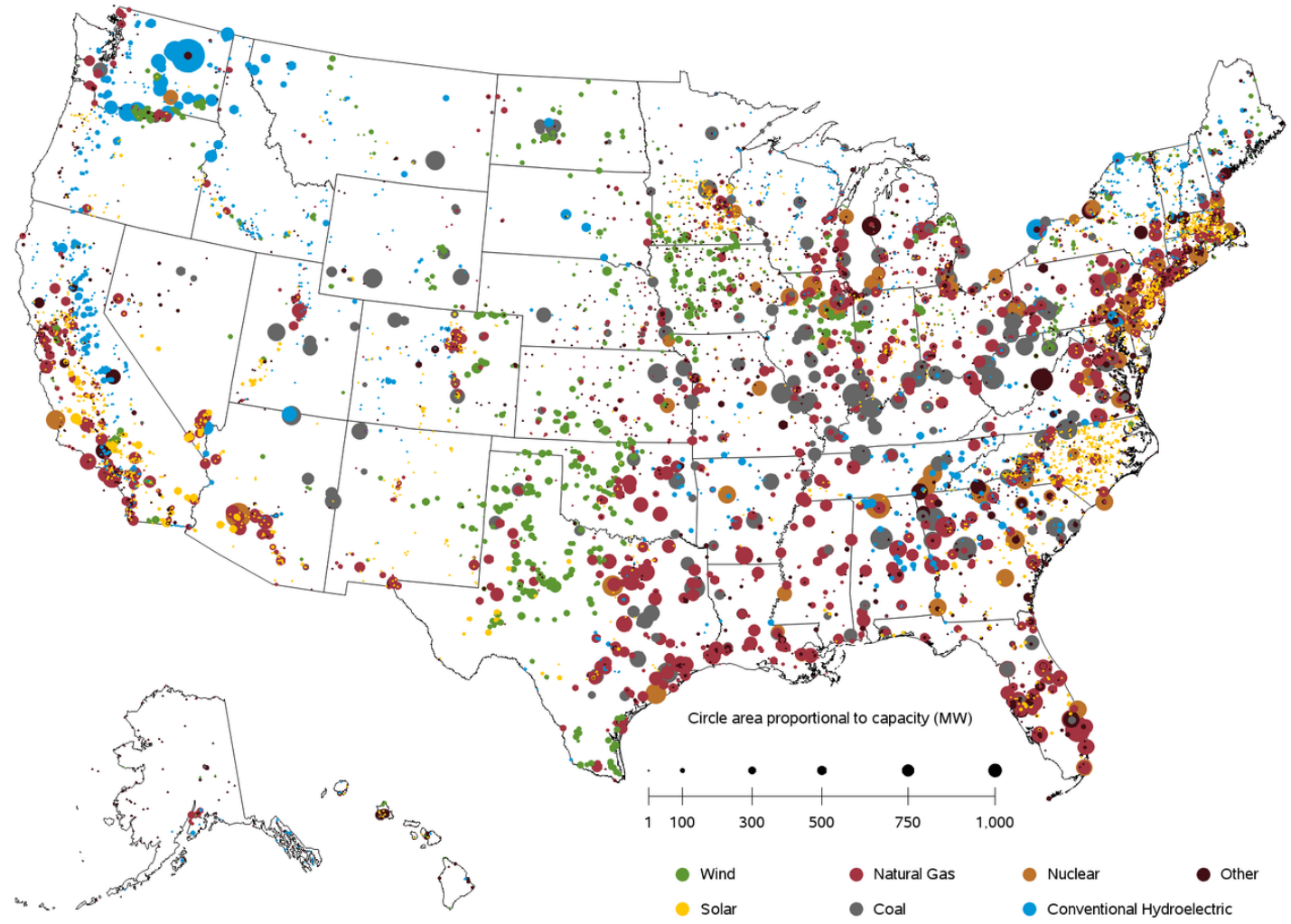
U.S. Energy Flow

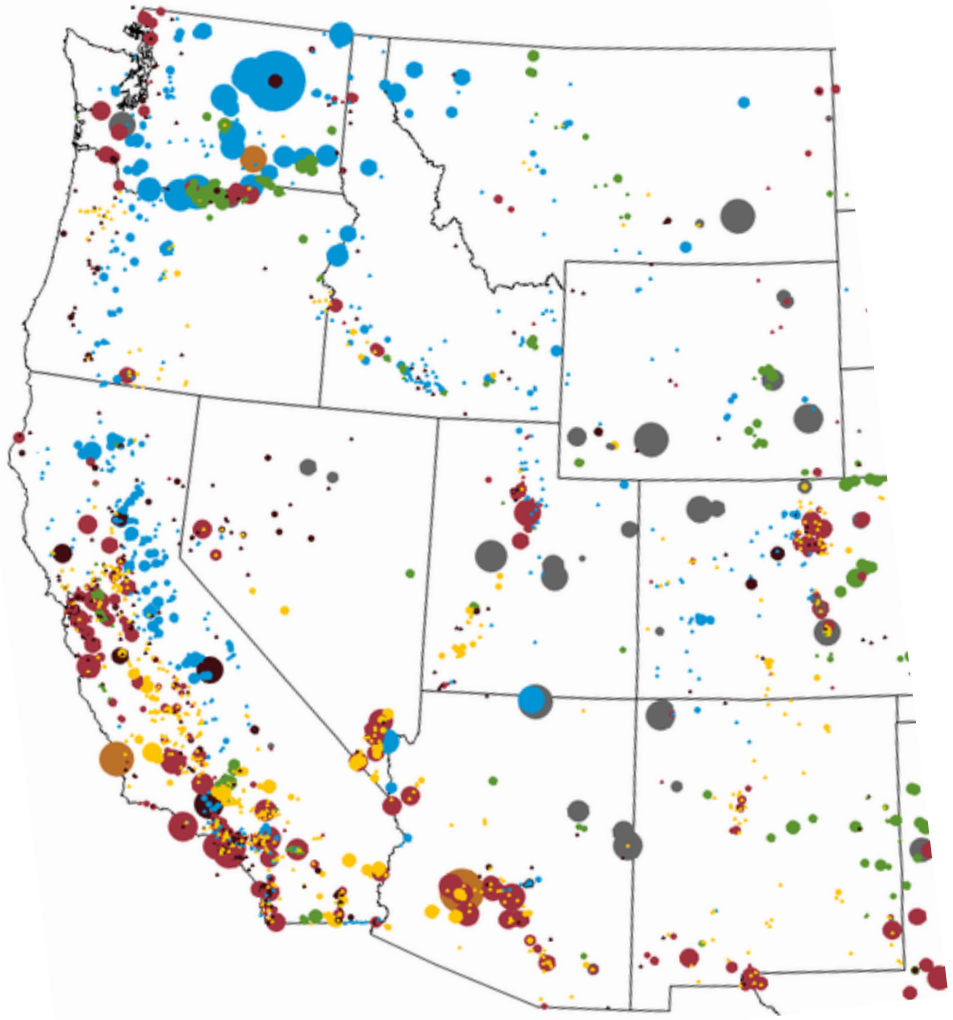


U.S. Electricity Generation by Type



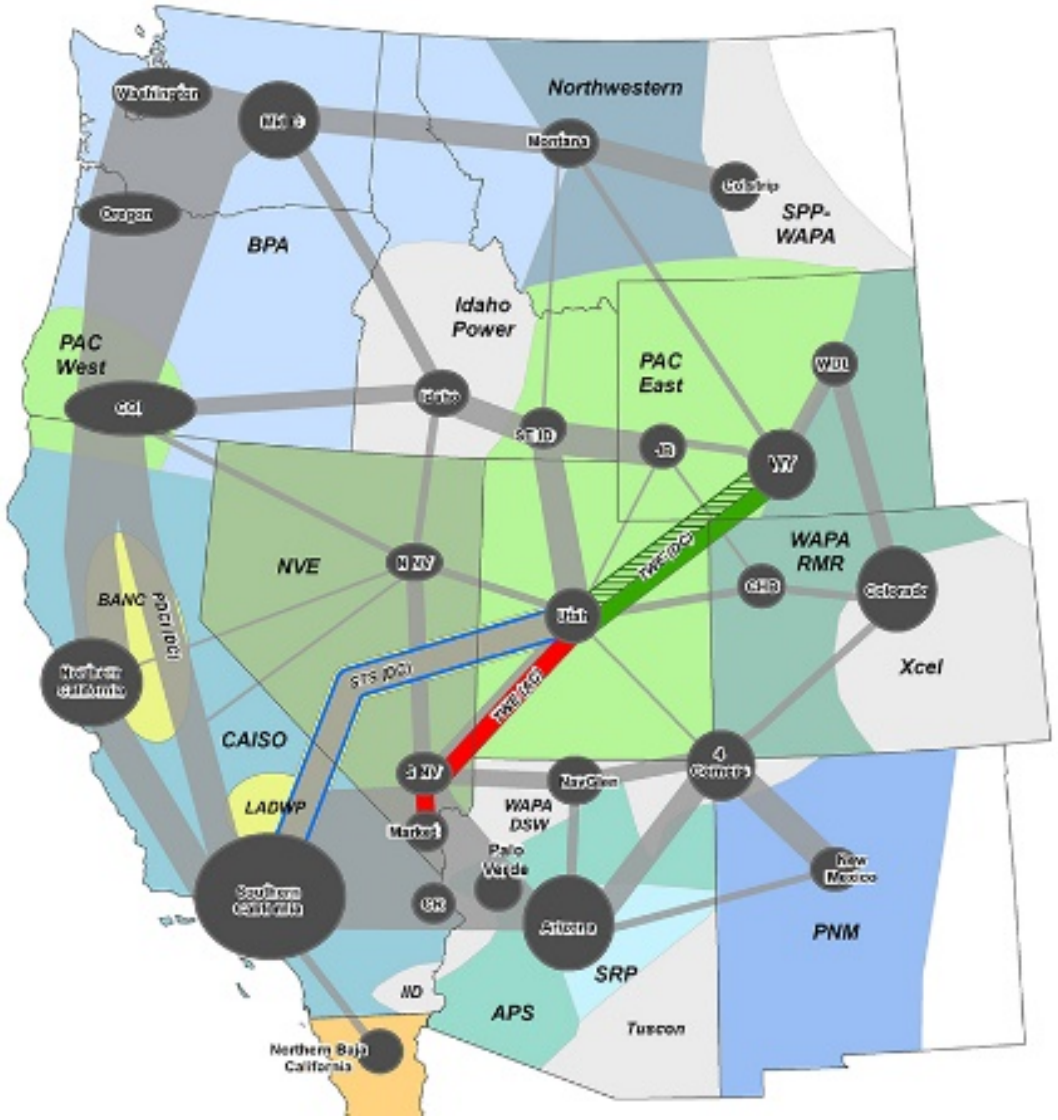
Utility-Scale Generating Units





Sources: U.S. Energy Information Administration, Form EIA-860, 'Annual Electric Generator Report' and Form EIA-860M, 'Monthly Update to the Annual Electric Generator Report.'

Western Interconnect Electricity Flow



Regional Priorities

Legislation/Policy

SB 1530 (Oregon)

CETA Rule Making (Washington)

Green New Deal (H.Res.109)

Resource Adequacy

Market Development

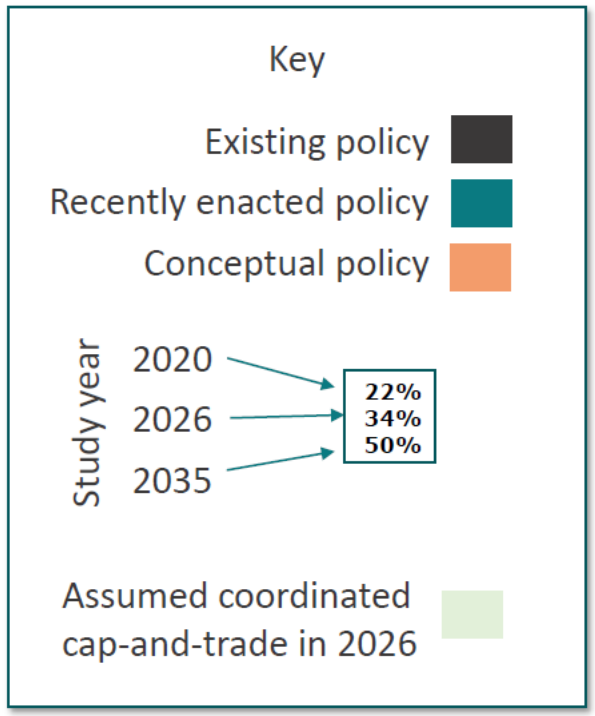
Columbia River System Operation (EIS)

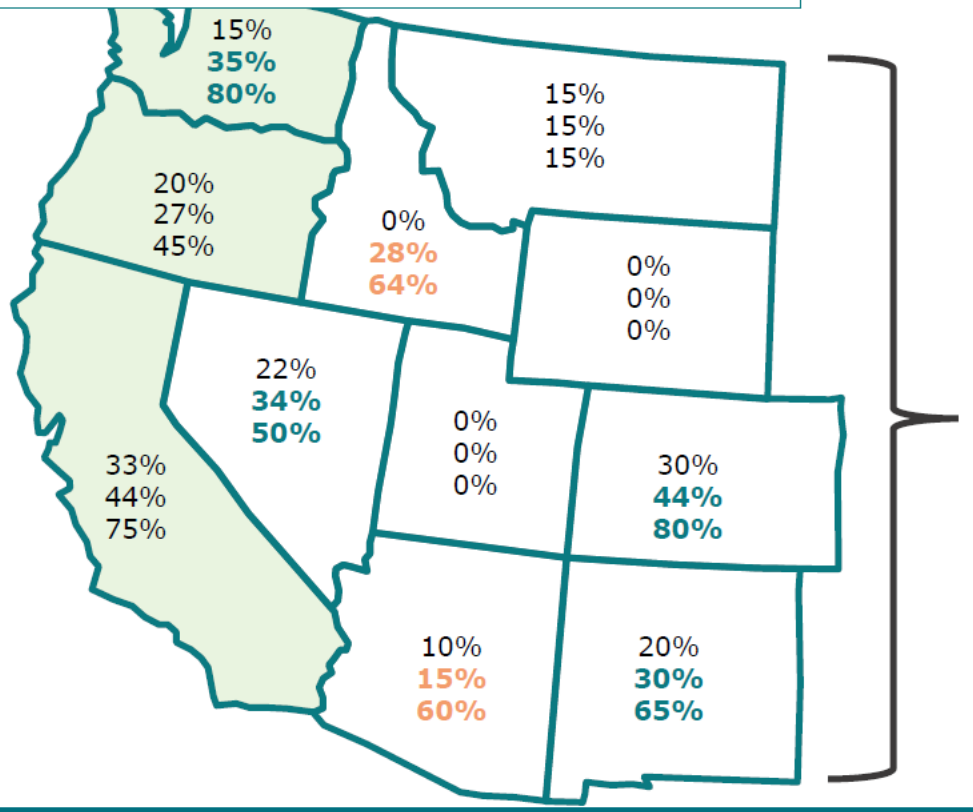
Western Electricity Policy

Assumed RPS and Clean Energy Policies for Western States:

Modeling western policies to help investigate system flexibility needs

Clean/Renewable Penetration Requirements in Baseline Case





Clean Energy Target Based on Assumed Policies

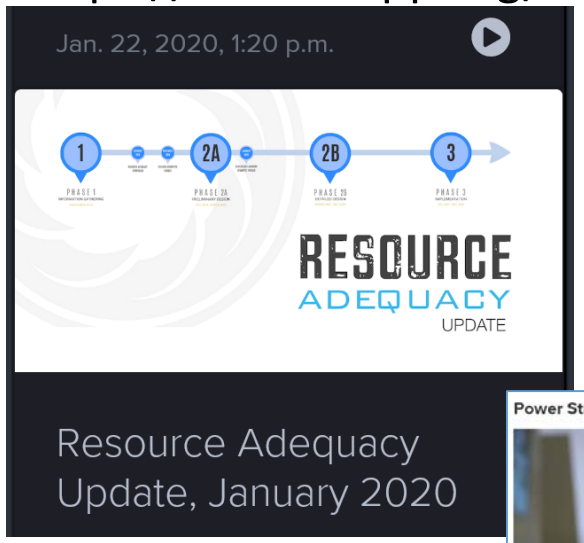
2026	2035
33%	64%

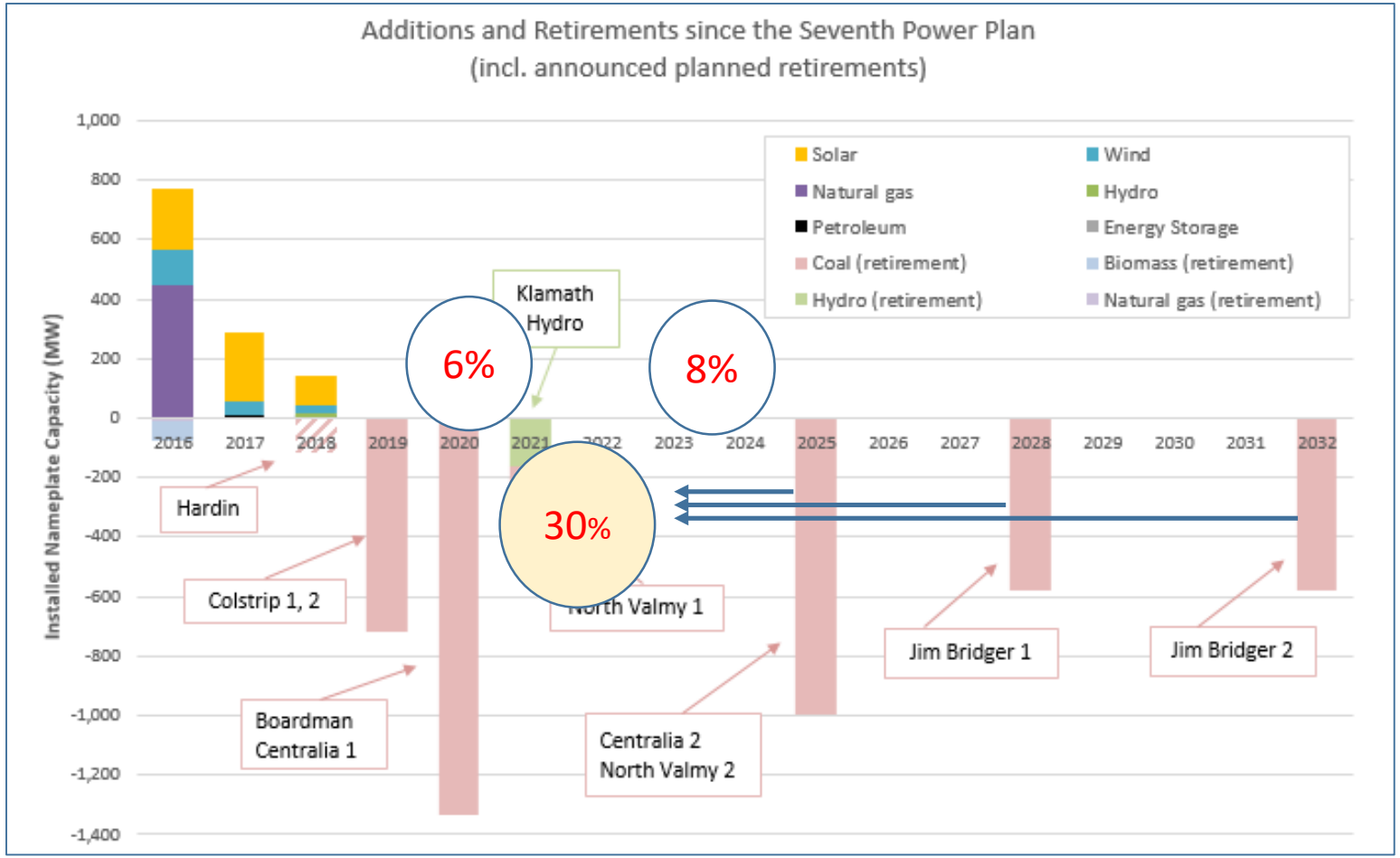
Resource Adequacy (RA)

NW Power & Conservation Council

- Simulation(s):
- Possible Futures (Hourly Resources v. loads)
- <5 Years
- LOLP – Loss of Load Probability

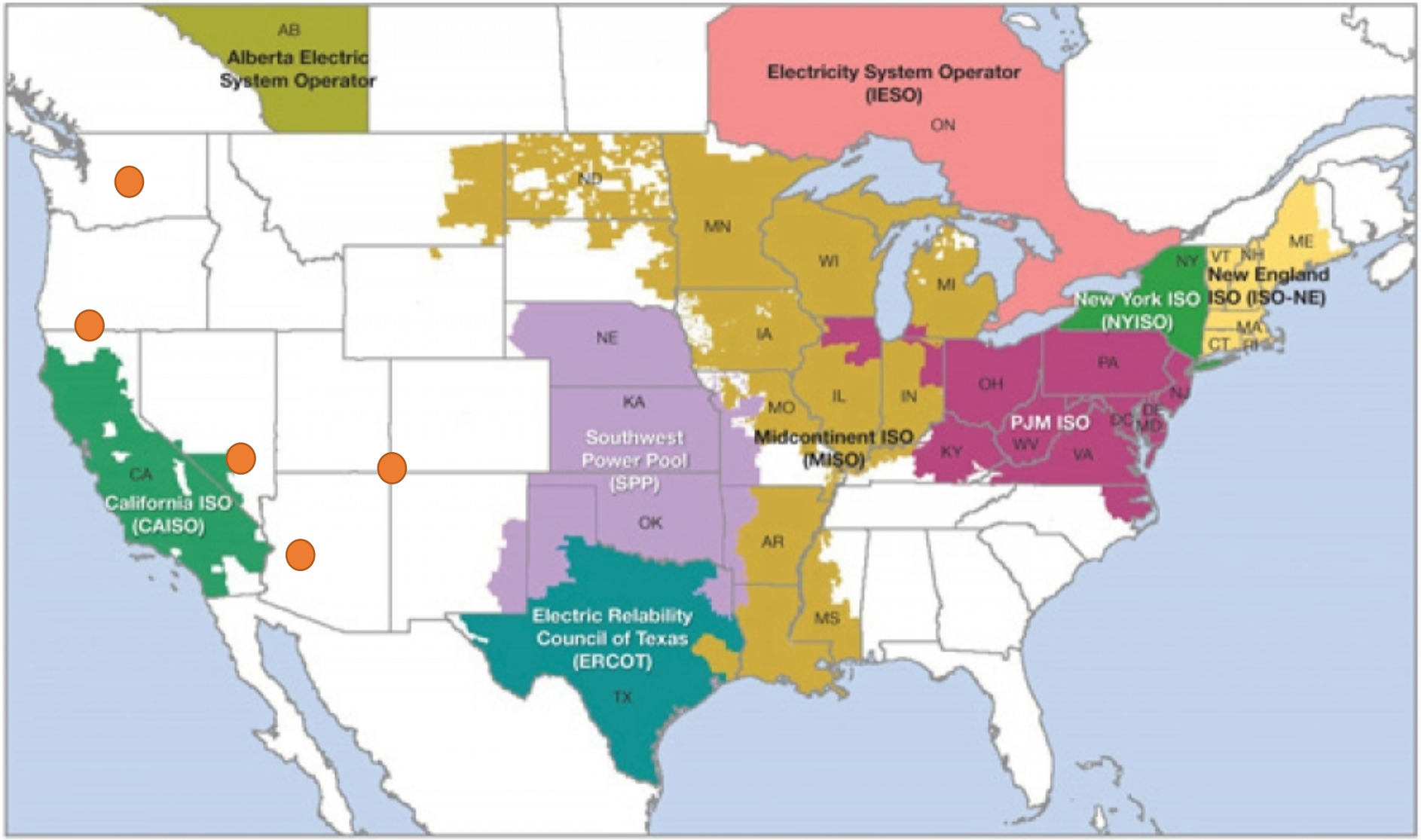
https://www.nwpp.org/adequacy



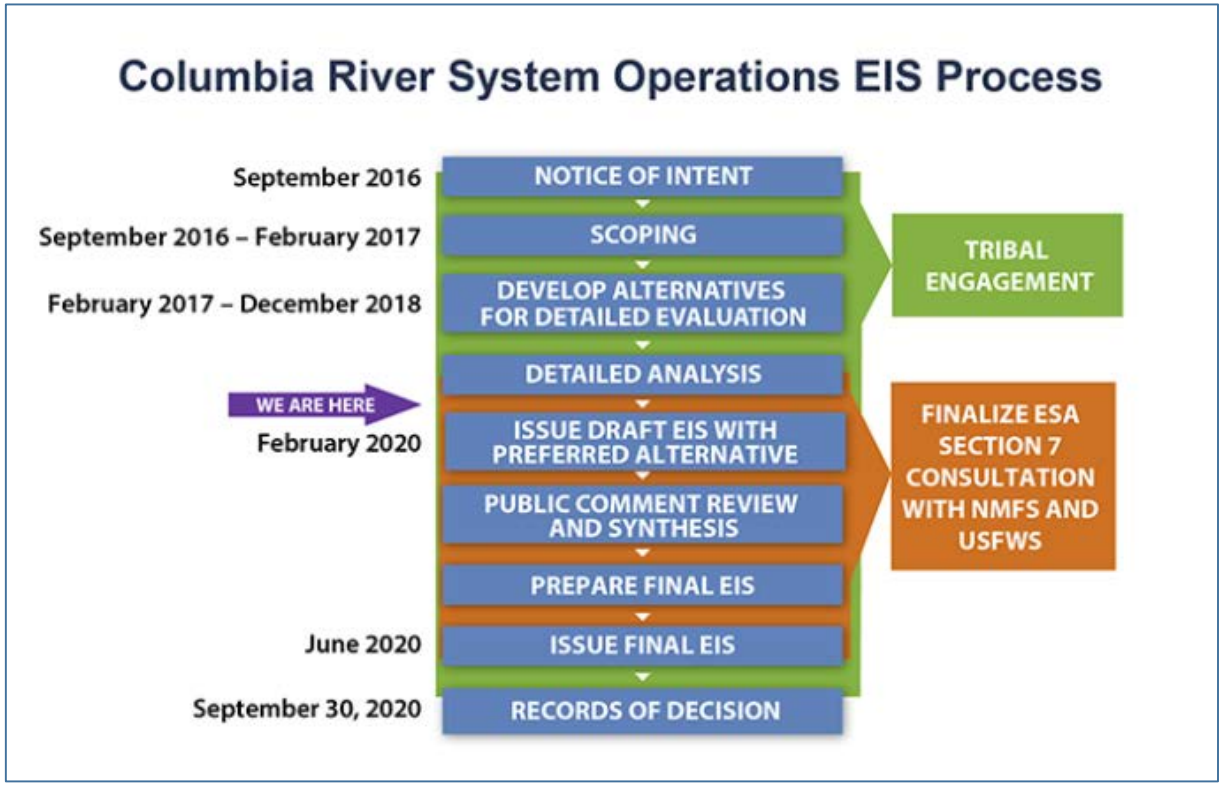


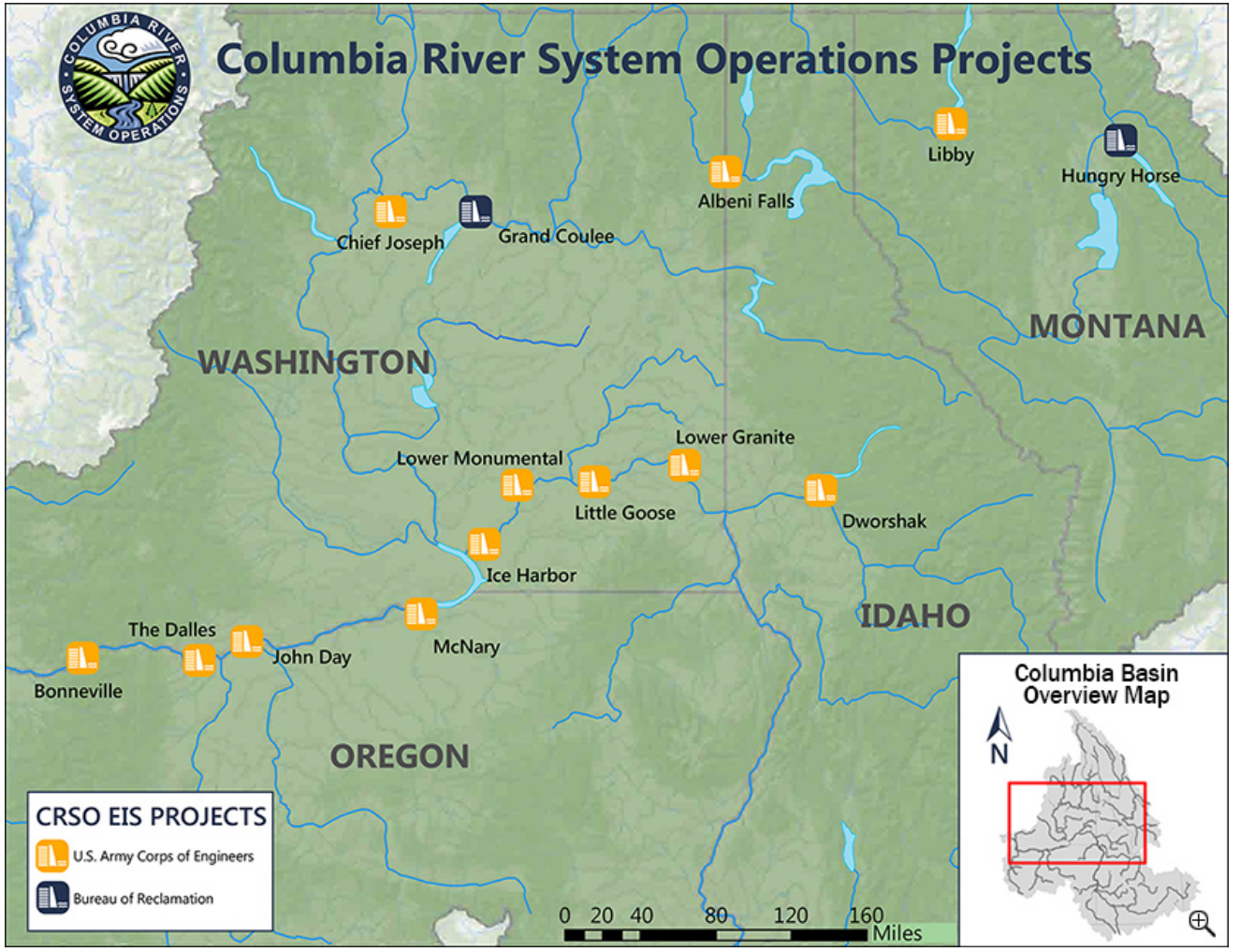
CAISO EDAM Market Development

- ***Price Formation:*** **Unique Resource Attributes; Fast-Start, Dispatchable, Shortage Pricing**
- ***Reliability:*** **Capacity, Sufficiency, Transmission Management**
- ***GHG Accounting:*** **Dispatch and account correctly**



Columbia River System Operation (CRSO)





EWEB Climate Change Policy

1. Electric power portfolio utilizing low-carbon, renewable resources

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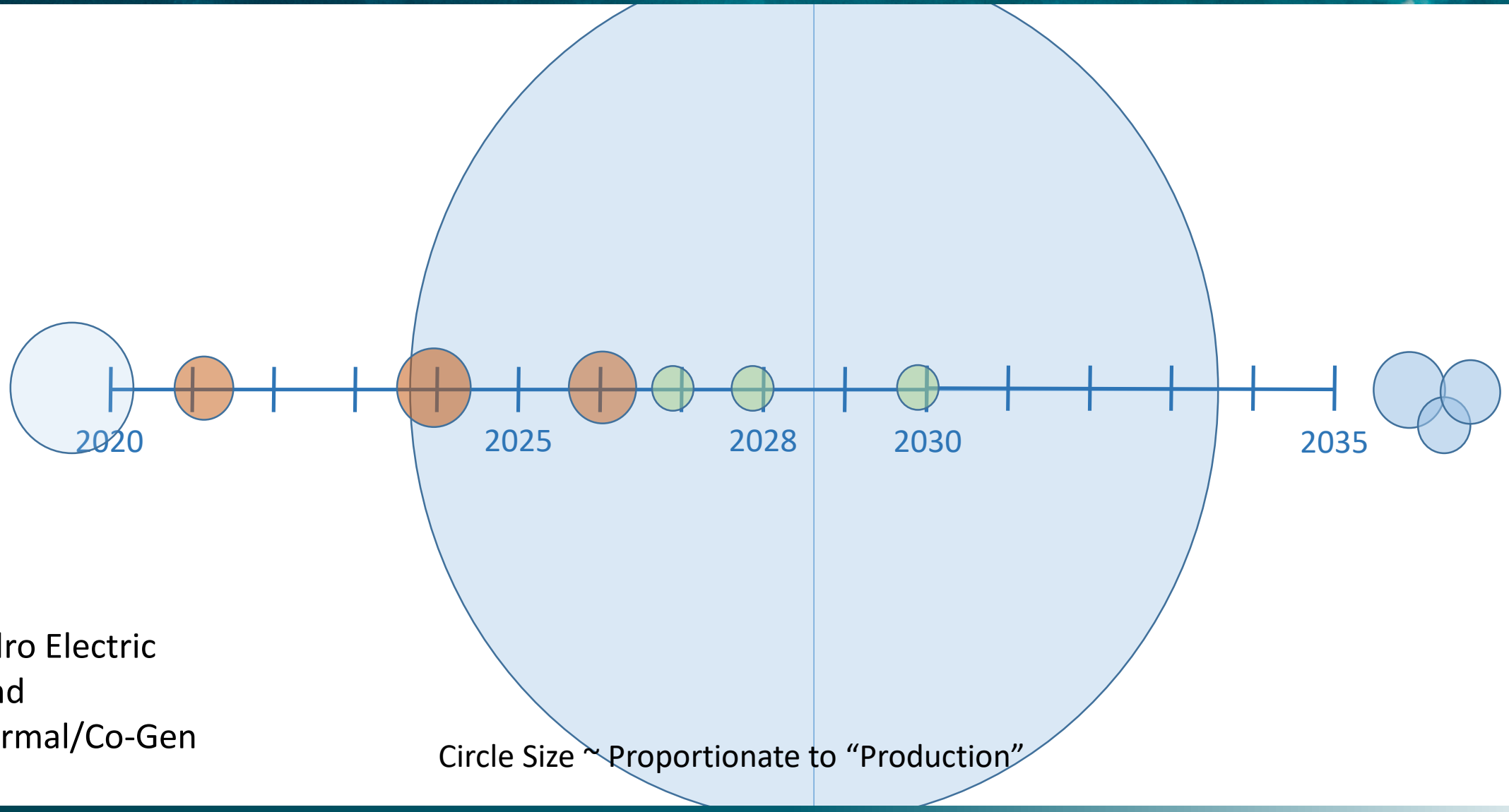
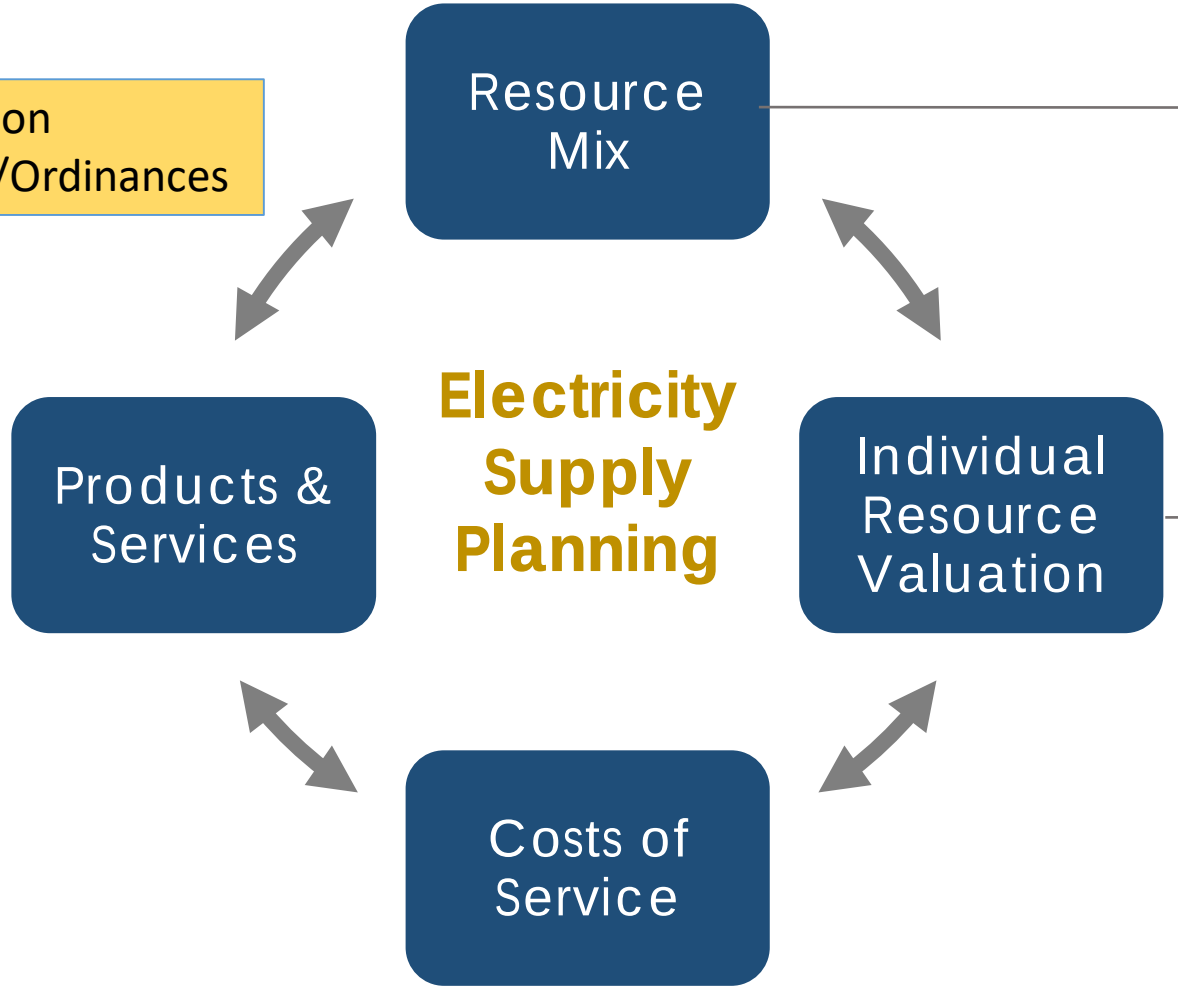
5. Prepare for impacts – EWEB's water/electric supply

EWEB Electricity Decisions



Electricity Supply Planning

Impacts of Electrification
Impacts of Legislation/Ordinances



Integrated Resource Plan

Leaburg/Walterville Analysis

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2019 Goal 6 - Climate Change/Conservation/EE	Goal	Actual	% Attained
LI EE Education Home Audits	500	499	100%
Energy Efficiency Savings (MWh)	9,500	10,958	115%
Peak Savings - MW	1.20	2.20	184%
Carbon Emissions Reduction (MTCO2e)	7,500	8,366	112%

EWEB Mission

EWEB's Mission

Our mission is to enhance our community's vitality by delivering drinking water and electric services consistent with the values of our customer-owners.

Safety
Reliability
Affordability
Responsibility
Community

1. **Drinking water quality**
2. **Ensure safe, reliable delivery of drinking water**
3. **Water service reliability**
4. **Electric service reliability & restoration**
5. Responsiveness
6. Efforts to protect the environment
7. Efforts to control cost
8. Efforts to help customers reduce energy use
9. Increase customer & community emergency preparedness
10. Keep customers informed
11. Help customers reduce water use
12. Involvement in community events & activities

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Our mission is to enhance our community's vitality by delivering drinking water and electric services consistent with the values of our customer-owners.

Most Popular Products of Interest

Financial rewards for shifting energy use

Reduce carbon footprint by using less & cleaner energy

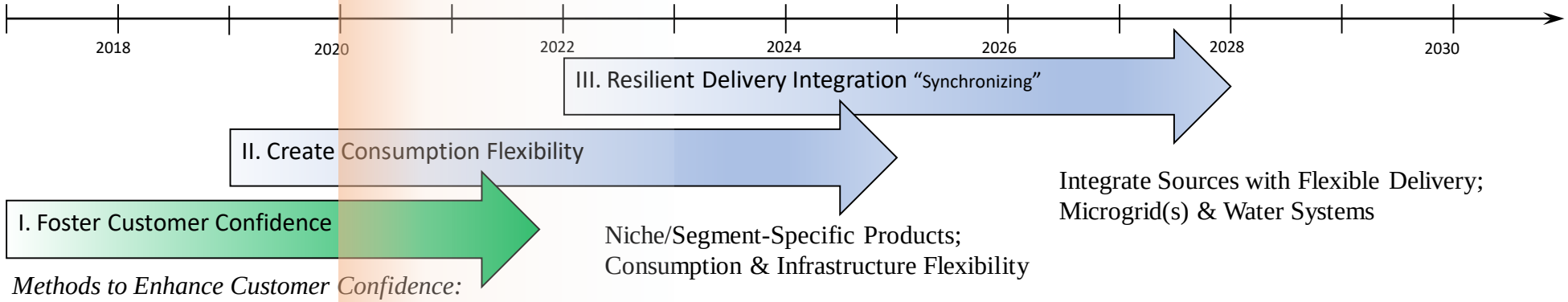
1. **Drinking water quality**
2. **Ensure safe, reliable delivery of drinking water**
3. **Water service reliability**
4. **Electric service reliability & restoration**
5. Responsiveness
6. Efforts to protect the environment
7. Efforts to control cost
8. Efforts to help customers reduce energy use
9. Increase customer & community emergency preparedness
10. Keep customers informed
11. Help customers reduce water use
12. Involvement in community events & activities

EWEB Strategy

10-Year Strategic Priorities

1. Emergency Preparedness & Disaster Recovery

2. Electric Resource Choices



Methods to Enhance Customer Confidence: 2017-2020+

1. **Consistent Performance (Safe & Reliable)**
2. **Cost Improvement**
3. **Service/Responsiveness**
4. **Open and Transparent Communications**

Product Extensions

Nutrition Facts
Per 1 cup (30 g)

Amount	Cereal Only	Plus 125 mL 2% P.S. Milk
Calories	120	180
	% Daily Value	
Fat 2 g*	3 %	7 %
Saturated 0.4 g + Trans 0 g	2 %	10 %
Cholesterol 0 mg		
Sodium 270 mg	11 %	14 %
Carbohydrate 22 g	7 %	9 %
Fibre 3 g	12 %	12 %
Sugars 1 g		
Protein 4 g		
Vitamin A	0 %	8 %
Vitamin C	0 %	0 %
Calcium	4 %	20 %
Iron	30 %	30 %
Vitamin D	0 %	25 %
Thiamine	4 %	8 %
Riboflavin	2 %	15 %
Niacin	6 %	15 %
Vitamin B_6	10 %	15 %
Folate	8 %	10 %
Vitamin B_{12}	0 %	25 %
Pantothenate	6 %	10 %
Phosphorus	10 %	25 %
Magnesium	15 %	25 %
Zinc	8 %	15 %

* Amount in cereal

Nutrition Facts
Serving Size ¾ cup (28g)
Servings Per Container about 17

Amount Per Serving	Honey Nut Cheerios	with ½ cup skim milk
Calories	110	150
Calories from Fat	15	15
	% Daily Value**	
Total Fat 1.5g*	2%	2%
Saturated Fat 0g	0%	0%
Trans Fat 0g		
Polyunsaturated Fat 0.5g		
Monounsaturated Fat 0.5g		
Cholesterol 0mg	0%	1%
Sodium 160mg	7%	9%
Potassium 115mg	3%	9%
Total Carbohydrate 22g	7%	9%
Dietary Fiber 2g	8%	8%
Soluble Fiber less than 1g		
Sugars 9g		
Other Carbohydrate 11g		
Protein 2g		
Vitamin A	10%	15%
Vitamin C	10%	10%
Calcium	10%	25%
Iron	25%	25%
Vitamin D	10%	25%
Thiamin	25%	30%
Riboflavin	25%	35%
Niacin	25%	25%
Vitamin B_6	25%	25%
Folic Acid	50%	50%
Vitamin B_{12}	25%	35%
Phosphorus	8%	20%
Magnesium	6%	10%
Zinc	25%	30%

* Amount in cereal. A serving of cereal plus skim milk provides 1.5g total fat, less than 5mg cholesterol, 220mg sodium, 329mg potassium, 28g total carbohydrate (15g sugars, 12g other carbohydrate), and 7g protein.

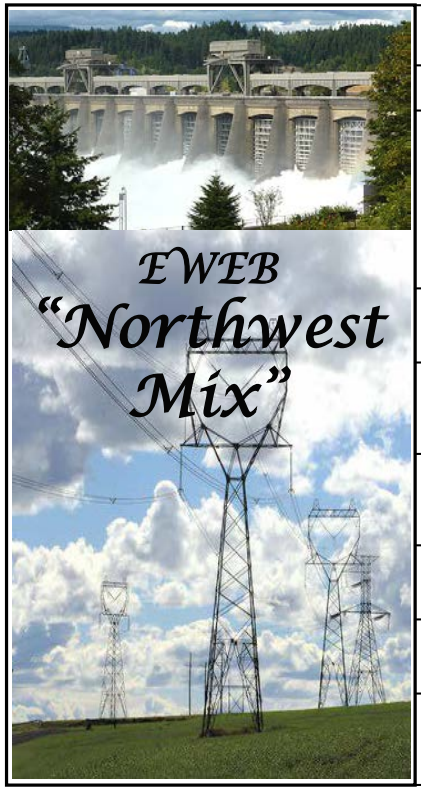
** Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Potassium		3,500mg	3,500mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Ingredients: Whole grain oat, modified corn starch, corn starch, sugar, salt, trisodium phosphate, calcium carbonate, monoglycerides, tocopherols, wheat starch, annatto, Vitamins & minerals: niacinamide, calcium pantothenate, pyridoxine hydrochloride (vitamin b6), folate, iron.

Contains wheat ingredients.

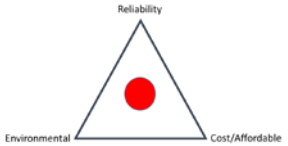
Future Electricity Products



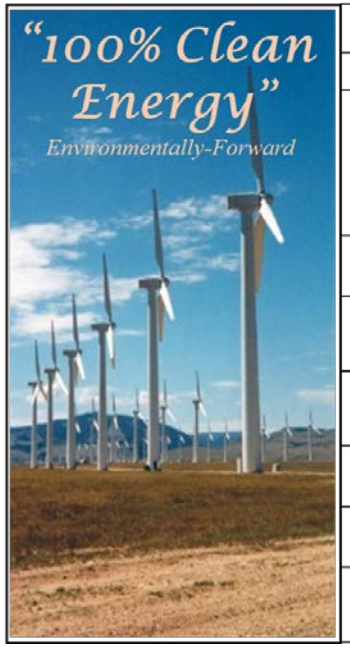
Electricity Facts

Characteristics	Value
Generation Resource(s)	
Coal	2 %
Gas	1 %
Nuclear	7 %
Hydro	77 %
Wind	6 %
Biomass (Renewable)	6 %
Solar	0.1 %
Other	0.9 %
Carbon Intensity (MTCO2e/kWh)	
Average	0.016
Peak	0.420
Pricing (Residential)	
Basic (per month)	$20.50
Delivery/Demand (cents)	2.624/kWh
Energy (cents)	6.524/kWh
Consumption	
Peak Reduction Credit	N/A
Off-Peak Credit	N/A
Delivery Credit	N/A
Demand Response	
Periodic	N/A
Programmatic	N/A
Resiliency Add-Ons	
Battery Storage Incentive	N/A
EV Charging Rate	N/A
Metering Requirements	
Advanced Time-of-Use	IN PROCESS
Sub-Metering	N/A
Connectivity	N/A

Available Today



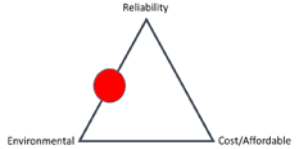
An electricity mix assembled and managed to meet forecasted consumption



Electricity Facts

Characteristics	Value
Generation Resource(s)	
Coal	0 %
Gas	__ %
Nuclear	__ %
Hydro	__ %
Wind	__ %
Biomass (Renewable)	__ %
Solar	__ %
Other	__ %
Carbon Intensity (MTCO2e/kWh)	
Average	0.000
Peak	0.???
Pricing (Residential)	
Basic (per month)	$20.50
Delivery/Demand (cents)	x.xxx/kWh
Energy (cents) – Time or Carbon-based	y.yyy/kWh
Consumption	
Peak Reduction Credit	✓
Off-Peak Credit	✓
Delivery Credit	✓
Demand Response	
Periodic	✓
Programmatic	OPTIONAL
Resiliency Add-Ons	
Battery Storage Incentive	OPTIONAL
EV Charging Rate	OPTIONAL
Metering Requirements	
Advanced Time-of-Use	REQUIRED
Sub-Metering	OPTIONAL
Connectivity	OPTIONAL

2023-2025

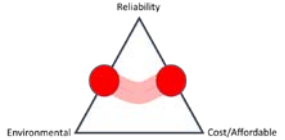


Synchronize consumption and generating resources that will minimize environmental impacts, while maintaining reliability

Electricity Facts

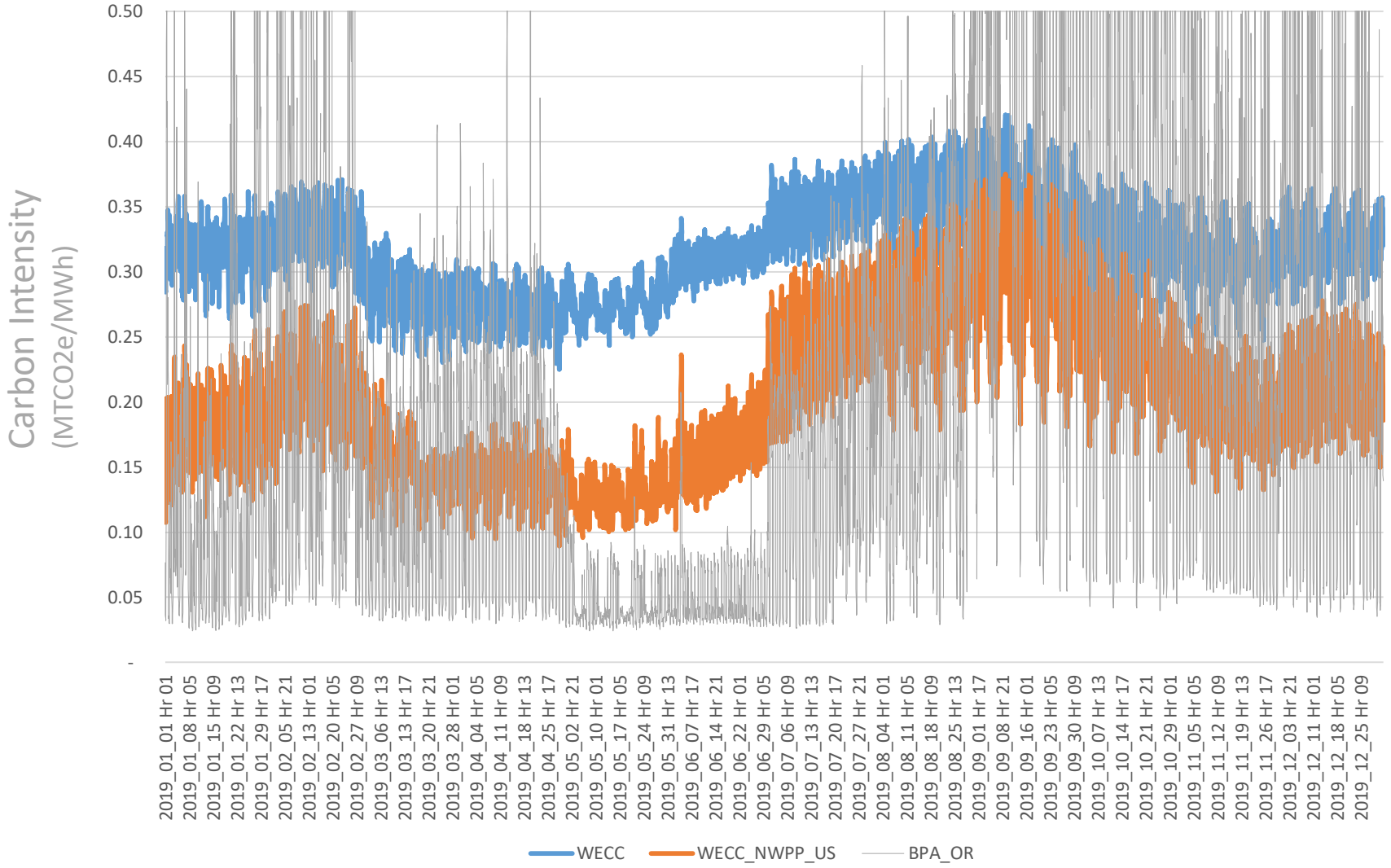
Characteristics	Value
Generation Resource(s)	
Coal	0 %
Gas	__ %
Nuclear	__ %
Hydro	__ %
Wind	__ %
Biomass (Renewable)	__ %
Solar	__ %
Other	__ %
Carbon Intensity (MTCO2e/kWh)	
Average	0.000
Peak	0.???
Pricing (Residential)	
Basic (per month)	$20.50
Delivery/Demand (cents)	x.xxx/kWh
Energy (cents) – Time or Carbon-based	y.yyy/kWh
Consumption	
Peak Reduction Credit	✓
Off-Peak Credit	✓
Delivery Credit	✓
Demand Response	
Periodic	✓
Programmatic	✓
Resiliency Add-Ons	
Battery Storage Incentive	OPTIONAL
EV Charging Rate	OPTIONAL
Metering Requirements	
Advanced Time-of-Use	REQUIRED
Sub-Metering	REQUIRED
Connectivity	REQUIRED

2025-2028

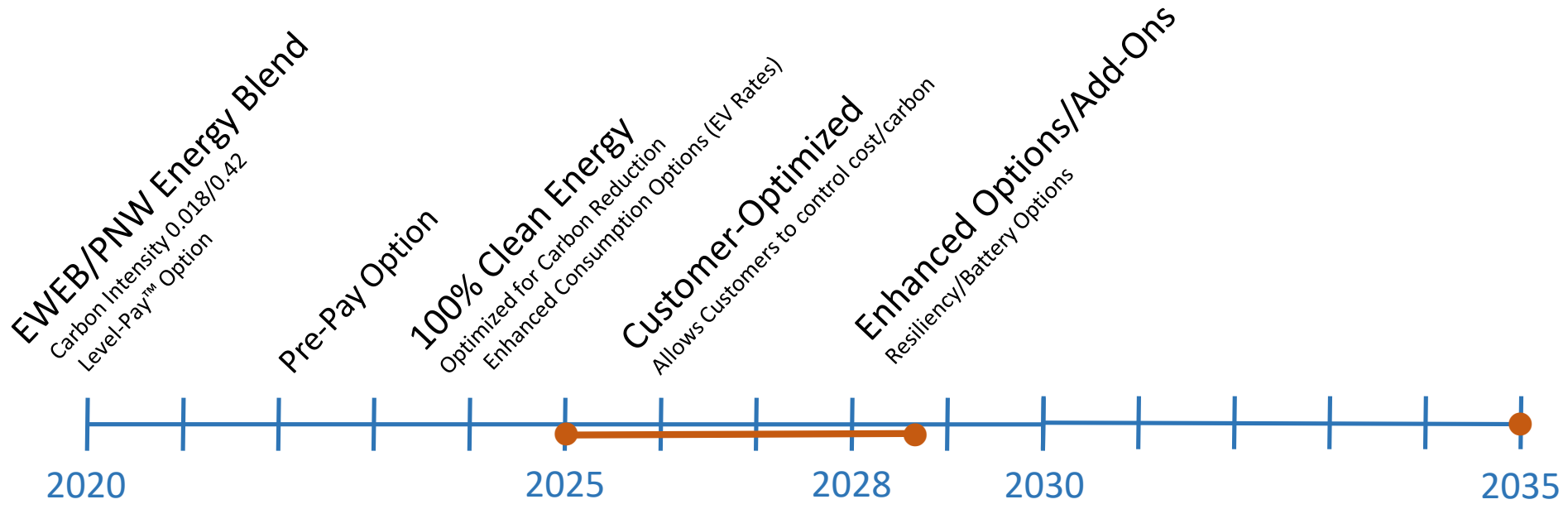


Encourages customers to control consumption to optimize cost, environment, and reliability

Carbon Intensity Trends



Future Electricity Products



Enhanced Metering

Product Development

Enhanced Cost-of-Service

Time-Based Consumption

Demand Response

Supply Chain

Electricity/Climate Strategy

1. Influence Policy
2. Regional Market Development
3. Conservation/Efficiency
4. Expand Consumption Choice(s)

Questions