AGENDA

• Welcome
  o Safety moment, goals for the meeting

• Review
  o Assumptions, Portfolio, Metrics

• Metrics
  o Total Portfolio Cost, Portfolio Carbon emissions

• Scenario results discussion with small group exercise

• Wrap up & next meeting
GOALS FOR THE MEETING

• Walk away understanding the analysis and issues to be considered
• Provide time to answer questions and take in feedback
• Discuss and decide next steps
Bonneville Power Administration transmission limits may make REC contract purchases more attractive or the only option in the near-term.

Wind and Solar generation resources in this IRP use BPA’s pilot renewable resource shaping and scheduling service as a proxy cost to firm and flatten and integrate 140 aMW of wind and solar (approximately 150 MW of wind and 350 MW solar nameplate capacity).

How electrification and grid decarbonization may impact City Light should be strongly considered for further investigation in the IRP process.

As a replacement alternative to BPA, build a portfolio with geothermal and/or biomass.
POTENTIAL NEW CLIMATE CHANGE LEGISLATION

- Early January 2018 Governor Inslee unveils legislation for Washington State carbon tax starting in 2020
- Governor Brown in Oregon works on a Cap and Trade proposal
- California has considered adoption of 100 percent RPS
- Mayor Durkan recently started discussing ideas for more EVs, charging stations, transit, and congestion pricing to help Seattle meets its climate change goals
CHANGE IN ELECTRIC SECTOR FUEL MIX
2002 TO 2015

The chart above illustrates the change in electric sector fuel mix from 2002 to 2015. It shows the percentage breakdown of energy sources for different regions and entities, including USA, CA, WA, City Light, with categories such as Nuclear, Oils, Natural Gas, Coal, Other Renewables, and Hydro.

Seattle City Light
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# RESOURCE ADDITIONS TO MEET NEED WITH 70% BANKING

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<tr>
<th>Note: Does not show BPA or Conservation additions</th>
<th>RECs</th>
<th>Early Renewables</th>
<th>Gas Plant</th>
<th>Renewables</th>
<th>Extreme Renewables</th>
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COMPARISON OF REMAINING REQUIREMENTS FOR RESOURCE ADDITIONS AFTER BPA AND CONSERVATION

- **Resource Adequacy need without Market Flex (Dec)**
- **Early resource portfolio**
- **Annual RPS Need**
- **Resource Adequacy need after Market Flex (Dec)**
## 2018 IRP SCENARIOS

Portfolios are tested in scenarios to see how they compare across a range of situations

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MID-COLUMBIA WHOLESALE PRICE FORECAST BY SCENARIO

MidC Wholesale Price by Scenario (nominal, annual flat)

- CO2
- Dem High
- Dem Low
- Expected
- NG High
- NG Low
- Wat High
- Wat Low

$/MWH

2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037
MID-COLUMBIA WHOLESALE PRICE - ON PEAK AND OFF PEAK IN EXPECTED SCENARIO

On Peak and Off Peak MidC Wholesale Prices (nominal, annual flat)

$/MWH

2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037

On Peak  Off Peak

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MID-COLUMBIA WHOLESALE PRICE - ON PEAK AND OFF PEAK IN EXPECTED SCENARIO BY MONTH

2020 Monthly Prices (nominal)

2037 Monthly Prices (nominal)

$/mwh

1 2 3 4 5 6 7 8 9 10 11 12

On Peak  On Peak

Off Peak  Off Peak

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SCENARIO IMPACTS ON CO2 EMISSIONS IN PNW

Regional-Wide Emission Rates

Metric Ton/MWh

- CO2
- Dem High
- Dem Low
- Expected
- NG High
- NG Low
- Wat High
- Wat Low

Year: 2018 to 2037
PORTFOLIO ANNUAL SURPLUS/DEFICIT IN 2037

Net Surplus (Market Sales - Market Purchases)

- CO2
- Dem High
- Dem Low
- Expected
- NG High
- NG Low
- Wat High
- Wat Low

- RECS
- Renewables
- Early Renewables
- Gas
- Extreme Renewables

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2018 MONTHLY SURPLUS/DEFICIT

2018 Monthly Net Surplus by Scenario

- CO2
- Dem High
- Dem Low
- Expected
- NG High
- NG Low
- Wat High
- Wat Low

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PORTFOLIO MONTHLY SURPLUS/DEFICIT IN 2037

2037 Monthly Net Surplus(aMW) Portfolio = **RECS**

2037 Monthly Net Surplus(aMW) Portfolio = **Renewables**

2037 Monthly Net Surplus(aMW) Portfolio = **Early Renewables**

2037 Monthly Net Surplus(aMW) Portfolio = **Extreme Renewables**

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PROJECTED CARBON EMISSION COSTS

- E3 Carbon Market Forecast (CO2 Scenario)
- EPA Social Cost of Carbon for comparison (carbon offset price)
METRICS

• Total portfolio cost (Net present value of 2018-2037)
  Resource Cost + Contract Purchases - Contract Sales +
  Market Purchases - Market Sales

• Portfolio carbon emissions to be offset
  Resource Emissions + Contract Emissions + Market
  Purchase Emissions

Note: Market purchase emission offsets are calculated
using City Light’s current methodology
FINANCIAL INPUTS

• Inflation~ 2.3% annually (City CPI assumptions)
• Nominal Discount Rate = 5%
• Real Discount Rate = 3%
GROUP EXERCISE

• High level description of the slides (all)
• Small group review and discussion of the results
  o What do you conclude from the review of the results?
  o What questions do you have about the results?
COMPARISON OF 20-YEAR NPV OF COSTS

Portfolio NPV(2018-2037) of Portfolio Costs by Scenario

- CO2
- Dem High
- Dem Low
- Expected
- NG High
- NG Low
- Wat High
- Wat Low

- RECS
- Renewables
- Early Renewables
- Gas
- Extreme Renewables

$ Millions, $2017
COMPARISON OF 10-YEAR NPV OF COSTS

Portfolio NPV(2018-2027) of Portfolio Costs by Scenario

$ Millions, $2017

CO2  |  Dem High  |  Dem Low  |  Expected  |  NG High  |  NG Low  |  Wat High  |  Wat Low
--- | --- | --- | --- | --- | --- | --- | ---
RECS | Renewables | Early Renewables | Gas | Extreme Renewables

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COMPARISON OF 20-YEAR NPV OF COSTS + OFFSET COSTS

NPV(2018-2037) of Total Costs(Portfolio+Offset) by Scenario

- $ Millions

- CO2, Dem High, Dem Low, Expected, NG High, NG Low, Wat High, Wat Low

- RECS, Renewables, Early Renewables, Gas, Extreme Renewables
20 YEAR PORTFOLIO CARBON EMISSIONS TO BE OFFSET

Total 20 Year CO2 Emissions

- Washington State primary electric utility emissions in 2016 >17,000,000 Metric Tons (fuel mix disclosure)
- City Light portfolio market purchase emissions average about 27,000 metric tons per year across scenarios and portfolios(except for the Gas portfolio)
City Light’s portfolio market purchase emissions in most scenarios average about 20,000 metric tons in 2037 across portfolios (except for the Gas portfolio).
DYNAMICS INFLUENCING ELECTRIC UTILITIES

• West coast states evaluating legislative options and timing for grid decarbonization
• Rapidly declining solar and battery costs
• Low wholesale electric market price environment continues
• Electric load growth is stagnant creating new rate pressures
WRAP UP AND NEXT STEPS

These are questions we answer in an IRP

✓ What do we have? (resources and contracts)
✓ How much do we need and when? (to meet demand and renewable portfolio standards)
☐ How can we fill that need? (portfolio options)
☐ Which options are robust? (scenario testing)
☐ Where’s the best value? (cost, risk, and environmentally responsible)
OUR MISSION
Seattle City Light is dedicated to delivering customers affordable, reliable and environmentally responsible electricity services.

OUR VISION
We resolve to provide a positive, fulfilling and engaging experience for our employees. We will expect and reinforce leadership behaviors that contribute to that culture. Our workforce is the foundation upon which we achieve our public service goals and will reflect the diversity of the community we serve.

We strive to improve quality of life by understanding and answering the needs of our customers. We aim to provide more opportunities to those with fewer resources and will protect the well-being and safety of the public.

We aspire to be the nation’s greenest utility by fulfilling our mission in an environmentally and socially responsible manner.

OUR VALUES
Safety, Environmental Stewardship, Innovation, Excellence, Customer Care