AGENDA

- Welcome
- Review key inputs
- Expected future resource needs
  - Resource Adequacy
  - Renewable portfolio standard (RPS) compliance
- Preliminary portfolios
- Draft scenarios
- Wrap up/ next meeting
WHAT WILL WE REASSESS IN THE 2018 IRP?

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)
2018 IRP UPDATE - WHAT’S CHANGED

- Existing and future BPA contract modeled as shaped block only
- Future BPA annual energy allotment reduced by expected cost-effective energy efficiency
- Gas and hydro resources will be modeled to reflect resource variability, not as fixed block PPAs
- Inclusion of an option to rely on 70% of next year’s RECs for compliance
- Inclusion of 20-year REC contracts
KEY INPUT REVIEW
2018 IRP LOAD FORECAST
BEFORE AND AFTER UTILITY ENERGY EFFICIENCY

Before Energy Efficiency (EE)

After EE scenarios

Annual Average MW

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

- Load Forecast
- Low EE
- Middle EE
- High EE
PROJECTED BPA CONTRACT
ENERGY REDUCTIONS FOR REDUCED DEMAND

BPA annual energy with no change in demand

With changes in demand based on IRP inputs

Annual Average MW

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

BPA net requirements under Middle EE BPA net requirements under High EE
Current BPA contract

Seattle City Light
THE NATION'S GREENEST UTILITY | 7
REDUCED VARIABILITY IN BPA CONTRACT

2016 IRP Slice (Low, Expected, and High Water)  2016 IRP Block  2018 IRP Block
UTILITY SCALE NEW RESOURCE COST INPUTS
PROJECTED LEVELIZED COST – 2017 $/MWH

- Includes PTC and ITC in 2020
- Includes BPA firm transmission service
- Assumes no incremental cost for new transmission
- Wind at 35% capacity factor + firming and shaping to a flat block
- Solar at 26% capacity factor + firming and shaping to a flat block
- CCGT and SCCT includes fuel cost, excludes City Light GHG offsets
UTILITY SCALE NEW RESOURCE COSTS
DISCUSSION OF ASSUMPTIONS

• Levelized cost not equal to levelized avoided cost

• Wind and Solar include a firming cost based on a demand charge equivalent to a new combustion turbine and energy costs to make more equivalent to other resources for comparison

• City Light relies on BPA transmission for remote resource delivery (firmed resources better utilize existing transmission)

• Skagit and Boundary hydroelectric projects essentially operate as a battery for City Light
RESOURCE ADEQUACY
RESOURCE ADEQUACY VARIABLES

What will City Light need to ensure future electric demands are met?

- Future electric demand may be above or below the forecast
- Hydro capability varies from year to year

City Light’s current portfolio was tested against a range of supply and demand scenarios that cover these different possibilities
RESOURCE ADEQUACY MEASURES

250 scenarios

• Capture peak winter loads (December)
• Range of demand conditions
• Range of hydro conditions

Identified top 10% of largest hourly gaps between demand and supply

This is consistent with 2016 IRP methodology
CITY LIGHT’S RESOURCE NEEDS OVER TIME

Resource Need for 2018 IRP

We develop portfolios to fill this gap.
City Light’s Resource Needs Over Time

Resource Need for 2018 IRP

City Light can reasonably meet some needs through market purchases.

We develop portfolios to fill this gap.
CITY LIGHT’S RPS-ELIGIBLE PORTFOLIO

• 15% by 2020
  o Stateline wind purchase expires end of 2021
    • REC purchase continues 2022 to 2026
  o RPS-eligible RECs from BPA expire 2020 to 2027
  o New REC-only purchases begin in 2019 and 2024
  o Need for additional RECs in 2021 - 2022
    (dependent on load and REC banking and compliance option)
CITY LIGHT RPS PLANNING

- If retail load declines over a 3 year period, we would be eligible for a different compliance option
  - Spend 1% of retail revenue on eligible resources and/or RECs
  - Use additional RECs to offset non-renewable resource purchases made after 2007
  - 2017 retail sales trending up
  - May be lower cost option compared to 15% target
EXPECTED RPS NEED
(AFTER UTILITY EE AND PREVIOUS YEAR EXCESS RECS BANKING)
EXPECTED RPS NEED
(AFTER UTILITY EE AND FUTURE YEAR REC BANKING)

RECs

70% of next year's REC position

Previous and current year RECs

Expected RPS Need

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<th>RECs</th>
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DRAFT PORTFOLIO DEVELOPMENT

Portfolios are designed to be lowest cost based on resource availability assumptions and must at a minimum:

• Meet resource need based on City Light’s resource adequacy planning metric
• Satisfy Washington’s renewable portfolio standard requirements
DRAFT PORTFOLIO DEVELOPMENT

Design takes into consideration

• cost

• characteristics of supply resources

• resource availability such as
  o Renewable resources and RPS eligible resources only (consistent with City Council policies)
  o renewable resources instead of REC only contracts
  o non renewable resources available for cost and risk comparison
PORTFOLIO DESIGN

• See hand out
PRELIMINARY PORTFOLIOS
(RESOURCE ADEQUACY COMPONENT)

Note: Wind and solar are firmed to provide RA equal to annual average generation.
PRELIMINARY PORTFOLIOS
(RPS COMPLIANCE COMPONENT)

1 aMW = 8,760 RECs (non leap year)
PORTFOLIOS WILL BE TESTED AGAINST HIGH AND LOW LEVELS OF ELECTRIC DEMAND

High and Low System Load Forecast Scenarios

Scenarios use outcomes of NWPCC’s 7th Power Plan.
MAJOR FACTORS IN DEMAND SCENARIOS

The base case uses our internal load forecast. High and low scenarios are primarily based on:

- Future residential units in the region
- Future commercial floor space in the region
- Future industrial output in the region

These affects are scaled to fit City Light’s sector mix.

City Light’s load forecast methodology is changing. Future scenarios will be developed in-house.
PORTFOLIOS WILL BE TESTED AGAINST HIGH AND LOW NATURAL GAS PRICES

Natural Gas High and Low Scenarios

Real 2017$/MMBtu

$16 $14 $12 $10 $8 $6 $4 $2 $0


Scenarios use outcome of EIA Annual Energy Outlook 2017
MAJOR FACTORS IN NATURAL GAS SCENARIOS

The base case uses IHS natural gas forecast.
High and low scenarios are primarily based on:
• Future oil and gas resource availability
• Future oil and gas production costs
PORTFOLIOS WILL BE TESTED AGAINST HIGH AND LOW WATER CONDITIONS

Example Dam Under High and Low Water Scenarios

Average MW by Month

Scenarios use outcome of regional headwater benefits study 2016
## HYDRO SCENARIOS

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<th>Scenario</th>
<th>Conditions</th>
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PORTFOLIOS WILL BE TESTED AGAINST A POSSIBLE FUTURE CARBON MARKET

Regional Carbon Market Scenario

Forecast created by E3 for City Light in 2015 based on California cap and trade market
POSSIBLE OTHER SCENARIOS
NOW OR FUTURE IRPS

• Early runoff at Skagit and Boundary dams representing a changing climate scenario

• Other
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WRAP UP

• What do we want to further explore?

• Review Stakeholder meeting schedule and topics
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