# 2022 Integrated Resource Plan

## Building the Long-Term Plan: February 14, 2022

## SCL Team and IRP Advisory Group

Seattle City Light

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# Today's Presenters, Contributors and Sponsors

| Name | Title | Business Unit/ Organization |
|---|---|---|
| Aliza Seelig | Manager, Resource Planning Forecasting & Analysis | Energy Innovation And Resources |
| Saul Villarreal | Data Scientist/Resource Planning Forecasting & Analysis | Energy Innovation And Resources |
| Paul Nissley | Data Scientist/Resource Planning Forecasting & Analysis | Energy Innovation And Resources |
| Rebecca Klein | Intern/Resource Planning Forecasting & Analysis | Energy Innovation And Resources |
| Andy Strong | Interim Director, Power Management | Energy Innovation And Resources |
| Emeka Anyanwu | Officer, Energy Innovation and Resources | Energy Innovation And Resources |

# Building the 2022 IRP: Agenda

- Welcome
- What we need to accomplish
- Focus on Baseline and Rapid Market Electrification Scenarios
- Resource Choices
- Portfolio Strategies & Feedback
- Next steps

# What we need to accomplish

## Today:

- Confirm IRP SharePoint access and advisory group subject specific roles
- Collect advisory group input, feedback and questions
- Review Baseline and Rapid Electrification scenario resource needs
- Review resource choices
- Develop portfolio strategies focused on questions to be examined

## For IRP completion:

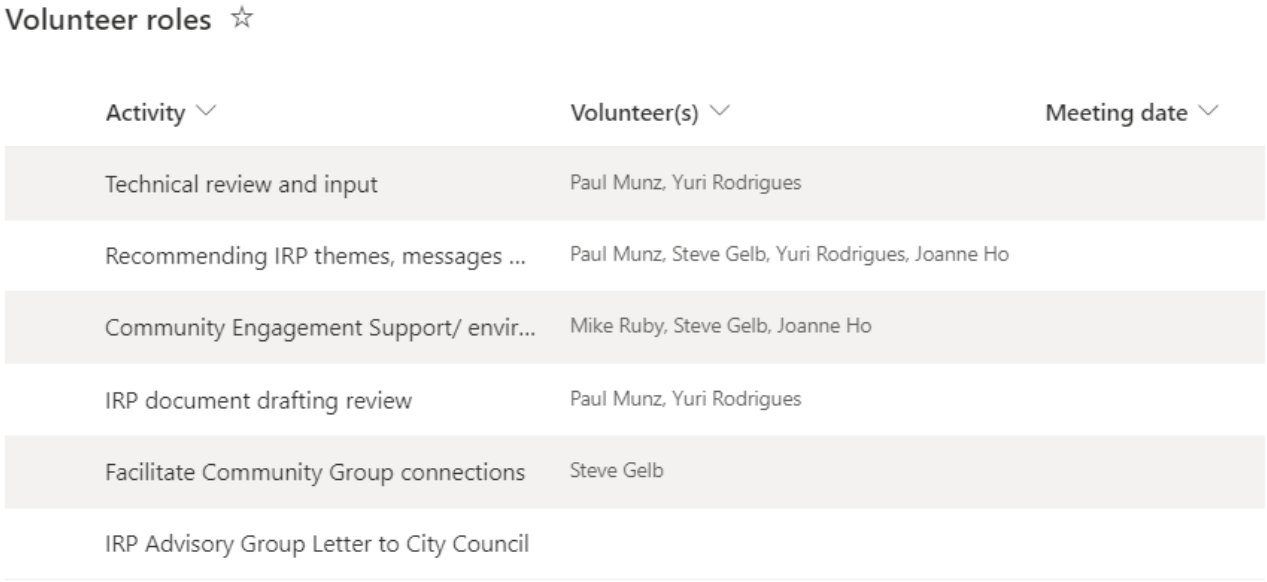
- Establish advisory group subject specific meeting dates
- March finalize portfolio selections- features of top resource choices
- Develop Community Outreach materials to get input on desired resources and outcomes
- Develop 2-year and 10-year clean energy action plans

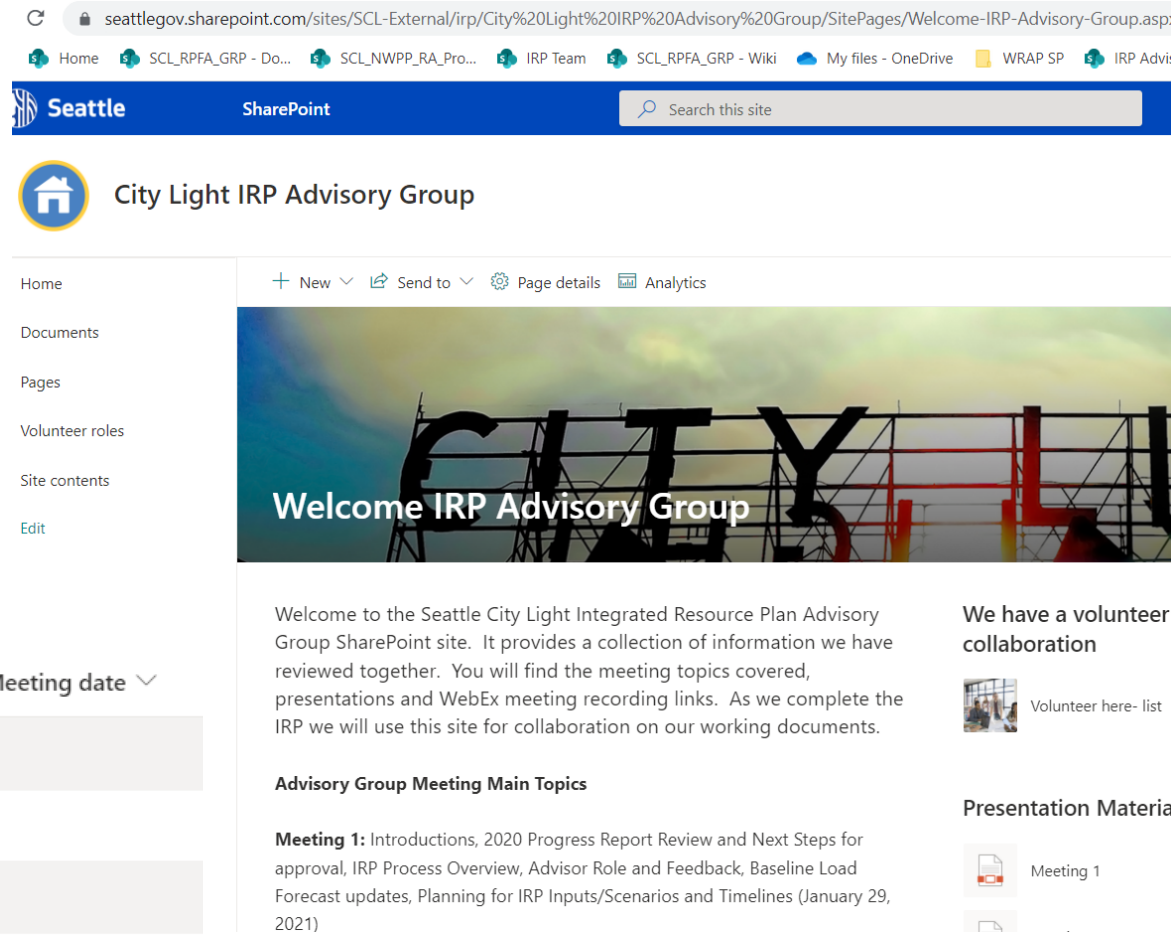
# Advisory Group Check in

- SharePoint Site Access

  https://seattlegov.sharepoint.com/sites/SCL-External/irp/City%20Light%20IRP%20Advisory%20Group (requires an Office 365 login or free outlook or Hotmail account, no gmail accounts, contact me if you need help)

- Subject Specific Group Roles



# Baseline and Rapid Market Electrification Scenarios

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# Near-term actions driven by new summer resource adequacy needs and proximity to load growth tipping point

## Clean Energy Implementation Plan

| Renewable Builds | Year | Capacity (MW) |
|---|---|---|
| Gorge Wind | 2026 | 25 |
| SE OR Solar | 2026 | 100 |
| E WA Solar | 2026 | 300 |
| Gorge Wind | 2027 | 50 |
| E WA Solar | | |
| E WA Solar | | |

400 - 475 MW renewables across scenarios before 2028

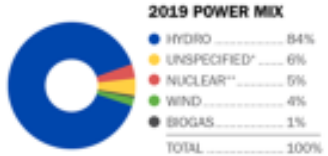
| Conservation, BPA & Spot RECs |
|---|
| Cumulative Conservation Savings (2-Year) |
| BPA_(max energy entitlement is 500 aMW) |
| Annual I937 RECs |
| Cumulative Conservation Savings (4-Year) |
| BPA (max energy entitlement is 500 aMW) |
| Annual I937 RECs |
| Cumulative Conservation Savings (20-Year) |
| BPA (max energy entitlement is 500 aMW) |

### Proposed Targets – Median Hydro Conditions

**Interim target: Percentage of retail load to be served using renewable and nonemitting resources (WAC 194-40-200(2))**

| Resource | 2022 | 2023 | 2024 | 2025 | 4-year Period Avg |
|---|---|---|---|---|---|
| Renewable | 93% | 93% | 93% | 93% | 93% |
| Nonemitting | 4% | 4% | 4% | 4% | 4% |
| Total | 97% | 97% | 97% | 97% | 97% |

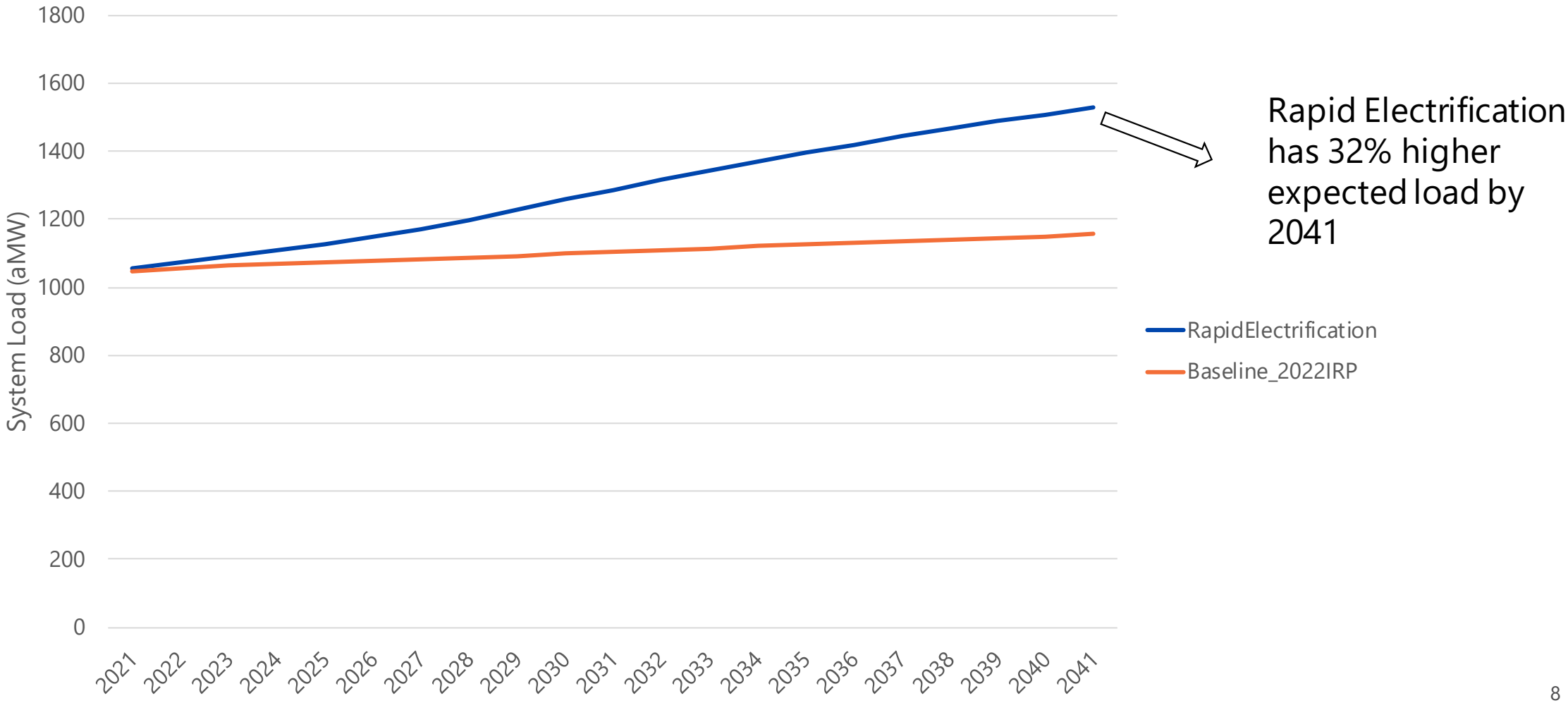
Median hydro: SCL median historical generation, each month, over the operating period 1999 to 2020




**Specific targets (WAC 194-40-200(3)):**

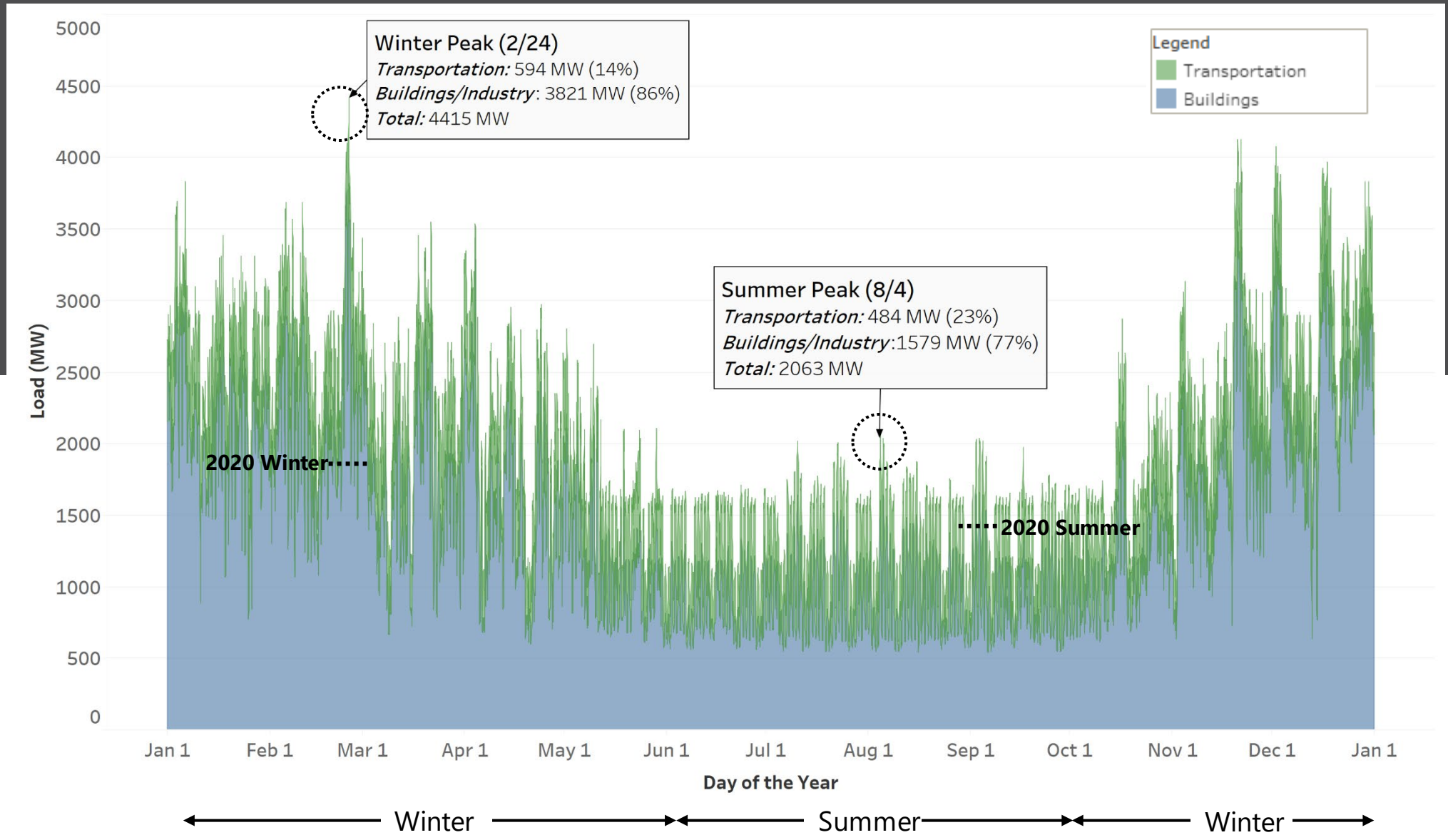
| Resource | Amount |
|---|---|
| Energy Efficiency 2025 savings | 35 aMW |
| Renewable energy 4-yr sum | 32,685,546 MWh |
| Demand response | Pilot programs planned |

# IRP Load Forecast Annual

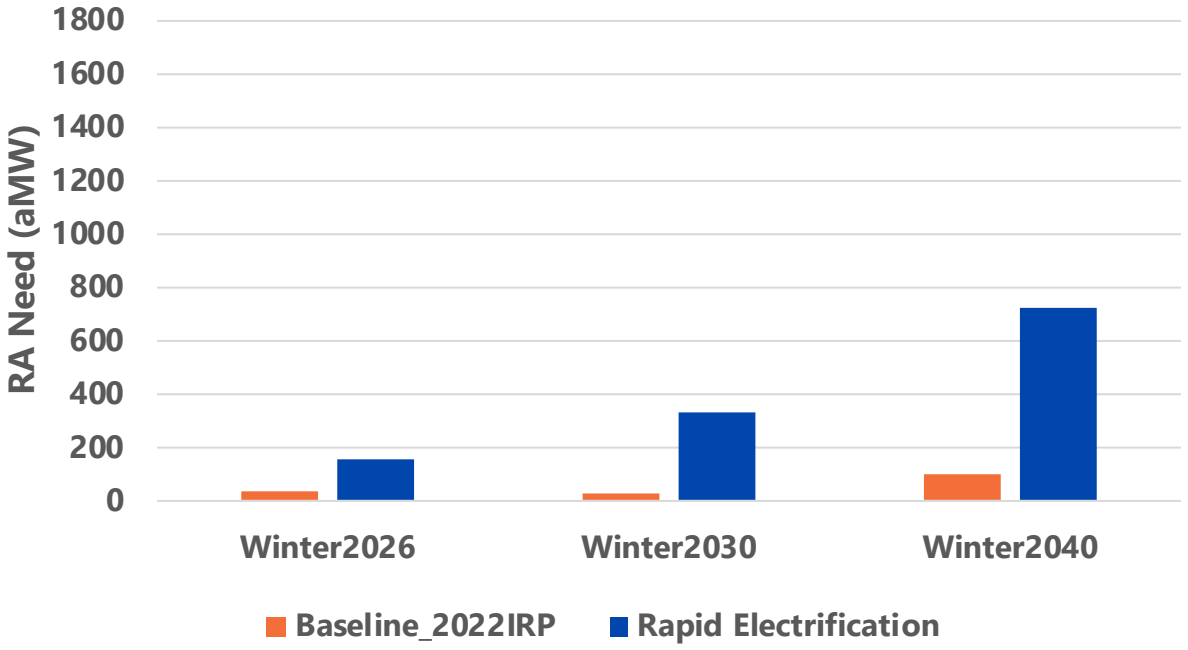


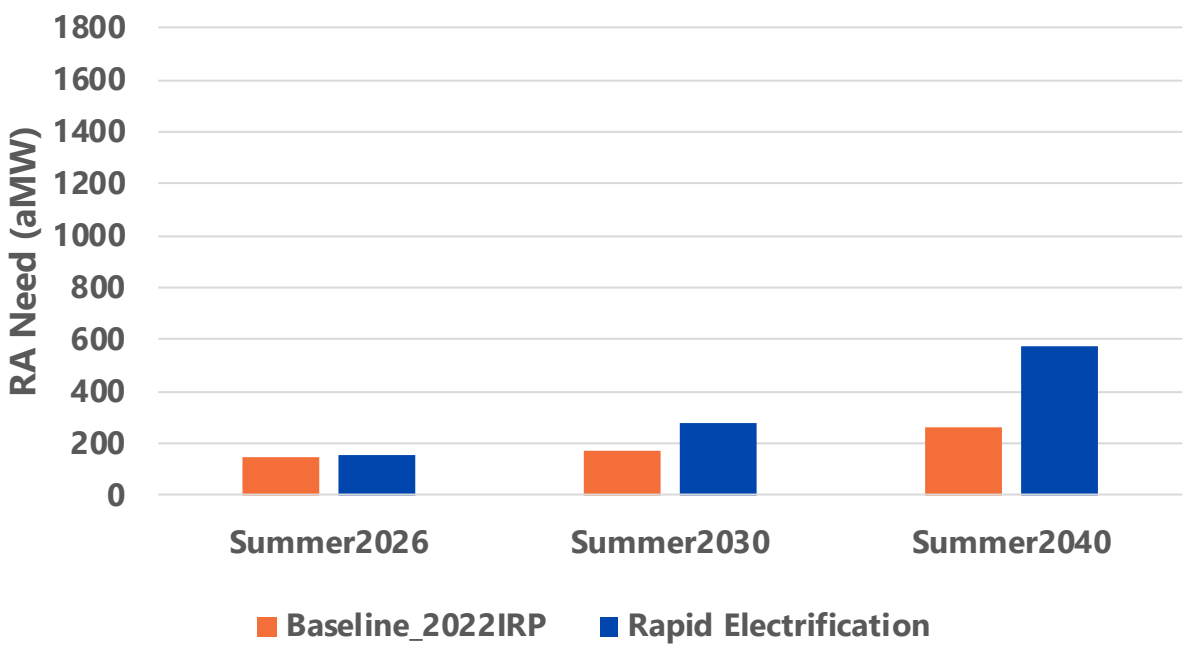

Rapid Electrification has 32% higher expected load by 2041

# Rapid Electrification Scenario, 2042, yearly load

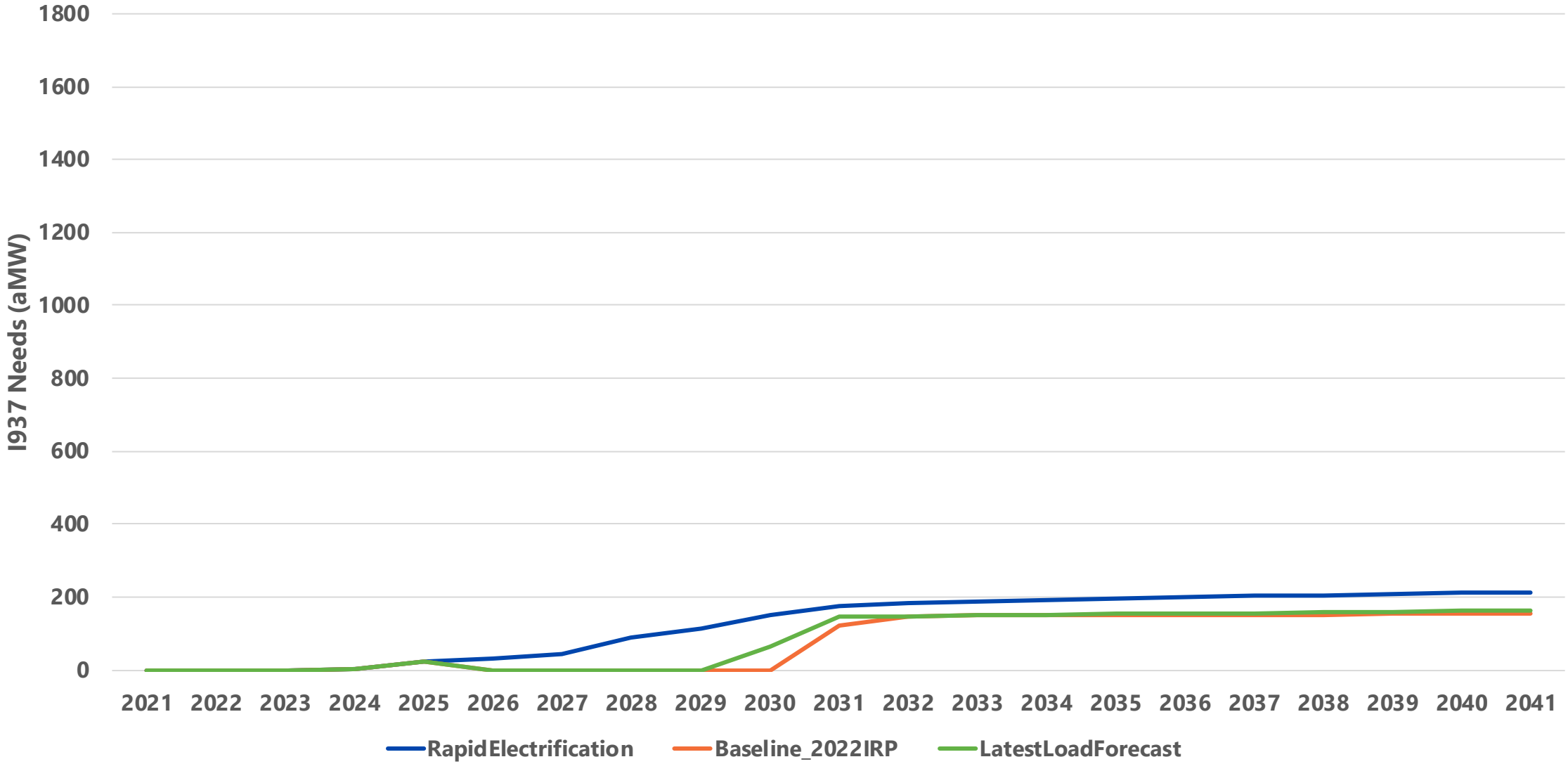


# Resource Adequacy Needs



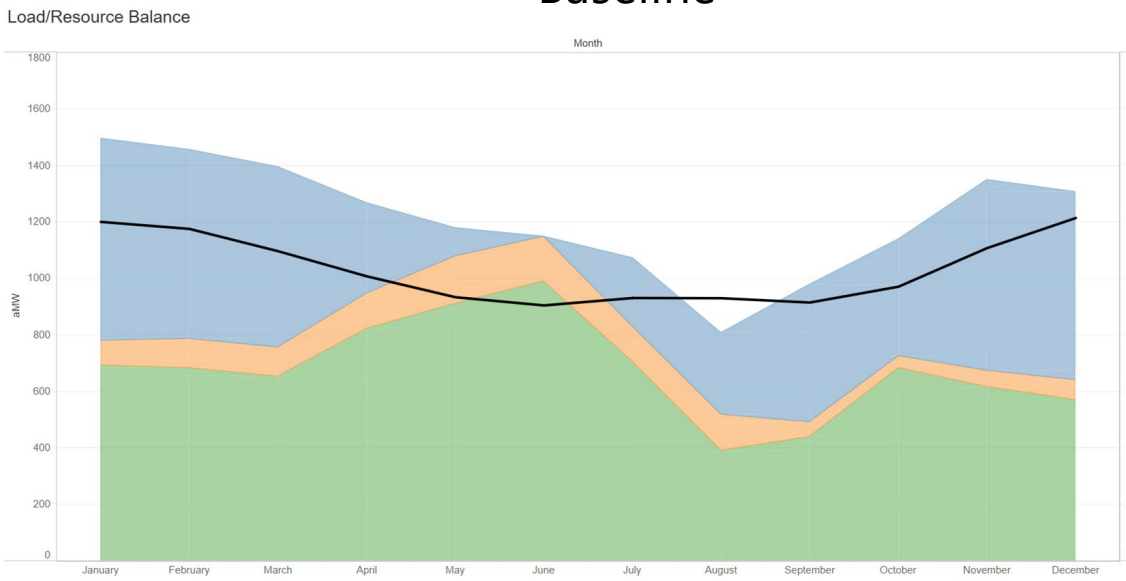
# I-937 Need after 2022 CPA target



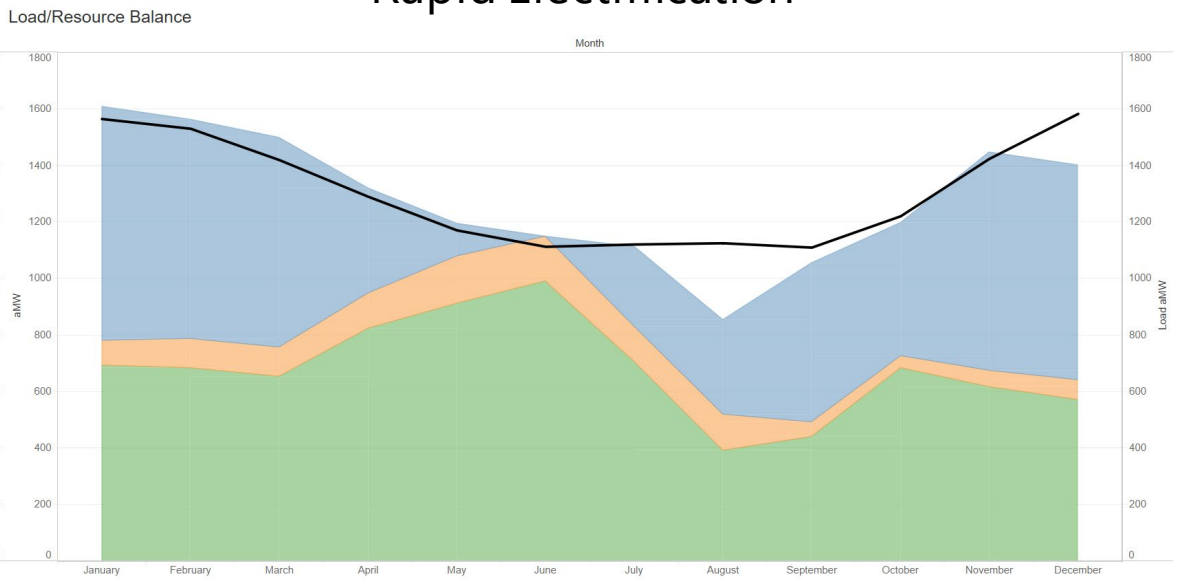
# Median Load Resource Balance 2035

## Existing resources and newly identified 2022 CPA conservation

### Baseline




### Rapid Electrification




BPA, Resource aMW
Other Contracts, Resource aMW
Owned Generation, Resource aMW

Under Rapid Electrification without new conservation, City Light's right to BPA supply increases to maximum available by 2027

By 2035 surpluses under median hydro conditions are just about gone.

# Resource Choices

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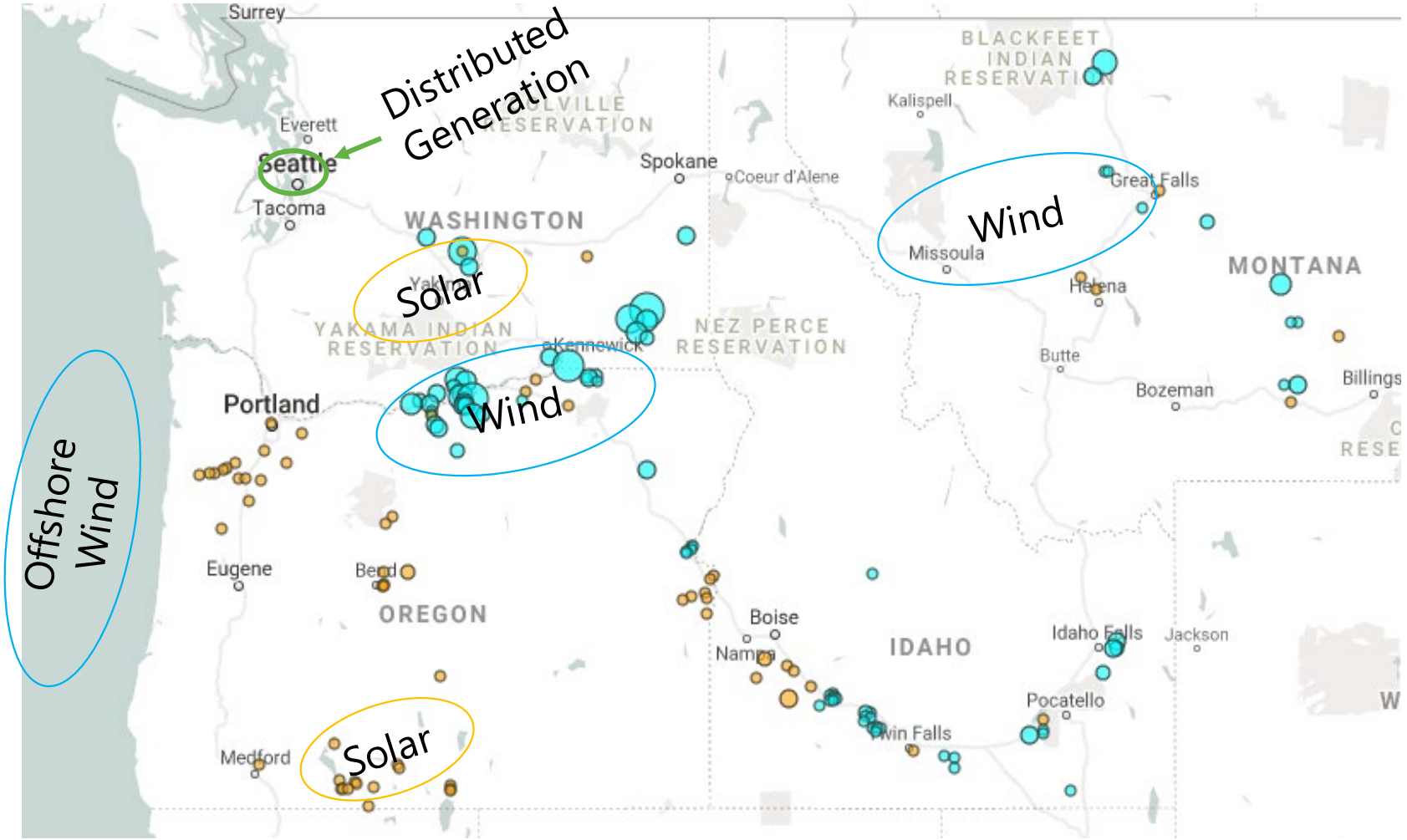
# 2022 Resource Choices

- 3 wind locations
- 2 solar locations
- 2 solar locations + battery
- Seattle behind the meter solar (BTM solar) and with battery
- 4 Demand Response Options
- 2022 CPA Energy Efficiency supply curve (616 Residential, Commercial, and Industrial program combinations)
- RECs can be used until 2025

# Resource Choices



# Wind and Solar- Baseline Transmission Inputs

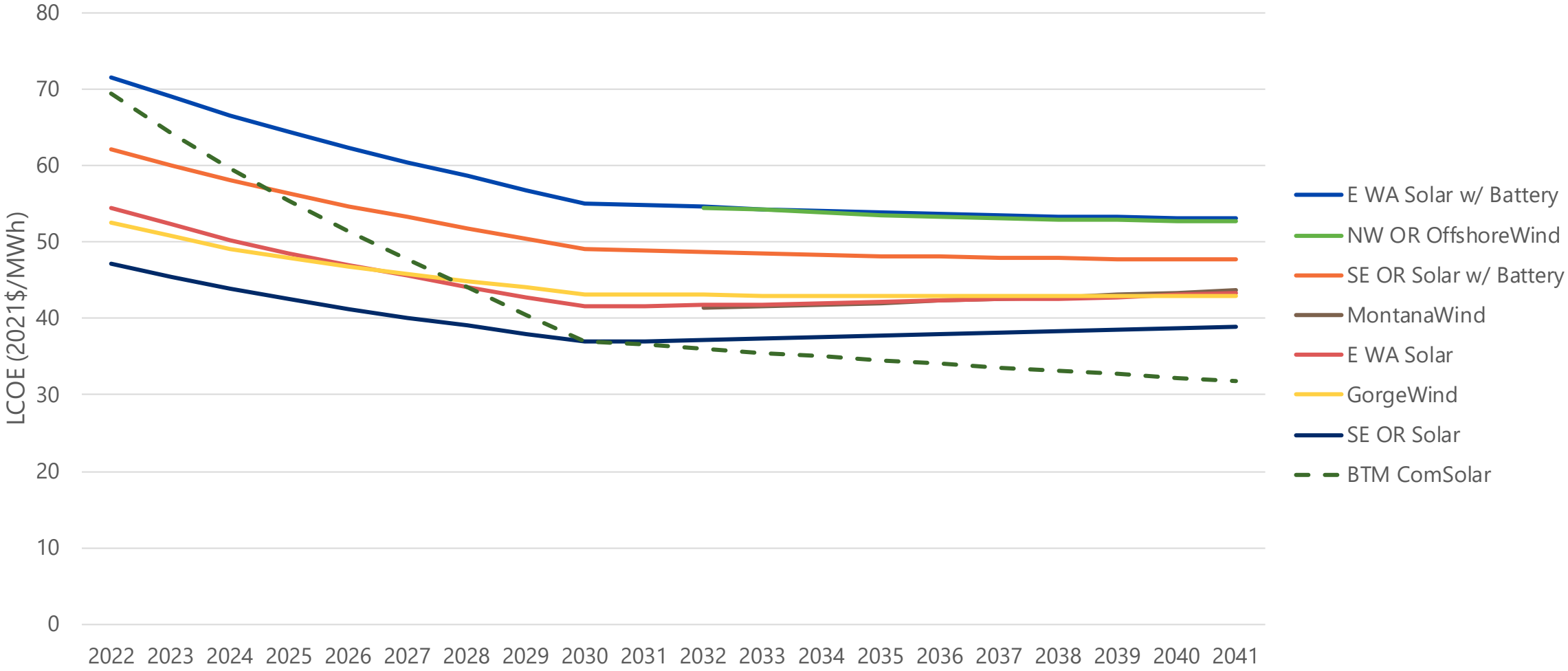
## Capacity

- Gorge Wind 250MW max
- E WA Solar 350MW max
- SE OR Solar 100MW max
- Western MT Wind 0MW max until 2032
  - In 2032 200MW max

## Costs

- BPA Long Term Firm Point to Point rate of $20,600 (nominal $/MW – yr) (escalates nominally 4% each year)
- BPA Ancillary Services rate of nominal $2 per MWh (escalates nominally 3% each year)
- BPA System Control & Dispatch rate of $4,000 (nominal $/MW – yr) (escalates nominally 4% each year)

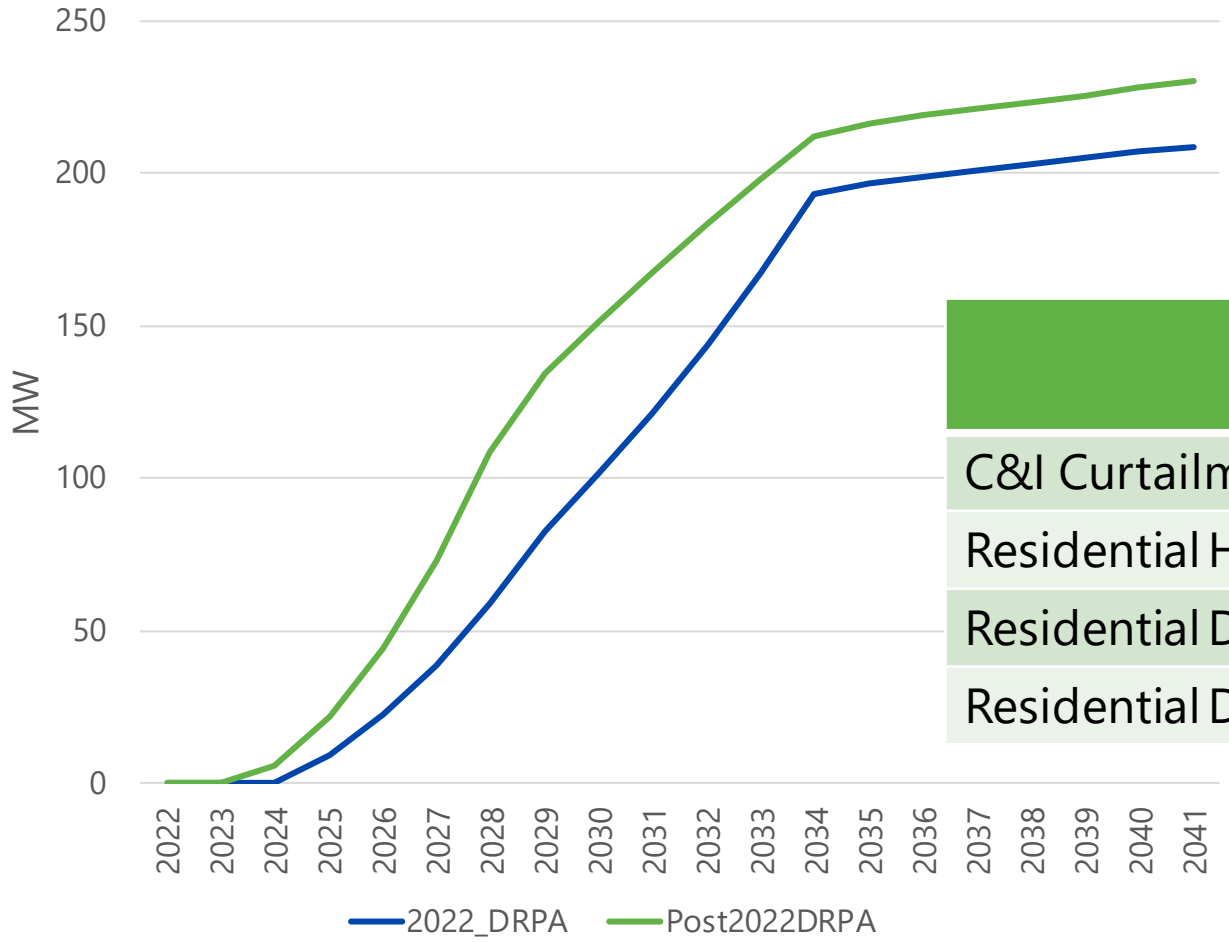
# Resource Choices
# Delivered Levelized Cost of Energy (LCOE)



# Demand Response Choice Updates

| Resource | Levelized Cost ($2022/kW-year) | 2026 MW | 2040 MW |
|---|---|---|---|
| C&I Curtailment | 25 | 7 | 20 |
| Residential HVAC BYOT | 7 | 9 | 63 |
| Residential DLC Water Heat (ER) | 26 | 26 | 134 |
| Residential DLC Water Heat (HP) | 96 | 2 | 10 |

# Demand Response Updates Since Potential Assessments




| Resource | Levelized Cost Change |
|---|---|
| C&I Curtailment | 0 % |
| Residential HVAC BYOT | -66% |
| Residential DLC Water Heat (ER) | -20% |
| Residential DLC Water Heat (HP) | -64% |

# Portfolio Strategies

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# IRP Framework

Goal: Identify using optimization methods the lowest cost combination of demand and supply resources for the next twenty years to meet resource needs

Demand Side Resources + **ΔBPA contract**

Supply Side Resources (Includes delivery costs and constraints)

New Portfolio Investment Choices

City Light's Supply Portfolio and Demand

- Δ Energy position

Regulatory Constraints

- Energy Independence Act (I-937)
- Resource Adequacy
- SCL Greenhouse Gas Neutrality
- Clean Energy Transformation Act

Minimize Portfolio Cost

# Testing Portfolio Strategies in Each Scenario

- Used to assess a variety of conditions and portfolio impacts
- Metrics to compare across portfolio strategies:
  - Net Present Value (NPV) of Portfolio Costs
    - Sum up societal cost of greenhouse gas emissions, new supply resources, BPA, energy efficiency, & wholesale revenue
  - Greenhouse Gas Emissions
    - Measured in metric tons of carbon dioxide equivalent (MTCO2e)

# 2022 IRP Portfolio Strategies Matrix

## Integrated Resource Plan

| | | |
|---|---|---|
| Lowest Cost Portfolio | Transmission Availability | Resource Adequacy Risk Reduction |
| 100% Clean by 2030 | Balanced Resource Portfolio | Maximize Energy Efficiency and Demand Response Programs |
| Higher Market Reliance | Maximize Customer Owned Resources | Other Strategies |

# Lowest Cost Portfolio

- Transmission baseline inputs
- CETA 2045 Greenhouse Gas Free
- I937 compliance using both declining load and 15% compliance options
- Lowest cost resource choices combined by portfolio model (optimization)
- Resource adequacy standard: Loss of Load Event metric: 2 events every 10 years in months January, July, August and December

Lowest Cost Portfolio

# 100% Clean by 2030

- All SCL's energy is greenhouse gas free on a net monthly basis by 2030 under median hydro conditions

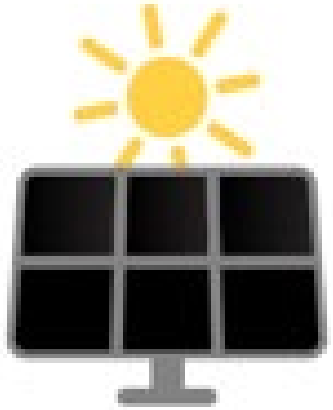
# Balanced Resource Portfolio

- Balanced Supply and Demand Resources
  - Diversify renewables' locations & transmission routes
  - Balance wired vs non-wired resources
  - Include battery storage

# Maximize Energy Efficiency and Demand Response Programs

- Evaluate all combinations of Energy Efficiency and Demand Response that are greater than the 2022 CPA
- Higher Energy Efficiency for Industrial, Commercial, and Residential Programs (above the CPA Baseline)
- All Demand Response Programs Available

Maximize Energy Efficiency and Demand Response Programs



# Maximize Customer Owned Resources

- Portfolio includes
  - Seattle Behind the Meter Solar (with battery option)
  - Demand Response Residential Programs
  - High Energy Efficiency Programs

Maximize Customer Owned Resources

# Resource Adequacy Risk Reduction

- Increased investments in supply and demand resources
- Choose to meet a higher level of resource adequacy: reduce the number of events by ½.

# Higher Market Reliance Strategy

- Fewer investments in supply and demand resources
- Less stringent resource adequacy metric (Loss of Load Event metric of 3 events every 10 years in the 4 months)

Higher Market Reliance

# Transmission Availability

- This strategy has almost ***no*** transmission constraints on supply side resources
  - Montana wind and NW OR offshore wind not available before 2032

# Recap: Possible Future Resource Mix Matrix

## Integrated Resource Plan

| | | |
|---|---|---|
| Lowest Cost Portfolio | Transmission Availability | Resource Adequacy Risk Reduction |
| 100% Clean by 2030 | Balanced Resource Portfolio | Maximize Energy Efficiency and Demand Response Programs |
| Higher Market Reliance | Maximize Customer Owned Resources | Other Strategies |

# IRP Team Next Steps

- Create and review portfolio strategy results in baseline scenario and electrification scenario
  - Review progress at subject specific technical advisory group meeting
  - Identify a suite of top portfolios based on input and perform risk assessment
  - Pinpoint areas where we are going to need more precision to help create our energy future
- No later than a week from now schedule subject specific advisory group meetings
- Layout key information to help us establish action plans

# Subject Specific Advisory Group Activities

## Volunteer roles ☆

| Activity | Volunteer(s) |
| --- | --- |
| Technical consultation: review, document review and action planning | Paul Munz, Yuri Rodrigues |
| Community Engagement Planning (underserved community prioritization), community connections and Support | Mike Ruby, Steve Gelb, Joanne Ho |
| Overall IRP Themes, Messages and Action Planning | Steve Gelb, Joanne Ho |
| IRP Advisory Group Letter to City Council | |

# THANK YOU

Seattle City Light