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Building the 2022 IRP: Agenda

- Welcome
- Meeting Tasks
- Review IRP Portfolio Results
- Identify Preferred Portfolio Features
- Discuss Outreach and IRP Action Plans
- Next steps



What we need to accomplish

Today:

- Collect advisory group input, feedback and questions
- Review Top Baseline Portfolio Scoring
- Review Top Rapid Electrification Scoring
- Identify common features of robust portfolio
- Discuss 2- and 10-year Clean Energy Action Plans

For IRP completion:

- Complete Portfolio Risk and Rate Analysis
- IRP City Council Draft (April 1 Review)
- Schedule additional small group review meetings
- Conduct Consultant RFP for IRP equitable outreach and engagement strategy
- Finalize 2-year and 10-year clean energy action plans

Process to create the IRP Action Plan

Translate results into actions related to:

- Advance Equitable outcomes for Highly Impacted Communities and Vulnerable Populations
- Enable Climate Change Resilience and Mitigation
- Identify areas to partner with customers, policy makers and interest groups to enable successful electrification policy development
- Prepare customers for more complex choices and the capacity to work through difficult issues



Review

- Previous IRPs: economic load growth scenarios and limited load shape changes
- New and Bold 2022 IRP Scenarios:
 - Climate Change
 - Rapid Electrification Load

- Decision
 - 2020 Load Forecast as Baseline
 - Rapid Electrification as a high book-end scenario



2022 IRP Portfolio Strategies Matrix

Integrated Resource Plan



Wind and Solar- Baseline Transmission Constraints

Total Build Capacity limits

- Gorge Wind 250MW max
- E WA Solar 350MW max
- SE OR Solar 100MW max
- Western MT Wind & Offshore Wind available in 2032



Summary of Portfolios & Scenarios

Scenario	NPVs	Wind Supply Resources (MW)	Solar Supply Resources (MW)	EE Resources (aMW)	DR Programs
Baseline	\$3-\$4 billion	75-300*	175-325	116-135	0-4
Rapid Market Electrification	\$6 – \$7 billion	950-1325	100	139-150	1-4

*Excludes outlier

Baseline Portfolios



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Baseline Load Highlights

- Portfolio's capacity/demand expansion are mainly driven by August Resource Adequacy & 15% of load I937 Compliance
- I937 compliance limits the value of Solar Supply Resources and Demand Response Programs
- Montana wind is chosen in the 2030s solely for I937 Compliance
- All portfolios contain slightly more commercial EE savings
- CETA's compliance can be achieved by current Resource Adequacy Strategy under median hydro condition
- Portfolios fall short under climate change futures

2022 IRP Base Load Portfolios

Portfolio	NPV (\$2021 B)	Wind (MW)	Solar (MW)	EE (aMW)	DR (MW)	Added BTM Solar (MW)	Strategy
P3	\$2.9	75	325	122	52	0	Transmission Availability*
P13	\$2.9	325	150	116	0	0	Higher Market Reliance
P2	\$3.0	100	325	116	0	0	Lowest Cost Portfolio*
P9	\$3.0	300	175	128	0	52	Other: More Customer BTM only
P5	\$3.0	225	300	116	0	0	Transmission Availability
P1	\$3.0	275	225	116	0	0	Lowest Cost Portfolio
P10	\$3.1	300	175	123	8	52	Max Customer Owned Resources**
P6	\$3.1	300	200	116	122	0	Balanced
P7	\$3.1	300	200	116	141	0	Max DR & Energy Efficiency
P11	\$3.1	300	200	116	122	52	Balanced Portfolio/ Max Customer Owned Resources**
P12	\$3.7	900	325	116	0	0	2030 Clean/Less Market Reliance

*1937 off

**City Light buys RECs from the customers BTM Solar

2022 IRP Base Load Portfolio Strategies Results

Portfolio	NPV (\$2021 B)	Wind (MW)	Solar (MW)	EE (aMW)	DR (MW)	Added BTM Solar (MW)	Strategy
P3*	\$2.9	75	325	122	52	0	Transmission Availability
P13	\$2.9	325	150	116	0	0	Other: No resource additions before 2029
P2*	\$3.0	100	325	116	0	0	Lowest Cost Portfolio
P1	\$3.0	275	225	116	0	0	Lowest Cost Portfolio
P6	\$3.1	300	200	116	122	0	Balanced Portfolio
P7	\$3.1	300	200	116	141	0	Max Demand Response & Energy Efficiency
P11**	\$3.1	300	200	116	122	52	Balanced Portfolio/ Max Customer Owned Resources
P12	\$3.7	900	325	116	0	0	2030 Clean/Less Market Reliance

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Testing Portfolio Strategies in Each Scenario

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)
- Performance in climate change scenarios
 - Resource adequacy metrics
- Supply & Demand Balance
 - Ratio of total supply side resources to total demand-side resources in portfolio
- Customer Program Choices

2022 IRP Base Load Portfolio Strategies Results

Portfolio	NPV (\$2021 B)	20 Year MTCO2e Sum (Median Hydro)	Balanced Metric***	Strategy
P3*	<i>\$2.9</i>	1,538,415	0.9	Transmission Availability
P13	\$2.9	1,700,139	0.6	Other: No resource additions before 2029
P2*	\$3.0	1,471,237	0.9	Lowest Cost Portfolio
P1	\$3.0	1,407,959	0.6	Lowest Cost Portfolio
P6	\$3.1	1,447,274	0.7	Balanced Portfolio
P7	\$3.1	1,445,310	0.7	Max Demand Response & Energy Efficiency
P11**	\$3.1	1,416,255	0.7	Balanced Portfolio/ Max Customer Owned Resources
P12	\$3.7	1,193,913	0.2	2030 Clean/ Less Market Reliance

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***Balanced metric of 1 is best score (represents perfect balance of added supply & demand resources)

2022 IRP Base Load Top Portfolios

Note: a score of 1 is the best score

Portfolio	Portfolio NPV (Billions \$)	CanESM RA Metric	CCSM RA Metric	SCL MTCO2e (net hourly)	Supply Demand Balance	Customer Program Score	Average
P11	0.8	0.5	0.5	0.4	0.7	1.0	0.64
P7	0.8	0.4	0.4	0.3	0.7	0.8	0.55
P3	1.0	0.4	0.4	0.1	1.0	0.3	0.52
P2	0.9	0.4	0.4	0.2	0.9	0.0	0.46
P6	0.8	0.5	0.5	0.3	0.6	0.0	0.45
P1	0.9	0.4	0.4	0.4	0.6	0.0	0.45
P13	1	0.4	0.4	0	0.6	0	0.40
P12	0.0	0.4	0.4	1.0	0.2	0.0	0.35

Portfolio	NPV (\$2021 B)	Wind (MW)	Solar (MW)	EE (aMW)	DR (MW)	Added BTM Solar (MW)	Strategy
P3*	<i>\$2.9</i>	75	325	122	52	0	Transmission Availability
P1	\$3.0	275	225	116	0	0	Lowest Cost Baseline Portfolio
P7	\$3.1	300	200	116	141	0	Max Demand Response & Energy Efficiency
P11**	\$3.1	300	200	116	122	52	Balanced Portfolio/ Max Customer Owned Resources

*1937 off

**City Light buys RECs from the customers BTM Solar

P11: Balanced and Customer Owned Base Load Portfolio



P7: Max Demand Response Programs Base Load Scenario



P3: Transmission Available & 1937 Off **Base Load Scenario**



Rank #3: \$2.9 NPV

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P1: Lowest Cost Baseline Base Load Portfolio



Rank #6: \$3.0 NPV

Rapid Market Electrification Portfolios



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2022 IRP Electrification Load Portfolios

- Follows the Seattle Climate Action Plan for a greenhouse gas free city by 2050
- Is an aggressive plan, probably not realistic at this pace
- Assumes a hopeful timeline for transmission builds to support electrification/decarbonization policy
- Serves as a good 'book end' for analysis
- Learned what attributes are important that can help with electrification in near future

2022 IRP Rapid Electrification Load Portfolio Strategies Results

Portfolio	NPV (\$2021 B)	20-year MTCO2e Sum (Median Hydro)	Wind (MW)	Solar (MW)	EE (aMW)	DR (MW)	Strategy
P22	NO SOLU	JTION					Other Lowest Cost: Transmission Constraints from Base Load
P21	\$6.3	2,173,048	1100	250	144	70	Other: Winter High Market Reliance until 2032
P14	\$6.7	2,714,720	1375	100	150	52	Lowest Cost: Transmission Availability
P18	\$6.7	2,778,325	1350	100	150	141	Max Demand Response & EE
P16	\$6.7	2,231,936	1300	225	150	122	Other: Base Load P1 Resources forced in
P17	\$6.7	2,236,200	1300	225	150	122	Other: Base Load P1 Solar Resource Forced In

P14: Lowest Cost with Transmission Available Assumption Electrification Load Scenario



Rapid Market Electrification Load Highlights Aggressive Scenario to meet Seattle Climate Action Plan

- High priority planning and outreach efforts needed to expand the BPA, regional and local grid to support a clean energy transformation
- Portfolio cost doubled for all Electrification portfolios compared to the Baseline Load
 - does not estimate impact of potential offsetting new revenue or other customer only costs
- Portfolios favor resources that can meet the Winter Resource Adequacy need
- Solar resources fall short in meeting high winter loads and needs
- Seattle needs its maximum BPA entitlement for reliability and meeting clean energy requirements as early as 2030
- DR is attractive and we need more conservation
 - Winter programs important for electrification

Portfolio Results and Preferred Portfolio Features Discussion



IRP Equitable Outreach and Action Plans Discussion





Topics for 2-way customer and community discussions

- Discuss climate change facts and customer impacts, choices for mitigation and resilience
- Consider and discuss clean energy and distribution and transmission expansion system issues and impacts
- Understand expectations of City Light
- Discuss emerging technology, its uses, customer participation opportunities and current utility perspectives/limitations for incentivizing change
- Other

(NOTE: SMALL ADVISORY GROUP DISCUSSED CITY LIGHT WIDE COMMUNICATION; RECOMMENDED FOCUS ON WHAT WE NEED TO DO AS A COMMUNITY TO CREATE OUR ENERGY FUTURE TO SUPPORT ELECTRIFICATION AND GRID DECARBONIZATION EQUITABLY)

Review and update 2020 IRP Action Plan Completed Actions

- Clean Energy Equity Plan
- ✓ IRP Climate Change Sensitivity
- ✓ IRP Rapid Electrification Scenario
- Clean Energy Survey with BIPOC, immigrant, refugee results identified
- Customer Renewable RFP and Tariff Rate Design

- ✓ 2022 Conservation Potential and Demand Response Assessment
- ✓ 2022-2026 Clean Energy Implementation targets
- Resource Adequacy metrics and targets used
- ✓ Social Cost of Carbon

Review document sent "2022 IRP proposed action plan additions and 2020 IRP action plan report card" for more information.

Draft New 2 and 10-year Clean Energy Actions Social Equity focused

- Engage with customers and interest groups in climate change action discussions with priority on social equity
- Review and refine equity metrics with community members
- Identify, advocate for and implement financial options that support socially equitable and transformative decarbonization targets
- Implement IRP Equitable Outreach & Engagement Strategy
- Target customer outreach and legislative processes to streamline equitable grid and clean energy resource expansion



EQUITABLE COMMUNITY CONNECTIONS



Draft New 2 and 10-year Clean Energy Actions Utility and Regional solutions

- Develop with other utilities electrification and climate change study process for robust collaboration
- Ensure CETA, I-937 and Climate Commitment Act are harmonized to keep energy transformation affordable
- Identify conflicting City directives with other Departments, Mayor and City Council to synchronize and make more efficient new Climate Change action
- Investigate other Winter energy solutions with BPA and regional partners to reduce cost

- Partner with customers, policy makers, governing bodies and interest groups to develop a transformational electrification and decarbonization pace
- Seek authority for demand response programming



Next steps: schedule more small group meetings

Volunteer roles $\,\,\dot{\,}\,\,\dot{\,}\,\,$

Activity \checkmark	Volunteer(s) \checkmark	Meeting date $^{\vee}$
Technical review and input	Paul Munz, Yuri Rodrigues	
Recommending IRP themes, messages	Paul Munz, Steve Gelb, Yuri Rodrigues, Joanne Ho	
Community Engagement Support/ envir	Mike Ruby, Steve Gelb, Joanne Ho	
IRP document drafting review	Paul Munz, Yuri Rodrigues	
Facilitate Community Group connections	Steve Gelb	
IRP Advisory Group Letter to City Council		

THANK YOU

