



Seattle City Light

2018 INTEGRATED RESOURCE PLAN

Stakeholder Meeting # 4

Seattle City Light | January 16, 2018

AGENDA

- Welcome
 - Safety moment, goals for the meeting
- Review
 - Assumptions, Portfolio, Metrics
- Metrics
 - 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

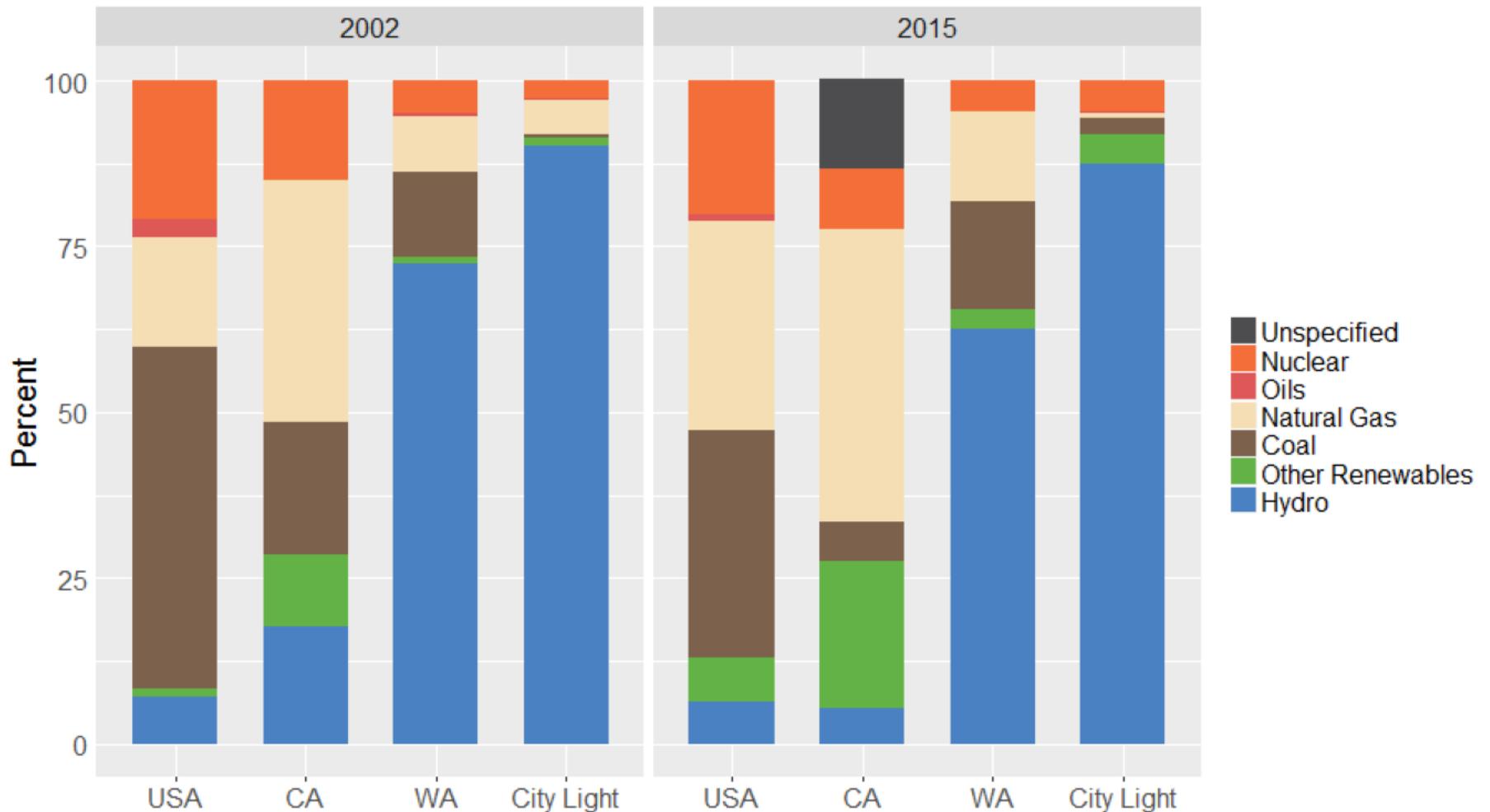
REVIEW NOVEMBER 2017 IRP STAKEHOLDER MEETING DISCUSSION TOPICS

- 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 meet its climate change goals

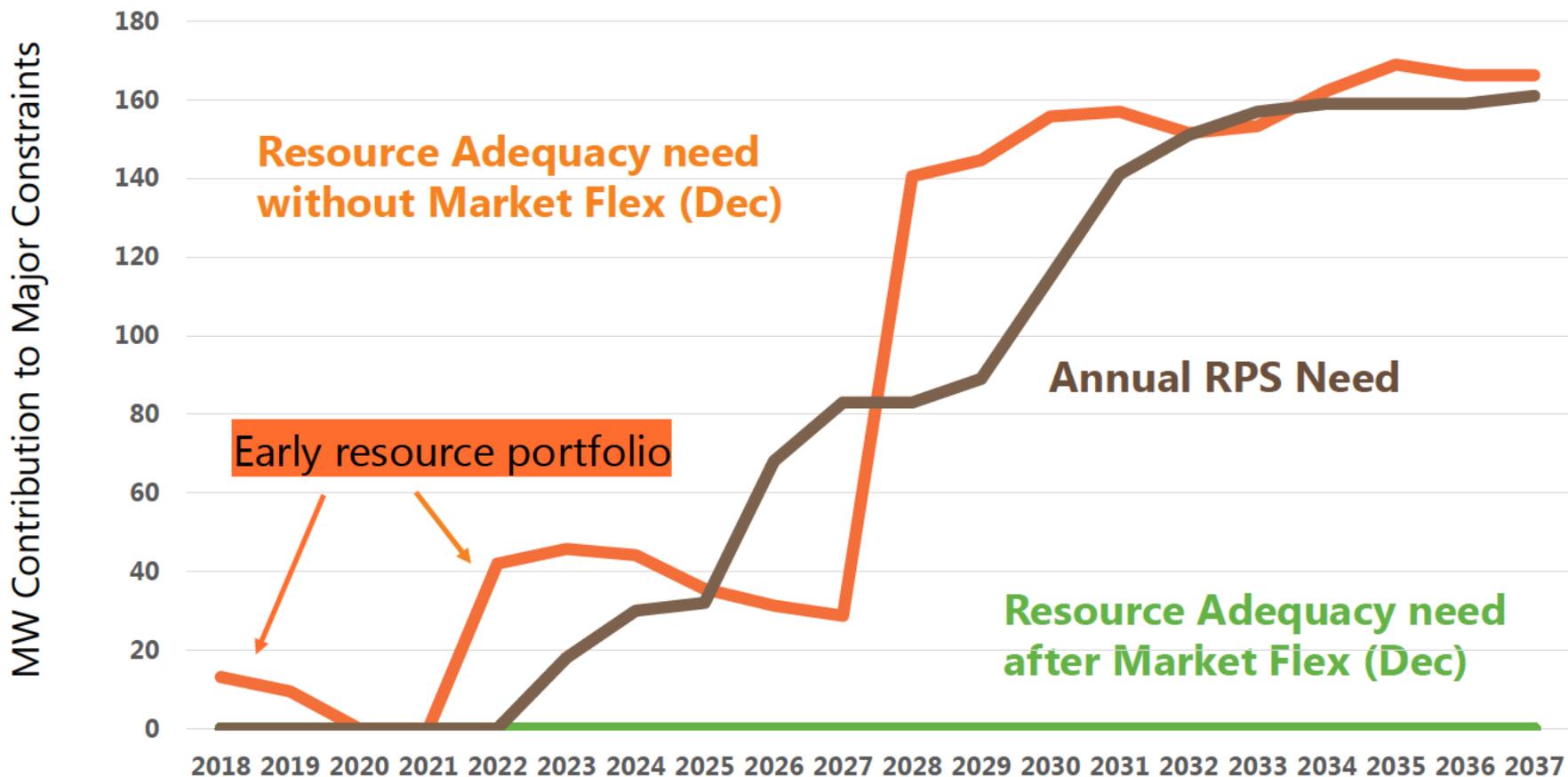
CHANGE IN ELECTRIC SECTOR FUEL MIX 2002 TO 2015



RESOURCE ADDITIONS TO MEET NEED WITH 70% BANKING

Note: Does not show BPA or Conservation additions		RECs	Early Renewables	Gas Plant	Renewables	Extreme Renewables
2023	RA NEED	0	46	0	0	0
	RPS NEED	18	18	18	18	18
	RENEWABLE ENERGY CERTIFICATES	97	0	85	0	61
	RPS RENEWABLE ENERGY	0	47	0	38	0
	NON-RPS ENERGY	0	0	0	0	0
2028	RA NEED	0	138	633	0	633
	RPS NEED	83	83	83	83	83
	RENEWABLE ENERGY CERTIFICATES	97	0	85	0	61
	RPS RENEWABLE ENERGY	0	138	0	89	567
	NON-RPS ENERGY	0	0	633	0	80
2032	RA NEED	0	148	643	0	643
	RPS NEED	151	151	151	151	151
	RENEWABLE ENERGY CERTIFICATES	151	0	130	0	61
	RPS RENEWABLE ENERGY	0	157	21	152	567
	NON-RPS ENERGY	0	0	633	0	80
2037	RA NEED	0	161	667	0	667
	RPS NEED	161	161	161	161	161
	RENEWABLE ENERGY CERTIFICATES	161	0	118	0	61
	RPS RENEWABLE ENERGY	0	165	44	161	567
	NON-RPS ENERGY	0	0	624	0	100

COMPARISON OF REMAINING REQUIREMENTS FOR RESOURCE ADDITIONS AFTER BPA AND CONSERVATION



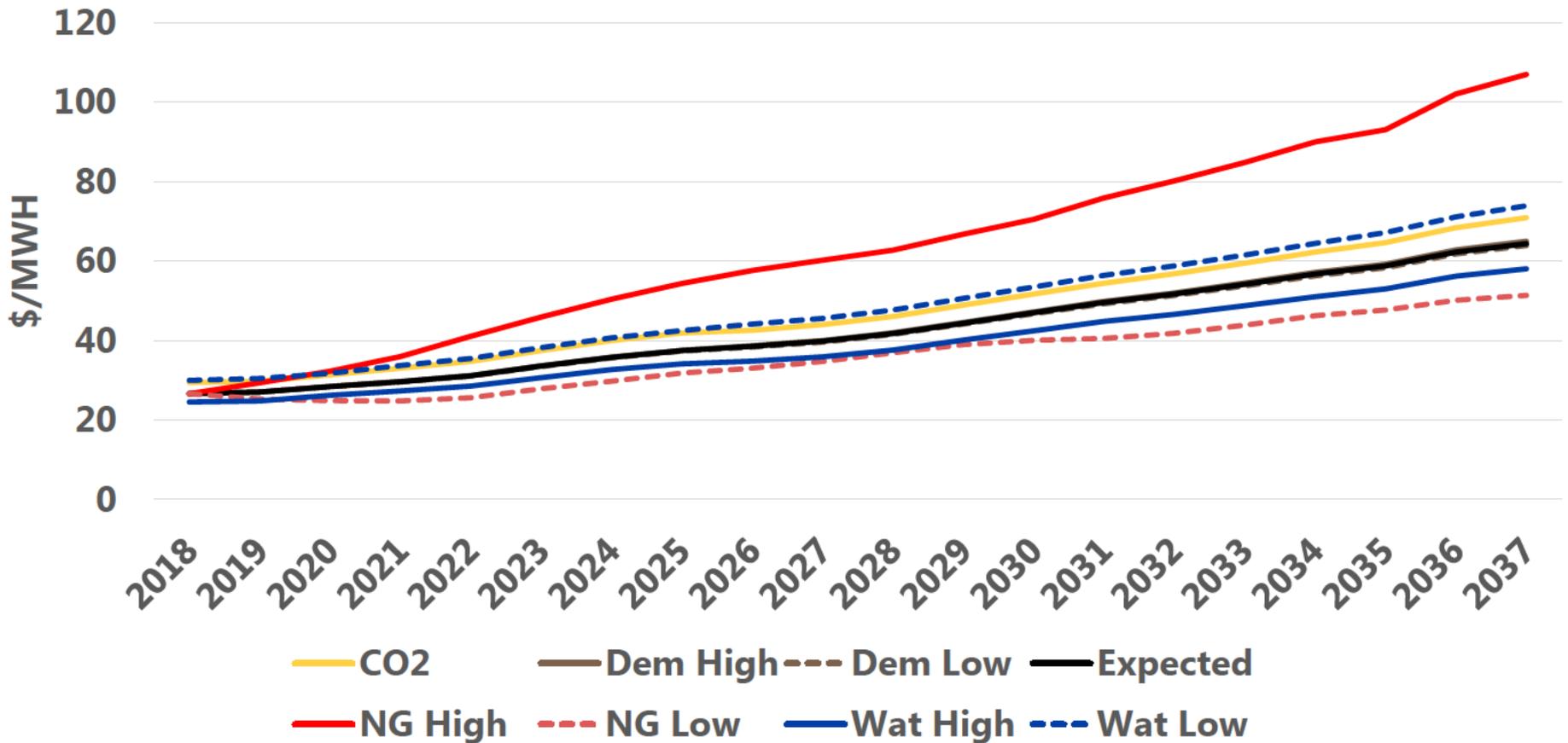
2018 IRP SCENARIOS

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

Name	Description
Expected	Expected conditions
High Demand	High SCL demand
Low Demand	Low SCL demand
High NG	High natural gas market prices
Low NG	Low natural gas market prices
High Water	Abundant water conditions
Low Water	Scarce water conditions
CO ₂ Market	CO ₂ Market Scenario

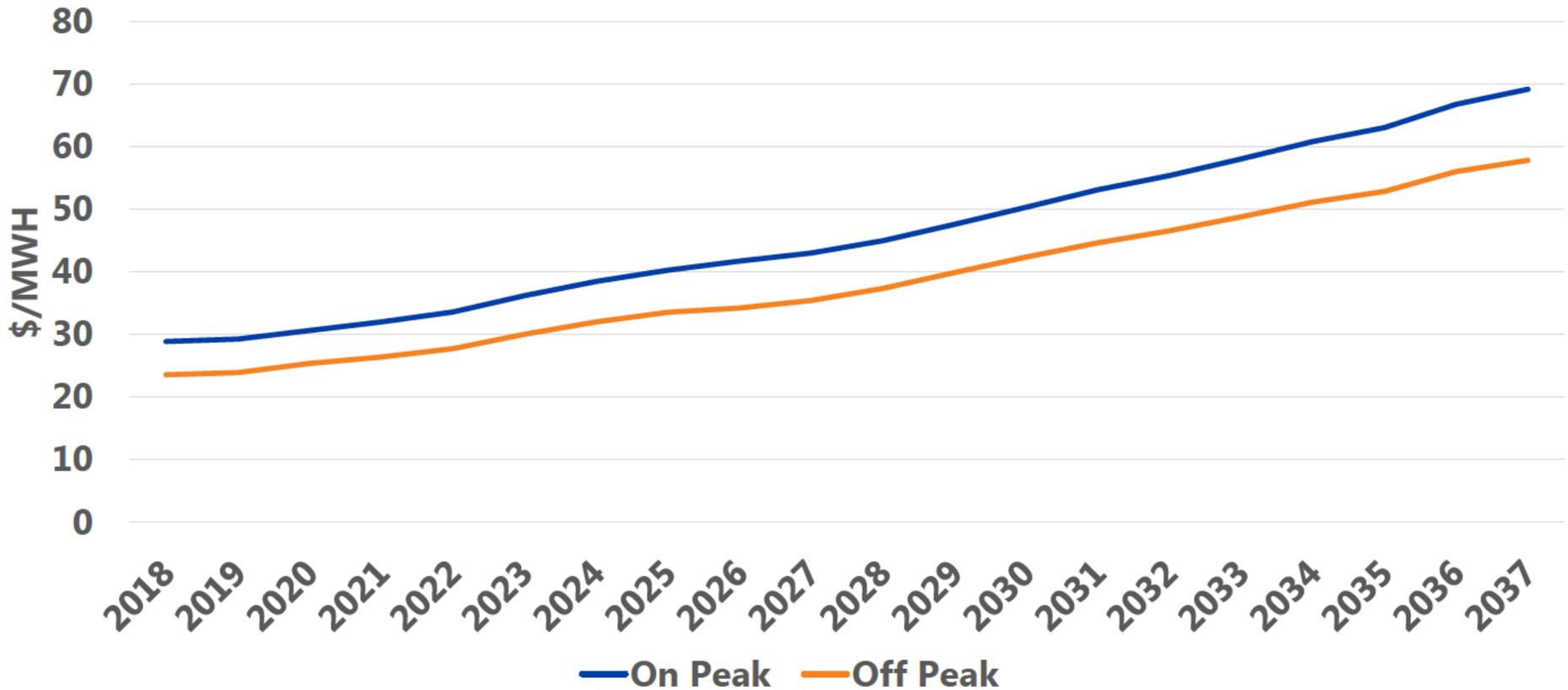
MID-COLUMBIA WHOLESAL PRICE FORECAST BY SCENARIO

MidC Wholesale Price by Scenario (nominal, annual flat)



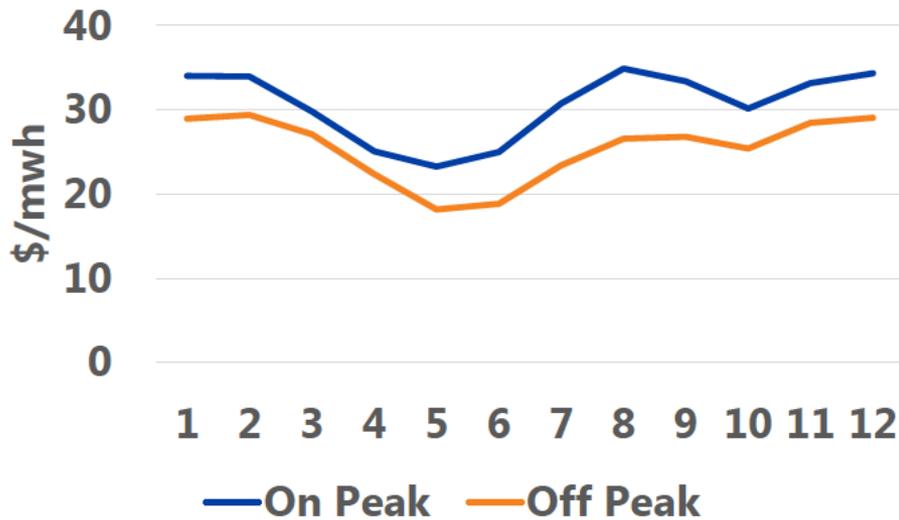
MID-COLUMBIA WHOLESAL PRICE - ON PEAK AND OFF PEAK IN EXPECTED SCENARIO

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

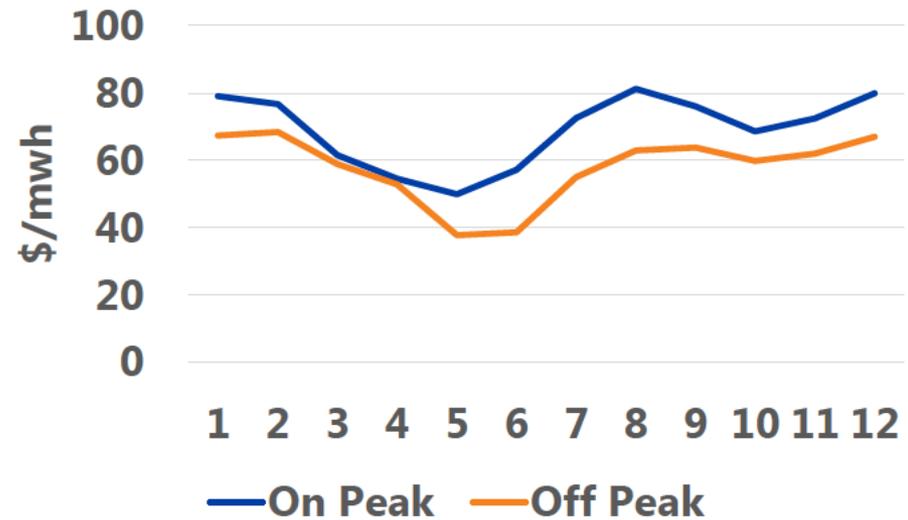


MID-COLUMBIA WHOLESALE PRICE - ON PEAK AND OFF PEAK IN EXPECTED SCENARIO BY MONTH

2020 Monthly Prices(nominal)

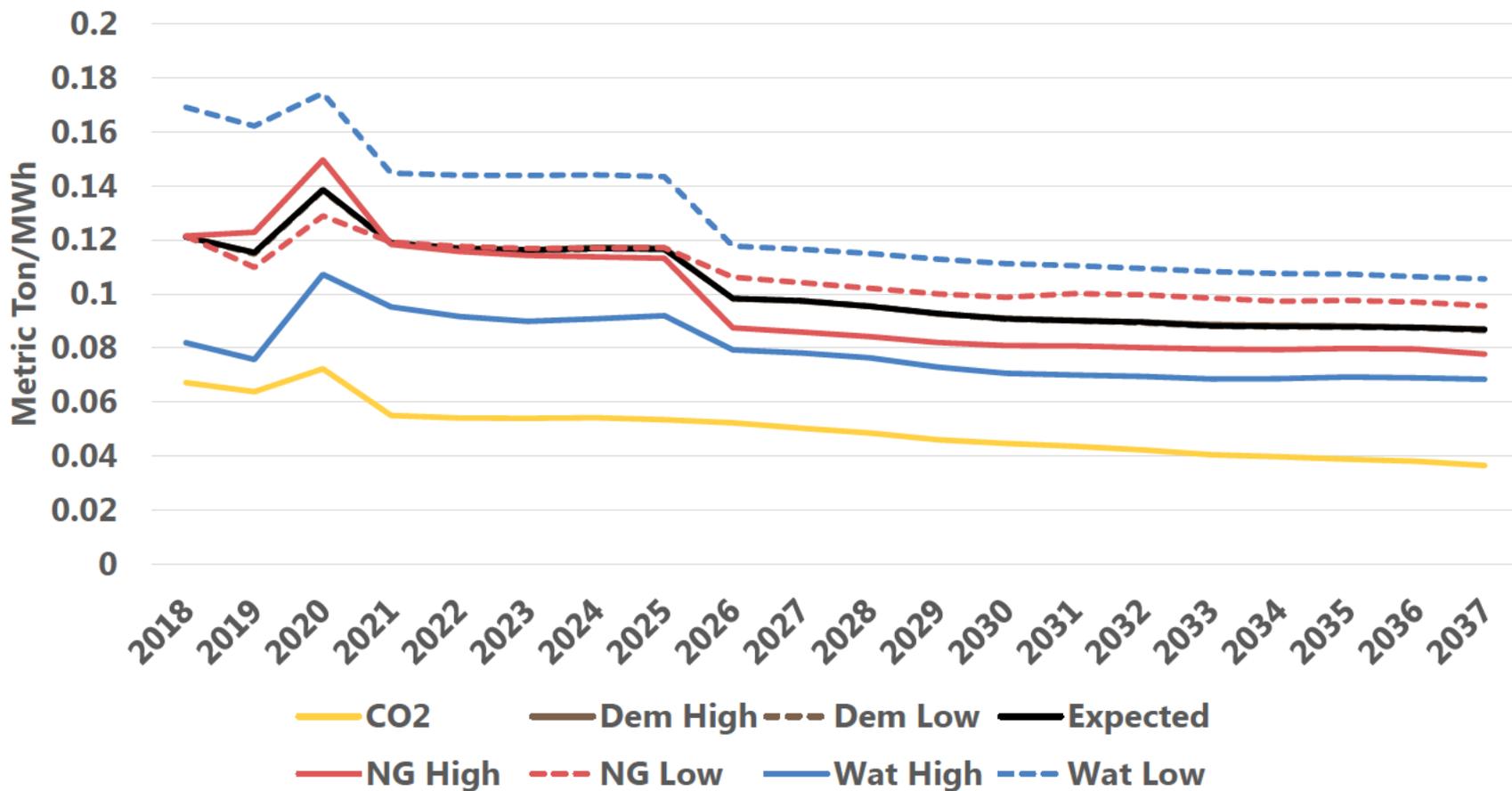


2037 Monthly Prices(nominal)



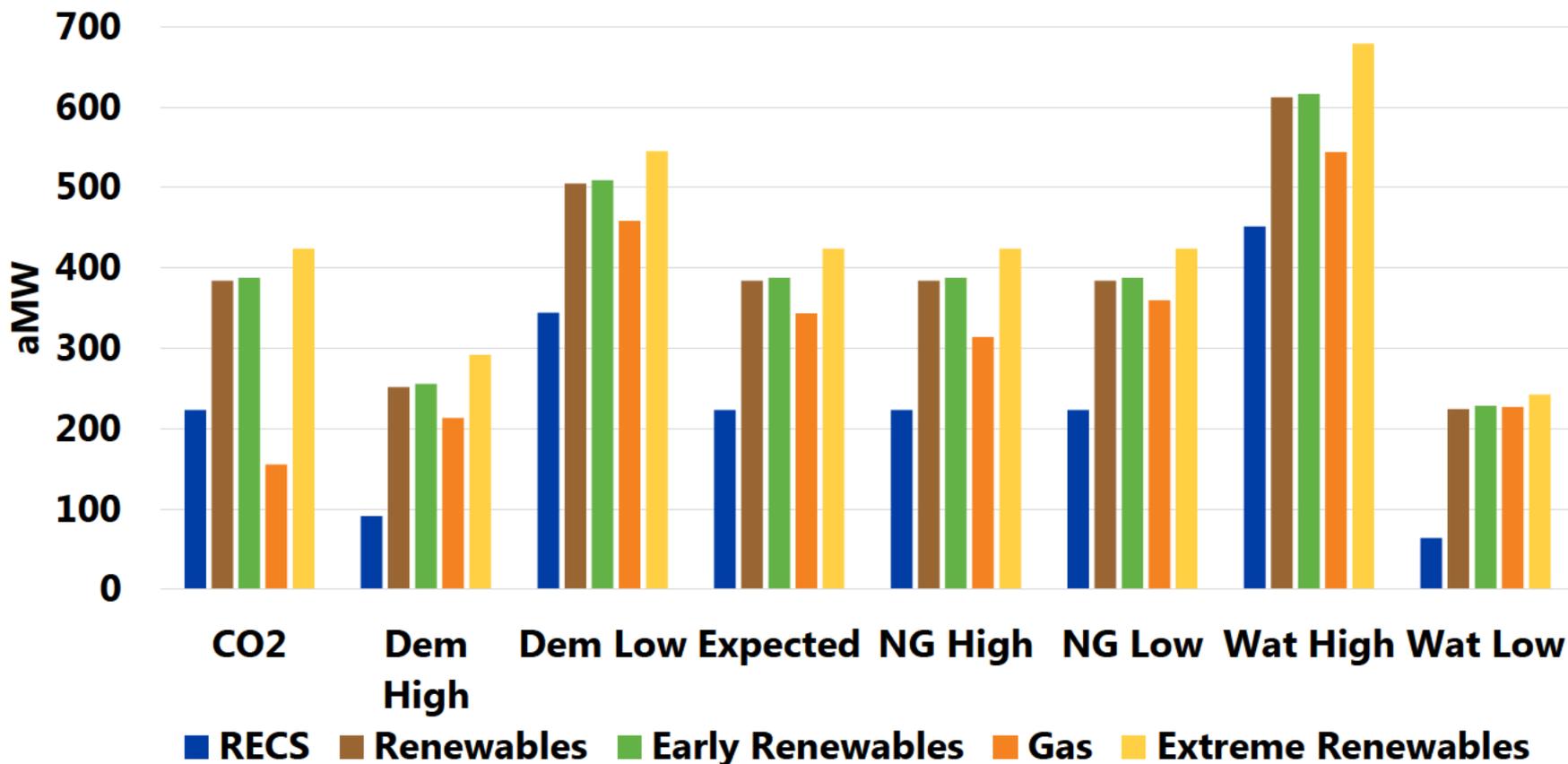
SCENARIO IMPACTS ON CO2 EMISSIONS IN PNW

Regional-Wide Emission Rates



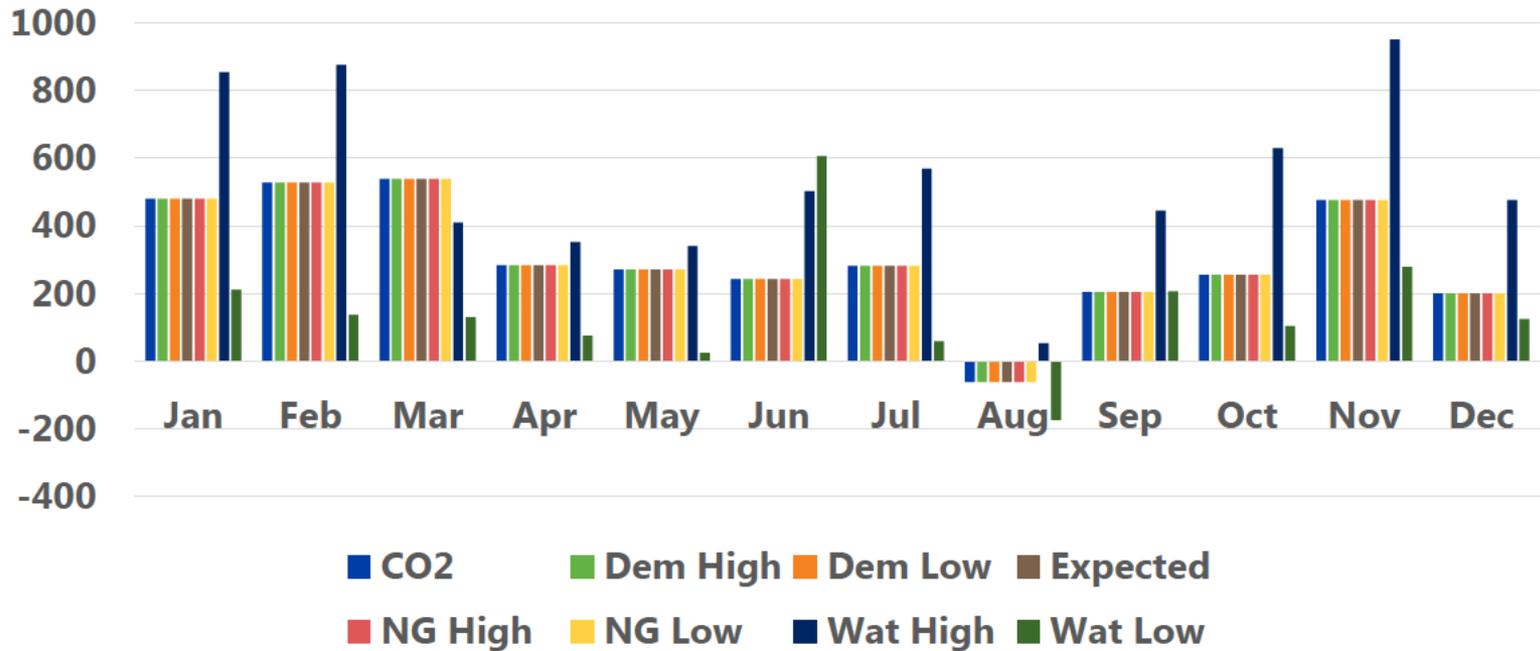
PORTFOLIO ANNUAL SURPLUS/DEFICIT IN 2037

Net Surplus(Market Sales - Market Purchases)



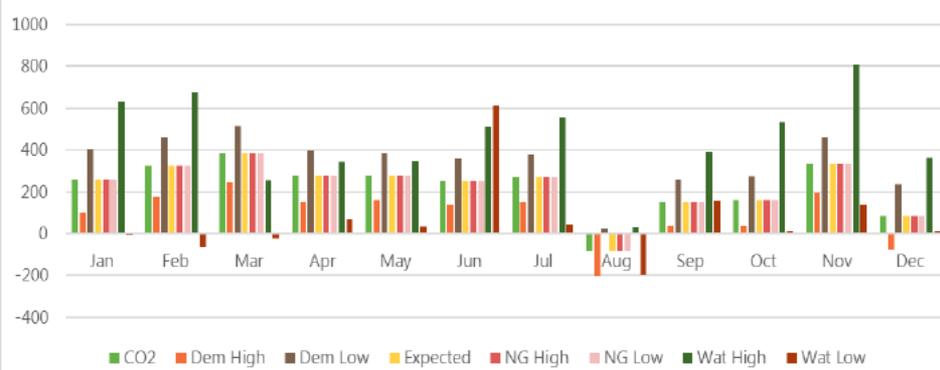
2018 MONTHLY SURPLUS/DEFICIT

2018 Monthly Net Surplus by Scenario

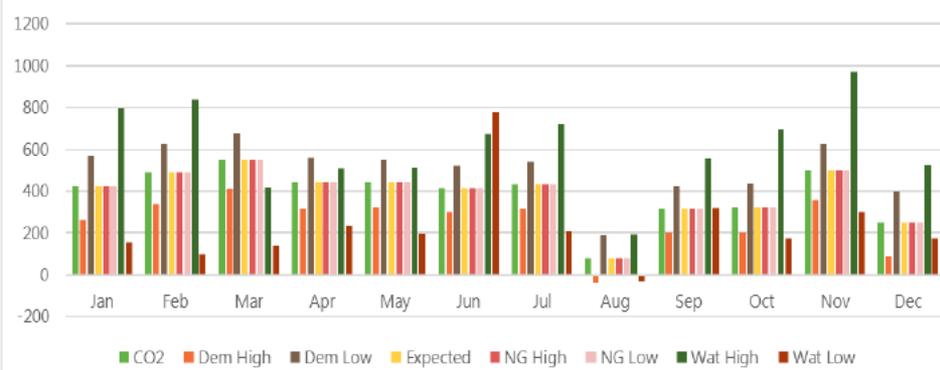


PORTFOLIO MONTHLY SURPLUS/DEFICIT IN 2037

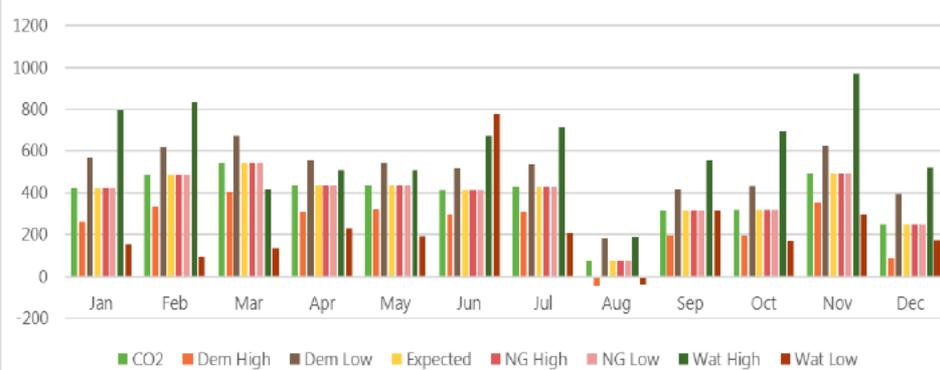
2037 Monthly Net Surplus(aMW) Portfolio = **RECS**



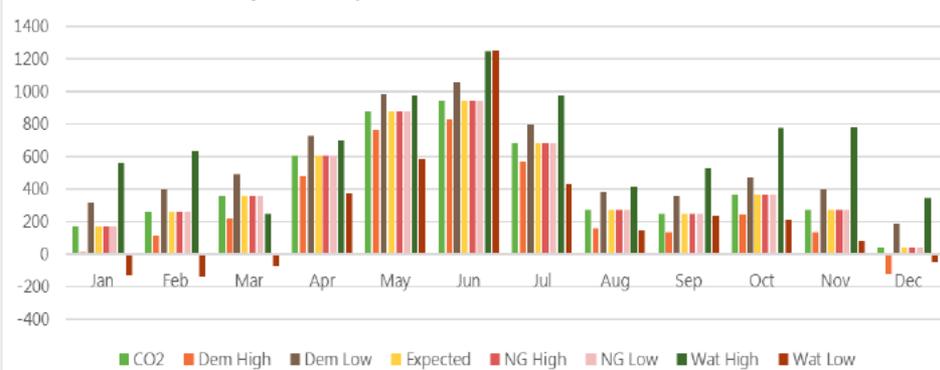
2037 Monthly Net Surplus(aMW) Portfolio = **Renewables**



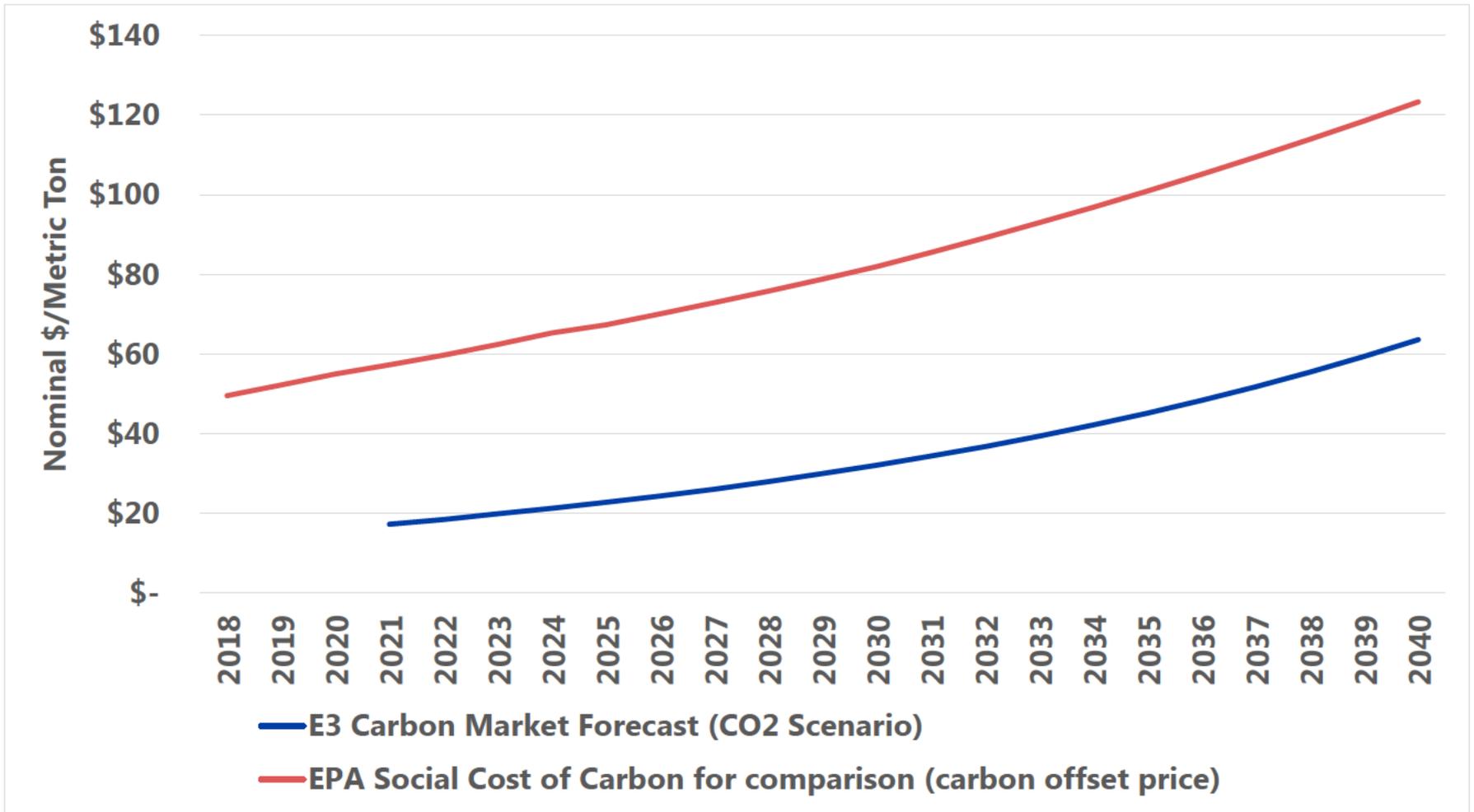
2037 Monthly Net Surplus(aMW) Portfolio = **Early Renewables**



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



PROJECTED CARBON EMISSION COSTS



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%

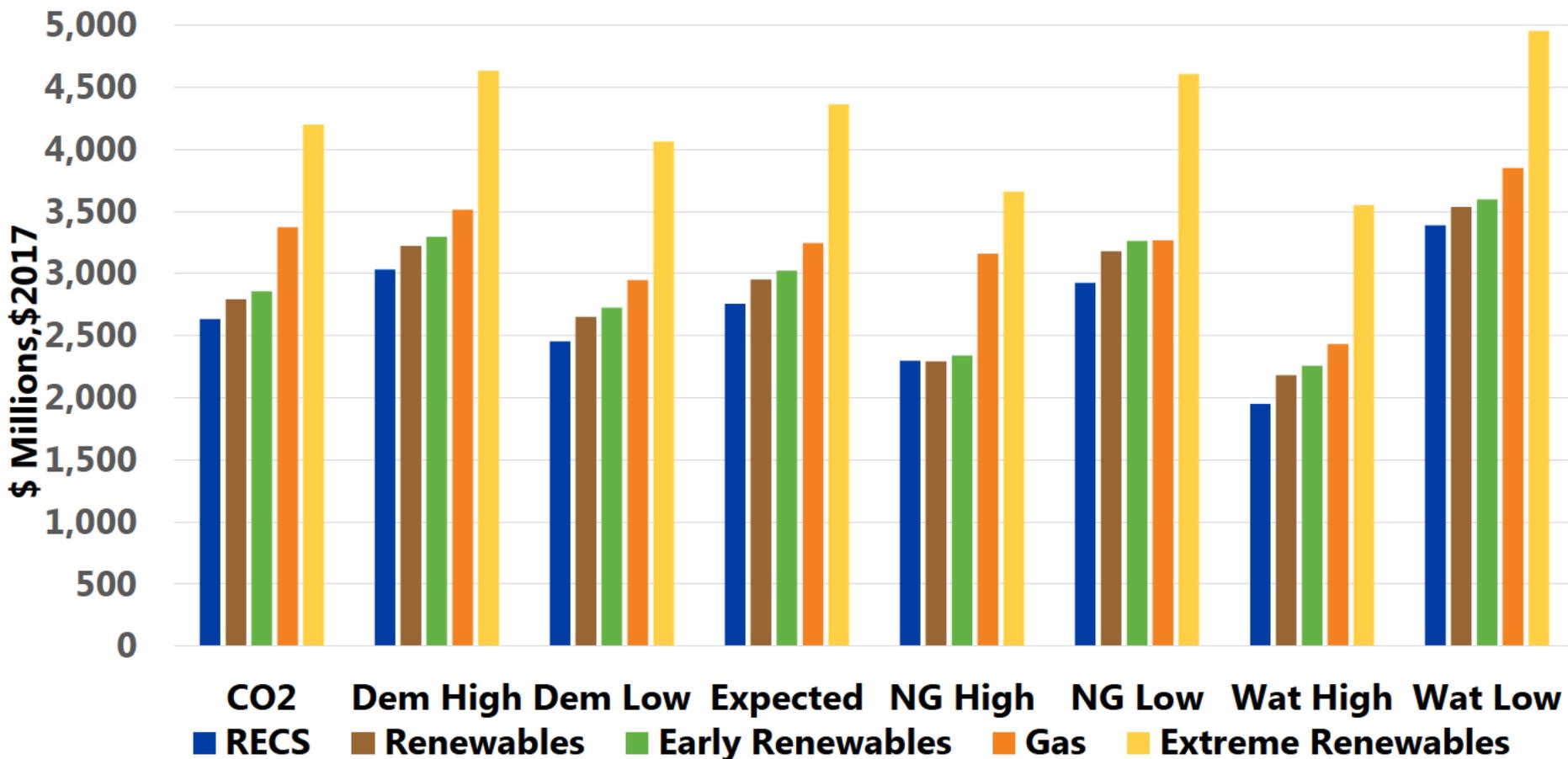
GROUP EXERCISE

- High level description of the slides (all)
- Small group review and discussion of the results
 - What do you conclude from the review of the results?
 - What questions do you have about the results?



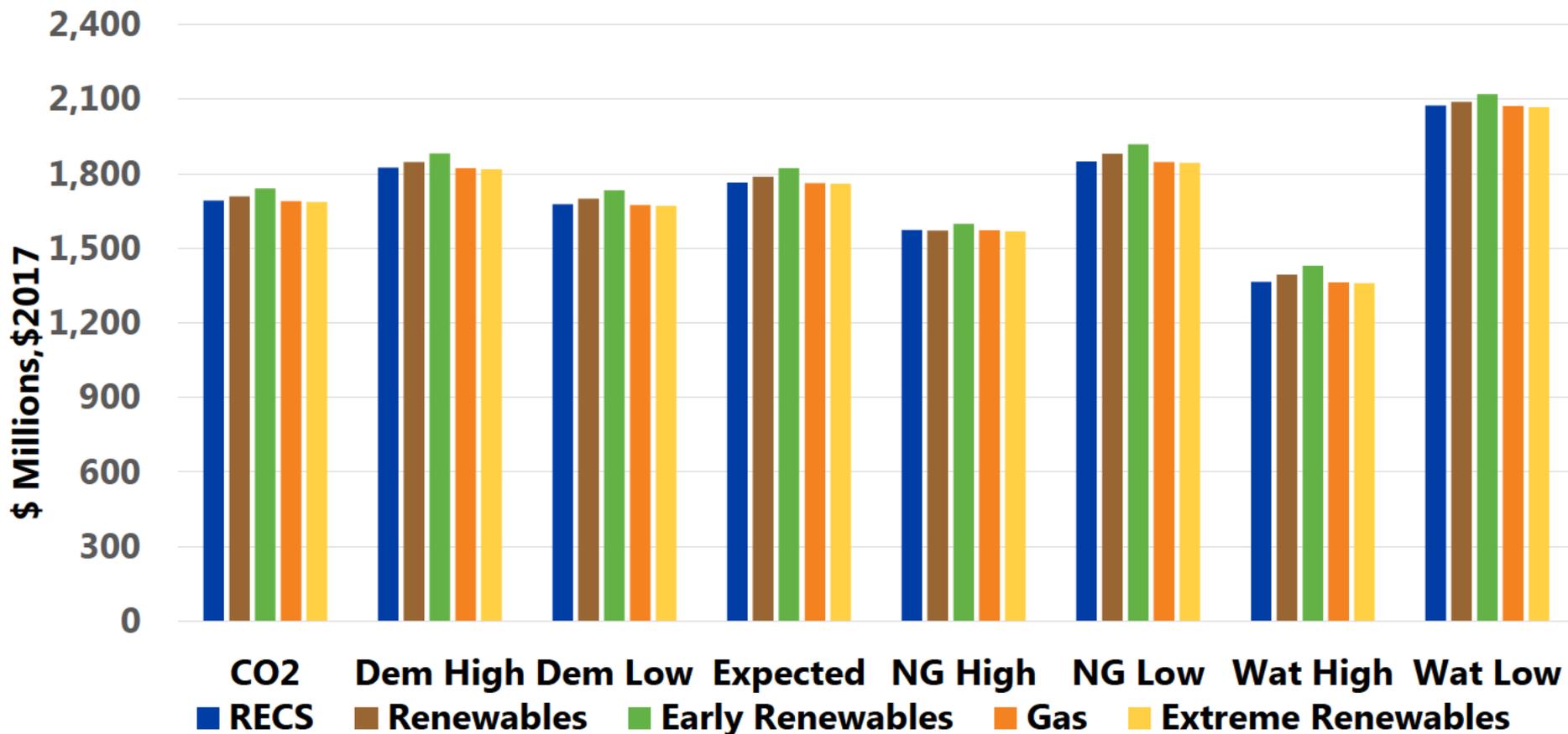
COMPARISON OF 20-YEAR NPV OF COSTS

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



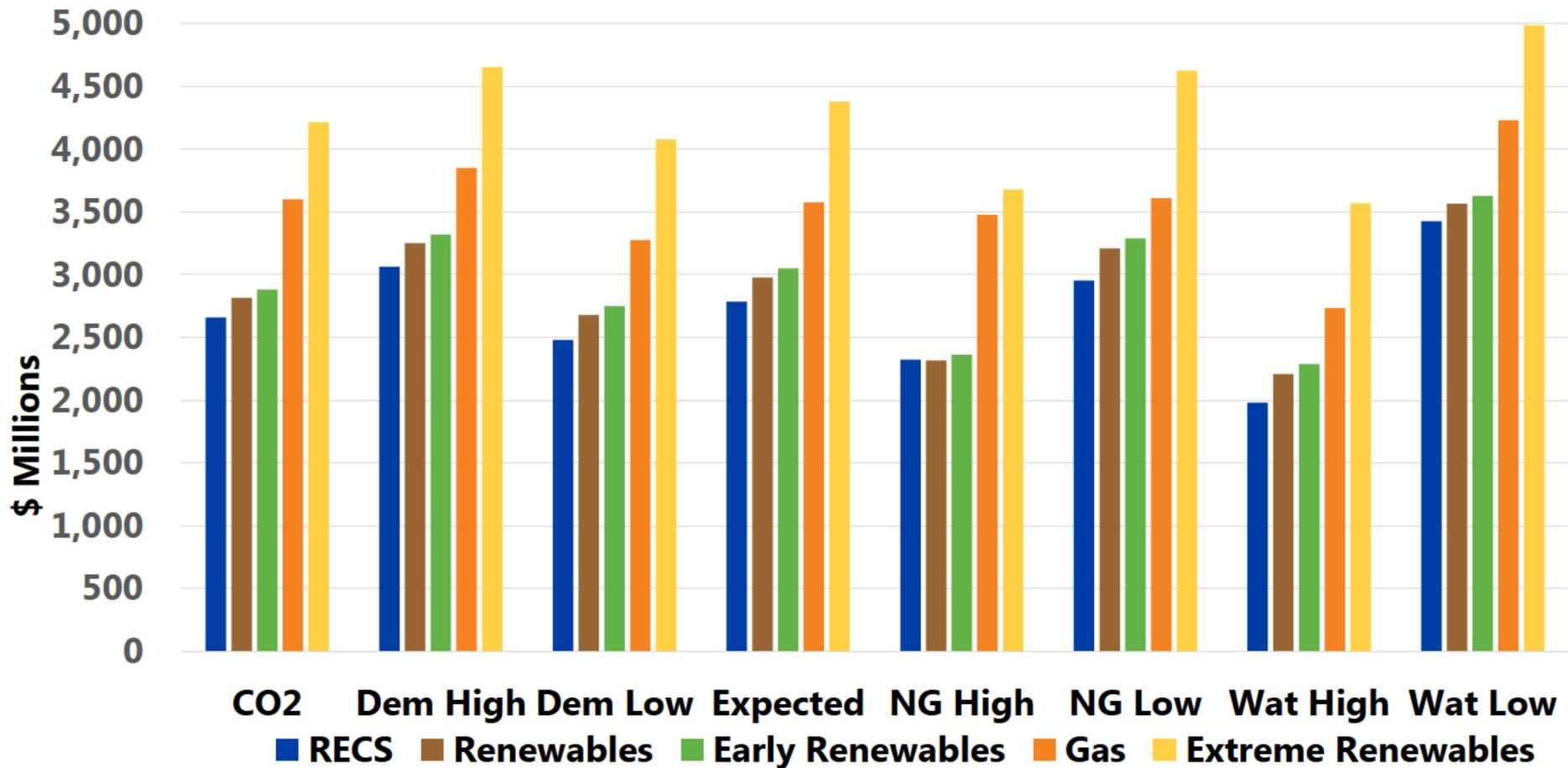
COMPARISON OF 10-YEAR NPV OF COSTS

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

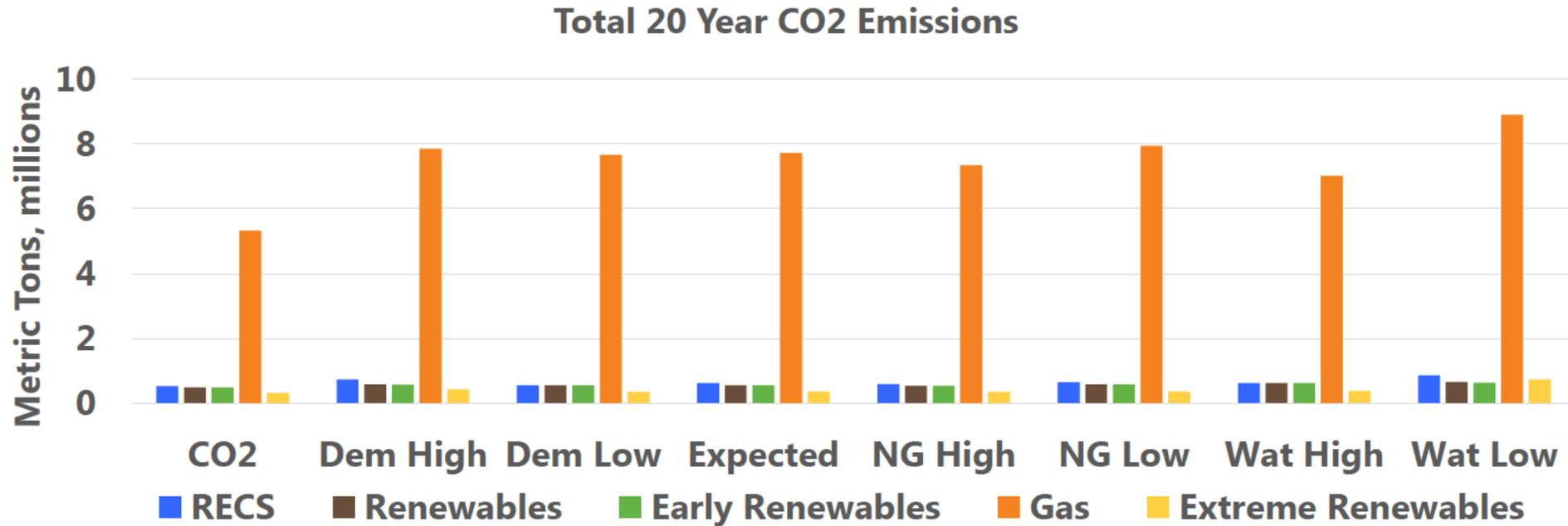


COMPARISON OF 20-YEAR NPV OF COSTS + OFFSET COSTS

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

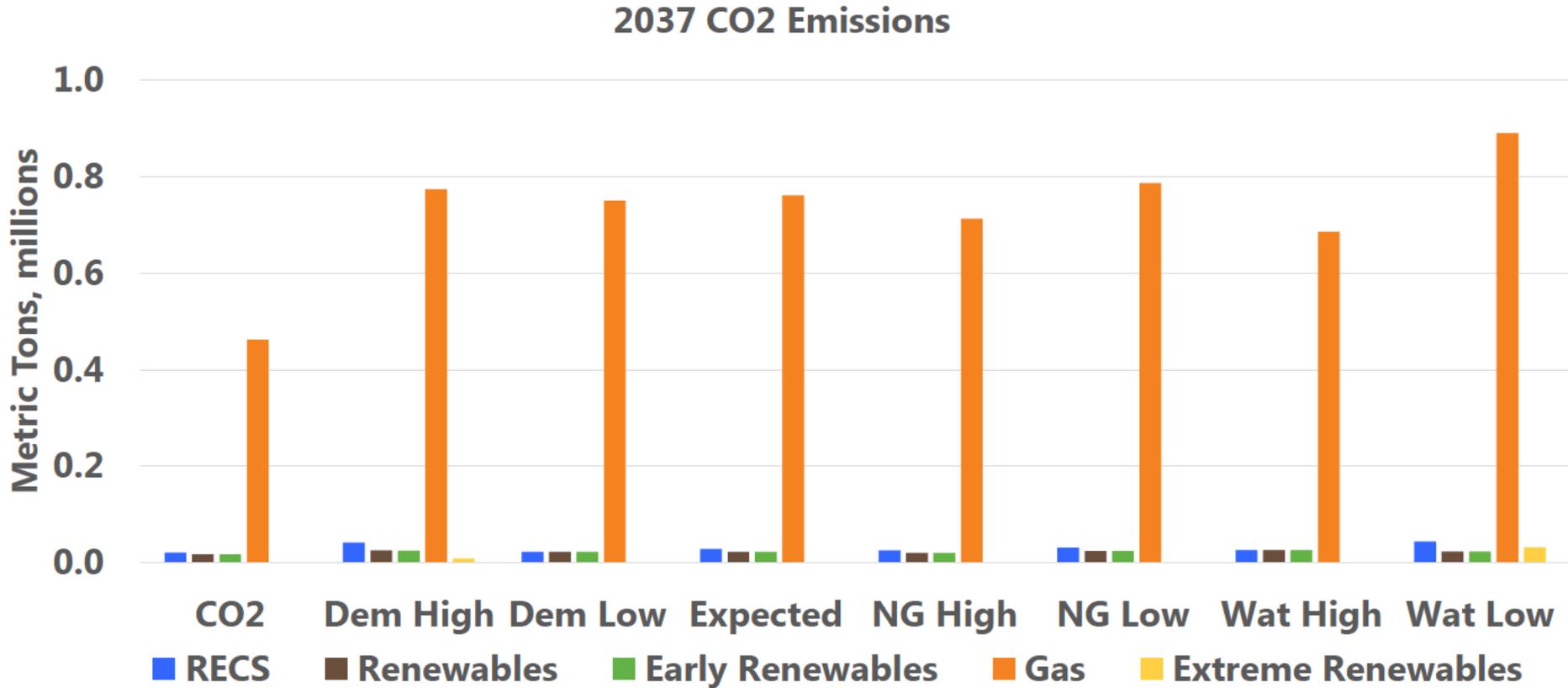


20 YEAR PORTFOLIO CARBON EMISSIONS TO BE OFFSET



- 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)

2037 PORTFOLIO CARBON EMISSIONS TO BE OFFSET



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)



CITY LIGHT

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



Seattle City Light