Integrated Resource Planning

Roundtable Meeting #19-3

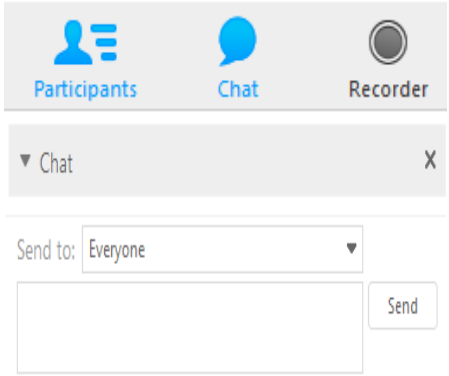
November 21,2019

MEETING LOGISTICS

- **Participants:**
  - Ask questions via ‘chat’ feature
  - Meeting will stay open during breaks, but will be muted
  - Electronic version of presentation:

portlandgeneral.com/irp

>> Integrated Resource Planning



AGENDA

- Needs Assessment Update
  - Informational
- Intergenerational Equity
  - Informational
- Supplemental Analysis
  - Informational
- IRP Stakeholder Engagement Feedback
  - Informational & input from stakeholders

SAFETY MOMENT

- Physical well-being
  - To maintain well-being people need to move their bodies often
  - A stretch or rest is recommended every 30 minutes
  - Set a goal to stretch your hands, wrists, shoulders, ankles, or neck twice during this meeting
  - You could use an official break or do a quick stretch between each topic to keep you alert and healthy

Needs Assessment Update

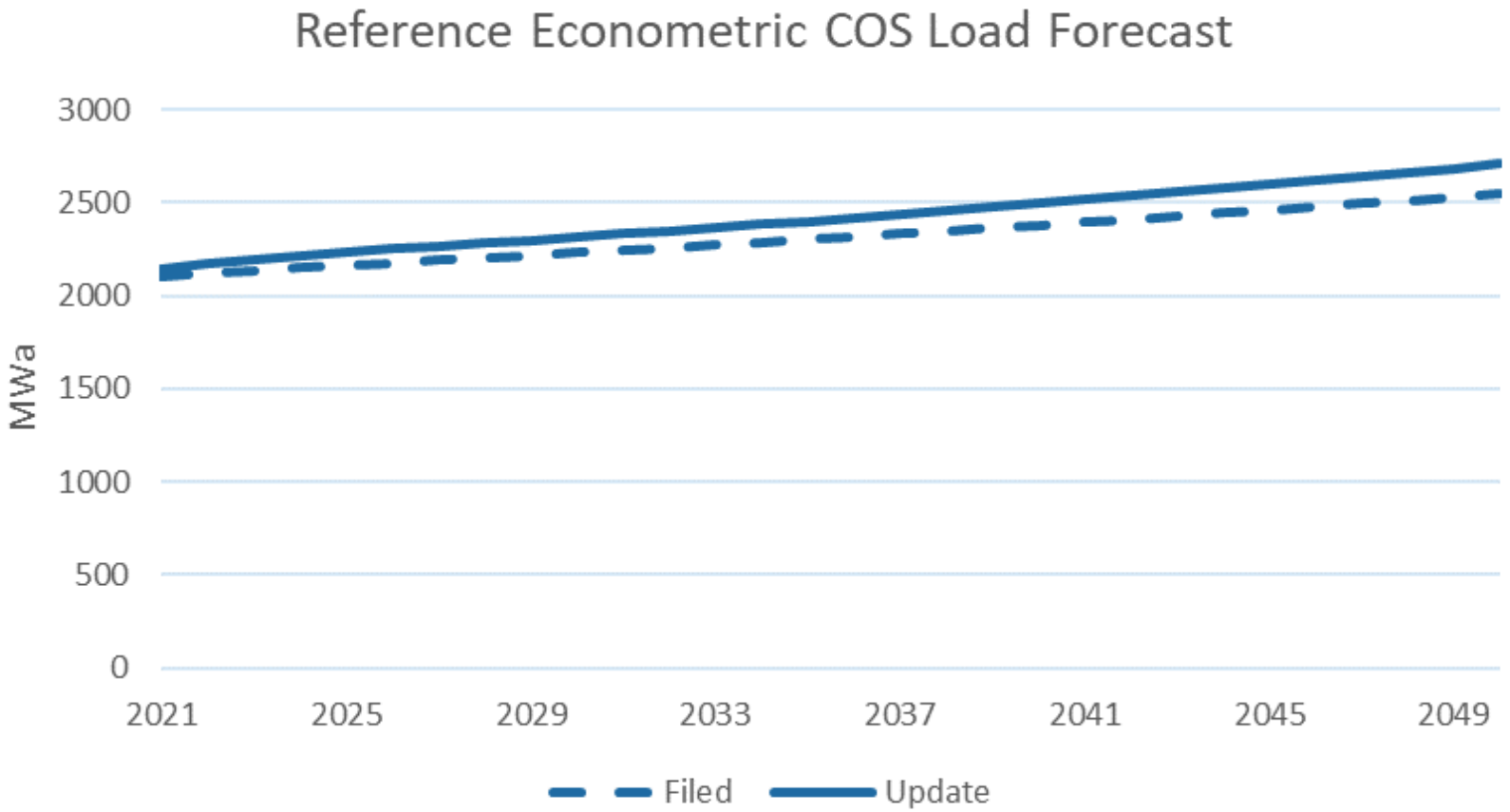
Kate von Reis Baron

NEEDS ASSESSMENT UPDATE

- Load Update
  - Update Econometric Load Forecast (Reference Case)
- Resource Updates
  - Add Green Tariff Resource
  - Update QF Snapshot to September 19, 2019
  - Other contract updates

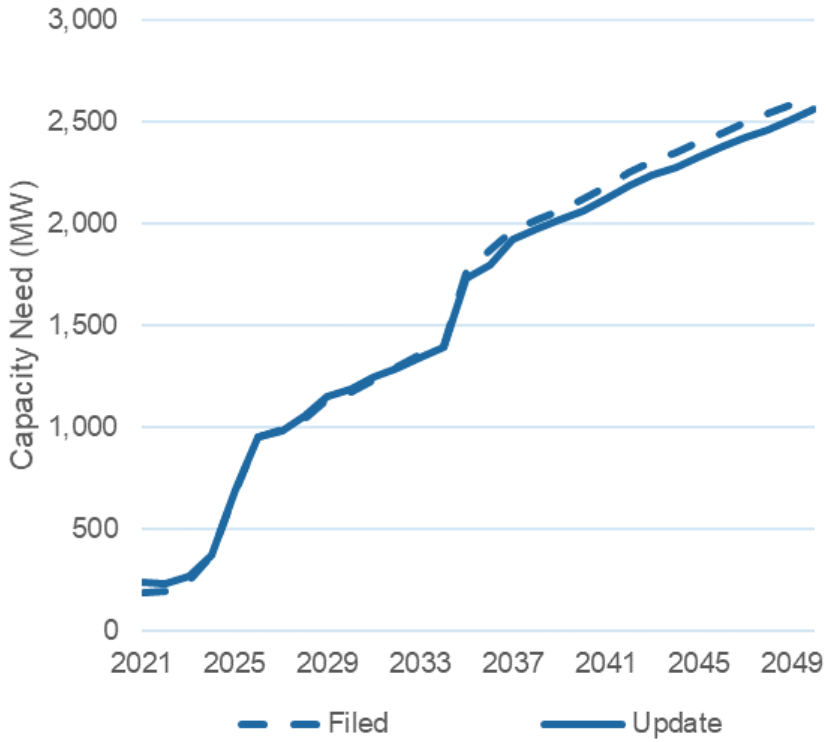
ECONOMETRIC LOAD FORECAST

Updated from September 2018 to September 2019 Forecast

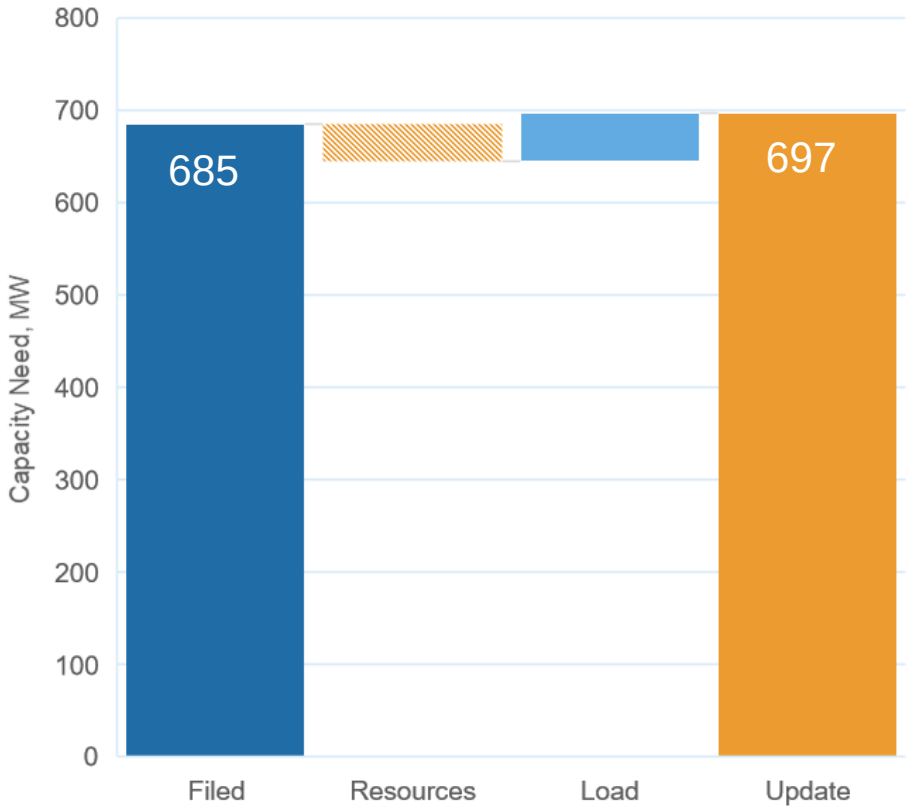


CAPACITY NEED

- Minor increase in the near term and minor decrease in the long term
- Need in Year 2025:
  - Filed = 685 MW
  - Update = 697 MW



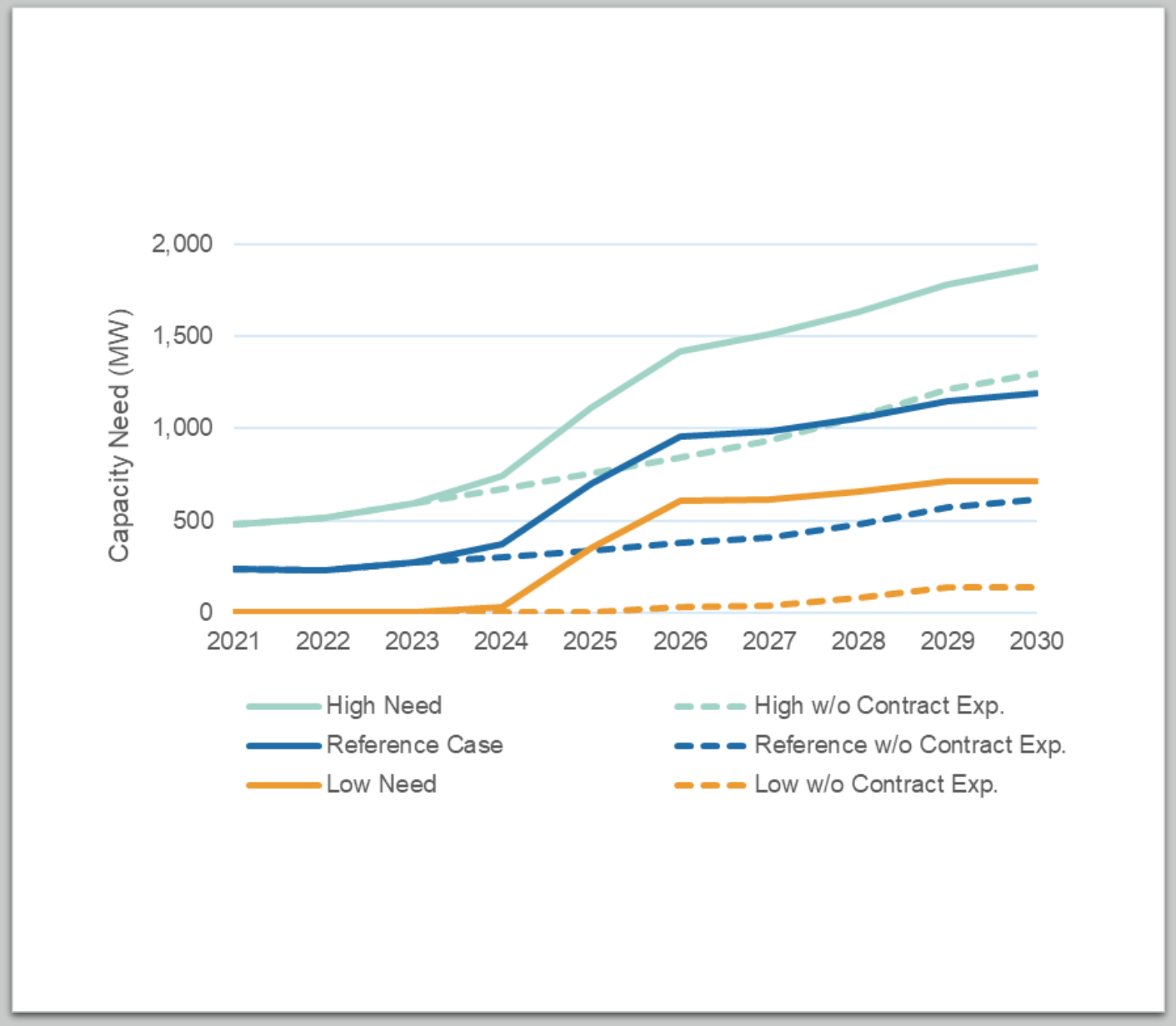
CAPACITY NEED



- The net impact from resource updates was a slight decrease to capacity need in the year 2025
- The update to the econometric load forecast resulted in a slight increase to capacity need in 2025

CAPACITY NEED

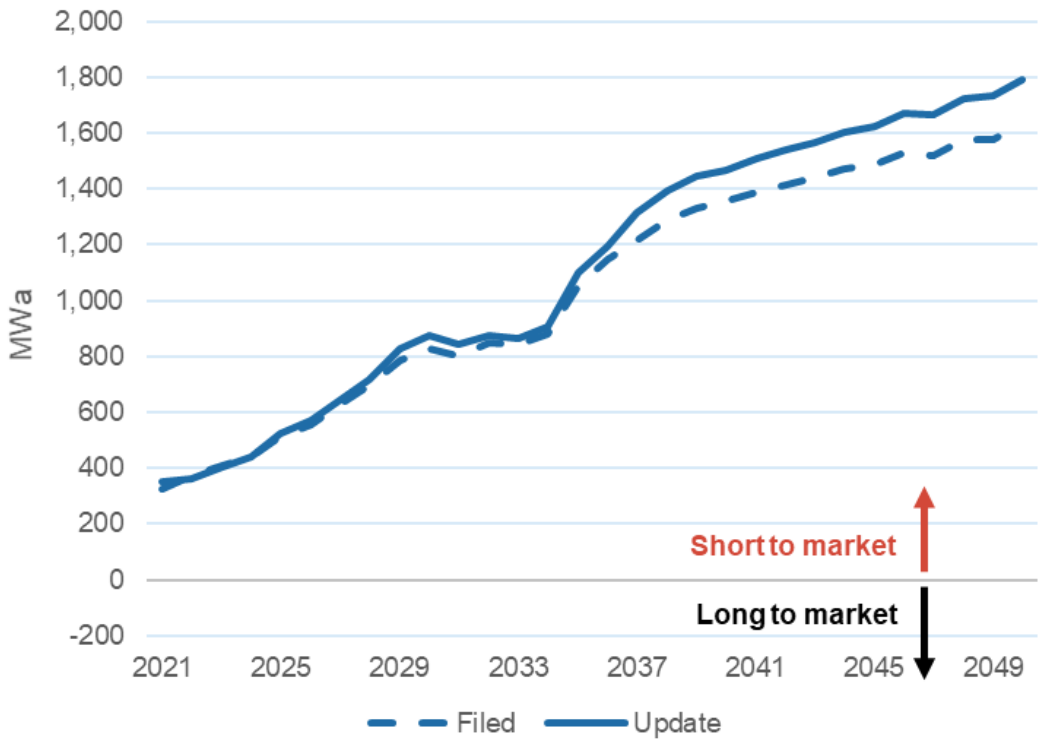
- Continued need for a flexible capacity action to account for wide range of potential need



Note: All three Need Futures reflect the resource updates. The load forecast was updated in the Reference Case only.

ENERGY NEED

- Minor increase to the energy position in the near term and larger increase in the outer years



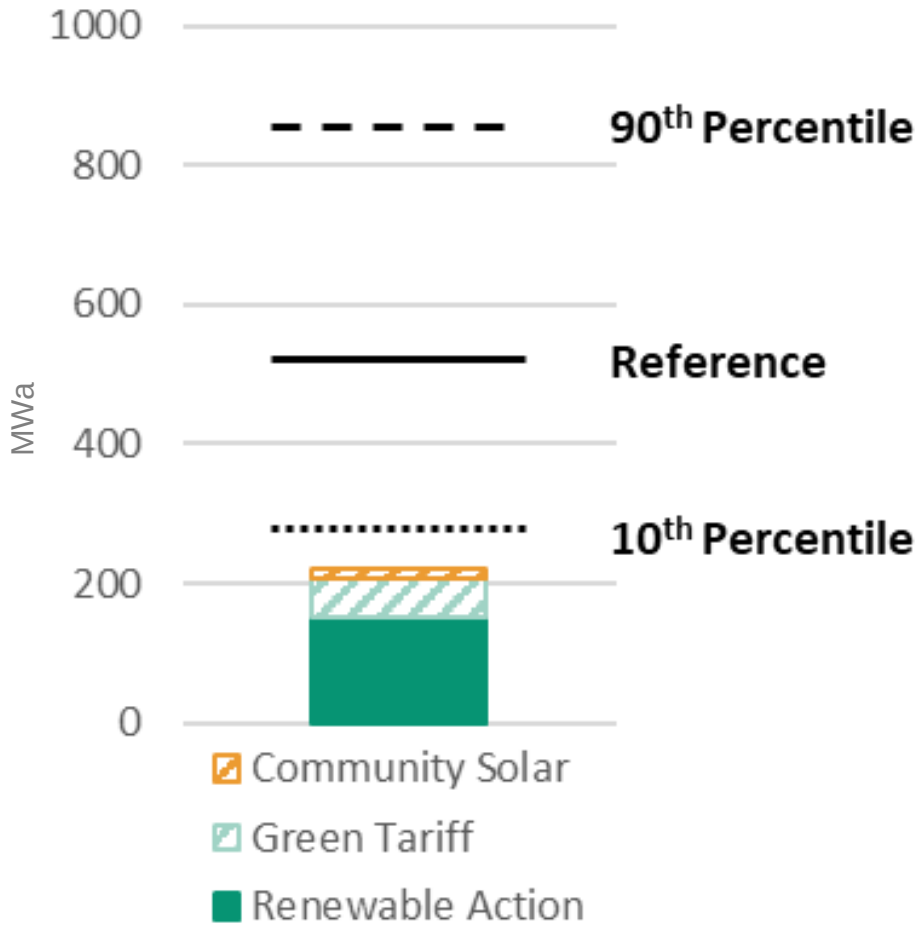
Energy Shortage to Market in 2025 (MWa)	Filed	Update
Reference Case	515	527
10th Percentile	344	285
90th Percentile	907	848

Note: All three Need Futures reflect the resource updates. The load forecast was updated in the Reference Case only.

ENERGY NEED

- The Reference Case energy shortage is approximately 307 MWa larger than the total energy associated with the Renewable Action, the remaining approved Green Tariff, and Community Solar

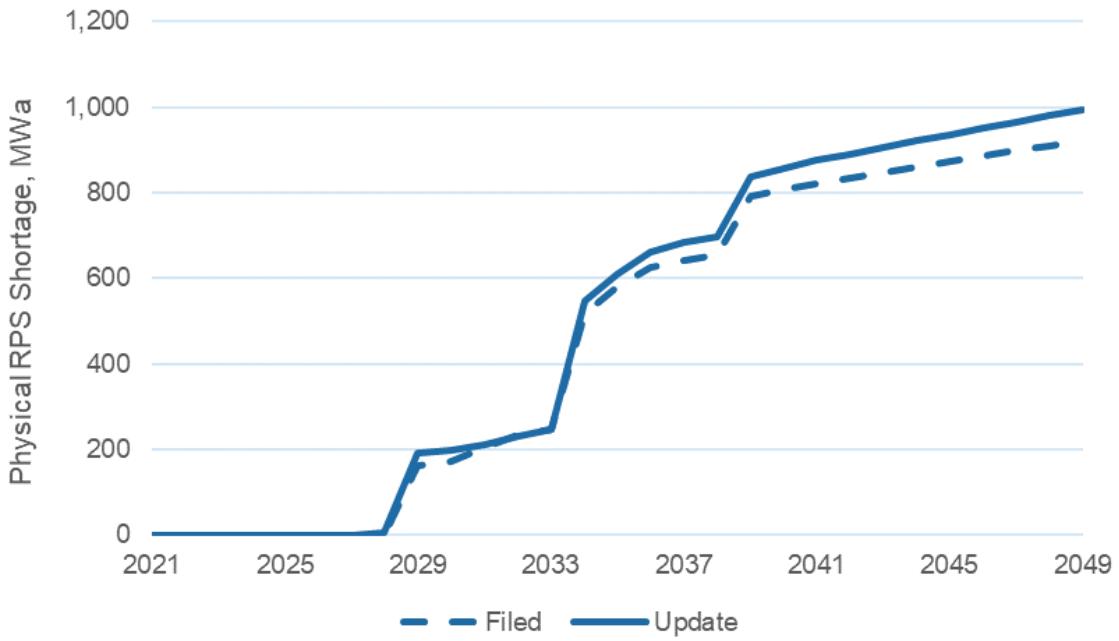
Energy position distribution for 2025 compared to renewable energy action with voluntary program sensitivity



Note: All three Need Futures reflect the resource updates. The load forecast was updated in the Reference Case only.

RPS NEED

- Small increase to Physical RPS Need



Physical RPS Shortage in 2030 (MWa)		
	Filed	Update
Reference Case	161	190
Low Need	47	48
High Need	282	283

Note: All three Need Futures reflect the resource updates. The load forecast was updated in the Reference Case only.

SENSITIVITIES

Voluntary Program Sensitivity C				
Program	Installed Capacity MW	Generation MWa	Capacity Contribution MW	2030 Avoided RPS MWa
Community Solar	93	12	15	4
Green Tariff (unsubscribed)	135	58	28	0
Total	**228**	**70**	**42**	**4**

Resource needs across QF Sensitivities			
	High QF	Base QF	Low QF
2025 Capacity Need (MW)	681	697	713
2025 Energy Shortage (MWa)	492	527	589
2030 RPS Physical Shortage (MWa)	155	190	253

QUESTIONS/ DISCUSSION?

Intergenerational Equity Analysis

Elaine Hart

Near-term cost impacts in the 2019 IRP

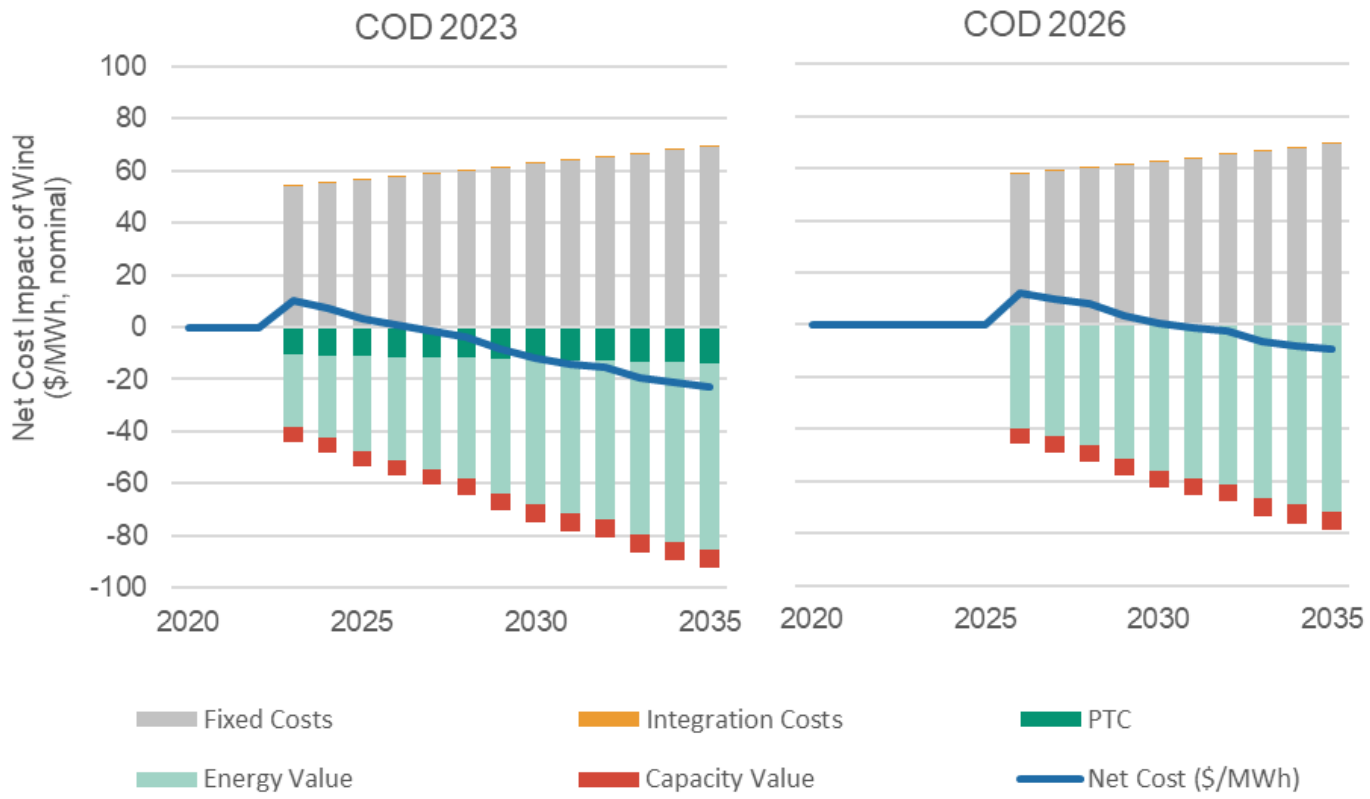
- In the 2016 IRP, the Commission emphasized the importance of balancing long-term economic value with potential near-term cost impacts, particularly when evaluating near-term renewable additions
- PGE addressed this concern in two ways in the 2019 IRP:
  - Near-term Cost non-traditional scoring metric (see Section 7.2 of the 2019 IRP)
    - Considered the NPVRR through 2025 and the exclusion of portfolios that perform the worst with respect to this metric from consideration for the Action Plan
  - Intergenerational equity analysis (see Section 7.3 of the 2019 IRP)
    - Estimates annual cost and benefits associated with a near-term renewable addition relative to delaying renewable additions in the near term, based on IRP Reference Case assumptions

Assumptions and Methodology

- Near-term cost impacts of renewables are driven by several variables:
  - Step down of federal tax credits (60% for COD 2023, 40% for COD 2024, 0% after)
  - Declining resource costs by commercial online date (COD)
  - Resource value to the portfolio (capacity and energy value)
- Analysis compared two scenarios:
  - 150 MWa wind addition on December 31, 2022 (COD 2023, 60% PTC)
  - 150 MWa wind addition on December 31, 2024 (COD 2025, 0% PTC)
- For each scenario, PGE quantified net cost impacts in each year, based on:
  - Levelized resource costs, reflecting a PPA structure
  - Energy value in each year based on IRP Reference Case wholesale market price forecast
  - Capacity value in each year based on ELCC and annualized net cost of capacity from the IRP
  - Net costs normalized by retail load so that units are comparable to rate impacts

Findings

- In early years, most of the resource costs in both scenarios are offset by cost savings associated with energy and capacity from the wind resource (and the PTC for the COD 2023 scenario)
- Assumes PTC benefit is levelized over the life of the project (e.g., via a PPA). PTCs for owned resources flow to customers in the first 10 years of the project



Net Cost [$/MWh] =

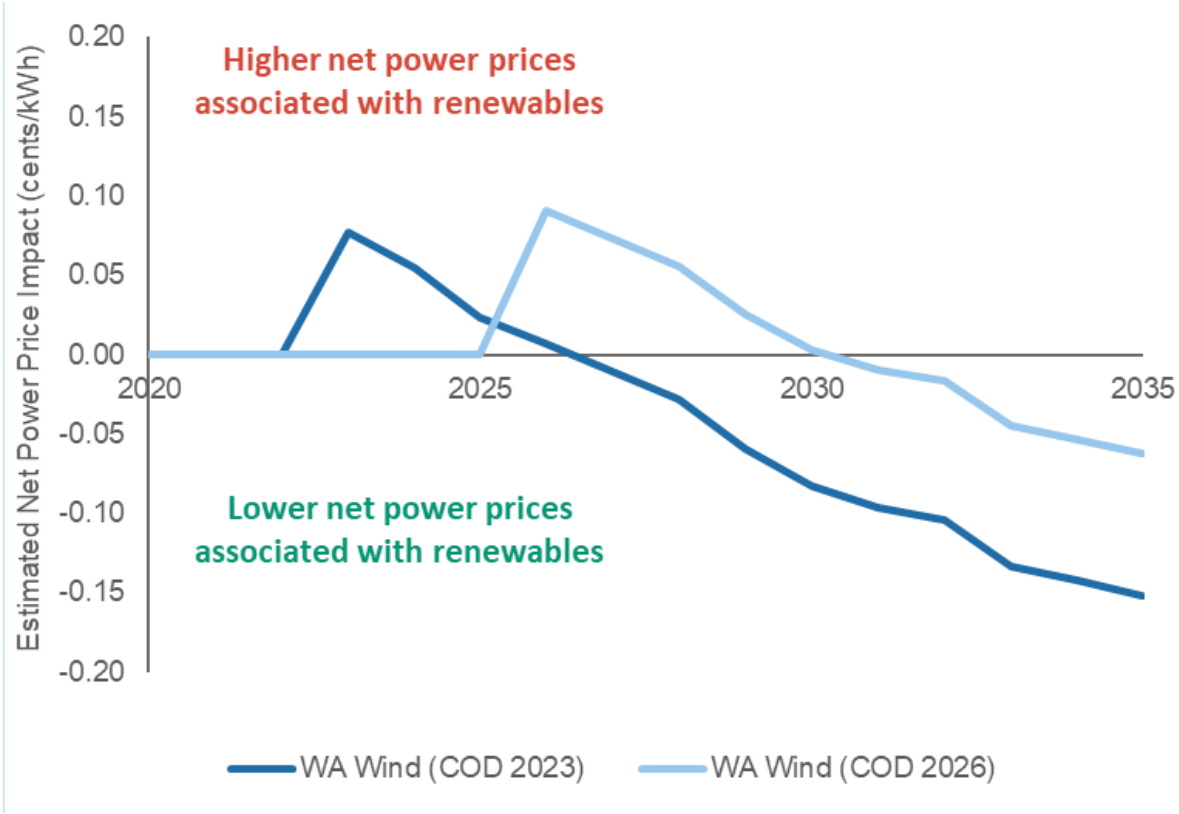
$$\frac{\text{(Fixed Costs + Int. Costs - PTC – Energy Value – Capacity Value)[\$/MWh] x 150 [MWa] x 8760 [hrs/yr]}}{\text{Retail Sales (MWh/yr)}}$$

Findings

COD 2023 Scenario
- 2023-2026 average net increase of ~0.04 cents/kWh
- Net decrease beginning in 2027

COD 2026 Scenario
- 2026-2030 average net increase of ~0.05 cents/kWh
- Net decrease beginning in 2031

*Actual net cost impacts will depend on resource price, value, and ownership or contract structure



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QUESTIONS/ DISCUSSION?

SUPPLEMENTAL ANALYSIS

Seth Wiggins

SUPPLEMENTAL ANALYSIS

- RPS Obligations
- Wind Capacity Factor Sensitivities
- Benefits of Early Action
- Weighting Futures

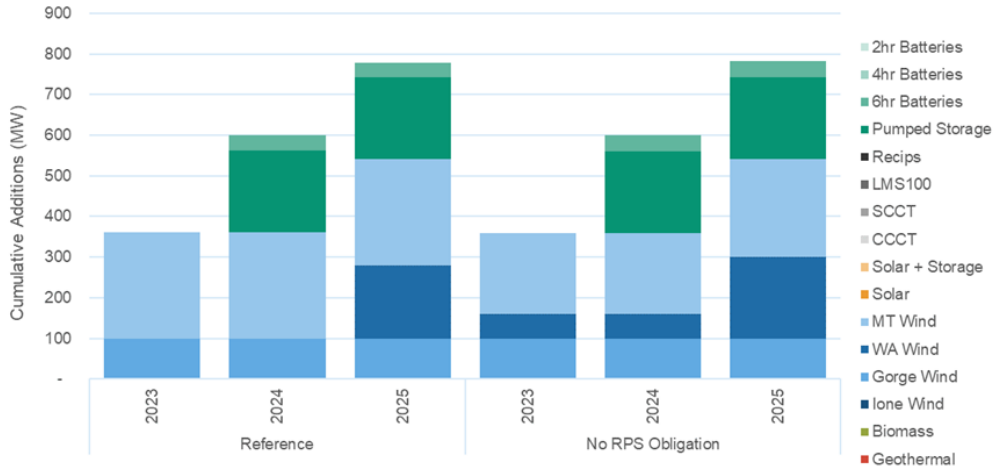
SUPPLEMENTAL ANALYSIS

- RPS Obligations
  - Multiple parties commented on PGE's treatment of RPS needs
  - We investigated whether an alternative approach would make an impact on modeling results
    - **RPS Sensitivity A**:
      - Relax Physical RPS constraint
      - Allow 20% use of Unbundled RECs at zero cost
    - **RPS Sensitivity B**:
      - Remove all RPS compliance obligations

SUPPLEMENTAL ANALYSIS

RPS Obligation Sensitivity

- Results show the value of the near-term Renewable Action from the perspective of both cost and risk are unaffected by the assumptions that PGE made regarding banked and unbundled RECs.



Cost, millions $	Base Case	RPS Sensitivity A	RPS Sensitivity B
Mixed Full Clean	25,740	25,740	25,744
Delay Renewables	26,625	26,625	26,625
Difference	-885	-885	-881
Variability, millions $			
Mixed Full Clean	3,614	3,706	3,700
Delay Renewables	3,835	3,865	3,896
Difference	-220	-159	-196
Severity, millions $			
Mixed Full Clean	31,004	30,970	30,968
Delay Renewables	32,065	32,035	32,021
Difference	-1,061	-1,065	-1,054

SUPPLEMENTAL ANALYSIS

Wind capacity factor sensitivities

- The IRP showed the net cost of SE WA wind with reduced capacity factors – from 38-32%
  - Staff recommended additional portfolio analysis using proportional reductions of capacity factors of all wind resources
  - We performed this analysis looking specifically at the Mixed Full Clean and Delay Renewables Portfolios

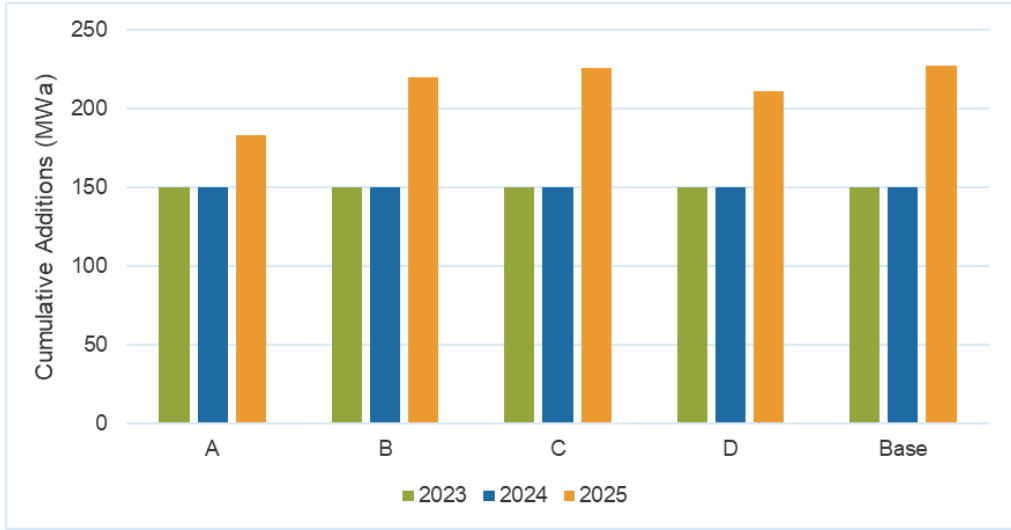
		Wind CF Sensitivities			
Proxy Wind Resource	HDR Capacity Factors	A	B	C	D
Montana	43%	32%	34%	36%	38%
SE WA	43%	32%	34%	36%	38%
Gorge	41%	30%	32%	34%	36%
Ione	33%	24%	26%	27%	29%

SUPPLEMENTAL ANALYSIS

Wind capacity factor sensitivities

- Results show little difference in near-term renewable actions

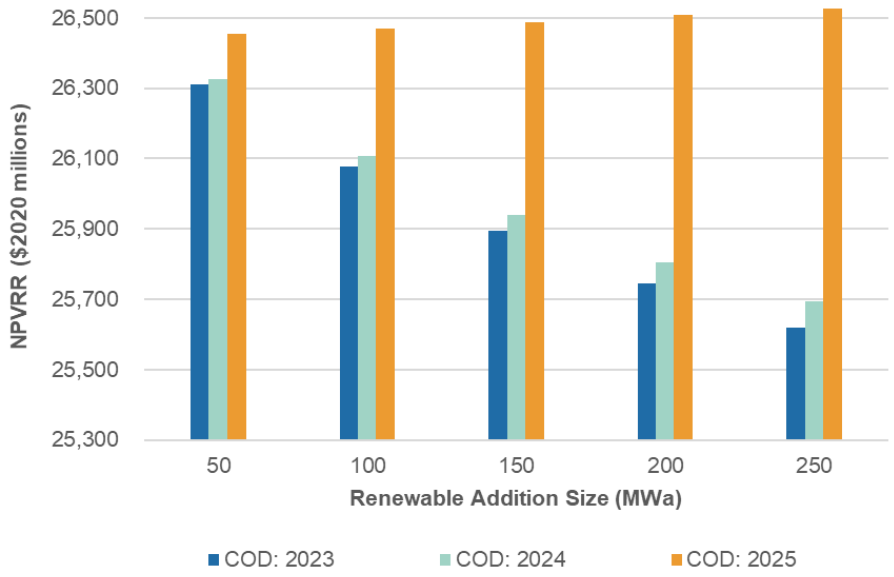
Wind Capacity Factor Sensitivity					
Cost, $ millions	A	B	C	D	Base Case
Mixed Full Clean	27,070	26,762	26,551	26,191	25,740
Delay Renewables	27,740	27,527	27,311	27,084	26,625
Difference	-670	-765	-761	-893	-885
Variability, $ millions					
Mixed Full Clean	4,163	4,047	3,937	3,839	3,614
Delay Renewables	4,266	4,173	4,096	4,015	3,835
Difference	-103	-126	-160	-176	-220
Severity, $ millions					
Mixed Full Clean	33,067	32,615	32,285	31,815	31,004
Delay Renewables	33,819	33,501	33,186	32,838	32,065
Difference	-752	-886	-901	-1,022	-1,061

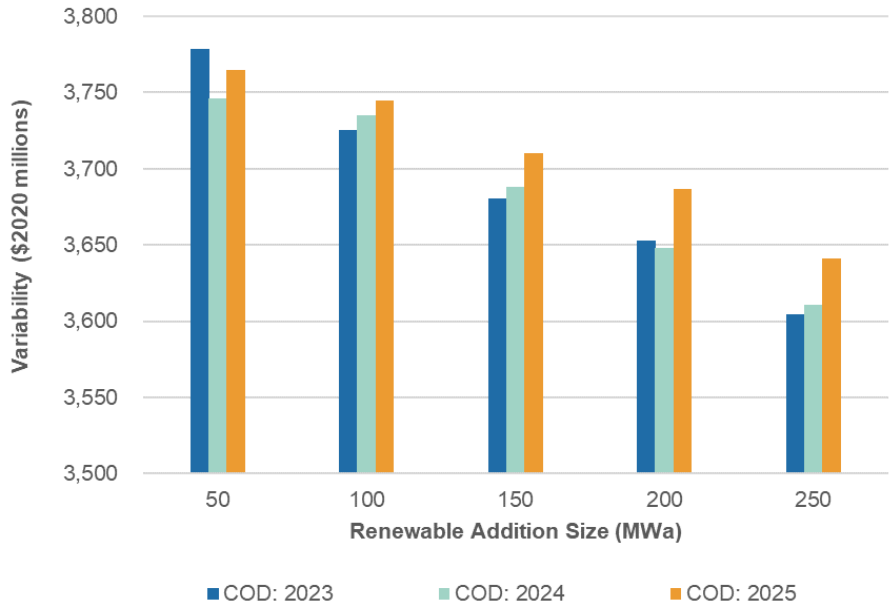


SUPPLEMENTAL ANALYSIS

Benefits of early action

- Staff requested more information about the difference in acquiring renewable resources with different CODs
- Portfolio analysis suggests significant cost and risk reductions from earlier action





SUPPLEMENTAL ANALYSIS

Weighting futures

- Staff requested more about alternatively weighting futures
- The reference case of each need, price, and technology cost future is the most likely – so we tested the preferred portfolio optimized on the reference case

Cost, millions $	Base Case – Optimized with Equal Weights Across Futures	Sensitivity – Optimized for the Reference Case
Mixed Full Clean	25,740	25,739
Delay Renewables	26,625	26,625
Difference	-885	-886
Variability, millions $		
Mixed Full Clean	3,614	3,621
Delay Renewables	3,835	3,841
Difference	-220	-220
Severity, millions $		
Mixed Full Clean	31,004	31,012
Delay Renewables	32,065	32,047
Difference	-1,061	-1,035

QUESTIONS/ DISCUSSION?

IRP STAKEHOLDER ENGAGEMENT FEEDBACK

Jessica Graeber

IRP STAKEHOLDER ENGAGEMENT FEEDBACK

Goal

For PGE to get a clear picture of the things we are doing well, the things we can improve upon, and suggestions for ways to keep improving our stakeholder engagement process.

IRP STAKEHOLDER ENGAGEMENT FEEDBACK

- Which of these were helpful to engage with the IRP process? Other ideas?
  - Values discussion – desire to repeat
  - Higher frequency of meetings during analysis
  - Shorter meetings
  - Offered office hours
  - Showing results early and often
  - Showing evolving analysis results
  - Portfolio requests
  - Supplemented slides with handouts
  - Requested informal comments
  - Listening session
  - Opening the docket early

IRP STAKEHOLDER ENGAGEMENT FEEDBACK

- Are there other aspects which could help your organization engage in the IRP process?
  - For example, is there a different way we might start the next IRP process, or; are there accessibility accommodations we could offer?

- How do you feel about our level of engagement with you?
  - For example, do you find our communication regular enough to engage effectively with you?

IRP STAKEHOLDER ENGAGEMENT FEEDBACK

- Is there anything we could do to support you in providing written feedback during the IRP process?

- Is there anything other than traditional meetings which could provide you, or other groups, with better opportunities to engage in the IRP process? Especially groups who haven't chosen to participate but would provide valuable perspective?

THANK YOU

Contact us at:

IRP@pgn.com

Next Roundtable: February 19, 2020