FINAL REPORT OF THE INDEPENDENT EVALUATOR FOR PGE's 2021 ALL SOURCE RFP

Oregon Public Service Commission Workshop Presentation

May 19, 2022

BATES WHITE
ECONOMIC CONSULTING

I. Summary

A. Bates White served as the Independent Evaluator (IE) for PGE's 2021 All Source RFP. As IE we performed the following functions

1. Reviewed and commented on scoring methodology and draft of the RFP;
2. Monitored bidder contact, including the answers to bidder questions;
3. Confirmed the assumptions, models and processes used in the analyses;
4. Confirmed the initial qualification of bidders and provided input with respect to bidder disqualifications;
5. Independently scored offers and reviewed the price and non-price scores and models for the Company's shortlist process and confirmed the Company's selection of a shortlist; and
6. Reviewed the portfolio creation and modelling using the shortlisted offers.

B. Key conclusions

1. Process run in accordance with RFP rules, all bidders treated fairly
2. Reasonably competitive process
3. PGE price and non-price scoring were reasonable
4. RFP aligned with IRP process
5. Portfolio modelling suggests selection of top bids.
6. Modelling also suggests potential benefit of larger renewable buy while highlighting risks

II. Timeline

A. Actions since RFP Approval

Milestone	Date
RFP Issued to Market	12/6/2021
Bidder's Conference	12/17/2021
Benchmark Bid Due	1/4/2022
RFP Bids Due	1/20/2022
BAFO Price Update	3/16/2022
Sensitivity Analysis submitted to OPUC	5/4/2022
IE Report submitted to OPUC	5/5/2022

III. Benchmark Evaluation

A. Benchmarks submitted January 4
B. Reviewed scoring and qualification details, compared to past offers and public data, memo to Commission
C. Extensive Q&A process – third party bids stored on website until scores finalized
D. Bids presented as partnership BTA/PPA – not cost-plus

Project	Partner	Capacity	Transaction Type	Technology
[redacted]	[redacted]	200	PPA	Battery Storage
		75	BTA	Battery Storage
		125	BTA	Battery Storage
		230	BTA	Wind
		120	PPA	Wind
		100	PPA	Solar
		30	PPA	Battery Storage
		209	BTA	Wind
		103	PPA	Wind
		100	PPA	Solar
		100	BTA	Solar

IV. Minimum Qualifications

A. Third-party bids opened on February 4. IE delivered bds to PGE.

B. Review for minimum threshold items. Key minimum qualifications included
   1. COD by 12/31/2024 (for non-pumped storage items)
   2. Site Control
   3. Commercially proven technology
   4. Completed System Impact Study
   5. Firm Transmission for 80% of project MW (100% for dispatchable resources)

C. Many projects disqualified – within RFP rules
   1. Failure to have system impact study
   2. No site control/use of PGE assets not made available
   3. Failure to meet transmission requirements
   4. Failure to have commercial technology

V. Price and Non-Price Scoring

A. Renewable and Dispatchable categories

B. Price Score – Costs/Benefit (812 points)

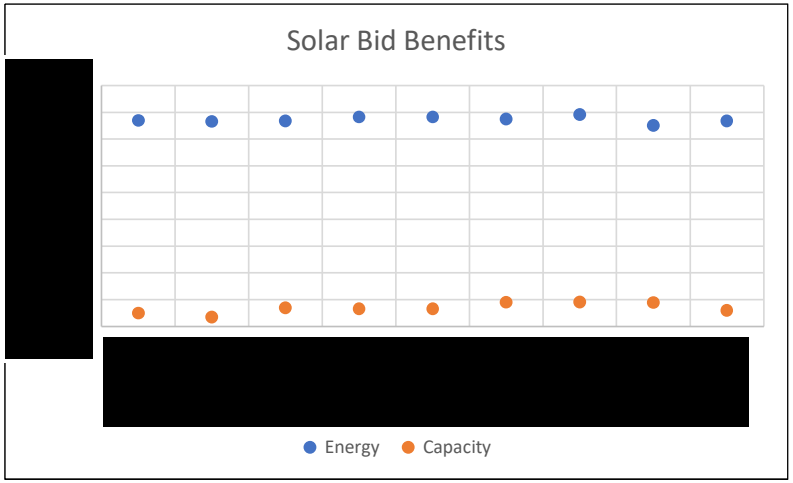
1. Costs
   a. PPA – Price plus transmission
   b. BTA – Revenue requirement, O&M, tax credits, transmission and upgrades

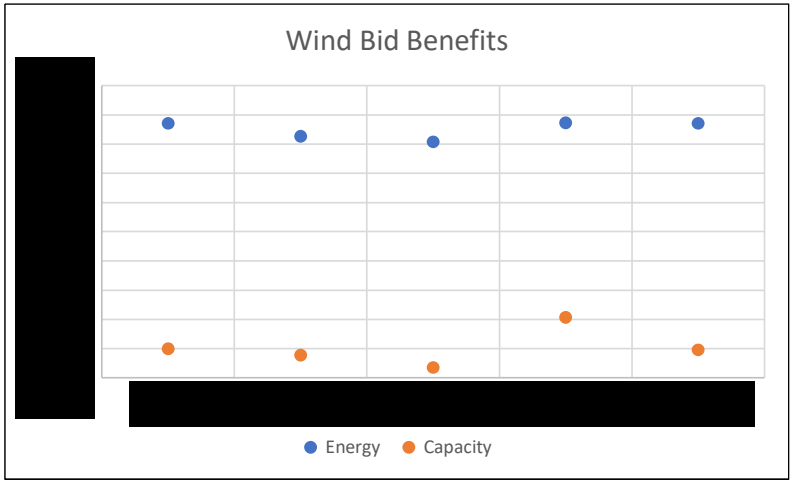
2. Benefits
   a. Energy – Using AURORA and forward price curve
   b. Capacity – Using Sequoia and SCCT
   c. Flexibility – Using 2019 IRP values from ROM.

C. Non-Price Scores (188 points)

	Dispatchable Resources	Renewable Resources
Commercial Performance Risk	100	100
Transmission Plan		29
Level Capacity Ratio		59
Online Date	88	

V. Price and Non-Price Scoring





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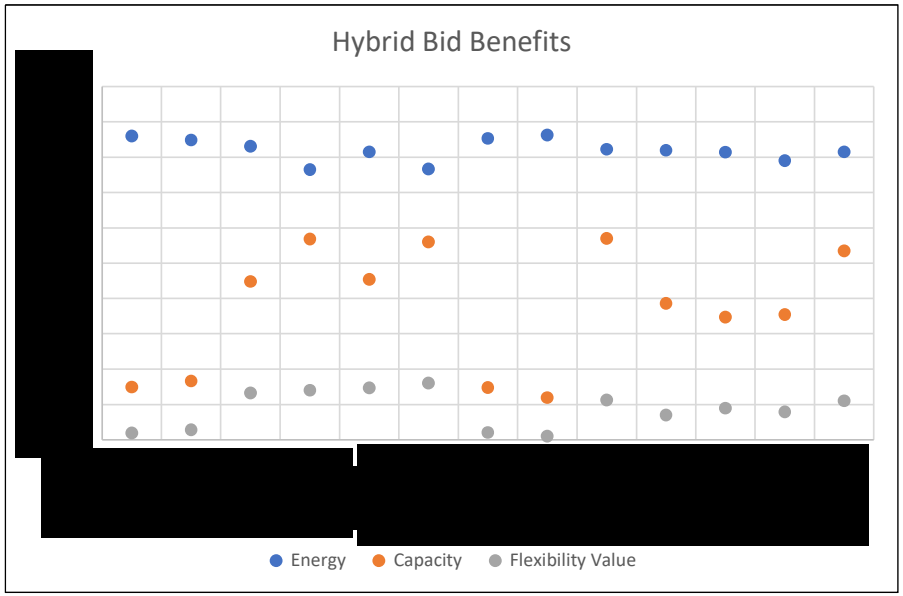

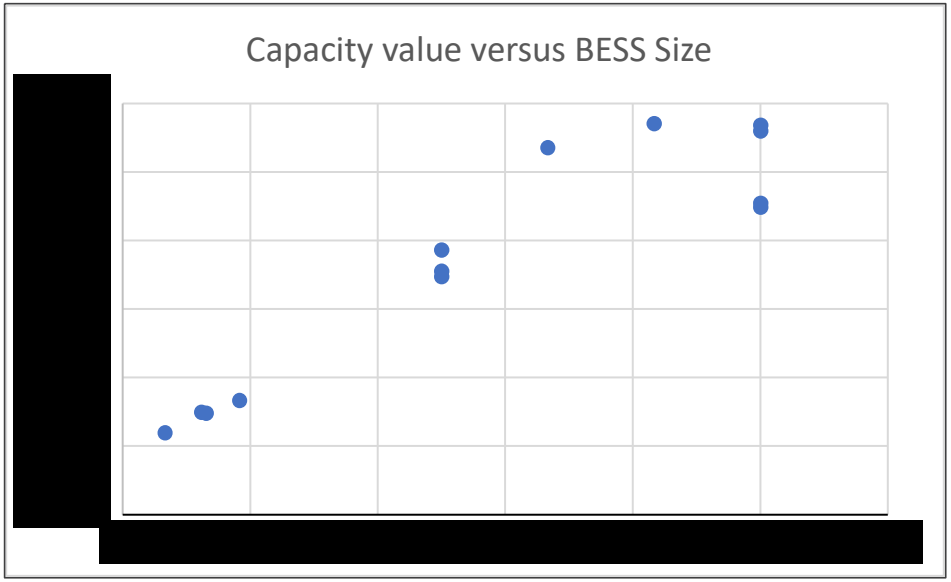

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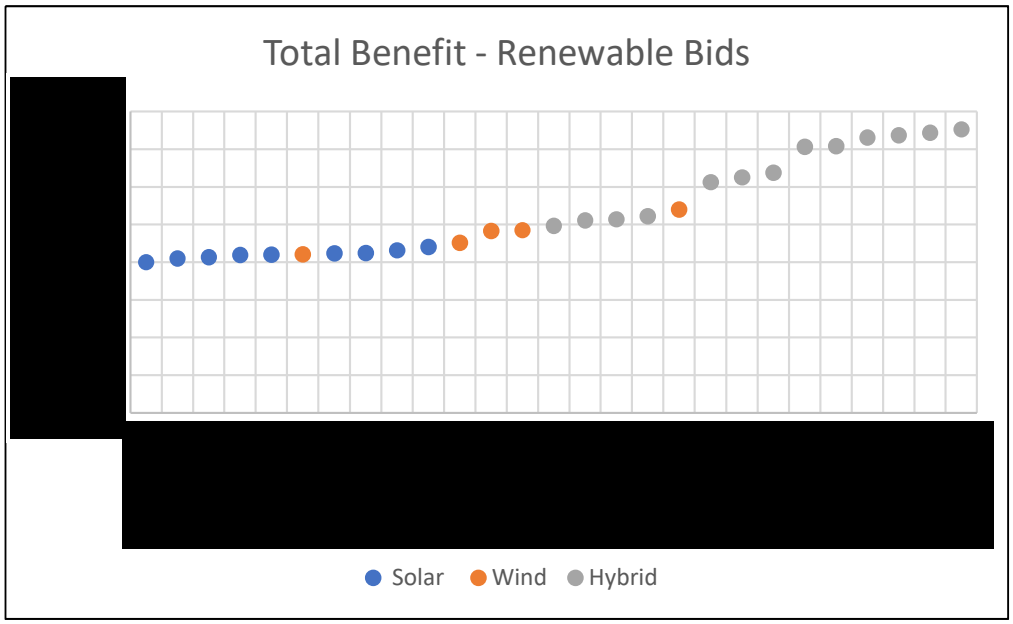
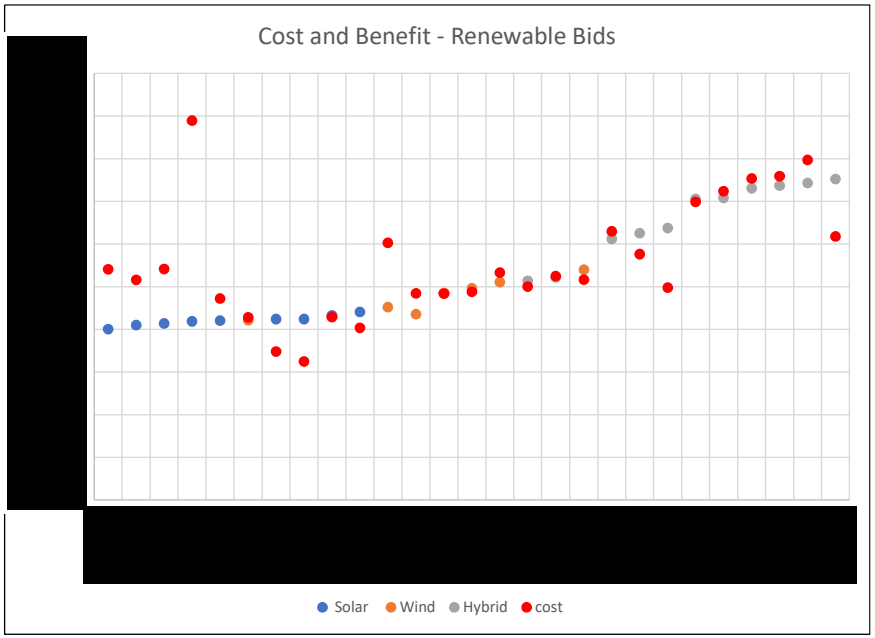




V. Price and Non-Price Scoring

A. Top scoring bid (best cost/benefit) gets 812 points, scaled thereafter

B. IE scoring via busbar models and review of PGE models and non-price scoring. Similar results

C. Non-price scoring – minimal differences in score (about 10 of 1000 points).

D. Cutoff - lowest score with a positive cost/benefit ratio. Did allow addition of some options with higher non-price scores

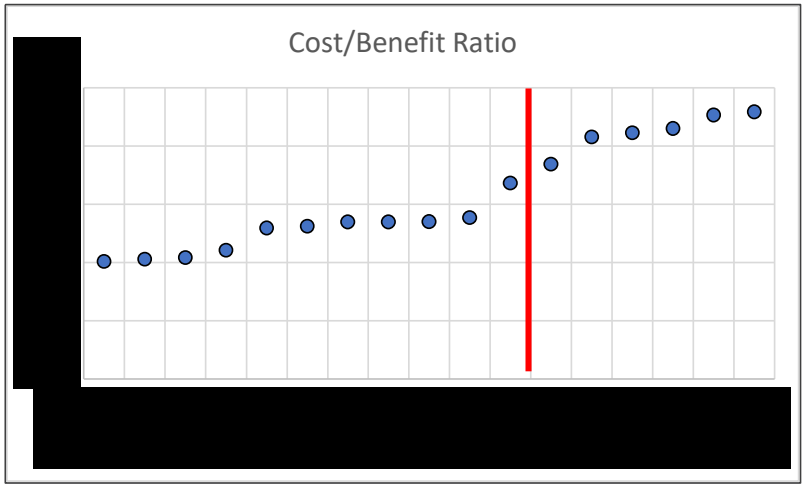
E. Renewable Shortlist
   1. Selected per RFP scoring methods
   2. Scoring reasonable
   3. Featured diversity of technologies, transaction types and bidders
   4. Volume significantly over RFP need

F. Split between last in and first out is small – bids scored reasonably and portfolio modelling shows limited selection of lower-ranked offers

G. No change in 90/10 scenario. Limited change in 70/30

V. Price and Non-Price Scoring - Dispatchable

A. Clear split between top scores



B. Total selection of six projects about 500 MW of ELCC

C. Includes BESS and pumped storage

D. Changing price and non-price ratios had no real effect on selection

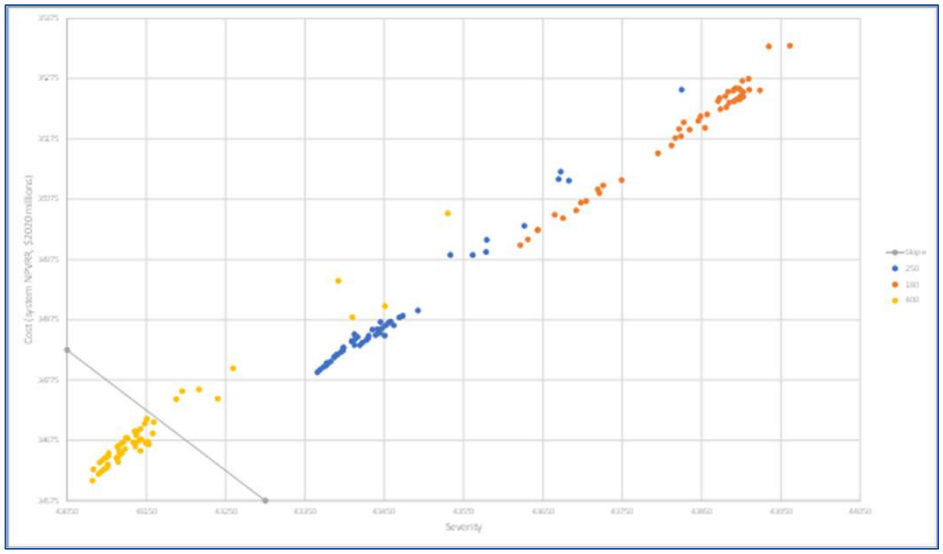
VI. Portfolio Modelling

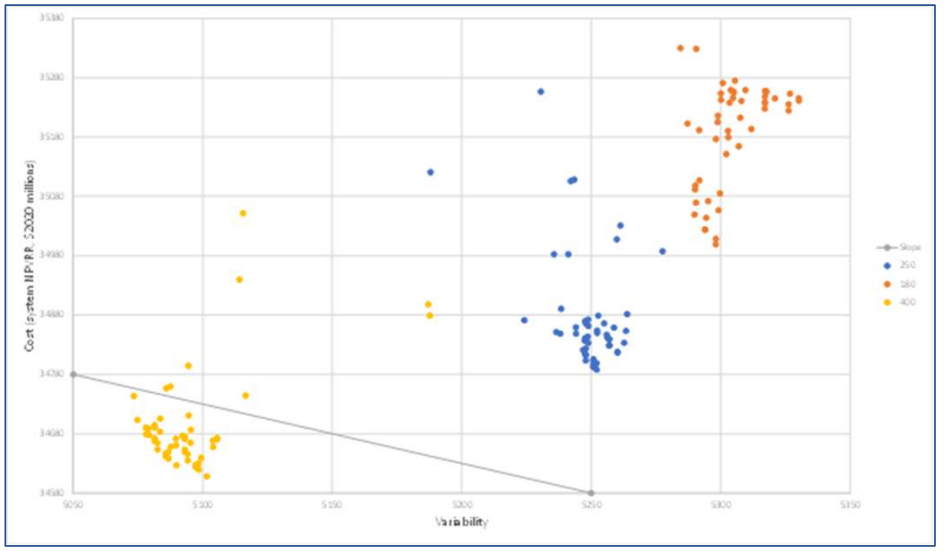
A. Portfolio Creation
   1. Needed to narrow down combinations of offers
   2. Looked at three levels of Mwa target (180, 250, 400) and picked top 50 combinations of each.
   3. Each offer represented
   4. Total of 150 total portfolios

B. ROSE-E Model
   1. Looks at cost of portfolios through variations in multiple risk factors
      a. Load
      b. Gas Price
      c. Hydro levels
      d. Carbon Costs
      e. Future Wind construction costs
      f. WECC-renewables buildout

C. Scored on cost/severity and cost/variability

VI. Portfolio Modelling





VI. Portfolio Modelling

A. PGE picked top portfolios which fell under “efficient frontier” lines. Scored 50% on reference case NPVRR and 50% on standard deviation.

B. Non-Price scores added in to create total portfolio score.

C. Limited difference in scores

D. All top portfolios were 400 Mwa, Bates White looked at top scores in 250 and 180 Mwa calls as well

E. Observations

1. Projects with top cost/benefit ratios generally scored best
2. More renewable capacity generally means less dispatchable capacity selected
3. Some less straightforward decisions at lower levels of capped renewable supply

VI. Portfolio Modelling

A. Top bids generally had best cost/benefit ratios. Confirmed in lower-buy cases as well

Category			Number of times in efficent frontier portfolios	Cost/Benefit Ratio
Renewable	[redacted]		41	96%
			40	82%
			40	78%
			34	98%
			17	102%
			13	92%
			8	103%
			8	92%
			7	100%
			6	99%
			3	99%
			1	103%
			1	77%
			1	82%
			0	104%
			0	101%
			0	100%
			0	97%
Dispatchable			18	104%
			12	103%
			11	111%
			8	135%
			0	131%
			0	135%
			0	130%
			0	101%
			0	135%
			0	139%
			0	168%

VI. Portfolio Modelling

A. Risk factors in larger renewables buys are as expected.

Case	180	250	400	Difference (400-180)
Reference	$ 35,189	$ 34,879	$ 34,694	$ 494
Low cost wind	$ 32,434	$ 32,225	$ 32,227	$ 207
High cost wind	$ 37,771	$ 37,354	$ 36,989	$ 783
low need	$ 31,507	$ 31,192	$ 31,011	$ 496
high need	$ 39,513	$ 39,200	$ 39,013	$ 500
High WECC Buildout	$ 32,088	$ 31,870	$ 31,736	$ 352
High carbon adder	$ 34,465	$ 34,152	$ 33,958	$ 507
Low carbon adder	$ 37,583	$ 37,284	$ 37,120	$ 462
High Gas	$ 34,697	$ 34,357	$ 34,124	$ 573
Low Gas	$ 34,755	$ 34,444	$ 34,256	$ 499
Low Hydro	$ 39,215	$ 38,899	$ 38,700	$ 515
High Hydro	$ 32,134	$ 31,832	$ 31,663	$ 471
High buildout low cost wind	$ 29,537	$ 29,434	$ 29,488	$ 49
Low need/low cost wind/high buildout/low gas/low carbon/high hydro	$ 26,276	$ 26,166	$ 26,261	$ 16

VI. Portfolio Modelling

A. PTC Extension generally favors lower renewables buys

Case	180	250	400	Difference (400-180)
Reference	$ 32,118	$ 31,839	$ 31,755	$ 363
Low cost wind	$ 29,058	$ 28,849	$ 28,857	$ 201
High cost wind	$ 35,000	$ 34,651	$ 34,469	$ 532
low need	$ 29,573	$ 29,354	$ 29,423	$ 150
high need	$ 36,296	$ 36,008	$ 35,861	$ 435
High WECC Buildout	$ 29,437	$ 29,296	$ 29,336	$ 101
High carbon adder	$ 31,176	$ 30,870	$ 30,737	$ 439
Low carbon adder	$ 34,974	$ 34,755	$ 34,778	$ 196
High Gas	$ 31,321	$ 30,981	$ 30,754	$ 566
Low Gas	$ 33,018	$ 32,870	$ 32,957	$ 62
Low Hydro	$ 35,982	$ 35,679	$ 35,524	$ 458
High Hydro	$ 29,254	$ 29,002	$ 28,946	$ 309
High buildout low cost wind	$ 26,399	$ 26,314	$ 26,431	$ (33)
Low need/low cost wind/high buildout/low gas/low carbon/high hydro	$ 24,685	$ 24,675	$ 25,004	$ (319)

VI. Portfolio Modelling

A. Observations
1. Larger buy generally favored
2. Key risks to this strategy - Higher WECC buildout (market prices), lower wind tech costs, PTC extension

B. Optimization runs
1. Generally reinforce modelling
2. Even more renewables can be preferable under reference conditions
3. No selections at times under lower priced scenarios (i.e. PTC extension, low future tech costs, WECC buildouts, etc.)
4. High fill costs bring more selections

C. Non-Traditional Metrics
1. Rate Impact

Portfolio	Average	Median
180 MWa	7.0%	6.2%
250 MWa	9.4%	9.6%
400 MWa	11.0%	11.1%

VII. Recommendations

A. Provide additional non-traditional metrics

B. Speed interconnection process

C. Accommodate and design for hybrid proposals – i.e. wind/solar proposals sharing transmission

D. IE review of scoring and modelling methodology