
DRAFT APPENDIX L. PORTFOLIO DETAIL



LONG-TERM RESOURCE PORTFOLIOS

Long-term resource portfolios evaluated in PGE's 2016 IRP are subject to the following constraints:

- Reliability: portfolios meet the reliability standard of a maximum of 2.4 hours of lost load expectation in any single year from 2017 to 2050;¹
- Environmental: portfolios meet emission limits imposed by current legislation.²

Additionally, all portfolios pursue:

- Physical compliance to Oregon's Renewable Portfolio Standard (RPS) by compliance years: 2020, 2025, 2030, 2035, 2040 and 2050;
- Maximization of cost-effective, customer-side options: energy efficiency, demand-response and distributed generation;
- Retention of all existing power plants until 2050 with the exception of Boardman, which is ceasing its coal operation by the end of 2020. Colstrip units 3 and 4 are removed from PGE's resource portfolios no later than 2035;
- An action item of this IRP is the renewal of long-term hydro contracts, if they are cost-effective. For modeling purposes, however, PGE assumes that these and any other contracts end on their original expiration date.

This appendix lists the detailed composition of each long-term resource portfolio, describing the nameplate capacity of each resource added by year through 2030. Portfolios have major resource additions until 2025. After that date, all portfolios have a similar profile as they share the same customer side projected resources and include only incremental renewables resources to comply with the Oregon RPS and incremental generic capacity resources to meet reliability standards.

Resource options include:

- Distributed Energy Resources (DER):
 - DERs include Distributed Generation (DG), Dispatchable Standby Generation (DSG), Demand Response (DR), Energy Efficiency (EE), and Conservation Voltage Reduction (CVR);

¹ Portfolio 1 addresses incremental energy and capacity needs with spot market purchases. This portfolio does not meet reliability standards and is therefore not a viable strategy for PGE. It is used as a benchmark only.

² Portfolios 15 through 18 address Colstrip (units 3 and 4), which is removed from PGE customer prices in 2035. These portfolios exceed emission limits proposed under the Clean Power Plan.



- Generic capacity (seasonal contracts, mid-term/short-term contracts, energy storage, combustion turbines). For modeling purposes, PGE used a frame combustion turbine fueled with natural gas as proxy for generic capacity resources;
- Biomass;
- Efficient Thermal. For modeling purposes, PGE used an H-technology Combined Cycle Combustion Turbine (CCCT) fueled with natural gas as the proxy for efficient thermal resources;
- Geothermal;
- Wind located in Montana (Wind Montana);
- Wind located in the Oregon Gorge (Wind Gorge);
- Central Station Solar (Solar).

All portfolios contain the following common resources from 2017 through 2025³:

- 271 MWa (346 MW) of new EE;
- 255 MW of new DR;
- 22 MW of new DSG;
- 3 MWa (4 MW) of CVR, and
- A minimum of 213 MWa of qualifying resources by 2025 to meet the Oregon RPS.

PGE analyzed 26 different portfolios in the 2016 IRP, with the goal of evaluating the performance of various technologies, energy efficiency targets, the timing of resource additions, and the timing of physical RPS compliance. [Table 1](#) outlines which portfolios test each of the variables.

Of the 26 portfolios, eleven were considered as candidates for the Action Plan.

³ Gross amounts at the busbar.



TABLE 1 – LIST OF PORTFOLIOS AND SCOPE

No.	Name	Physical RPS Compliance Timing	Technology Options	Resource Addition Timing	Action Plan Candidate
1	RPS Wind 2018 + No Capacity Action				
2	RPS Wind 2018	•			•
3	Efficient Thermal 2021		•		•
4	Wind 2018 Long		•		•
5	Diverse Wind 2018 Long		•		
6	Wind 2018		•	•	•
7	Diverse Wind 2018		•	•	
8	Diverse Wind 2018 + Solar PV 2018		•	•	
9	Geothermal 2021		•		•
10	Boardman Biomass 2021		•	•	•
11	Wind 2018 + Solar PV 2018			•	•
12	Efficient Thermal 2021 + 2025		•	•	
13	Efficient Thermal 2021 + High EE		•		•
14	Wind 2018 + High EE		•		•
15	Colstrip Wind 2030		•	•	
16	Colstrip Wind 2035		•	•	
17	Colstrip Efficient Thermal 2030		•	•	
18	Colstrip Efficient Thermal 2035		•	•	
19	RPS Wind 2020	•			
20	RPS Wind 2025	•			
21	RPS Wind 2021	•			
22	Diverse Wind 2018 + Geothermal 2021		•	•	
23	Diverse Wind 2018 + Biomass 2021		•	•	
24	Diverse Wind 2021		•	•	
25	Wind 2018 + Solar PV 2021		•	•	•
26	RPS Wind 2018 + Staged RPS 2030	•	•	•	



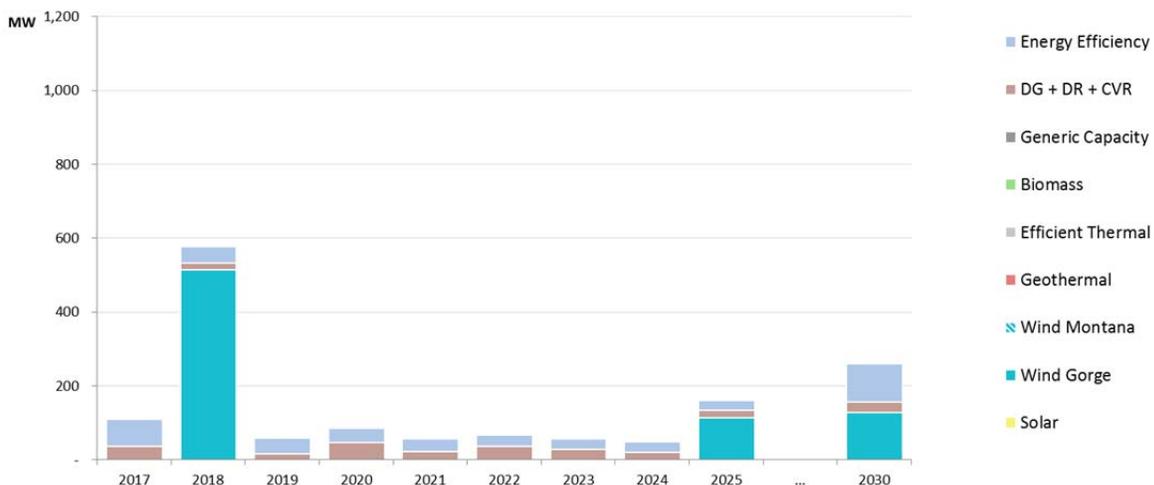
PORTFOLIO 1: RPS WIND 2018 + NO CAPACITY ACTION

In addition to the common resource actions, this portfolio adds Pacific Northwest Wind (Wind Gorge) resources in 2018 and on each compliance stair step date thereafter, adding: 175 MWa (515 MW nameplate capacity) in 2018, 38 MWa (113 MW) in 2025, 43 MWa (128 MW) in 2030, 597 MWa (1,755 MW) in 2035, 191 MWa (563 MW) in 2040, and 92 (271 MW) and 102 MWa (300 MW) in 2045 and 2050, respectively. Any other incremental energy and capacity needs are met with spot market purchases. This portfolio does not meet reliability standards and is therefore not a viable strategy for PGE. It is used as a benchmark only.

TABLE 2- PORTFOLIO 1: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER	109	62	60	85	56	68	57	48	47		134
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26		104
<i>DG + DR + CVR</i>	37	18	17	46	22	37	28	21	21		29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5		9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16		19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49		1.01
Generic Capacity	-	-	-	-	-	-	-	-	-		-
Biomass	-	-	-	-	-	-	-	-	-		-
Efficient Thermal	-	-	-	-	-	-	-	-	-		-
Geothermal	-	-	-	-	-	-	-	-	-		-
Wind Montana	-	-	-	-	-	-	-	-	-		-
Wind Gorge	-	515	-	-	-	-	-	-	113		128
Solar	-	-	-	-	-	-	-	-	-		-

FIGURE 1- PORTFOLIO 1 INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





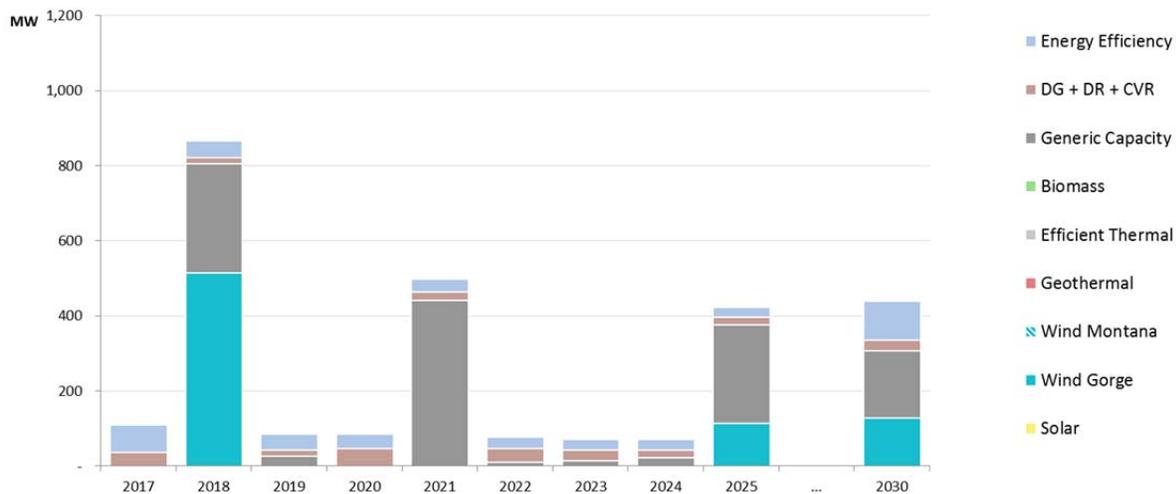
PORTFOLIO 2: RPS WIND 2018

In addition to the common resource actions, this portfolio is similar to Portfolio 1, but includes sufficient capacity resources to achieve PGE’s resource adequacy standards, while relying on the market for expected energy needs.

TABLE 3- PORTFOLIO 2: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER	109	62	60	85	56	68	57	48	47		134
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26		104
DG + DR + CVR	37	18	17	46	22	37	28	21	21		29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5		9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16		19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49		1.01
Generic Capacity	-	290	27	-	442	10	14	22	263		179
Biomass	-	-	-	-	-	-	-	-	-		-
Efficient Thermal	-	-	-	-	-	-	-	-	-		-
Geothermal	-	-	-	-	-	-	-	-	-		-
Wind Montana	-	-	-	-	-	-	-	-	-		-
Wind Gorge	-	515	-	-	-	-	-	-	113		128
Solar	-	-	-	-	-	-	-	-	-		-

FIGURE 2- PORTFOLIO 2 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





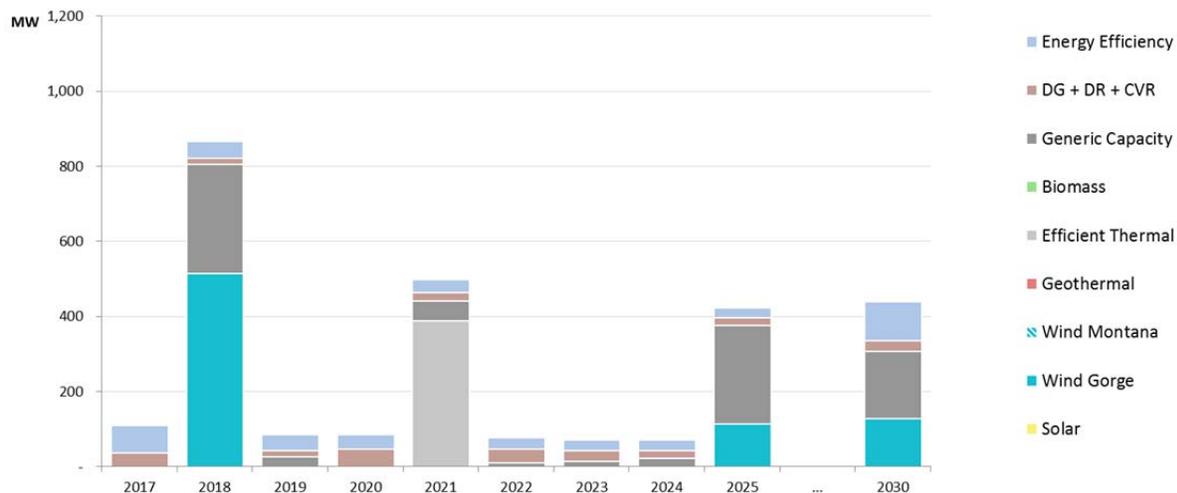
PORTFOLIO 3: EFFICIENT THERMAL 2021

In addition to the common resource actions, this portfolio adds a natural gas-fired CCCT to meet incremental energy needs in 2021. PGE assumes that partial construction of a CCCT is not an option. Therefore, the addition of a 389 MW nameplate CCCT results in an energy surplus through 2027 (with energy contribution from the resource measured at annual average availability).

TABLE 4- PORTFOLIO 3: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER	109	62	60	85	56	68	57	48	47		134
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26		104
<i>DG + DR + CVR</i>	37	18	17	46	22	37	28	21	21		29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5		9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16		19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49		1.01
Generic Capacity	-	290	27	-	53	10	14	22	263		179
Biomass	-	-	-	-	-	-	-	-	-		-
Efficient Thermal	-	-	-	-	389	-	-	-	-		-
Geothermal	-	-	-	-	-	-	-	-	-		-
Wind Montana	-	-	-	-	-	-	-	-	-		-
Wind Gorge	-	515	-	-	-	-	-	-	113		128
Solar	-	-	-	-	-	-	-	-	-		-

FIGURE 3- PORTFOLIO 3 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





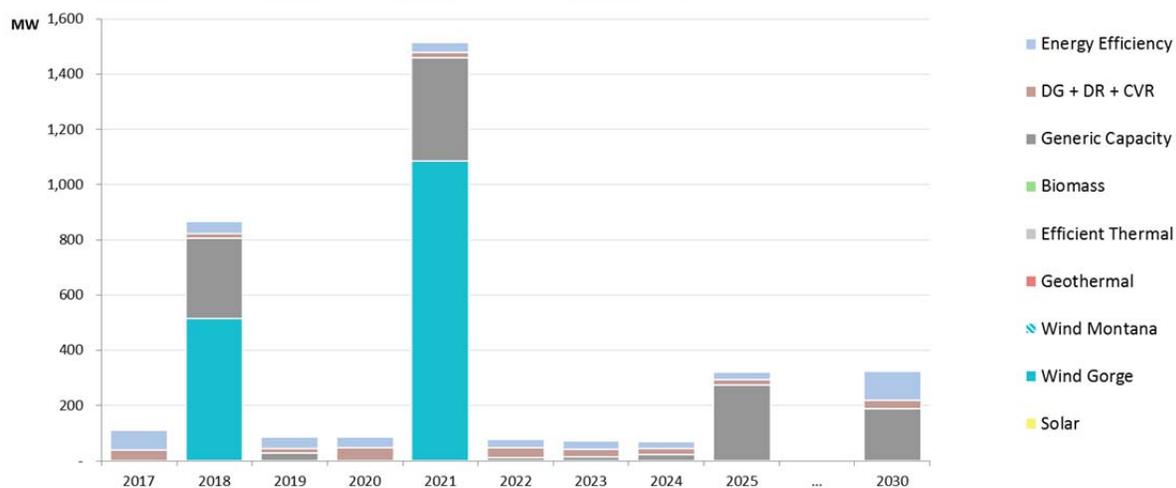
PORTFOLIO 4: WIND 2018 LONG

In addition to the common resource actions, this portfolio is similar to Portfolio 3 – Efficient Thermal 2021, but adds Wind Gorge in an equivalent quantity on an expected annual average energy basis in 2021. These early renewables additions result in deferral of additional physical RPS compliance actions. This portfolio is included for comparison purposes with Portfolio 3 to assess the relative cost/benefit of a portfolio composed of Wind Gorge, removing timing and size differences.

TABLE 5- PORTFOLIO 4: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER	109	62	60	85	56	68	57	48	47		134
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26		104
DG + DR + CVR	37	18	17	46	22	37	28	21	21		29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5		9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16		19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49		1.01
Generic Capacity	-	290	27	-	374	10	14	21	273		189
Biomass	-	-	-	-	-	-	-	-	-		-
Efficient Thermal	-	-	-	-	-	-	-	-	-		-
Geothermal	-	-	-	-	-	-	-	-	-		-
Wind Montana	-	-	-	-	-	-	-	-	-		-
Wind Gorge	-	515	-	-	1,084	-	-	-	-		-
Solar	-	-	-	-	-	-	-	-	-		-

FIGURE 4- PORTFOLIO 4 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





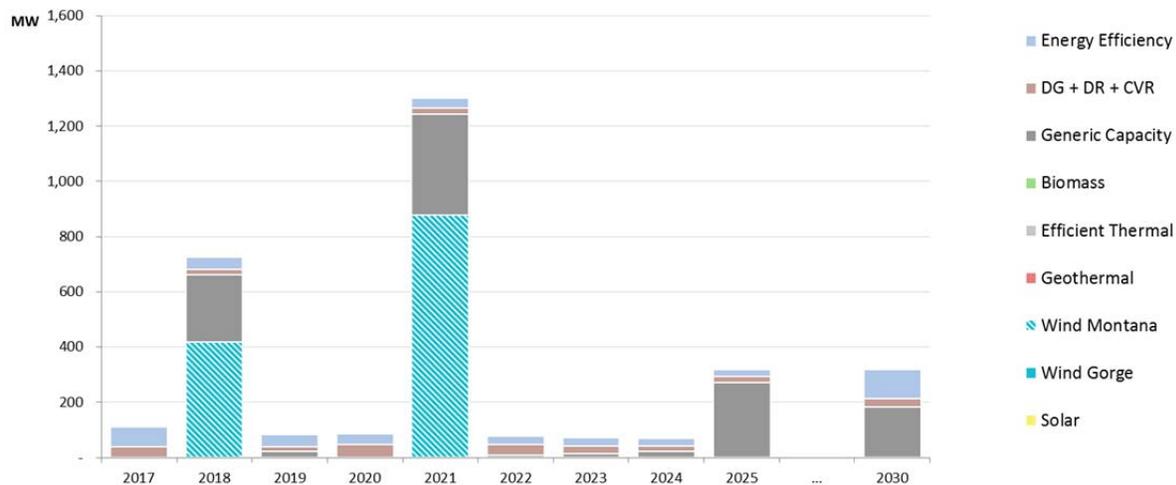
PORTFOLIO 5: DIVERSE WIND 2018 LONG

In addition to the common resource actions, this portfolio is similar to Portfolio 4 – Wind 2018 Long, but adds a wind resource with performance characteristics representative of a Montana site (Wind Montana) as opposed to Wind Gorge in 2018 and 2021. This portfolio is included for comparison purposes with Portfolio 4 to assess the relative cost/benefit of a portfolio composed of Montana wind.

TABLE 6- PORTFOLIO 5: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER	109	62	60	85	56	68	57	48	47		134
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26		104
DG + DR + CVR	37	18	17	46	22	37	28	21	21		29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5		9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16		19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49		1.01
Generic Capacity	-	245	22	-	366	8	13	20	271		183
Biomass	-	-	-	-	-	-	-	-	-		-
Efficient Thermal	-	-	-	-	-	-	-	-	-		-
Geothermal	-	-	-	-	-	-	-	-	-		-
Wind Montana	-	417	-	-	878	-	-	-	-		-
Wind Gorge	-	-	-	-	-	-	-	-	-		-
Solar	-	-	-	-	-	-	-	-	-		-

FIGURE 5- PORTFOLIO 4 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





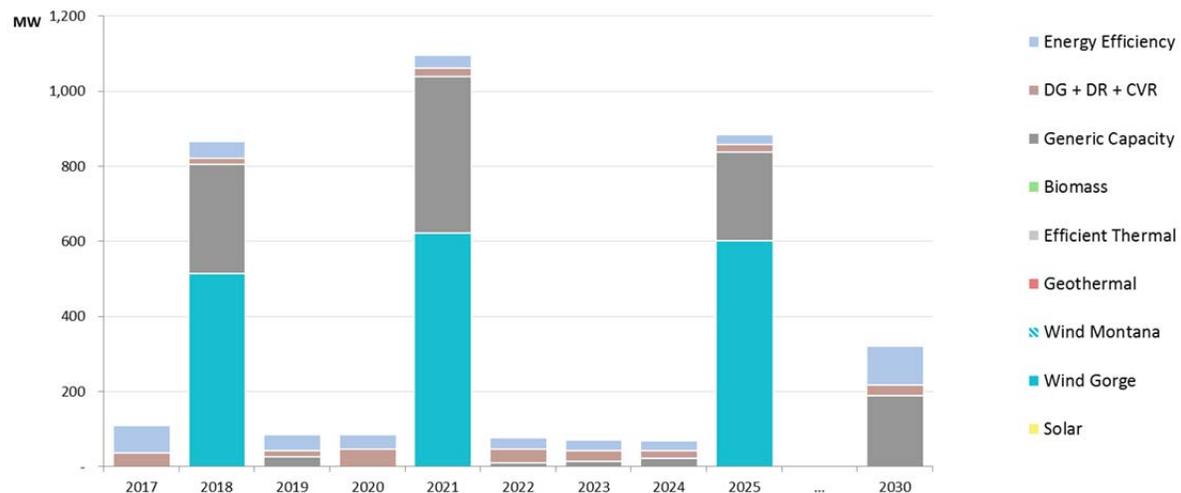
PORTFOLIO 6: WIND 2018

In addition to the common resource actions, this portfolio is similar to Portfolio 4 – Wind 2018 Long, but adds a wind resource sized to satisfy the portfolio energy need in that year (approximately 112 MWa). The wind resource addition qualifies for Federal Production Tax Credits (PTC) at the 40% level under an assumed construction period duration and commercial operation date (COD).

TABLE 2- PORTFOLIO 6: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER	109	62	60	85	56	68	57	48	47		134
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26		104
DG + DR + CVR	37	18	17	46	22	37	28	21	21		29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5		9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16		19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49		1.01
Generic Capacity	-	290	27	-	418	10	14	22	236		188
Biomass	-	-	-	-	-	-	-	-	-		-
Efficient Thermal	-	-	-	-	-	-	-	-	-		-
Geothermal	-	-	-	-	-	-	-	-	-		-
Wind Montana	-	-	-	-	-	-	-	-	-		-
Wind Gorge	-	515	-	-	622	-	-	-	601		-
Solar	-	-	-	-	-	-	-	-	-		-

FIGURE 6- PORTFOLIO 6 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





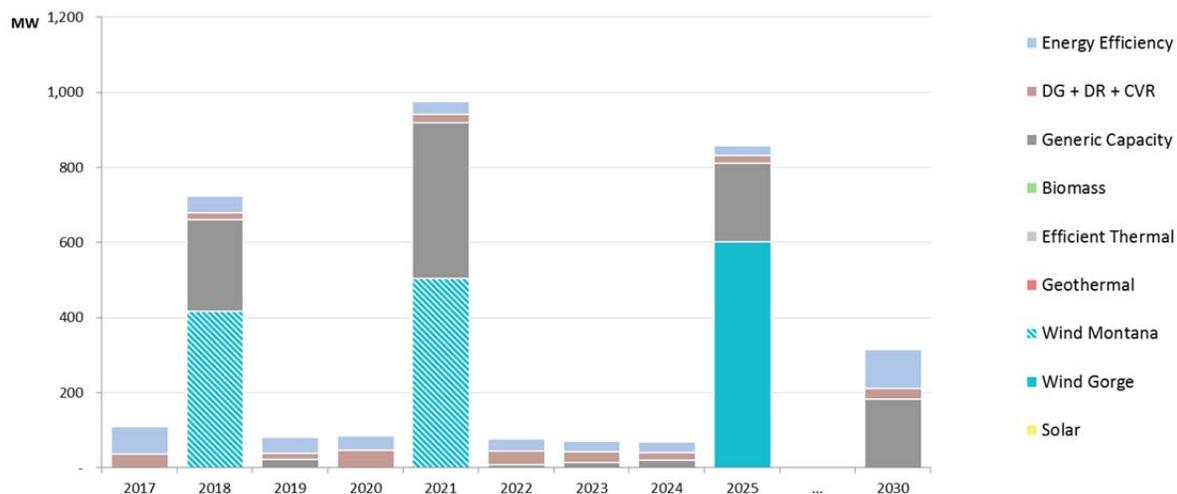
PORTFOLIO 7: DIVERSE WIND 2018

In addition to the common resource actions, this portfolio is similar to Portfolio 5 – Diverse Wind 2018 Long, but adds Wind Montana in 2021 sized to satisfy the portfolio energy need in that year (approximately 112 MWa). This portfolio identifies the difference of a diverse wind resource after removing the requirement imposed in Portfolio 5 – Diverse Wind 2018 Long that the resource be sized equivalent to a CCCT. When compared with Portfolio 2 – RPS Wind 2018, this portfolio also enables PGE to estimate the potential budget that could be allocated to transmission infrastructure (if needed) in order to deliver output from a remote resource to PGE Load.

TABLE 8- PORTFOLIO 7: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER		109	62	60	85	56	68	57	48		47
<i>Energy Efficiency</i>		72	44	43	38	35	31	29	27		26
<i>DG + DR + CVR</i>		37	18	17	46	22	37	28	21		21
- Distributed Generation (DG)		7	14	13	13	12	10	8	6		5
- Demand Response (DR)		30	4	3	33	9	26	19	15		16
- Conservation Voltage Reduction (CVR)		-	0.43	0.43	0.43	0.45	0.46	0.47	0.48		0.49
Generic Capacity		-	245	22	-	416	9	14	20		209
Biomass		-	-	-	-	-	-	-	-		-
Efficient Thermal		-	-	-	-	-	-	-	-		-
Geothermal		-	-	-	-	-	-	-	-		-
Wind Montana		-	417	-	-	504	-	-	-		-
Wind Gorge		-	-	-	-	-	-	-	-		601
Solar		-	-	-	-	-	-	-	-		-

FIGURE 7- PORTFOLIO 7 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





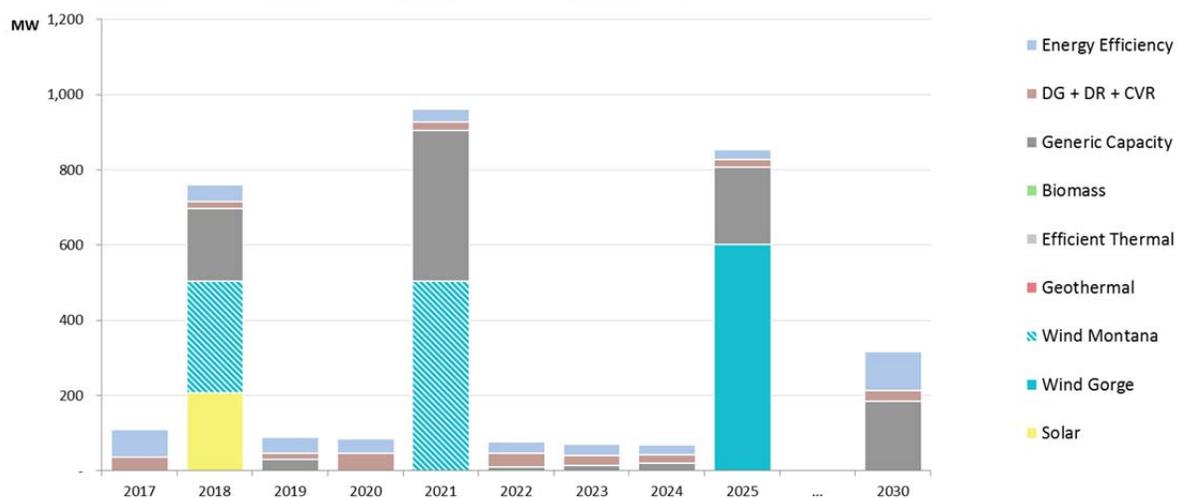
PORTFOLIO 8: DIVERSE WIND 2018 + SOLAR PV 2018

In addition to the common resource actions, this portfolio is similar to Portfolio 5 – Diverse Wind 2018 Long, but includes 50 MWa of Solar PV in 2018 to explore the potential benefits of displacing a portion of the Wind Gorge resource by including Solar PV. The Solar PV resource addition qualifies for Federal Investment Tax Credits (PTC) at the 30% level under an assumed construction period duration and commercial operation date (COD).

TABLE 9- PORTFOLIO 8: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	... 2030
DER	109	62	60	85	56	68	57	48	47	134
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26	104
DG + DR + CVR	37	18	17	46	22	37	28	21	21	29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5	9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16	19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49	1.01
Generic Capacity	-	238	35	-	416	11	15	21	236	191
Biomass	-	-	-	-	-	-	-	-	-	-
Efficient Thermal	-	-	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-	-	-
Wind Montana	-	-	-	-	-	-	-	-	-	-
Wind Gorge	-	368	-	-	622	-	-	-	601	-
Solar	-	207	-	-	-	-	-	-	-	-

FIGURE 8- PORTFOLIO 8 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





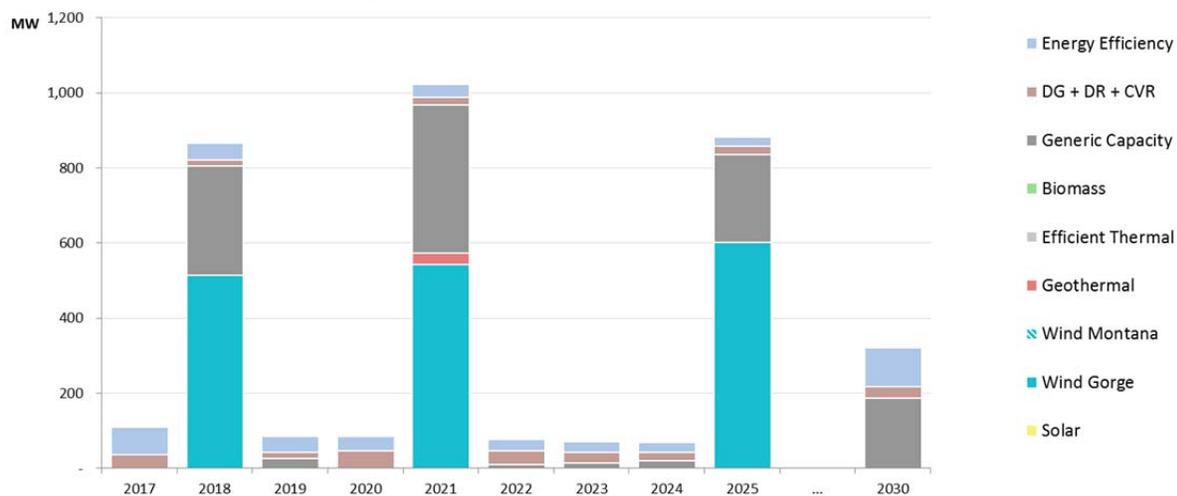
PORTFOLIO 9: GEOTHERMAL 2021

In addition to the common resource actions, this portfolio is similar to Portfolio 5 – Diverse Wind 2018 Long, but replaces 27 MWA of Wind Gorge with Geothermal to explore the effects of a renewable resource with a higher capacity contribution than wind or solar.

TABLE 10- PORTFOLIO 9: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER	109	62	60	85	56	68	57	48	47		134
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26		104
DG + DR + CVR	37	18	17	46	22	37	28	21	21		29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5		9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16		19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49		1.01
Generic Capacity	-	290	27	-	393	10	14	21	235		188
Biomass	-	-	-	-	-	-	-	-	-		-
Efficient Thermal	-	-	-	-	-	-	-	-	-		-
Geothermal	-	-	-	-	30	-	-	-	-		-
Wind Montana	-	-	-	-	-	-	-	-	-		-
Wind Gorge	-	515	-	-	544	-	-	-	601		-
Solar	-	-	-	-	-	-	-	-	-		-

FIGURE 9- PORTFOLIO 9 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





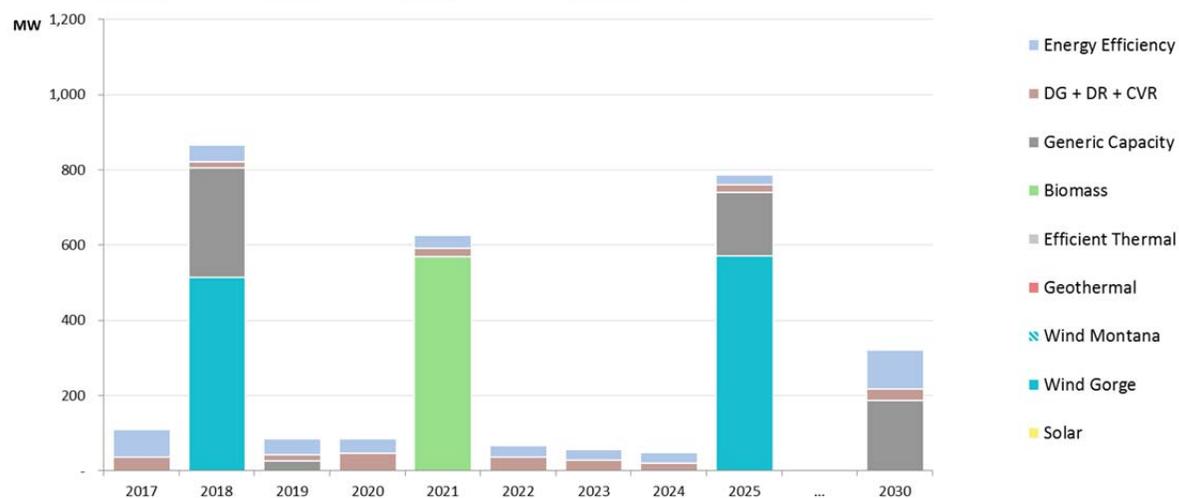
PORTFOLIO 10: BOARDMAN BIOMASS 2021

In addition to the common resource actions, this portfolio is similar to Portfolio 2 – RPS Wind 2018, but adds a resource based on the conversion of the Boardman Plant to a Biomass facility, slightly exceeding the energy target. Adding this resource to the portfolio explores the effect of a renewable resource with a higher capacity contribution than wind or solar and further investigates the cost-effectiveness threshold for Boardman’s conversion to biomass.

TABLE 11- PORTFOLIO 10: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	... 2030
DER	109	62	60	85	56	68	57	48	47	134
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26	104
DG + DR + CVR	37	18	17	46	22	37	28	21	21	29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5	9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16	19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49	1.01
Generic Capacity	-	290	27	-	-	-	-	-	169	188
Biomass	-	-	-	-	570	-	-	-	-	-
Efficient Thermal	-	-	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-	-	-
Wind Montana	-	-	-	-	-	-	-	-	-	-
Wind Gorge	-	515	-	-	-	-	-	-	571	-
Solar	-	-	-	-	-	-	-	-	-	-

FIGURE 10- PORTFOLIO 10 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





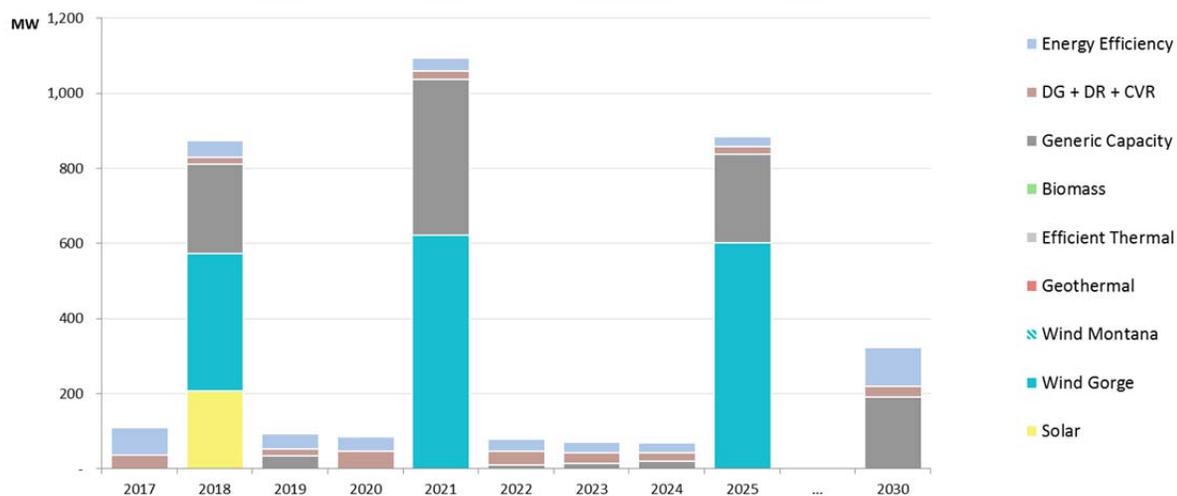
PORTFOLIO 11: WIND 2018 + SOLAR PV 2018

In addition to the common resource actions, this portfolio is similar to Portfolio 8 – Diverse Wind 2018 + Solar PV 2018, but replaces Wind Montana with Wind Gorge.

TABLE 12- PORTFOLIO 11: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER	109	62	60	85	56	68	57	48	47		134
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26		104
DG + DR + CVR	37	18	17	46	22	37	28	21	21		29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5		9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16		19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49		1.01
Generic Capacity	-	238	35	-	416	11	15	21	236		191
Biomass	-	-	-	-	-	-	-	-	-		-
Efficient Thermal	-	-	-	-	-	-	-	-	-		-
Geothermal	-	-	-	-	-	-	-	-	-		-
Wind Montana	-	-	-	-	-	-	-	-	-		-
Wind Gorge	-	368	-	-	622	-	-	-	601		-
Solar	-	207	-	-	-	-	-	-	-		-

FIGURE 11- PORTFOLIO 11 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





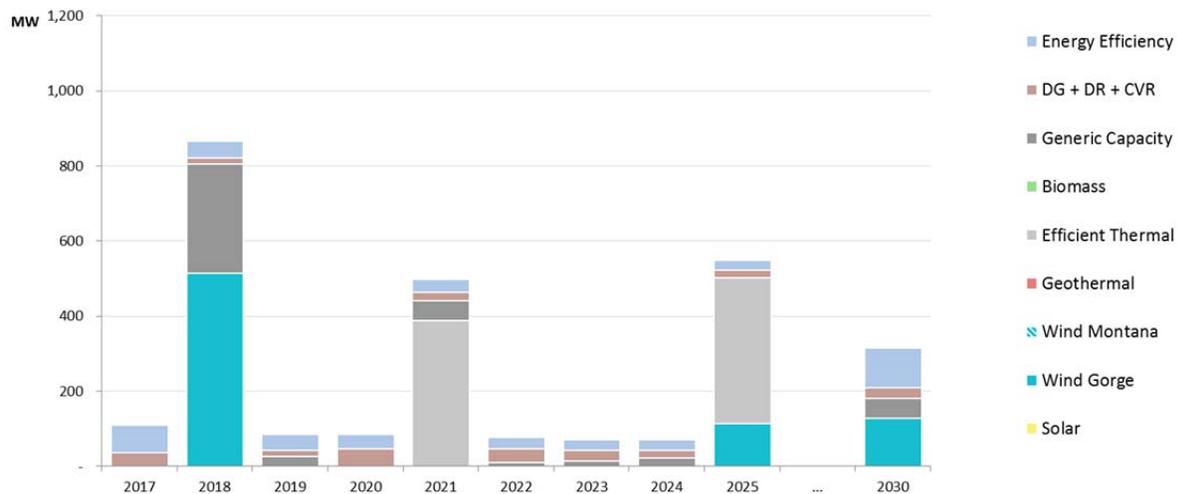
PORTFOLIO 12: EFFICIENT THERMAL 2021 + 2025

In addition to the common resource actions, this portfolio is similar to Portfolio 3 – Efficient Thermal 2021, but adds a CCCT in 2025 to approximately satisfy the estimated capacity needs. This portfolio is long energy on an expected availability basis, and explores the effects of relying on a low-heat rate resource to meet capacity needs.

TABLE 13- PORTFOLIO 12: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER	109	62	60	85	56	68	57	48	47		134
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26		104
DG + DR + CVR	37	18	17	46	22	37	28	21	21		29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5		9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16		19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49		1.01
Generic Capacity	-	290	27	-	53	10	14	22	-		53
Biomass	-	-	-	-	-	-	-	-	-		-
Efficient Thermal	-	-	-	-	389	-	-	-	389		-
Geothermal	-	-	-	-	-	-	-	-	-		-
Wind Montana	-	-	-	-	-	-	-	-	-		-
Wind Gorge	-	515	-	-	-	-	-	-	113		128
Solar	-	-	-	-	-	-	-	-	-		-

FIGURE 12- PORTFOLIO 12 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





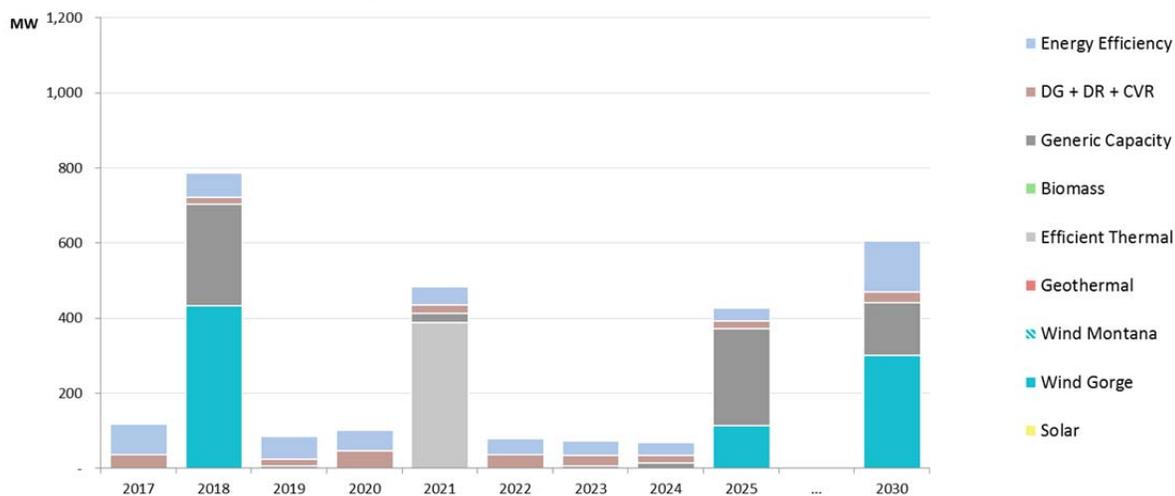
PORTFOLIO 13: EFFICIENT THERMAL 2021 + HIGH EE

In addition to the common resource actions, this portfolio is similar to Portfolio 3 – Efficient Thermal 2021, but adds the procurement all potential EE above the cost-effective threshold. Including incremental EE displaces portions of the energy, capacity, and RPS requirements in the portfolio.

TABLE 14- PORTFOLIO 13: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER	109	62	60	85	56	68	57	48	47		134
<i>Energy Efficiency</i>	80	67	63	54	48	43	39	35	33		136
DG + DR + CVR	37	18	17	46	22	37	28	21	21		29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5		9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16		19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49		1.01
Generic Capacity	(21)	271	7	-	25	-	7	14	258		141
Biomass	-	-	-	-	-	-	-	-	-		-
Efficient Thermal	-	-	-	-	389	-	-	-	-		-
Geothermal	-	-	-	-	-	-	-	-	-		-
Wind Montana	-	-	-	-	-	-	-	-	-		-
Wind Gorge	-	432	-	-	-	-	-	-	114		301
Solar	-	-	-	-	-	-	-	-	-		-

FIGURE 13- PORTFOLIO 13 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





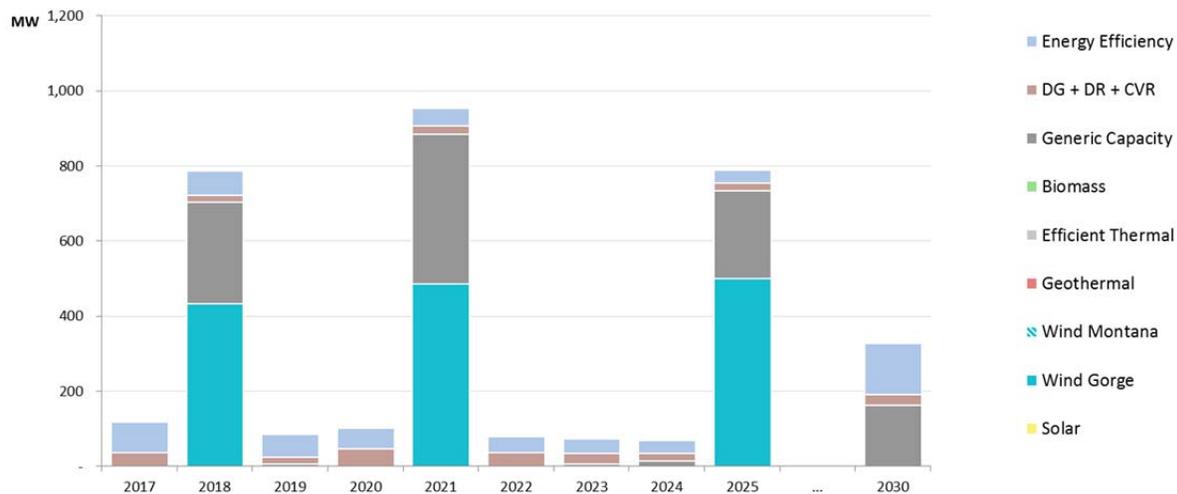
PORTFOLIO 14: WIND 2018 + HIGH EE

In addition to the common resource actions, this portfolio is similar to Portfolio 2 – RPS Wind 2018, but adds the procurement all potential EE above the cost-effective threshold. Including incremental EE displaces portions of the energy, capacity, and RPS requirements in the portfolio.

TABLE 15- PORTFOLIO 14: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER	109	62	60	85	56	68	57	48	47		134
<i>Energy Efficiency</i>	80	67	63	54	48	43	39	35	33		136
DG + DR + CVR	37	18	17	46	22	37	28	21	21		29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5		9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16		19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49		1.01
Generic Capacity	(21)	271	7	-	398	-	7	14	233		163
Biomass	-	-	-	-	-	-	-	-	-		-
Efficient Thermal	-	-	-	-	-	-	-	-	-		-
Geothermal	-	-	-	-	-	-	-	-	-		-
Wind Montana	-	-	-	-	-	-	-	-	-		-
Wind Gorge	-	432	-	-	487	-	-	-	501		-
Solar	-	-	-	-	-	-	-	-	-		-

FIGURE 14- PORTFOLIO 14 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





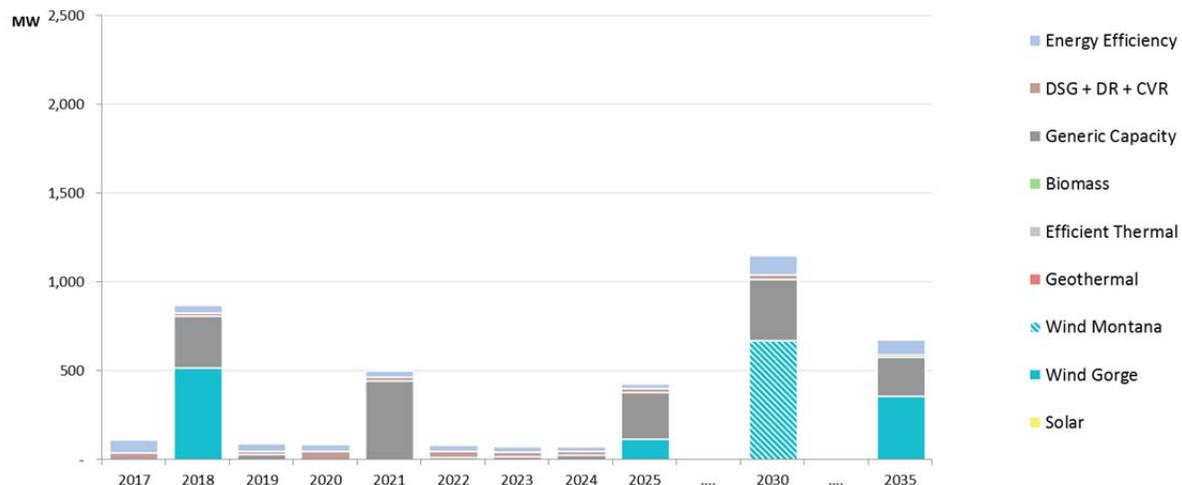
PORTFOLIO 15: COLSTRIP WIND 2030

In addition to the common resource actions, this portfolio removes Colstrip Units 3 & 4 from PGE's resource portfolio at year-end 2029, and replaces them on an equivalent expected energy basis with the Wind Montana resource. Capacity resources are added through 2034 to ensure comparability with Portfolio 16 – Colstrip Wind 2035.

TABLE 16- PORTFOLIO 15: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	2030	2035
DER	109	62	60	85	56	68	57	48	47	134	97
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26	104	86
DG + DR + CVR	37	18	17	46	22	37	28	21	21	29	11
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5	9	5
- Demand Response (DR)	30	4	3	33	9	26	19	15	16	19	5
- Conservation Voltage Reduction (CVR)	0	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49	134	97
Generic Capacity	-	290	27	-	442	10	14	22	263	343	219
Biomass	-	-	-	-	-	-	-	-	-	-	-
Efficient Thermal	-	-	-	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-	-	-	-
Wind Montana	-	-	-	-	-	-	-	-	-	670	-
Wind Gorge	-	515	-	-	-	-	-	-	113	-	357
Solar	-	-	-	-	-	-	-	-	-	-	-

FIGURE 15- PORTFOLIO 15 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





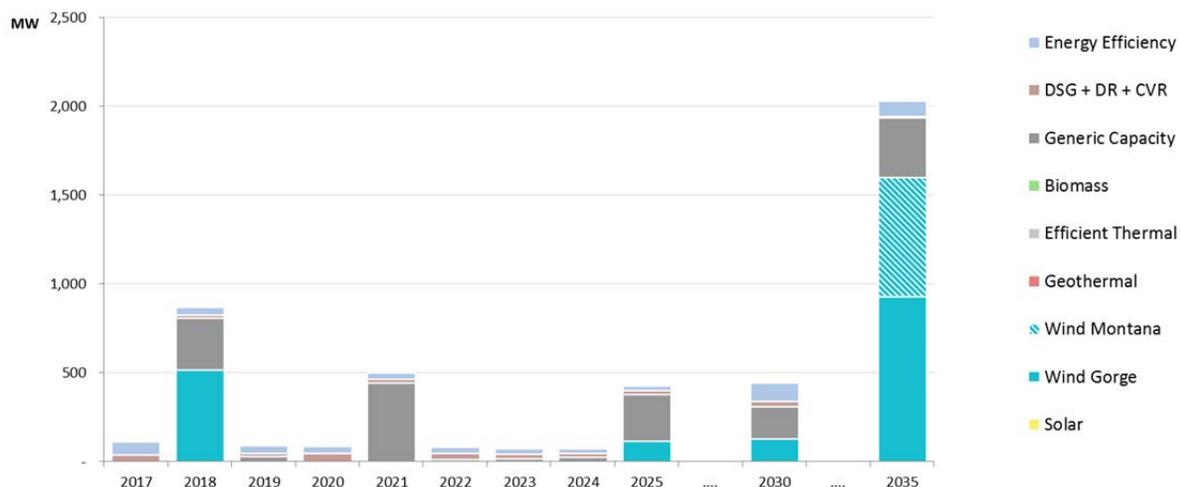
PORTFOLIO 16: COLSTRIP WIND 2035

In addition to the common resource actions, this portfolio is similar to Portfolio 15 – Colstrip Wind 2030, but removes Colstrip Units 3 & 4 from PGE’s resource portfolio at year-end 2034 and replaces them on an equivalent expected energy basis with the Wind Montana resource.

TABLE 17- PORTFOLIO 16: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	2030	2035
DER	109	62	60	85	56	68	57	48	47	134	97
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26	104	86
DG + DR + CVR	37	18	17	46	22	37	28	21	21	29	11
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5	9	5
- Demand Response (DR)	30	4	3	33	9	26	19	15	16	19	5
- Conservation Voltage Reduction (CVR)	0	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49	134	97
Generic Capacity	-	290	27	-	442	10	14	22	263	179	337
Biomass	-	-	-	-	-	-	-	-	-	-	-
Efficient Thermal	-	-	-	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-	-	-	-
Wind Montana	-	-	-	-	-	-	-	-	-	-	670
Wind Gorge	-	515	-	-	-	-	-	-	113	128	928
Solar	-	-	-	-	-	-	-	-	-	-	-

FIGURE 16- PORTFOLIO 16 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





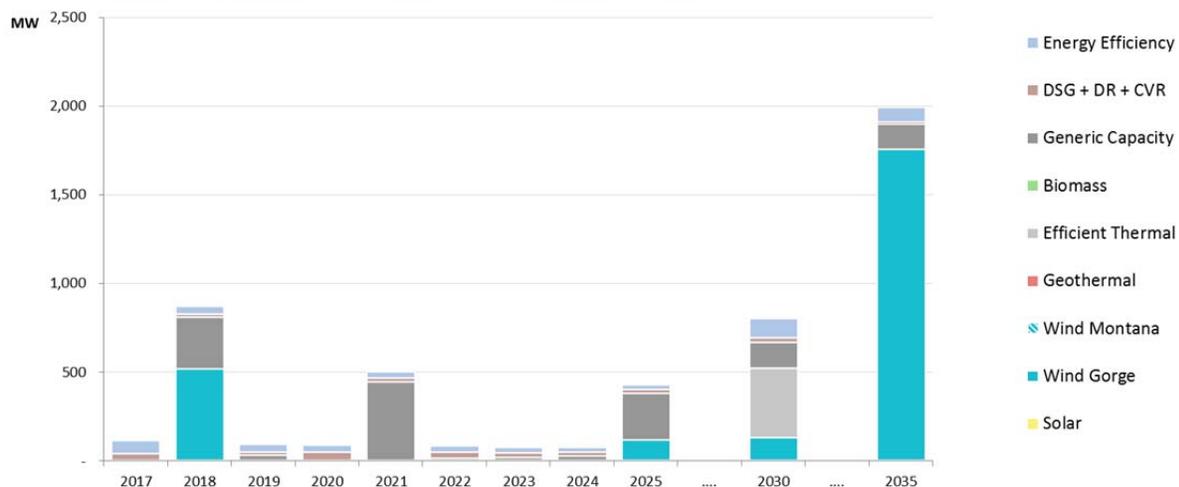
PORTFOLIO 17: COLSTRIP EFFICIENT THERMAL 2030

In addition to the common resource actions, this portfolio is similar to Portfolio 15 – Colstrip Wind 2030, but replaces Colstrip Units 3 & 4 with an H-class CCCT rather than a wind resource. Capacity resources are added through 2034 to ensure comparability with Portfolio 18 – Colstrip Efficient Thermal 2035. This portfolio explores the effect of relying on a low-heat rate resource to meet capacity needs.

TABLE 18- PORTFOLIO 17: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	2030	2035
DER	109	62	60	85	56	68	57	48	47	134	97
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26	104	86
DG + DR + CVR	37	18	17	46	22	37	28	21	21	29	11
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5	9	5
- Demand Response (DR)	30	4	3	33	9	26	19	15	16	19	5
- Conservation Voltage Reduction (CVR)	0	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49	134	97
Generic Capacity	-	290	27	-	442	10	14	22	263	146	142
Biomass	-	-	-	-	-	-	-	-	-	-	-
Efficient Thermal	-	-	-	-	-	-	-	-	-	389	-
Geothermal	-	-	-	-	-	-	-	-	-	-	-
Wind Montana	-	-	-	-	-	-	-	-	-	-	-
Wind Gorge	-	515	-	-	-	-	-	-	113	128	1,755
Solar	-	-	-	-	-	-	-	-	-	-	-

FIGURE 17- PORTFOLIO 17 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





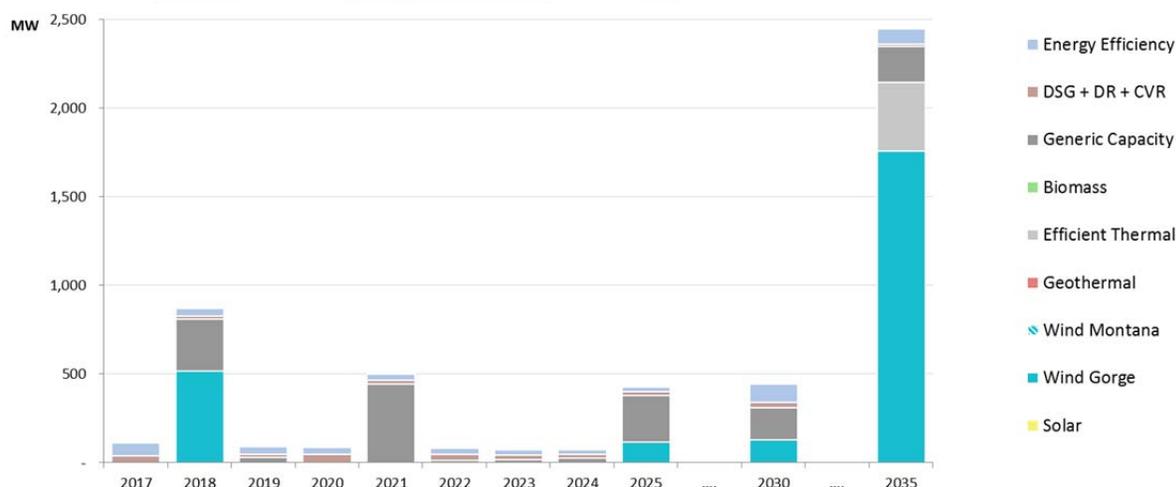
PORTFOLIO 18: COLSTRIP EFFICIENT THERMAL 2035

In addition to the common resource actions, this portfolio is similar to Portfolio 16 – Colstrip Wind 2030, but replaces Colstrip Units 3 & 4 with an H-class CCCT rather than a wind resource. This portfolio explores the effect of a relying on a low-heat rate resource to meet capacity needs.

TABLE 19- PORTFOLIO 18: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	2030	2035
DER	109	62	60	85	56	68	57	48	47	134	97
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26	104	86
DG + DR + CVR	37	18	17	46	22	37	28	21	21	29	11
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5	9	5
- Demand Response (DR)	30	4	3	33	9	26	19	15	16	19	5
- Conservation Voltage Reduction (CVR)	0	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49	134	97
Generic Capacity	-	290	27	-	442	10	14	22	263	179	202
Biomass	-	-	-	-	-	-	-	-	-	-	-
Efficient Thermal	-	-	-	-	-	-	-	-	-	-	389
Geothermal	-	-	-	-	-	-	-	-	-	-	-
Wind Montana	-	-	-	-	-	-	-	-	-	-	-
Wind Gorge	-	515	-	-	-	-	-	-	113	128	1,755
Solar	-	-	-	-	-	-	-	-	-	-	-

FIGURE 18- PORTFOLIO 18 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





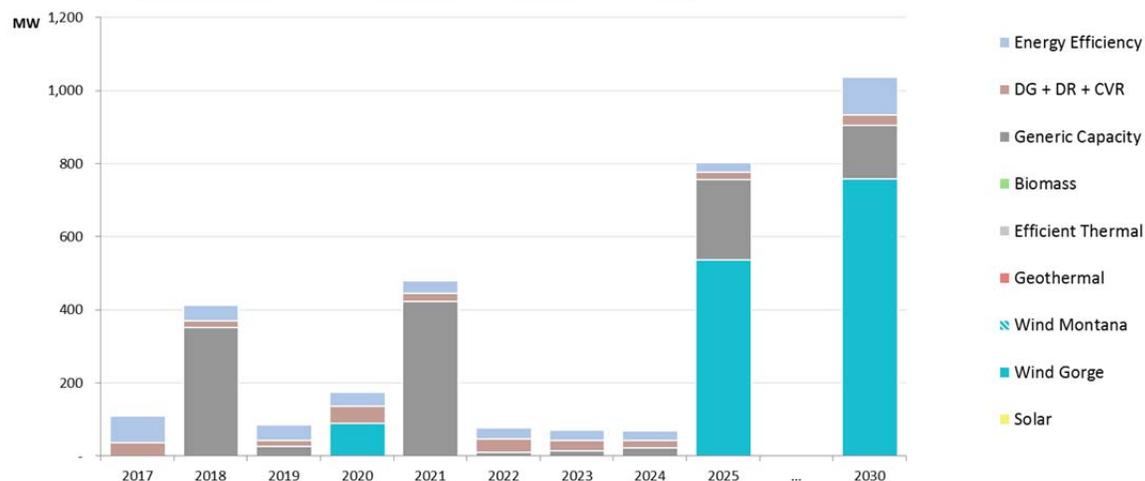
PORTFOLIO 19: RPS WIND 2020

In addition to the common resource actions, this portfolio reflects the addition of renewable resources sized and timed to comply with the RPS milestones. This portfolio adds Wind Gorge through 2035 as follows: 31 MWa (90 MW nameplate capacity) in 2020, 183 MWa (538 MW) in 2025, 258 MWa (758 MW) in 2030, and 383 MWa (1125 MW) in 2035.⁴

TABLE 20- PORTFOLIO 19: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER	109	62	60	85	56	68	57	48	47		134
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26		104
DG + DR + CVR	37	18	17	46	22	37	28	21	21		29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5		9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16		19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49		1.01
Generic Capacity	-	352	27	-	424	10	15	21	219		146
Biomass	-	-	-	-	-	-	-	-	-		-
Efficient Thermal	-	-	-	-	-	-	-	-	-		-
Geothermal	-	-	-	-	-	-	-	-	-		-
Wind Montana	-	-	-	-	-	-	-	-	-		-
Wind Gorge	-	-	-	90	-	-	-	-	538		758
Solar	-	-	-	-	-	-	-	-	-		-

FIGURE 19- PORTFOLIO 19 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)



⁴ Resource additions post-2035 are identical to Portfolio 2 – RPS Wind in 2018.



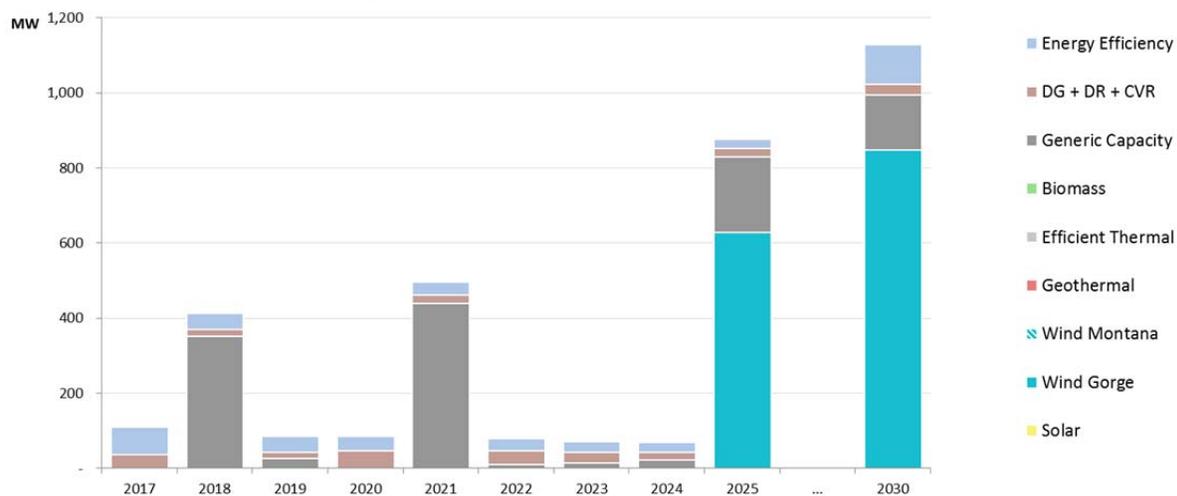
PORTFOLIO 20: RPS WIND 2025

In addition to the common resource actions, this portfolio reflects the deferral of physical compliance with the RPS milestones. This portfolio adds 213 MWa (628 MW nameplate capacity) of the Wind Gorge resource in 2025 as the first incremental physical RPS qualifying resource.

TABLE 21- PORTFOLIO 20: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER	109	62	60	85	56	68	57	48	47		134
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26		104
DG + DR + CVR	37	18	17	46	22	37	28	21	21		29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5		9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16		19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49		1.01
Generic Capacity	-	352	27	-	439	11	15	22	203		146
Biomass	-	-	-	-	-	-	-	-	-		-
Efficient Thermal	-	-	-	-	-	-	-	-	-		-
Geothermal	-	-	-	-	-	-	-	-	-		-
Wind Montana	-	-	-	-	-	-	-	-	-		-
Wind Gorge	-	-	-	-	-	-	-	-	628		848
Solar	-	-	-	-	-	-	-	-	-		-

FIGURE 20- PORTFOLIO 20 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





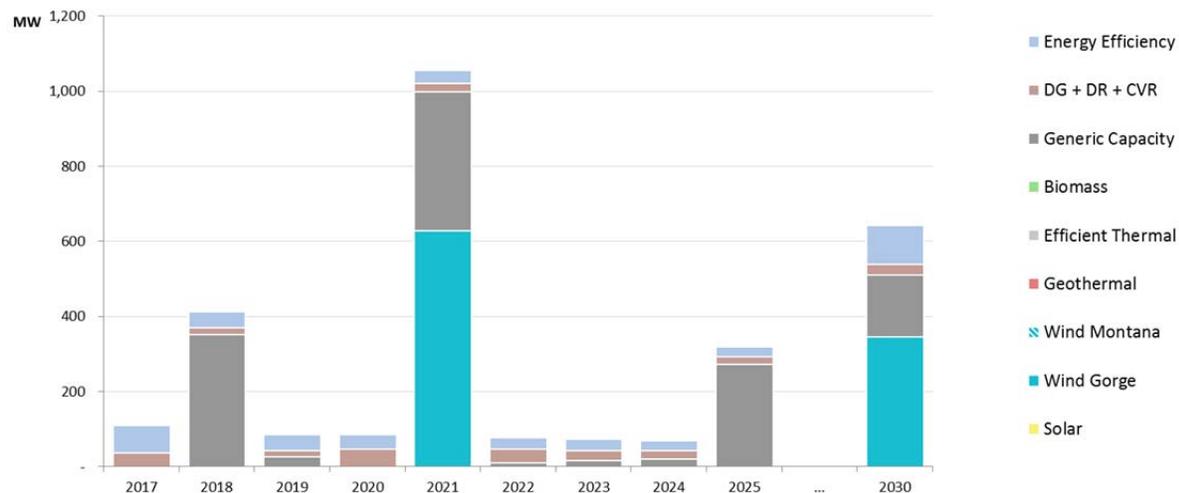
PORTFOLIO 21: RPS WIND 2021

In addition to the common resource actions, this portfolio is similar to Portfolio 20 – RPS Wind 2025, but adds 213 MWa (628 MW nameplate capacity) of the Wind Gorge resource in 2021 as the first incremental physical RPS qualifying resource. Wind Gorge resource addition qualifies for Federal Investment Tax Credits (PTC) at the 40% level under an assumed construction period duration and commercial operation date (COD).

TABLE 22- PORTFOLIO 21: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER	109	62	60	85	56	68	57	48	47		134
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26		104
DG + DR + CVR	37	18	17	46	22	37	28	21	21		29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5		9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16		19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49		1.01
Generic Capacity	-	352	27	-	371	9	15	21	272		164
Biomass	-	-	-	-	-	-	-	-	-		-
Efficient Thermal	-	-	-	-	-	-	-	-	-		-
Geothermal	-	-	-	-	-	-	-	-	-		-
Wind Montana	-	-	-	-	-	-	-	-	-		-
Wind Gorge	-	-	-	-	628	-	-	-	-		346
Solar	-	-	-	-	-	-	-	-	-		-

FIGURE 21- PORTFOLIO 21 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





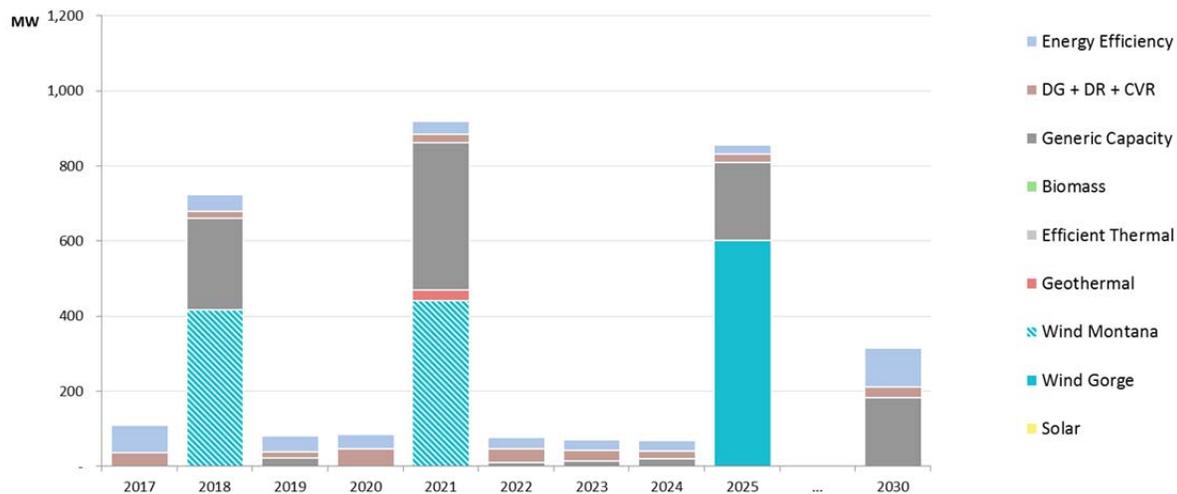
PORTFOLIO 22: DIVERSE WIND 2018 + GEOTHERMAL 2021

In addition to the common resource actions, this portfolio is similar to Portfolio 8 – Diverse Wind 2018, but replaces a portion of the Wind Gorge resource with Geothermal in 2021 to explore the effects of a renewable resource with a higher capacity contribution than wind or solar.

TABLE 23- PORTFOLIO 22: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER	109	62	60	85	56	68	57	48	47		134
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26		104
DG + DR + CVR	37	18	17	46	22	37	28	21	21		29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5		9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16		19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49		1.01
Generic Capacity	-	245	22	-	392	9	14	21	209		183
Biomass	-	-	-	-	-	-	-	-	-		-
Efficient Thermal	-	-	-	-	-	-	-	-	-		-
Geothermal	-	-	-	-	30	-	-	-	-		-
Wind Montana	-	417	-	-	440	-	-	-	-		-
Wind Gorge	-	-	-	-	-	-	-	-	601		-
Solar	-	-	-	-	-	-	-	-	-		-

FIGURE 22- PORTFOLIO 22 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





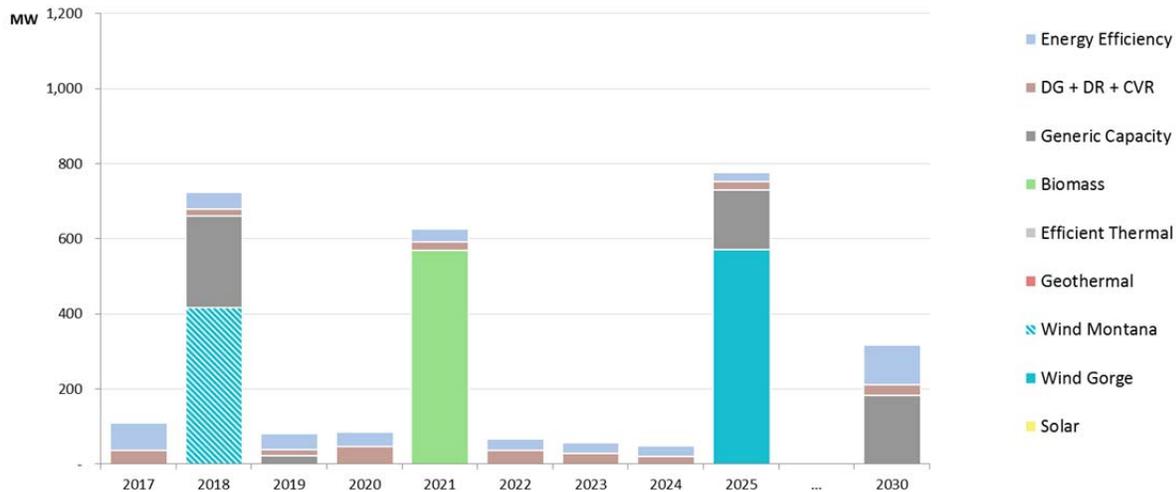
PORTFOLIO 23: DIVERSE WIND 2018 + BIOMASS 2021

In addition to the common resource actions, this portfolio explores the effects of RPS diversity by adding Wind Montana, Wind Gorge, and Boardman biomass in similar proportions.

TABLE 24- PORTFOLIO 23: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER	109	62	60	85	56	68	57	48	47		134
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26		104
DG + DR + CVR	37	18	17	46	22	37	28	21	21		29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5		9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16		19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49		1.01
Generic Capacity	-	245	22	-	-	-	-	-	161		183
Biomass	-	-	-	-	570	-	-	-	-		-
Efficient Thermal	-	-	-	-	-	-	-	-	-		-
Geothermal	-	-	-	-	-	-	-	-	-		-
Wind Montana	-	417	-	-	-	-	-	-	-		-
Wind Gorge	-	-	-	-	-	-	-	-	571		-
Solar	-	-	-	-	-	-	-	-	-		-

FIGURE 23- PORTFOLIO 23 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





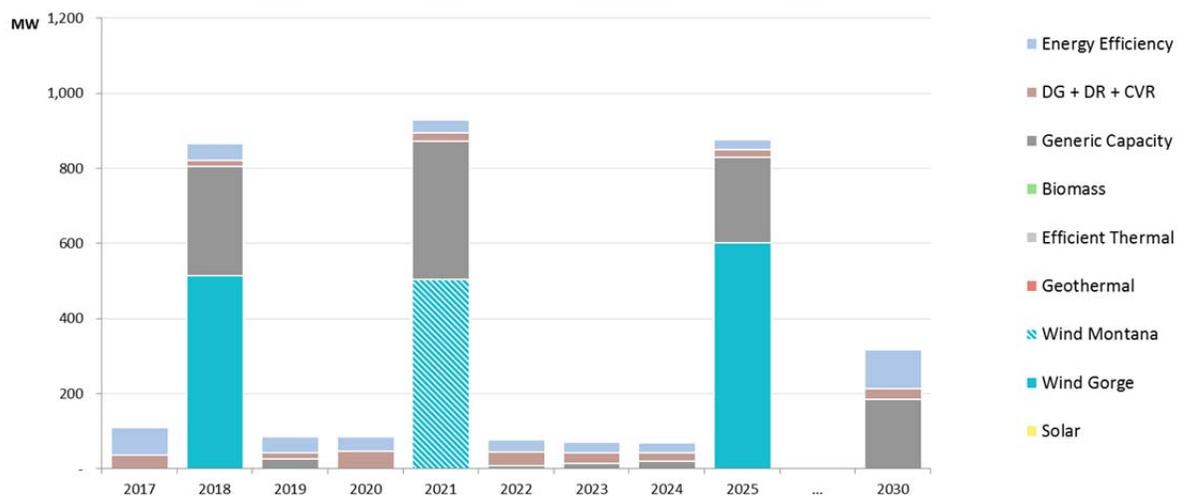
PORTFOLIO 24: DIVERSE WIND 2021

In addition to the common resource actions, this portfolio is similar to Portfolio 6 – Wind 2018, but replaces the addition of Wind Gorge with Wind Montana in 2021.

TABLE 25- PORTFOLIO 24: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER	109	62	60	85	56	68	57	48	47		134
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26		104
DG + DR + CVR	37	18	17	46	22	37	28	21	21		29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5		9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16		19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49		1.01
Generic Capacity	-	290	27	-	370	9	14	21	228		184
Biomass	-	-	-	-	-	-	-	-	-		-
Efficient Thermal	-	-	-	-	-	-	-	-	-		-
Geothermal	-	-	-	-	-	-	-	-	-		-
Wind Montana	-	-	-	-	504	-	-	-	-		-
Wind Gorge	-	515	-	-	-	-	-	-	601		-
Solar	-	-	-	-	-	-	-	-	-		-

FIGURE 24- PORTFOLIO 24 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





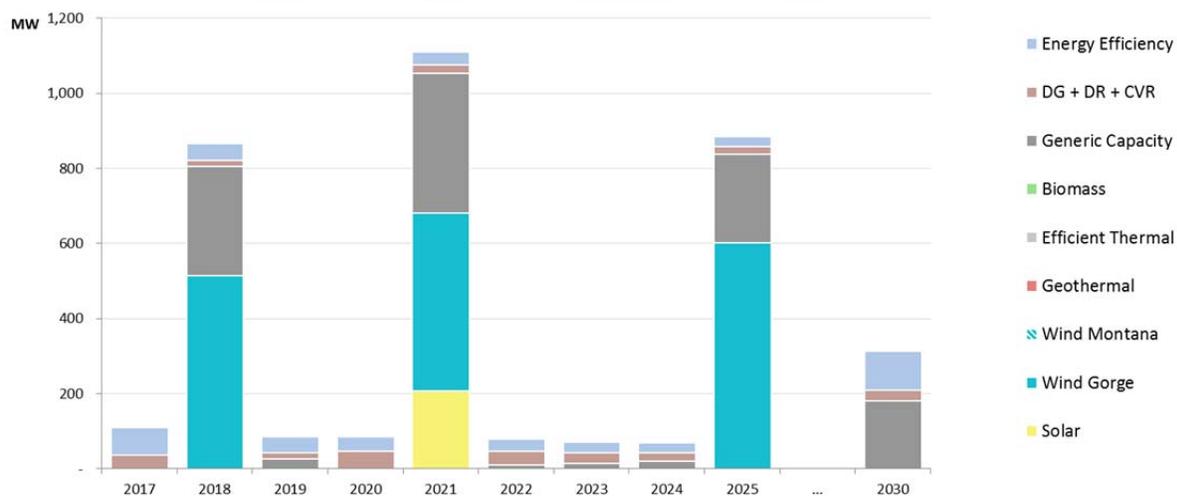
PORTFOLIO 25: WIND 2018 + SOLAR PV 2021

In addition to the common resource actions, this portfolio is similar to Portfolio 6 – Wind 2018, but replaces a portion of Wind Gorge with Solar PV in 2021.

TABLE 26- PORTFOLIO 25: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER	109	62	60	85	56	68	57	48	47		134
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26		104
<i>DG + DR + CVR</i>	37	18	17	46	22	37	28	21	21		29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5		9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16		19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49		1.01
Generic Capacity	-	290	27	-	372	11	15	21	236		180
Biomass	-	-	-	-	-	-	-	-	-		-
Efficient Thermal	-	-	-	-	-	-	-	-	-		-
Geothermal	-	-	-	-	-	-	-	-	-		-
Wind Montana	-	-	-	-	-	-	-	-	-		-
Wind Gorge	-	515	-	-	475	-	-	-	601		-
Solar	-	-	-	-	207	-	-	-	-		-

FIGURE 25- PORTFOLIO 25 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)





PORTFOLIO 26: RPS WIND 2018 + STAGED RPS 2030

In addition to the common resource actions, this portfolio explores the effects of deferral of physical compliance with the RPS and staging resources additions starting in 2025 to meet the 35% in 2030 RPS requirement.

TABLE 27- PORTFOLIO 26: ANNUAL RESOURCE ADDITIONS, NAMEPLATE CAPACITY (MW)

Resource	2017	2018	2019	2020	2021	2022	2023	2024	2025	...	2030
DER	109	62	60	85	56	68	57	48	47		134
<i>Energy Efficiency</i>	72	44	43	38	35	31	29	27	26		104
DG + DR + CVR	37	18	17	46	22	37	28	21	21		29
- Distributed Generation (DG)	7	14	13	13	12	10	8	6	5		9
- Demand Response (DR)	30	4	3	33	9	26	19	15	16		19
- Conservation Voltage Reduction (CVR)	-	0.43	0.43	0.43	0.45	0.46	0.47	0.48	0.49		1.01
Generic Capacity	-	290	27	-	442	10	14	22	263		146
Biomass	-	-	-	-	-	-	-	-	-		-
Efficient Thermal	-	-	-	-	-	-	-	-	-		-
Geothermal	-	-	-	-	-	-	-	-	-		-
Wind Montana	-	-	-	-	-	-	-	-	-		-
Wind Gorge	-	515	-	-	-	-	-	-	113		670
Solar	-	-	-	-	-	-	-	-	-		-

FIGURE 26- PORTFOLIO 26 RESOURCE ADDITIONS: INCREMENTAL NAMEPLATE CAPACITY BY YEAR (MW)

