BUILDING OUR FUTURE

September 2023

IRP

INTEGRATED RESOURCE PLAN

APPENDIX C: **TECHNICAL REPORT**

IDAHO POWER®

SAFE HARBOR STATEMENT

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INTRODUCTION

Appendix C–Technical Appendix contains supporting data and explanatory materials used to develop Idaho Power's *2023 Integrated Resource Plan* (IRP).

The main document, the 2023 IRP Report, contains a full narrative of Idaho Power's resource planning process. Additional information regarding the 2023 IRP sales and load forecast is contained in *Appendix A–Sales and Load Forecast* and details on Idaho Power's demand-side management efforts are explained in *Appendix B–Demand-Side Management 2022 Annual Report*.

For information or questions concerning the resource plan or the resource planning process, contact Idaho Power:

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IRP ADVISORY COUNCIL

Idaho Power has involved representatives of the public in the IRP planning process since the early 1990s. This public forum is known as the IRP Advisory Council (IRPAC). The IRPAC generally meets monthly during the development of the IRP, and the meetings are open to the public. Members of the council include regulatory, political, environmental, and customer representatives, as well as representatives of other public-interest groups.

Idaho Power hosted 11 IRPAC meetings for the 2023 IRP. Idaho Power values these opportunities to convene, and the IRPAC members and the public have made significant contributions to this plan.

Involvement from the public improves the IRP, and Idaho Power is grateful to the individuals and groups that participated in the process.

Customer Representatives

Agricultural Representative	Sid Erwin
Boise State University	Barry Burbank
Idaho Milk Products	Chris Parker
Idaho National Laboratory	Kurt Myers
KitzWorks, LLC	Kevin Kitz
Meta	Etta Lockey
Micron	Jim Swier
Obendorf Farms	Brock Obendorf
St. Luke's Medical	Stephanie Wicks
Syngenta Seeds	Patrick Silveria

Public-Interest Representatives

Boise State University Energy Policy Institute	Kathleen Araujo
City of Boise	Steve Burgos
City of Nampa	Mark Steuer
Clean Energy Opportunities for Idaho	Mike Heckler
Idaho Conservation League	Brad Heusinkveld
Idaho Legislature	Rep. Laurie Lickley
Idaho Office of Energy and Mineral Resources	Richard Stover
Idaho Water Resource Board	Brian Olmstead
National Renewable Energy Laboratory	Wesley Cole
Oil and Gas Industry Advisor	David Hawk

Oregon State University, Malheur Experiment Station Professor Emeritus	Clint Shock
Renewable Northwest	Sashwat Roy
Sierra Club	Lisa Young
Sun Valley Institute for Resilience	Herbert Romero

Regulatory Commission Representatives

Idaho Public Utilities Commission	Matt Suess
Public Utility Commission of Oregon	Kim Herb

IRPAC Meeting Schedule and Agenda

Meeting Dates		Agenda Items
2022	Wednesday, May 4	Energy Efficiency Subcommittee Meeting
2022	Tuesday, August 30	Introductory Comments Idaho Power Team Introductions Advisory Council Introductions
2022	Thursday, September 8	Review of 2021 IRP 2023 IRP Overview Carbon Outlook Transmission Update
2022	Thursday, October 13	CSPP, Natural Gas, Energy, and Demand Forecasts
2022	Thursday, November 10	Hydro System Future Resources Energy Efficiency Demand Response Modeling Scenarios
2022	Thursday, December 8	Reliability and Capacity Natural Gas Conversion Future Supply-Side Resources Modeling Scenarios
2023	Thursday, January 12	Transmission and Distribution (T&D) Planning Solar on Underutilized Lands Stochastics Resource Adequacy
2023	Thursday, February 9	Modeling Update with Scenarios and Sensitivities Follow-up
2023	Thursday, March 9	Industry Topics Electrification Scenarios Loss of Load Analysis
2023	Thursday, April 27	Transmission Updates
2023	Tuesday, August 15	Analysis Update Preliminary Modeling Results
2023	Thursday, August 31	Scenarios and Sensitivities Risk Analysis Preferred Portfolio and Action Plan

SALES AND LOAD FORECAST DATA

Compound Annual Forecast Growth Rates

	2024–2029	2024–2034	2024–2043
Sales			
Residential Sales	1.14%	1.19%	1.06%
Commercial Sales	0.71%	0.79%	0.83%
Irrigation Sales	0.36%	0.46%	0.56%
Industrial Sales	1.14%	1.18%	1.32%
Additional Firm Sales	35.81%	17.94%	9.13%
System Sales	4.22%	2.85%	1.87%
Total Sales	4.22%	2.85%	1.87%
Average Loads			
Residential Load	1.20%	1.22%	1.07%
Commercial Load	0.78%	0.82%	0.84%
Irrigation Load	0.42%	0.49%	0.58%
Industrial Load	1.19%	1.21%	1.33%
Additional Firm Sales	35.81%	17.94%	9.13%
System Load Losses	3.37%	2.30%	1.59%
System Load	5.40%	3.37%	2.12%
Total Load	5.40%	3.37%	2.12%
Peaks			
System Peak	3.67%	2.49%	1.76%
Total Peak	3.67%	2.49%	1.76%
Winter Peak	4.35%	2.59%	1.61%
Summer Peak	3.67%	2.49%	1.76%
Customers			
Residential Customers	2.01%	1.93%	1.60%
Commercial Customers	1.53%	1.60%	1.50%
Irrigation Customers	1.13%	1.10%	1.05%
Industrial Customers	0.80%	0.63%	0.65%

Expected-Case Load Forecast

2024 Monthly Summary[1]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Load (aMW) 70th Percentile												
Residential	854	760	639	535	508	596	817	719	557	559	697	891
Commercial	535	493	467	449	459	499	557	537	495	478	493	534
Irrigation	4	4	14	156	372	626	696	578	344	70	9	4
Industrial	311	296	307	299	304	318	319	322	314	315	314	315
Additional Firm	137	138	137	132	127	129	128	127	119	131	152	163
Loss	158	147	137	138	153	182	208	190	157	136	144	161
System Load	**1,998**	**1,837**	**1,701**	**1,710**	**1,923**	**2,350**	**2,725**	**2,473**	**1,986**	**1,690**	**1,809**	**2,069**
Light Load	1,865	1,716	1,587	1,566	1,755	2,108	2,451	2,194	1,808	1,541	1,689	1,925
Heavy Load	2,103	1,927	1,791	1,815	2,055	2,544	2,941	2,674	2,141	1,797	1,905	2,192
Total Load	**1,998**	**1,837**	**1,701**	**1,710**	**1,923**	**2,350**	**2,725**	**2,473**	**1,986**	**1,690**	**1,809**	**2,069**
Peak Load (MW) 70th Percentile												
System Peak Load (1 hour)	2,487	2,306	2,178	2,553	2,655	3,668	3,830	3,547	3,108	2,323	2,311	2,492
Total Peak Load	**2,487**	**2,306**	**2,178**	**2,553**	**2,655**	**3,668**	**3,830**	**3,547**	**3,108**	**2,323**	**2,311**	**2,492**

2025 Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Load (aMW) 70th Percentile												
Residential	862	794	646	542	514	605	829	729	563	564	701	897
Commercial	539	514	470	452	462	502	561	541	498	480	495	538
Irrigation	4	4	14	157	374	631	703	583	347	71	9	4
Industrial	317	312	313	304	310	324	325	328	319	321	320	319
Additional Firm	176	188	187	185	195	211	226	238	243	266	281	303
Loss	160	153	140	141	156	186	213	196	162	142	149	167
System Load	**2,057**	**1,965**	**1,769**	**1,781**	**2,011**	**2,460**	**2,857**	**2,615**	**2,132**	**1,843**	**1,955**	**2,227**
Light Load	1,920	1,835	1,650	1,631	1,835	2,206	2,570	2,320	1,941	1,680	1,825	2,072
Heavy Load	2,165	2,062	1,862	1,891	2,150	2,662	3,084	2,847	2,284	1,960	2,068	2,349
Total Load	**2,057**	**1,965**	**1,769**	**1,781**	**2,011**	**2,460**	**2,857**	**2,615**	**2,132**	**1,843**	**1,955**	**2,227**
Peak Load (MW) 70th Percentile												
System Peak Load (1 hour)	2,567	2,391	2,242	2,635	2,749	3,788	4,001	3,729	3,268	2,494	2,483	2,656
Total Peak Load	**2,567**	**2,391**	**2,242**	**2,635**	**2,749**	**3,788**	**4,001**	**3,729**	**3,268**	**2,494**	**2,483**	**2,656**

1.The sales and load forecast reflects the impact of existing energy efficiency programs on average load and peak demand. The new energy efficiency programs, proposed as part of the 2023 IRP. The peak load forecast does not include the impact of existing or new demand response programs.

2026 Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Load (aMW) 70th Percentile												
Residential	867	799	649	545	518	611	839	738	569	568	706	903
Commercial	546	519	474	457	466	507	567	547	502	484	499	541
Irrigation	4	4	14	157	374	632	704	584	347	71	9	4
Industrial	320	315	316	308	313	327	328	331	323	324	323	322
Additional Firm	329	355	370	384	395	422	443	456	456	473	484	498
Loss	166	160	146	148	163	194	221	204	170	149	156	174
System Load	**2,232**	**2,152**	**1,970**	**1,998**	**2,230**	**2,693**	**3,103**	**2,860**	**2,366**	**2,069**	**2,176**	**2,442**
Light Load	2,083	2,010	1,838	1,829	2,034	2,416	2,791	2,537	2,154	1,886	2,032	2,272
Heavy Load	2,349	2,259	2,074	2,121	2,398	2,896	3,349	3,115	2,536	2,201	2,303	2,576
Total Load	**2,232**	**2,152**	**1,970**	**1,998**	**2,230**	**2,693**	**3,103**	**2,860**	**2,366**	**2,069**	**2,176**	**2,442**
Peak Load (MW) 70th Percentile												
System Peak Load (1 hour)	2,741	2,568	2,460	2,847	2,942	4,041	4,256	3,981	3,515	2,707	2,700	2,880
Total Peak Load	**2,741**	**2,568**	**2,460**	**2,847**	**2,942**	**4,041**	**4,256**	**3,981**	**3,515**	**2,707**	**2,700**	**2,880**

2027 Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Load (aMW) 70th Percentile												
Residential	874	805	655	550	524	619	852	749	577	574	713	913
Commercial	550	522	476	459	468	510	571	551	504	485	500	544
Irrigation	4	4	14	157	375	635	708	587	348	71	9	4
Industrial	323	318	319	310	316	330	332	334	326	327	326	325
Additional Firm	511	523	520	519	518	537	547	551	544	553	562	576
Loss	173	166	152	153	168	199	227	209	174	153	160	178
System Load	**2,434**	**2,339**	**2,137**	**2,150**	**2,369**	**2,830**	**3,236**	**2,981**	**2,473**	**2,163**	**2,270**	**2,539**
Light Load	2,272	2,184	1,993	1,968	2,161	2,538	2,910	2,645	2,251	1,972	2,119	2,362
Heavy Load	2,574	2,455	2,240	2,282	2,548	3,043	3,493	3,247	2,650	2,314	2,391	2,679
Total Load	**2,434**	**2,339**	**2,137**	**2,150**	**2,369**	**2,830**	**3,236**	**2,981**	**2,473**	**2,163**	**2,270**	**2,539**
Peak Load (MW) 70th Percentile												
System Peak Load (1 hour)	2,949	2,765	2,633	3,000	3,061	4,185	4,406	4,116	3,625	2,795	2,792	2,972
Total Peak Load	**2,949**	**2,765**	**2,633**	**3,000**	**3,061**	**4,185**	**4,406**	**4,116**	**3,625**	**2,795**	**2,792**	**2,972**

2028 Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
						Average Load (aMW) 70th Percentile						
Residential	884	786	662	557	531	629	867	762	585	582	721	923
Commercial	555	509	480	463	472	514	577	556	508	488	503	547
Irrigation	4	4	14	157	375	636	710	589	349	71	9	4
Industrial	326	310	322	313	319	334	335	337	329	331	329	328
Additional Firm	578	584	587	583	577	592	598	598	585	589	594	604
Loss	177	165	156	157	171	202	230	212	177	155	162	180
System Load	**2,523**	**2,358**	**2,220**	**2,230**	**2,445**	**2,908**	**3,317**	**3,054**	**2,533**	**2,215**	**2,317**	**2,586**
Light Load	2,355	2,202	2,071	2,042	2,231	2,607	2,983	2,709	2,306	2,019	2,163	2,405
Heavy Load	2,668	2,474	2,328	2,381	2,615	3,127	3,604	3,304	2,715	2,370	2,441	2,741
Total Load	**2,523**	**2,358**	**2,220**	**2,230**	**2,445**	**2,908**	**3,317**	**3,054**	**2,533**	**2,215**	**2,317**	**2,586**
						Peak Load (MW) 70th Percentile						
System Peak Load (1 hour)	3,038	2,853	2,714	3,074	3,121	4,269	4,501	4,204	3,695	2,845	2,840	3,011
Total Peak Load	**3,038**	**2,853**	**2,714**	**3,074**	**3,121**	**4,269**	**4,501**	**4,204**	**3,695**	**2,845**	**2,840**	**3,011**

2029 Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
						Average Load (aMW) 70th Percentile						
Residential	894	824	670	564	539	640	883	776	595	589	729	934
Commercial	560	531	483	467	474	517	582	560	511	491	505	552
Irrigation	4	4	14	157	375	638	712	591	350	71	9	4
Industrial	329	324	325	317	322	337	338	341	332	334	332	331
Additional Firm	605	615	615	613	609	628	637	638	627	631	637	648
Loss	179	172	158	159	174	205	233	215	180	157	164	183
System Load	**2,570**	**2,470**	**2,265**	**2,276**	**2,493**	**2,965**	**3,386**	**3,122**	**2,595**	**2,273**	**2,377**	**2,652**
Light Load	2,399	2,306	2,112	2,083	2,274	2,659	3,045	2,770	2,362	2,072	2,219	2,467
Heavy Load	2,706	2,592	2,374	2,429	2,666	3,189	3,679	3,377	2,798	2,418	2,503	2,811
Total Load	**2,570**	**2,470**	**2,265**	**2,276**	**2,493**	**2,965**	**3,386**	**3,122**	**2,595**	**2,273**	**2,377**	**2,652**
						Peak Load (MW) 70th Percentile						
System Peak Load (1 hour)	3,085	2,899	2,755	3,114	3,161	4,337	4,585	4,288	3,767	2,900	2,898	3,070
Total Peak Load	**3,085**	**2,899**	**2,755**	**3,114**	**3,161**	**4,337**	**4,585**	**4,288**	**3,767**	**2,900**	**2,898**	**3,070**

2030 Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Load (aMW) 70th Percentile												
Residential	904	833	678	571	546	651	899	789	604	596	736	943
Commercial	568	537	488	472	479	523	589	568	516	495	510	555
Irrigation	4	4	14	157	377	641	716	594	352	71	9	4
Industrial	333	328	329	320	326	341	342	344	336	338	336	335
Additional Firm	667	677	668	661	654	674	682	683	671	677	684	697
Loss	182	175	160	161	176	208	237	219	182	160	167	186
System Load	**2,658**	**2,554**	**2,337**	**2,343**	**2,559**	**3,038**	**3,465**	**3,197**	**2,660**	**2,337**	**2,442**	**2,720**
Light Load	2,480	2,385	2,180	2,145	2,334	2,724	3,116	2,836	2,422	2,130	2,280	2,530
Heavy Load	2,798	2,681	2,461	2,488	2,736	3,289	3,740	3,458	2,869	2,486	2,572	2,883
Total Load	**2,658**	**2,554**	**2,337**	**2,343**	**2,559**	**3,038**	**3,465**	**3,197**	**2,660**	**2,337**	**2,442**	**2,720**
Peak Load (MW) 70th Percentile												
System Peak Load (1 hour)	3,176	2,983	2,830	3,178	3,220	4,420	4,679	4,381	3,848	2,970	2,968	3,133
Total Peak Load	**3,176**	**2,983**	**2,830**	**3,178**	**3,220**	**4,420**	**4,679**	**4,381**	**3,848**	**2,970**	**2,968**	**3,133**

2031 Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Load (aMW) 70th Percentile												
Residential	914	842	686	578	554	662	915	804	614	604	745	954
Commercial	572	541	491	475	482	526	594	572	519	497	512	559
Irrigation	4	4	14	158	378	644	720	598	353	72	9	4
Industrial	337	332	333	324	330	345	346	348	340	342	340	339
Additional Firm	696	705	696	688	680	698	704	702	688	692	697	707
Loss	185	177	162	163	178	210	240	221	184	161	168	187
System Load	**2,707**	**2,601**	**2,381**	**2,386**	**2,602**	**3,085**	**3,519**	**3,246**	**2,698**	**2,368**	**2,471**	**2,752**
Light Load	2,526	2,429	2,221	2,184	2,374	2,766	3,164	2,879	2,456	2,158	2,307	2,560
Heavy Load	2,838	2,730	2,507	2,534	2,767	3,340	3,775	3,535	2,875	2,519	2,603	2,891
Total Load	**2,707**	**2,601**	**2,381**	**2,386**	**2,602**	**3,085**	**3,519**	**3,246**	**2,698**	**2,368**	**2,471**	**2,752**
Peak Load (MW) 70th Percentile												
System Peak Load (1 hour)	3,224	3,032	2,870	3,215	3,258	4,478	4,747	4,446	3,902	3,003	2,997	3,156
Total Peak Load	**3,224**	**3,032**	**2,870**	**3,215**	**3,258**	**4,478**	**4,747**	**4,446**	**3,902**	**3,003**	**2,997**	**3,156**

2032 Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Load (aMW) 70th Percentile												
Residential	924	823	694	585	562	672	931	817	622	611	752	962
Commercial	579	528	495	480	487	531	601	578	523	502	516	563
Irrigation	4	4	14	158	380	648	724	601	355	72	9	4
Industrial	341	324	336	328	333	349	350	352	344	346	344	344
Additional Firm	705	706	701	692	683	701	706	705	690	694	699	709
Loss	187	174	164	165	180	212	242	223	186	162	169	188
System Load	**2,739**	**2,558**	**2,404**	**2,408**	**2,624**	**3,113**	**3,554**	**3,277**	**2,721**	**2,386**	**2,488**	**2,771**
Light Load	2,556	2,388	2,242	2,204	2,394	2,791	3,196	2,907	2,476	2,174	2,323	2,578
Heavy Load	2,871	2,696	2,521	2,557	2,806	3,348	3,813	3,569	2,899	2,552	2,609	2,911
Total Load	**2,739**	**2,558**	**2,404**	**2,408**	**2,624**	**3,113**	**3,554**	**3,277**	**2,721**	**2,386**	**2,488**	**2,771**
Peak Load (MW) 70th Percentile												
System Peak Load (1 hour)	3,255	3,058	2,888	3,230	3,283	4,520	4,797	4,495	3,943	3,025	3,015	3,169
Total Peak Load	**3,255**	**3,058**	**2,888**	**3,230**	**3,283**	**4,520**	**4,797**	**4,495**	**3,943**	**3,025**	**3,015**	**3,169**

2033 Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Load (aMW) 70th Percentile												
Residential	933	860	700	592	569	682	946	831	631	618	759	972
Commercial	584	551	499	484	490	535	606	583	527	504	518	567
Irrigation	4	4	14	159	382	652	729	605	357	72	9	4
Industrial	345	340	341	332	338	353	354	357	348	350	348	348
Additional Firm	707	714	703	694	685	703	709	707	693	696	701	712
Loss	188	180	165	166	181	214	244	225	187	164	170	190
System Load	**2,761**	**2,648**	**2,422**	**2,426**	**2,644**	**3,139**	**3,588**	**3,308**	**2,743**	**2,403**	**2,506**	**2,793**
Light Load	2,576	2,473	2,258	2,221	2,412	2,815	3,227	2,934	2,497	2,191	2,339	2,598
Heavy Load	2,906	2,780	2,539	2,576	2,828	3,376	3,874	3,579	2,923	2,571	2,628	2,934
Total Load	**2,761**	**2,648**	**2,422**	**2,426**	**2,644**	**3,139**	**3,588**	**3,308**	**2,743**	**2,403**	**2,506**	**2,793**
Peak Load (MW) 70th Percentile												
System Peak Load (1 hour)	3,276	3,079	2,902	3,243	3,305	4,560	4,847	4,545	3,984	3,047	3,033	3,183
Total Peak Load	**3,276**	**3,079**	**2,902**	**3,243**	**3,305**	**4,560**	**4,847**	**4,545**	**3,984**	**3,047**	**3,033**	**3,183**

2034 Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Load (aMW) 70th Percentile												
Residential	942	868	707	597	575	692	960	842	638	622	763	977
Commercial	591	556	503	489	494	540	613	590	531	508	522	572
Irrigation	4	4	14	160	384	656	734	609	360	73	9	5
Industrial	350	345	345	336	342	358	359	362	353	355	353	353
Additional Firm	710	717	706	697	687	706	711	710	695	699	704	714
Loss	189	181	166	167	182	215	247	227	188	164	171	191
System Load	**2,785**	**2,671**	**2,441**	**2,446**	**2,666**	**3,167**	**3,623**	**3,340**	**2,766**	**2,420**	**2,522**	**2,812**
Light Load	2,599	2,494	2,277	2,239	2,431	2,839	3,258	2,962	2,517	2,206	2,354	2,615
Heavy Load	2,932	2,803	2,560	2,612	2,835	3,406	3,911	3,612	2,947	2,589	2,644	2,966
Total Load	**2,785**	**2,671**	**2,441**	**2,446**	**2,666**	**3,167**	**3,623**	**3,340**	**2,766**	**2,420**	**2,522**	**2,812**
Peak Load (MW) 70th Percentile												
System Peak Load (1 hour)	3,299	3,097	2,917	3,256	3,330	4,601	4,897	4,594	4,025	3,068	3,049	3,195
Total Peak Load	**3,299**	**3,097**	**2,917**	**3,256**	**3,330**	**4,601**	**4,897**	**4,594**	**4,025**	**3,068**	**3,049**	**3,195**

2035 Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Load (aMW) 70th Percentile												
Residential	947	873	711	602	581	700	973	853	645	627	768	983
Commercial	598	562	508	494	499	546	620	597	536	512	526	576
Irrigation	4	4	14	161	387	660	739	614	362	73	9	5
Industrial	355	350	350	341	347	363	364	367	358	360	358	358
Additional Firm	710	717	706	697	688	706	711	710	695	699	704	715
Loss	190	182	167	168	183	217	249	229	190	165	172	192
System Load	**2,804**	**2,688**	**2,456**	**2,463**	**2,684**	**3,191**	**3,656**	**3,369**	**2,786**	**2,436**	**2,537**	**2,828**
Light Load	2,616	2,509	2,291	2,254	2,448	2,862	3,287	2,988	2,536	2,221	2,368	2,630
Heavy Load	2,939	2,821	2,575	2,629	2,855	3,432	3,947	3,645	2,987	2,592	2,660	2,983
Total Load	**2,804**	**2,688**	**2,456**	**2,463**	**2,684**	**3,191**	**3,656**	**3,369**	**2,786**	**2,436**	**2,537**	**2,828**
Peak Load (MW) 70th Percentile												
System Peak Load (1 hour)	3,316	3,113	2,928	3,267	3,351	4,640	4,944	4,642	4,065	3,088	3,064	3,204
Total Peak Load	**3,316**	**3,113**	**2,928**	**3,267**	**3,351**	**4,640**	**4,944**	**4,642**	**4,065**	**3,088**	**3,064**	**3,204**

2036 Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Load (aMW) 70th Percentile												
Residential	954	849	717	607	587	709	987	866	654	633	774	990
Commercial	604	547	511	498	502	549	626	602	539	515	528	580
Irrigation	4	4	14	162	389	665	744	618	365	74	9	5
Industrial	360	342	355	346	352	368	369	372	363	365	363	363
Additional Firm	711	712	707	698	688	706	712	710	696	700	705	716
Loss	192	179	168	169	184	219	251	231	191	166	173	193
System Load	**2,823**	**2,632**	**2,472**	**2,479**	**2,703**	**3,217**	**3,689**	**3,399**	**2,807**	**2,452**	**2,552**	**2,846**
Light Load	2,634	2,458	2,305	2,269	2,465	2,884	3,317	3,015	2,555	2,235	2,382	2,648
Heavy Load	2,959	2,761	2,603	2,632	2,874	3,483	3,958	3,702	2,992	2,609	2,688	2,990
Total Load	**2,823**	**2,632**	**2,472**	**2,479**	**2,703**	**3,217**	**3,689**	**3,399**	**2,807**	**2,452**	**2,552**	**2,846**
Peak Load (MW) 70th Percentile												
System Peak Load (1 hour)	3,333	3,131	2,940	3,278	3,373	4,679	4,992	4,690	4,105	3,109	3,080	3,215
Total Peak Load	**3,333**	**3,131**	**2,940**	**3,278**	**3,373**	**4,679**	**4,992**	**4,690**	**4,105**	**3,109**	**3,080**	**3,215**

2037 Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Load (aMW) 70th Percentile												
Residential	961	886	723	613	594	719	1,003	879	662	639	780	998
Commercial	610	572	515	502	506	554	632	607	543	518	531	584
Irrigation	4	4	15	163	391	670	750	623	367	74	9	5
Industrial	365	359	360	351	357	373	374	377	368	370	368	369
Additional Firm	710	718	706	697	688	706	712	710	696	699	705	715
Loss	193	184	169	170	186	220	253	233	192	167	174	194
System Load	**2,843**	**2,723**	**2,488**	**2,496**	**2,722**	**3,242**	**3,723**	**3,430**	**2,829**	**2,468**	**2,567**	**2,865**
Light Load	2,653	2,543	2,320	2,285	2,482	2,907	3,348	3,042	2,575	2,250	2,396	2,665
Heavy Load	2,980	2,859	2,620	2,650	2,911	3,487	3,995	3,736	3,014	2,626	2,704	3,009
Total Load	**2,843**	**2,723**	**2,488**	**2,496**	**2,722**	**3,242**	**3,723**	**3,430**	**2,829**	**2,468**	**2,567**	**2,865**
Peak Load (MW) 70th Percentile												
System Peak Load (1 hour)	3,352	3,149	2,951	3,288	3,396	4,719	5,041	4,739	4,147	3,129	3,096	3,226
Total Peak Load	**3,352**	**3,149**	**2,951**	**3,288**	**3,396**	**4,719**	**5,041**	**4,739**	**4,147**	**3,129**	**3,096**	**3,226**

2038 Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Load (aMW) 70th Percentile												
Residential	968	893	729	619	601	729	1,017	892	670	645	785	1,004
Commercial	617	577	520	507	510	559	639	614	548	522	535	589
Irrigation	4	4	15	163	394	674	755	627	370	74	9	5
Industrial	370	365	366	356	362	379	380	383	373	375	374	374
Additional Firm	710	718	706	697	688	706	711	710	696	699	704	715
Loss	194	186	170	171	187	222	255	235	194	168	175	195
System Load	**2,864**	**2,742**	**2,505**	**2,514**	**2,742**	**3,269**	**3,759**	**3,461**	**2,851**	**2,485**	**2,582**	**2,883**
Light Load	2,672	2,561	2,336	2,301	2,501	2,931	3,380	3,070	2,595	2,265	2,411	2,682
Heavy Load	3,015	2,879	2,626	2,669	2,932	3,516	4,032	3,770	3,038	2,658	2,708	3,028
Total Load	**2,864**	**2,742**	**2,505**	**2,514**	**2,742**	**3,269**	**3,759**	**3,461**	**2,851**	**2,485**	**2,582**	**2,883**
Peak Load (MW) 70th Percentile												
System Peak Load (1 hour)	3,372	3,168	2,964	3,299	3,420	4,760	5,091	4,789	4,190	3,151	3,112	3,237
Total Peak Load	**3,372**	**3,168**	**2,964**	**3,299**	**3,420**	**4,760**	**5,091**	**4,789**	**4,190**	**3,151**	**3,112**	**3,237**

2039 Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Load (aMW) 70th Percentile												
Residential	975	899	734	624	607	738	1,031	904	678	650	789	1,009
Commercial	625	584	525	513	515	565	647	621	553	527	539	594
Irrigation	4	4	15	164	396	679	761	632	372	75	9	5
Industrial	376	370	371	361	368	385	386	389	379	381	379	380
Additional Firm	710	717	706	697	688	706	711	710	696	699	704	715
Loss	195	187	171	172	188	224	258	237	195	169	176	196
System Load	**2,885**	**2,761**	**2,522**	**2,532**	**2,762**	**3,296**	**3,794**	**3,493**	**2,873**	**2,501**	**2,597**	**2,899**
Light Load	2,692	2,578	2,352	2,317	2,519	2,955	3,411	3,098	2,615	2,280	2,425	2,697
Heavy Load	3,037	2,899	2,644	2,688	2,954	3,545	4,095	3,778	3,062	2,676	2,724	3,045
Total Load	**2,885**	**2,761**	**2,522**	**2,532**	**2,762**	**3,296**	**3,794**	**3,493**	**2,873**	**2,501**	**2,597**	**2,899**
Peak Load (MW) 70th Percentile												
System Peak Load (1 hour)	3,392	3,186	2,976	3,311	3,444	4,800	5,140	4,839	4,233	3,172	3,127	3,246
Total Peak Load	**3,392**	**3,186**	**2,976**	**3,311**	**3,444**	**4,800**	**5,140**	**4,839**	**4,233**	**3,172**	**3,127**	**3,246**

2040 Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
					Average Load (aMW) 70th Percentile							
Residential	980	873	739	629	613	747	1,045	916	685	655	794	1,015
Commercial	631	569	529	518	520	570	654	628	557	531	543	598
Irrigation	4	4	15	165	398	684	766	636	375	75	10	5
Industrial	382	363	377	367	373	391	392	395	385	387	385	386
Additional Firm	709	710	706	697	687	705	711	709	695	699	704	714
Loss	197	183	172	173	189	225	260	239	196	170	177	197
System Load	**2,903**	**2,702**	**2,537**	**2,548**	**2,781**	**3,322**	**3,827**	**3,523**	**2,894**	**2,517**	**2,611**	**2,915**
Light Load	2,709	2,523	2,366	2,332	2,536	2,978	3,441	3,124	2,634	2,294	2,438	2,711
Heavy Load	3,056	2,835	2,660	2,721	2,958	3,573	4,132	3,811	3,102	2,678	2,739	3,075
Total Load	**2,903**	**2,702**	**2,537**	**2,548**	**2,781**	**3,322**	**3,827**	**3,523**	**2,894**	**2,517**	**2,611**	**2,915**
					Peak Load (MW) 70th Percentile							
System Peak Load (1 hour)	3,409	3,203	2,987	3,321	3,467	4,840	5,188	4,888	4,274	3,192	3,142	3,256
Total Peak Load	**3,409**	**3,203**	**2,987**	**3,321**	**3,467**	**4,840**	**5,188**	**4,888**	**4,274**	**3,192**	**3,142**	**3,256**

2041 Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
					Average Load (aMW) 70th Percentile							
Residential	985	909	743	633	619	756	1,058	927	692	660	798	1,020
Commercial	638	595	534	523	524	575	661	634	562	535	546	602
Irrigation	4	4	15	166	401	688	772	641	377	76	10	5
Industrial	387	382	382	372	379	396	398	401	391	393	391	391
Additional Firm	719	726	714	704	693	711	716	715	701	706	712	723
Loss	198	189	173	174	191	227	262	241	198	172	178	198
System Load	**2,932**	**2,805**	**2,561**	**2,572**	**2,806**	**3,354**	**3,867**	**3,559**	**2,921**	**2,541**	**2,634**	**2,940**
Light Load	2,736	2,619	2,388	2,355	2,559	3,007	3,477	3,156	2,659	2,316	2,459	2,735
Heavy Load	3,073	2,945	2,696	2,732	2,985	3,631	4,149	3,850	3,131	2,703	2,763	3,102
Total Load	**2,932**	**2,805**	**2,561**	**2,572**	**2,806**	**3,354**	**3,867**	**3,559**	**2,921**	**2,541**	**2,634**	**2,940**
					Peak Load (MW) 70th Percentile							
System Peak Load (1 hour)	3,427	3,221	3,005	3,340	3,496	4,886	5,242	4,943	4,322	3,223	3,167	3,265
Total Peak Load	**3,427**	**3,221**	**3,005**	**3,340**	**3,496**	**4,886**	**5,242**	**4,943**	**4,322**	**3,223**	**3,167**	**3,265**

2042 Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
					Average Load (aMW) 70th Percentile							
Residential	990	914	748	638	624	765	1,072	939	700	664	802	1,024
Commercial	644	600	537	527	527	579	667	640	566	538	549	606
Irrigation	4	4	15	167	403	693	777	646	380	76	10	5
Industrial	393	387	388	378	385	402	404	407	396	399	397	397
Additional Firm	719	726	714	704	693	711	716	715	701	706	712	723
Loss	199	190	174	175	192	229	264	243	199	172	179	199
System Load	**2,950**	**2,822**	**2,575**	**2,588**	**2,825**	**3,379**	**3,900**	**3,589**	**2,942**	**2,556**	**2,648**	**2,955**
Light Load	2,752	2,634	2,402	2,369	2,576	3,029	3,506	3,183	2,678	2,329	2,472	2,749
Heavy Load	3,092	2,962	2,712	2,749	3,004	3,658	4,184	3,909	3,135	2,719	2,789	3,104
Total Load	**2,950**	**2,822**	**2,575**	**2,588**	**2,825**	**3,379**	**3,900**	**3,589**	**2,942**	**2,556**	**2,648**	**2,955**
					Peak Load (MW) 70th Percentile							
System Peak Load (1 hour)	3,444	3,237	3,016	3,351	3,518	4,925	5,290	4,991	4,362	3,242	3,181	3,274
Total Peak Load	**3,444**	**3,237**	**3,016**	**3,351**	**3,518**	**4,925**	**5,290**	**4,991**	**4,362**	**3,242**	**3,181**	**3,274**

2043 Monthly Summary	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
					Average Load (aMW) 70th Percentile							
Residential	995	919	752	642	630	773	1,084	950	706	669	805	1,028
Commercial	650	605	541	531	531	583	673	646	569	541	552	610
Irrigation	4	4	15	168	405	697	783	650	382	77	10	5
Industrial	399	393	394	383	390	408	409	413	402	404	403	403
Additional Firm	719	726	714	704	693	711	716	715	701	706	712	723
Loss	200	191	175	176	193	230	266	245	200	173	179	200
System Load	**2,968**	**2,838**	**2,590**	**2,605**	**2,843**	**3,403**	**3,932**	**3,617**	**2,962**	**2,570**	**2,661**	**2,970**
Light Load	2,769	2,650	2,415	2,384	2,593	3,052	3,535	3,208	2,696	2,342	2,484	2,762
Heavy Load	3,111	2,979	2,727	2,766	3,040	3,661	4,218	3,940	3,156	2,734	2,803	3,119
Total Load	**2,968**	**2,838**	**2,590**	**2,605**	**2,843**	**3,403**	**3,932**	**3,617**	**2,962**	**2,570**	**2,661**	**2,970**
					Peak Load (MW) 70th Percentile							
System Peak Load (1 hour)	3,461	3,252	3,026	3,361	3,539	4,964	5,337	5,038	4,401	3,261	3,194	3,283
Total Peak Load	**3,461**	**3,252**	**3,026**	**3,361**	**3,539**	**4,964**	**5,337**	**5,038**	**4,401**	**3,261**	**3,194**	**3,283**

Annual Summary

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Billed Sales (MWh) 70th Percentile										
Residential	5,952,203	6,015,372	6,064,292	6,131,412	6,212,505	6,299,614	6,383,861	6,471,568	6,555,018	6,633,732
Commercial	4,389,449	4,415,395	4,459,613	4,481,988	4,518,268	4,548,417	4,599,132	4,627,083	4,672,632	4,704,762
Irrigation	2,112,332	2,130,433	2,131,886	2,140,898	2,145,544	2,151,055	2,161,512	2,172,343	2,184,166	2,197,504
Industrial	2,730,923	2,780,341	2,808,143	2,835,162	2,861,510	2,890,833	2,922,399	2,956,967	2,991,128	3,029,583
Additional Firm	1,185,562	1,972,275	3,702,016	4,717,323	5,174,670	5,477,596	5,909,535	6,097,135	6,140,903	6,149,345
System Load	**16,370,468**	**17,313,815**	**19,165,950**	**20,306,782**	**20,912,497**	**21,367,515**	**21,976,439**	**22,325,096**	**22,543,847**	**22,714,925**
Total Load	**16,370,468**	**17,313,815**	**19,165,950**	**20,306,782**	**20,912,497**	**21,367,515**	**21,976,439**	**22,325,096**	**22,543,847**	**22,714,925**
Generation Month Sales (MWh) 70th Percentile										
Residential	5,956,695	6,018,895	6,068,360	6,136,888	6,218,381	6,305,689	6,389,286	6,477,861	6,559,842	6,639,006
Commercial	4,390,873	4,417,970	4,460,805	4,484,056	4,519,947	4,551,390	4,600,667	4,629,723	4,674,424	4,707,375
Irrigation	2,112,350	2,130,436	2,131,896	2,140,904	2,145,550	2,151,065	2,161,523	2,172,355	2,184,179	2,197,517
Industrial	2,735,093	2,782,687	2,810,423	2,837,385	2,863,985	2,893,497	2,925,317	2,959,850	2,994,373	3,033,114
Additional Firm	1,185,562	1,972,275	3,702,016	4,717,323	5,174,670	5,477,596	5,909,535	6,097,135	6,140,903	6,149,345
System Sales	**16,380,573**	**17,322,263**	**19,173,500**	**20,316,557**	**20,922,533**	**21,379,236**	**21,986,327**	**22,336,924**	**22,553,721**	**22,726,358**
Total Sales	**16,380,573**	**17,322,263**	**19,173,500**	**20,316,557**	**20,922,533**	**21,379,236**	**21,986,327**	**22,336,924**	**22,553,721**	**22,726,358**
Loss	1,400,102	1,435,438	1,499,307	1,542,889	1,570,420	1,591,049	1,617,688	1,635,569	1,649,836	1,660,426
Required Supply	**17,780,674**	**18,757,701**	**20,672,807**	**21,859,447**	**22,492,953**	**22,970,286**	**23,604,015**	**23,972,493**	**24,203,558**	**24,386,784**
Average Load (aMW) 70th Percentile										
Residential	678	687	693	701	708	720	729	739	747	758
Commercial	500	504	509	512	515	520	525	529	532	537
Irrigation	240	243	243	244	244	246	247	248	249	251
Industrial	311	318	321	324	326	330	334	338	341	346
Additional Firm	135	225	423	539	589	625	675	696	699	702
Loss	159	164	171	176	179	182	185	187	188	190
System Load	**2,024**	**2,141**	**2,360**	**2,495**	**2,561**	**2,622**	**2,695**	**2,737**	**2,755**	**2,784**
Light Load	1,852	1,959	2,159	2,283	2,343	2,399	2,465	2,503	2,521	2,547
Heavy Load	2,159	2,285	2,518	2,662	2,733	2,798	2,874	2,912	2,931	2,962
Total Load	**2,024**	**2,141**	**2,360**	**2,495**	**2,561**	**2,622**	**2,695**	**2,737**	**2,755**	**2,784**
Peak Load (MW) 70th Percentile										
System Peak (1 hour)	3,830	4,001	4,256	4,406	4,501	4,585	4,679	4,747	4,797	4,847
Total Peak Load	**3,830**	**4,001**	**4,256**	**4,406**	**4,501**	**4,585**	**4,679**	**4,747**	**4,797**	**4,847**

	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Billed Sales (MWh) 70th Percentile										
Residential	6,701,009	6,759,420	6,828,122	6,902,280	6,972,664	7,035,828	7,095,241	7,154,048	7,212,029	7,266,306
Commercial	4,750,003	4,798,757	4,831,415	4,871,061	4,917,076	4,968,676	5,011,749	5,056,679	5,094,573	5,132,734
Irrigation	2,211,654	2,226,398	2,241,679	2,257,279	2,272,690	2,288,397	2,304,043	2,319,739	2,335,293	2,350,298
Industrial	3,071,424	3,114,153	3,157,745	3,201,940	3,250,317	3,300,396	3,350,607	3,400,422	3,450,450	3,501,215
Additional Firm	6,171,167	6,172,006	6,193,102	6,177,196	6,176,327	6,173,887	6,183,582	6,234,425	6,234,425	6,234,425
System Load	**22,905,257**	**23,070,734**	**23,252,062**	**23,409,755**	**23,589,075**	**23,767,184**	**23,945,221**	**24,165,313**	**24,326,770**	**24,484,977**
Total Load	**22,905,257**	**23,070,734**	**23,252,062**	**23,409,755**	**23,589,075**	**23,767,184**	**23,945,221**	**24,165,313**	**24,326,770**	**24,484,977**
Generation Month Sales (MWh) 70th Percentile										
Residential	6,704,206	6,763,302	6,832,534	6,906,651	6,976,408	7,039,015	7,098,397	7,157,159	7,215,024	7,268,947
Commercial	4,752,832	4,800,574	4,833,665	4,873,707	4,920,067	4,971,129	5,014,314	5,058,800	5,096,708	5,134,882
Irrigation	2,211,669	2,226,412	2,241,694	2,257,294	2,272,705	2,288,412	2,304,058	2,319,755	2,335,307	2,350,312
Industrial	3,075,030	3,117,832	3,161,475	3,206,023	3,254,544	3,304,634	3,354,811	3,404,644	3,454,735	3,505,562
Additional Firm	6,171,167	6,172,006	6,193,102	6,177,196	6,176,327	6,173,887	6,183,582	6,234,425	6,234,425	6,234,425
System Sales	**22,914,904**	**23,080,126**	**23,262,469**	**23,420,870**	**23,600,052**	**23,777,076**	**23,955,161**	**24,174,783**	**24,336,199**	**24,494,128**
Total Sales	**22,914,904**	**23,080,126**	**23,262,469**	**23,420,870**	**23,600,052**	**23,777,076**	**23,955,161**	**24,174,783**	**24,336,199**	**24,494,128**
Loss	1,672,397	1,683,411	1,695,732	1,706,055	1,718,046	1,729,897	1,742,228	1,753,939	1,764,571	1,774,927
Required Supply	**24,587,300**	**24,763,537**	**24,958,202**	**25,126,925**	**25,318,098**	**25,506,973**	**25,697,389**	**25,928,722**	**26,100,770**	**26,269,054**
Average Load (aMW) 70th Percentile										
Residential	765	772	778	788	796	804	808	817	824	830
Commercial	543	548	550	556	562	567	571	577	582	586
Irrigation	252	254	255	258	259	261	262	265	267	268
Industrial	351	356	360	366	372	377	382	389	394	400
Additional Firm	704	705	705	705	705	705	704	712	712	712
Loss	191	192	193	195	196	198	198	200	201	203
System Load	**2,807**	**2,827**	**2,841**	**2,868**	**2,890**	**2,912**	**2,926**	**2,960**	**2,980**	**2,999**
Light Load	2,568	2,586	2,599	2,624	2,644	2,663	2,676	2,707	2,725	2,743
Heavy Load	2,987	3,008	3,023	3,052	3,075	3,098	3,114	3,149	3,171	3,191
Total Load	**2,807**	**2,827**	**2,841**	**2,868**	**2,890**	**2,912**	**2,926**	**2,960**	**2,980**	**2,999**
Peak Load (MW) 70th Percentile										
System Peak (1 hour)	4,897	4,944	4,992	5,041	5,091	5,140	5,188	5,242	5,290	5,337
Total Peak Load	**4,897**	**4,944**	**4,992**	**5,041**	**5,091**	**5,140**	**5,188**	**5,242**	**5,290**	**5,337**

DEMAND-SIDE RESOURCE DATA

DSM Financial Assumptions

Avoided Levelized Capacity Costs	
Simple Cycle Combustion Turbine (SCCT)	$145.94/kW-year
Financial Assumptions	
Discount rate (weighted average cost of capital)	7.12%
Financial escalation factor	2.60%
Transmission Losses	
Non-summer secondary losses	7.60%
Summer peak loss	7.60%

Avoided Cost Averages ($/MWh except where noted)

Year	Summer High-Risk	Summer Medium-Risk	Summer Low-Risk	Winter High-Risk	Winter Medium-Risk	Winter Low-Risk	Off Season Low-Risk
2024	$53.48	$49.44	$30.40	$46.68	$41.02	$38.83	$26.67
2025	$50.90	$48.25	$29.61	$45.80	$40.92	$38.37	$26.31
2026	$51.41	$47.73	$28.47	$47.42	$40.49	$39.12	$24.95
2027	$74.68	$70.21	$44.15	$65.45	$53.89	$53.84	$33.75
2028	$71.72	$68.19	$43.44	$64.02	$50.61	$52.15	$29.52
2029	$70.57	$66.78	$42.01	$61.08	$48.30	$51.82	$28.64
2030	$70.09	$65.60	$40.01	$62.08	$48.02	$53.41	$26.57
2031	$69.60	$64.72	$37.52	$58.34	$42.29	$47.89	$24.03
2032	$67.53	$63.29	$37.55	$58.38	$44.24	$49.46	$23.48
2033	$72.11	$67.37	$39.11	$57.08	$41.95	$49.69	$23.18
2034	$78.99	$73.32	$48.68	$63.30	$50.37	$57.11	$21.97
2035	$70.08	$58.41	$32.27	$45.04	$34.97	$37.71	$14.01
2036	$93.67	$64.41	$18.71	$45.04	$32.53	$30.90	$13.43
2037	$100.50	$69.86	$18.99	$47.41	$34.84	$32.96	$14.37
2038	$97.60	$69.33	$18.40	$45.25	$36.10	$31.44	$14.04
2039	$92.93	$63.94	$18.17	$41.56	$32.90	$27.96	$13.58
2040	$91.36	$57.96	$14.39	$34.69	$26.68	$23.99	$10.87
2041	$97.19	$61.51	$14.48	$36.95	$29.42	$25.26	$10.83
2042	$107.97	$65.06	$14.97	$36.62	$28.19	$23.43	$11.15
2043	$98.25	$60.65	$12.47	$34.86	$26.94	$23.43	$10.86

The time periods used to develop the avoided cost averages presented in the table above align with the company's highest-risk hours, which are described in the Loss of Load Expectation section.

Bundle Amounts

Incremental Achievable Potential (aMW)

Bundle	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Summer Low	2	2	2	2	3	3	3	3	3	3
Summer Medium	0	0	0	0	1	1	1	1	1	1
Summer High	0	1	1	1	1	2	2	2	2	2
Winter Low	1	2	2	3	3	4	3	3	3	3
Winter High	0	1	1	2	2	2	3	3	3	3
Total	**4**	**5**	**7**	**8**	**10**	**11**	**11**	**12**	**13**	**13**

Bundle	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Summer Low	3	2	2	2	2	2	2	2	2	2
Summer Medium	1	2	2	2	2	3	3	3	3	3
Summer High	2	2	2	2	2	2	2	2	2	2
Winter Low	3	3	3	4	4	4	4	4	4	4
Winter High	4	4	4	4	4	4	4	4	4	4
Total	**13**	**13**	**14**	**14**	**14**	**14**	**15**	**15**	**15**	**15**

Bundle Costs

Savings Weighted Levelized Cost of Energy ($/MWh) Real Dollars

Bundle	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Summer Low	$91	$94	$96	$98	$100	$99	$99	$97	$97	$99
Summer Medium	$336	$334	$333	$330	$326	$321	$316	$310	$307	$302
Summer High	$948	$873	$860	$835	$807	$772	$749	$725	$711	$648
Winter Low	$85	$84	$84	$83	$82	$80	$77	$74	$71	$68
Winter High	$632	$592	$559	$540	$514	$482	$466	$432	$405	$382
Total	**$2,091**	**$1,977**	**$1,933**	**$1,886**	**$1,829**	**$1,754**	**$1,707**	**$1,639**	**$1,591**	**$1,500**

Bundle	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Summer Low	$100	$99	$98	$97	$95	$93	$92	$90	$89	$88
Summer Medium	$300	$298	$295	$293	$291	$289	$287	$286	$285	$284
Summer High	$643	$640	$629	$615	$581	$555	$535	$519	$510	$495
Winter Low	$365	$350	$335	$315	$289	$277	$255	$237	$236	$224
Winter High	$66	$64	$61	$59	$56	$54	$52	$52	$52	$52
Total	**$1,473**	**$1,450**	**$1,419**	**$1,379**	**$1,313**	**$1,267**	**$1,221**	**$1,185**	**$1,173**	**$1,143**

SUPPLY-SIDE RESOURCE DATA

Key Financial and Forecast Assumptions

Financing Cap Structure and Cost	
Composition	
Debt	50.10%
Preferred	0.00%
Common	49.90%
Total	**100.00%**
Cost	
Debt	5.73%
Preferred	0.00%
Common	10.00%
Average Weighted Cost	**7.86%**

Financial Assumptions and Factors	
Plant operating (book) life	**Expected Life of the Asset**
Discount rate (weighted average cost of capital[1])	7.12%
Composite tax rate	25.74%
Deferred rate	21.30%
General O&M escalation rate	2.60%
Annual property tax rate (% of investment)	0.44%
B2H annual property tax rate (% of investment)	0.70%
Property tax escalation rate	3.00%
B2H property tax escalation rate	1.05%
Annual insurance premiums (% of investment)	0.046%
B2H annual insurance premiums (% of investment)	0.003%
Insurance escalation rate	5.00%
B2H insurance escalation rate	5.00%
AFUDC rate (annual)	7.50%

[1] Incorporates tax effects.

Cost Inputs and Operating Assumptions (Costs in 2024$)

Supply-Side Resources	Plant Capacity (MW)	Plant Capital[1] ($/kW)	Transmission/Interconnection Capital ($/kW)	Total Capital ($/kW)	Fixed O&M[2] ($/kW-month)	Variable O&M ($/MWh)	Heat Rate (Btu/kWh)	Economic Life (years)
Baseload Gas—Combined-Cycle Combustion Turbine (CCCT)	300	$1,450	$140	$1,590	$1.40	$3.10	6,363	30
Biomass	30	$4,770	$167	$4,937	$15.10	$7.00	13,500	30
Clean Peaking Gas—Hydrogen Combustion Turbine	170	$940	$81	$1,021	$2.10	$6.00	9,717	35
Danskin 1 Retrofit—Simple-Cycle Combustion Turbine (SCCT) to CCCT Conversion	90	$2,530	$94	$2,624	$1.40	$3.10	6,909	30
Geothermal	30	$5,150	$167	$5,317	$10.40	$0.00	0	30
Long-Duration Storage—Pumped Hydro (12 hour)	250	$3,710	$207	$3,917	$1.80	$0.60	0	75
Medium-Duration Storage—Li Battery (8 hour)	50	$2,500	$37	$2,537	$5.20	$0.00	0	20
Multi-Day-Duration Storage—Iron-Air Battery (100 hour)	50	$2,400	$37	$2,437	$1.80	$0.00	0	30
Nuclear—Small Modular Reactor	100	$7,960	$174	$8,134	$11.40	$4.30	10,461	60
Peaking Gas—Reciprocating Gas Engine (Recip)	50	$1,880	$81	$1,961	$3.50	$6.80	8,699	40
Peaking Gas—SCCT	170	$910	$81	$991	$2.10	$6.00	9,717	35
Short-Duration Storage—Li Battery (4 hour)	50	$1,600	$37	$1,637	$2.90	$0.00	0	20
Short-Duration Storage—Li Battery (4 hour)—Distribution Connected	5	$1,440	$40	$1,480	$2.90	$0.00	0	20
Solar PV	100	$1,200	$22	$1,222	$1.90	$0.00	0	30
Wind—Idaho	100	$1,760	$22	$1,782	$4.10	$0.00	0	30
Wind—Wyoming	100	$1,760	$22	$1,782	$4.10	$0.00	0	30

[1] Plant costs include engineering development costs, generating and ancillary equipment purchase, and installation costs, as well as balance of plant construction.
[2] Fixed O&M excludes property taxes and insurance (separately calculated within the levelized resource cost analysis).

Supply-Side Resource Escalation Factors[1] (2024–2032)

Supply-Side Resources	2024	2025	2026	2027	2028	2029	2030	2031	2032
Baseload Gas—Combined-Cycle Combustion Turbine (CCCT)		1.68%	1.90%	1.78%	2.01%	2.00%	2.24%	2.00%	2.24%
Biomass		1.94%	1.95%	1.95%	1.94%	1.94%	1.94%	1.93%	1.93%
Clean Peaking Gas—Hydrogen Combustion Turbine		0.76%	1.53%	1.24%	1.78%	1.77%	2.04%	1.90%	2.03%
Danskin 1 Retrofit—Simple-Cycle Combustion Turbine (SCCT) to CCCT Conversion		1.68%	1.90%	1.78%	2.01%	2.00%	2.24%	2.00%	2.24%
Geothermal		1.07%	1.05%	1.02%	1.00%	0.97%	0.94%	2.10%	2.10%
Long-Duration Storage—Pumped Hydro (12 hour)		2.60%	2.60%	2.60%	2.60%	2.60%	2.60%	2.60%	2.60%
Medium-Duration Storage—Li Battery (8 hour)		0.00%	-2.56%	-2.14%	-2.68%	-2.35%	-2.12%	1.39%	1.33%
Multi-Day-Duration Storage—Iron-Air Battery (100 hour)		0.00%	-2.56%	-2.14%	-2.68%	-2.35%	-2.12%	1.39%	1.33%
Nuclear—Small Modular Reactor		1.96%	1.95%	1.95%	1.95%	1.94%	1.94%	1.93%	1.93%
Peaking Gas—Reciprocating Gas Engine (Recip)		0.76%	1.53%	1.24%	1.78%	1.77%	2.04%	1.90%	2.03%
Peaking Gas—SCCT		0.76%	1.53%	1.24%	1.78%	1.77%	2.04%	1.90%	2.03%
Short-Duration Storage—Li Battery (4 hour)		0.00%	-1.67%	-1.36%	-2.04%	-1.18%	-1.33%	1.40%	1.33%
Short-Duration Storage—Li Battery (4 hour)—Distribution Connected		0.00%	-1.67%	-1.36%	-2.04%	-1.18%	-1.33%	1.40%	1.33%
Solar PV		-1.88%	-2.09%	-2.32%	-2.57%	-2.86%	-3.17%	1.71%	1.70%
Wind—Idaho		-1.47%	-1.65%	-1.83%	-2.04%	-2.27%	-2.51%	1.60%	1.59%
Wind—Wyoming		-1.47%	-1.65%	-1.83%	-2.04%	-2.27%	-2.51%	1.60%	1.59%

[1] Factors include the 2023 IRP general O&M escalation rate assumption of 2.6%.

Supply-Side Resource Escalation Factors[1] (2033–2043)

Supply-Side Resources	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Baseload Gas—Combined-Cycle Combustion Turbine (CCCT)	2.11%	2.23%	2.11%	2.23%	2.11%	2.23%	2.10%	2.22%	2.22%	2.10%	2.22%
Biomass	1.92%	1.92%	1.91%	1.91%	1.90%	1.90%	1.89%	1.89%	1.88%	1.88%	1.87%
Clean Peaking Gas—Hydrogen Combustion Turbine	2.03%	2.17%	2.03%	2.02%	2.02%	2.16%	2.01%	2.01%	2.01%	2.15%	2.00%
Danskin 1 Retrofit—Simple-Cycle Combustion Turbine (SCCT) to CCCT Conversion	2.11%	2.23%	2.11%	2.23%	2.11%	2.23%	2.10%	2.22%	2.22%	2.10%	2.22%
Geothermal	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%
Long-Duration Storage—Pumped Hydro (12 hour)	2.60%	2.60%	2.60%	2.60%	2.60%	2.60%	2.60%	2.60%	2.60%	2.60%	2.60%
Medium-Duration Storage—Li Battery (8 hour)	1.32%	1.30%	1.28%	1.27%	1.25%	1.23%	1.21%	1.19%	1.17%	1.15%	1.13%
Multi-Day-Duration Storage—Iron-Air Battery (100 hour)	1.32%	1.30%	1.28%	1.27%	1.25%	1.23%	1.21%	1.19%	1.17%	1.15%	1.13%
Nuclear—Small Modular Reactor	1.92%	1.92%	1.92%	1.91%	1.91%	1.90%	1.90%	1.89%	1.89%	1.88%	1.88%
Peaking Gas—Reciprocating Gas Engine (Recip)	2.03%	2.17%	2.03%	2.02%	2.02%	2.16%	2.01%	2.01%	2.01%	2.15%	2.00%
Peaking Gas—SCCT	2.03%	2.17%	2.03%	2.02%	2.02%	2.16%	2.01%	2.01%	2.01%	2.15%	2.00%
Short-Duration Storage—Li Battery (4 hour)	1.32%	1.30%	1.28%	1.27%	1.25%	1.23%	1.21%	1.19%	1.17%	1.15%	1.13%
Short-Duration Storage—Li Battery (4 hour)—Distribution Connected	1.32%	1.30%	1.28%	1.27%	1.25%	1.23%	1.21%	1.19%	1.17%	1.15%	1.13%
Solar PV	1.69%	1.68%	1.68%	1.67%	1.66%	1.65%	1.64%	1.63%	1.62%	1.61%	1.60%
Wind—Idaho	1.58%	1.57%	1.56%	1.55%	1.54%	1.52%	1.51%	1.50%	1.49%	1.48%	1.46%
Wind—Wyoming	1.58%	1.57%	1.56%	1.55%	1.54%	1.52%	1.51%	1.50%	1.49%	1.48%	1.46%

[1] Factors include the 2023 IRP general O&M escalation rate assumption of 2.6%.

Levelized Cost of Energy (costs in 2024$, $/MWh) at stated capacity factors

Supply-Side Resources	Cost of Capital[1]	Non-Fuel O&M[2]	Fuel[3]	Total Cost per MWh[4,5]	Capacity Factor
Baseload Gas—Combined-Cycle Combustion Turbine (CCCT)	$36	$12	$42	$89	55%
Biomass	$65	$61	$110	$236	64%
Clean Peaking Gas—Hydrogen Combustion Turbine	$68	$50	$191	$309	12%
Danskin 1 Retrofit—Simple-Cycle Combustion Turbine (SCCT) to CCCT Conversion	$56	$13	$46	$115	55%
Geothermal	$50	$27	$0	$78	90%
Long-Duration Storage—Pumped Hydro (12 hour)	$82	$17	$0	$99	50%
Medium-Duration Storage—Li Battery (8 hour)	$77	$33	$0	$111	33%
Multi-Day-Duration Storage—Iron-Air Battery (100 hour)	$148	$36	$0	$184	15%
Nuclear—Small Modular Reactor	$83	$42	$13	$139	94%
Peaking Gas—Reciprocating Gas Engine (Recip)	$188	$83	$61	$332	12%
Peaking Gas—SCCT	$98	$50	$66	$214	12%
Short-Duration Storage—Li Battery (4 hour)	$97	$37	$0	$134	17%
Short-Duration Storage—Li Battery (4 hour)—Distribution Connected	$88	$36	$0	$124	17%
Solar PV	$17	$15	$0	$31	31%
Wind—Idaho	$28	$25	$0	$53	36%
Wind—Wyoming	$16	$19	$0	$35	47%

[1] Cost of Capital includes tax credit benefits (ITC/PTC).
[2] Non-Fuel O&M includes fixed and property taxes.
[3] Fuel costs are not included for biomass resource.
[4] Storage resources will have a cost or benefit associated with the price difference between the energy price to charge the storage and the energy price during the time of discharge (less losses). Arbitrage is not included in the LCOE calculation in the table. As noted in IRP, levelized cost for storage resources is driven by fixed costs.
[5] Rounding may make the sum of Capital, Non-Fuel O&M and Fuel not match the total cost per MWh.

Levelized Capacity (fixed) Cost per kW/Month (costs in 2024$)

Supply-Side Resources	Cost of Capital[1]	Non-Fuel O&M[2]	Total Cost per kW[3]
Baseload Gas—Combined-Cycle Combustion Turbine (CCCT)	$14	$3	$17
Biomass	$31	$24	$54
Clean Peaking Gas—Hydrogen Combustion Turbine	$8	$4	$12
Danskin 1 Retrofit—Simple-Cycle Combustion Turbine (SCCT) to CCCT Conversion	$23	$4	$26
Geothermal	$33	$18	$51
Long-Duration Storage—Pumped Hydro (12 hour)	$30	$6	$36
Medium-Duration Storage—Li Battery (8 hour)	$19	$8	$27
Multi-Day-Duration Storage—Iron-Air Battery (100 hour)	$16	$4	$20
Nuclear—Small Modular Reactor	$57	$25	$82
Peaking Gas—Reciprocating Gas Engine (Recip)	$16	$6	$23
Peaking Gas—SCCT	$9	$4	$12
Short-Duration Storage—Li Battery (4 hour)	$12	$5	$17
Short-Duration Storage—Li Battery (4 hour)—Distribution Connected	$11	$4	$15
Solar PV	$4	$3	$7
Wind—Idaho	$7	$7	$14
Wind—Wyoming	$5	$7	$12

[1] Cost of Capital includes tax credit benefits (ITC/PTC).
[2] Non-Fuel O&M includes fixed and property taxes.
[3] Rounding may make sum of Cost of Capital and Non-Fuel O&M costs not match Total Cost per kW.

Renewable Energy Certificate Forecast

Year	Nominal ($/MWh)
2024	$22.07
2025	$20.10
2026	$20.58
2027	$21.06
2028	$21.54
2029	$22.01
2030	$22.49
2031	$22.97
2032	$23.45
2033	$23.93
2034	$24.40
2035	$24.88
2036	$25.36
2037	$25.84
2038	$26.32
2039	$26.79
2040	$27.27
2041	$27.75
2042	$28.23
2043	$28.71

EXISTING RESOURCE DATA

Qualifying Facility Data (PURPA)

Cogeneration & Small Power Production Projects

Status as of July 31, 2023

Hydro Projects

		Contract				Contract	
Project	**MW**	**On-line Date**	**End Date**	**Project**	**MW**	**On-line Date**	**End Date**
Arena Drop	0.45	Sep-2010	Sep-2030	Little Wood River Ranch II	1.25	Oct-2015	Oct-2035
Baker City Hydro	0.24	Sep-2015	Sep-2030	Little Wood River Res	2.85	Mar-2020	Mar-2040
Barber Dam	3.70	Apr-1989	Apr-2024	Low Line Canal	8.20	May-2020	May-2040
Birch Creek	0.07	Nov-2019	Nov-2039	Low Line Midway Hydro	2.50	Aug-2007	Aug-2027
Black Canyon #3	0.13	Apr-2019	Apr-2039	Lowline #2	2.79	May-2023	May-2043
Black Canyon Bliss Hydro	0.03	Oct-2015	Oct-2035	Magic Reservoir	9.07	Jun-1989	Jun-2024
Blind Canyon	1.63	Dec-2014	Dec-2034	Malad River	1.17	May-2019	May-2039
Box Canyon	0.30	Feb-2019	Feb-2039	Marco Ranches	1.20	Aug-2020	Aug-2040
Briggs Creek	0.60	Oct-2020	Oct-2040	MC6 Hydro	2.30	Apr-2021	Sep-2040
Bypass	9.96	Jun-2023	Jun-2043	Mile 28	1.50	Jun-1994	Jun-2029
Canyon Springs	0.11	Jan-2019	Jan-2039	Mitchell Butte	2.09	May-1989	Dec-2034
Cedar Draw	1.55	Jun-2019	Jun-2039	Mora Drop Small Hydro	1.85	Sep-2006	Sep-2026
Clear Springs Trout	0.56	Nov-2018	Nov-2038	Mud Creek/S&S	0.52	Feb-2017	Feb-2037
Coleman Hydro	0.80	Sep-2023	Estimated	Mud Creek/White	0.29	Jan-2021	Jan-2041
Crystal Springs	2.55	Apr-2021	Apr-2041	North Gooding Main Hydro	1.30	Oct-2016	Oct-2036
Curry Cattle Company	0.25	Jun-2018	Jun-2033	Owyhee Dam CSPP	5.00	Aug-1985	May-2034
Dietrich Drop	4.77	Sep-2023	Sep-2043	Pigeon Cove	1.75	Nov-2019	Nov-2039
Eightmile Hydro Project	0.36	Oct-2014	Oct-2034	Pristine Springs #1	0.13	May-2020	May-2040
Elk Creek Hydro	2.35	Jun-2021	Apr-2041	Pristine Springs #3	0.20	May-2020	May-2040
Fall River	9.10	Aug-1993	Aug-2028	Reynolds Irrigation	0.35	Sep-2021	Sep-2041
Fargo Drop Hydroelectric	1.27	Apr-2013	Apr-2033	Rock Creek #1	2.17	Jan-2018	Jan-2038
Faulkner Ranch Hydro	0.87	Aug-2022	Aug-2042	Rock Creek #2	1.90	Apr-1989	Apr-2024
Fisheries Dev.	0.26	Jul-1990	Jul-2040	Sagebrush	0.58	Jun-2021	Jun-2040
Geo-Bon #2	1.06	Nov-2021	Nov-2041	Sahko Hydro	0.50	Feb-2021	Feb-2041
Hailey CSPP	0.04	Jun-2020	Jun-2025	Shingle Creek	0.22	Aug-2022	Aug-2027
Hazelton A	8.10	Mar-2011	Feb-2026	Shoshone #2	0.58	May-1996	May-2031
Hazelton B	7.60	May-1993	May-2028	Shoshone CSPP	0.36	Feb-2017	Feb-2037
Head of U Canal Project	1.28	Jun-2015	Jun-2035	Snake River Pottery	0.09	Dec-2019	Dec-2027
Horseshoe Bend Hydro	9.50	Sep-1995	Sep-2030	Snedigar	0.50	Jan-2020	Jan-2040
Jim Knight	0.48	May-2021	May-2040	Tiber Dam	7.50	Jun-2004	Jun-2024
Koyle Small Hydro	1.25	Apr-2019	Apr-2039	Trout-Co	0.28	Dec-2021	Dec-2041
Lateral # 10	2.06	May-2020	May-2040	Tunnel #1	7.00	Jun-1993	Jun-2036
Lemhi Hydro	0.45	Aug-2021	Aug-2041	White Water Ranch	0.16	Aug-2020	Aug-2040
LeMoyne Hydro	0.08	Jun-2020	Jun-2030	Wilson Lake Hydro	8.40	May-1993	May-2028
Little Wood River Ranch I	1.01	Aug-2021	Aug-2041				
Total Hydro Nameplate Rating 151.32 MW							

Cogeneration/Thermal Projects

Project	MW	Contract On-line Date	Contract End Date
Pico Energy, LLC	2.13	Aug-2020	Aug-2030
Simplot Pocatello Cogen	15.90	Mar-2022	Mar-2025
TASCO—Nampa Natural Gas	2	Sep-2003	Sept-2040
TASCO—Twin Falls Natural Gas	3	Aug-2001	Jan-2040
Total Thermal Nameplate Rating 23.03 MW			

Biomass Projects

Project	MW	Contract On-line Date	Contract End Date	Project	MW	Contract On-line Date	Contract End Date
Bannock County Landfill	3.20	May-2014	May-2034	Pocatello Waste	0.50	Jan-2021	Jan-2041
Fighting Creek Landfill Gas to Energy Station	3.06	Apr-2014	Apr-2029	SISW LFGE	5.00	Sept-2018	Sept-2038
Hidden Hollow Landfill Gas	3.20	Jan-2007	Jan-2027	Tamarack CSPP	6.25	Jun-2018	Jun-2038
Total Biomass Nameplate Rating 21.21 MW							

Solar Projects

Project	MW	Contract On-line Date	Contract End Date	Project	MW	Contract On-line Date	Contract End Date
American Falls Solar II, LLC	20.00	Mar-2017	Mar-2037	Mt. Home Solar 1, LLC	20.00	Mar-2017	Mar-2037
American Falls Solar, LLC	20.00	Mar-2017	Mar-2037	Murphy Flat Power, LLC	20.00	Apr-2017	Apr-2037
Baker Solar Center	15.00	Feb-2020	Feb-2040	Ontario Solar Center	3.00	Mar-2020	Mar-2040
Brush Solar	2.75	Dec-2019	Dec-2039	Open Range Solar Center, LLC	10.00	Oct-2016	Oct-2036
Durkee Solar	3.00	Dec-2024	Mar-2042	Orchard Ranch Solar, LLC	20.00	Mar-2017	Mar-2037
Grand View PV Solar Two	80.00	Dec-2016	Dec-2036	Prairie City Solar	29.30	Dec-2024	Estimated
Grove Solar Center, LLC	6.00	Oct-2016	Oct-2036	Railroad Solar Center, LLC	4.50	Dec-2016	Dec-2036
Hyline Solar Center, LLC	9.00	Nov-2016	Nov-2036	Simcoe Solar, LLC	20.00	Mar-2017	Mar-2037
ID Solar 1	40.00	Aug-2016	Jan-2036	Thunderegg Solar Center, LLC	10.00	Nov-2016	Nov-2036
Moore's Hollow Solar	42.00	Dec-2024	Estimated	Vale Air Solar Center, LLC	10.00	Nov-2016	Nov-2036
Morgan Solar	3.00	Apr-2020	Apr-2040	Vale 1 Solar	3.00	Jul-2020	Jul-2040
Total Solar Nameplate Rating 390.55 MW							

Wind Projects

Project	MW	Contract On-line Date	Contract End Date	Project	MW	Contract On-line Date	Contract End Date
Bennett Creek Wind Farm	21.00	Dec-2008	Dec-2028	Mainline Windfarm	23.00	Dec-2012	Dec-2032
Benson Creek Windfarm	10.00	Mar-2017	Mar-2037	Milner Dam Wind	19.92	Feb-2011	Feb-2031
Burley Butte Wind Park	21.30	Feb-2011	Feb-2031	Oregon Trail Wind Park	13.50	Jan-2011	Jan-2031
Camp Reed Wind Park	22.50	Dec-2010	Dec-2030	Payne's Ferry Wind Park	21.00	Dec-2010	Dec-2030
Cassia Wind Farm LLC	8.40	Mar-2009	Mar-2029	Pilgrim Stage Station Wind Park	10.50	Jan-2011	Jan-2031
Cold Springs Windfarm	23.00	Dec-2012	Dec-2032	Prospector Windfarm	10.00	Mar-2017	Mar-2037
Desert Meadow Windfarm	23.00	Dec-2012	Dec-2032	Rockland Wind Farm	80.00	Dec-2011	Dec-2036
Durbin Creek Windfarm	10.00	Mar-2017	Mar-2037	Ryegrass Windfarm	23.00	Dec-2012	Dec-2032
Fossil Gulch Wind	10.50	Sep-2005	Sep-2025	Salmon Falls Wind	22.00	Apr-2011	Apr-2031
Golden Valley Wind Park	12.00	Feb-2011	Feb-2031	Sawtooth Wind Project	22.00	Nov-2011	Nov-2031
Hammett Hill Windfarm	23.00	Dec-2012	Dec-2032	Thousand Springs Wind Park	12.00	Jan-2011	Jan-2031
High Mesa Wind Project	40.00	Dec-2012	Dec-2032	Tuana Gulch Wind Park	10.50	Jan-2011	Jan-2031
Horseshoe Bend Wind	9.00	Feb-2006	Feb-2026	Tuana Springs Expansion	35.70	May-2010	May-2030
Hot Springs Wind Farm	21.00	Dec-2008	Dec-2028	Two Ponds Windfarm	23.00	Dec-2012	Dec-2032
Jett Creek Windfarm	10.00	Mar-2017	Mar-2037	Willow Spring Windfarm	10.00	Mar-2017	Mar-2037
Lime Wind Energy	3.00	Dec-2011	Dec-2031	Yahoo Creek Wind Park	21.00	Dec-2010	Dec-2030
Total Wind Nameplate Rating 624.82 MW							
Total Nameplate Rating 1,210.90 MW							

The above is a summary of the nameplate rating for the CSPP projects under contract with Idaho Power as of July 31, 2023. In the case of CSPP projects, nameplate rating of the actual generation units is not an accurate or reasonable estimate of the actual energy these projects will deliver to Idaho Power. Historical generation information, resource specific industry standard capacity factors, and other known and measurable operating characteristics are accounted for in determining a reasonable estimate of the energy these projects will produce.

Power Purchase Agreement Data

Project	MW	On-Line Date	Contract End Date
Wind Projects			
Elkhorn Wind Project	101	Dec-2007	Dec-2027
Total Wind Nameplate Rating	**101**		
Geothermal Projects			
Raft River Unit 1	13	Apr-2008	Apr-2033
Neal Hot Springs	22	Nov-2012	Nov-2037
Total Geothermal Nameplate Rating	**35**		
Solar Projects			
Black Mesa Solar	40	Jun-2023	Jun-2043
Franklin Solar	100	Jun-2024	Jun-2049
Jackpot Solar Facility	120	Dec-2022	Dec-2042
Pleasant Valley Solar	200	Mar-2025	Mar-2045
Total Solar Nameplate Rating	**460**		
Total Nameplate Rating	**596**		

The above is a summary of the Nameplate rating for the projects under contract with Idaho Power as of July 31, 2023. In the case of variable-energy resource projects, Nameplate rating of the actual generation units is not an accurate or reasonable estimate of the actual energy these projects will deliver to Idaho Power. Historical generation information, resource specific industry standard capacity factors, and other known and measurable operating characteristics are accounted for in determining a reasonable estimate of the energy these projects will produce.

Hydro Flow Modeling

Hydro Models

Idaho Power uses two modeling methods for the development of future hydro flow scenarios for the IRP. The first method accounts for surface water regulation in the system while the second method addresses groundwater processes.

The first modeling method consists of two models built in the Center for Advanced Decision Support for Water and Environmental Systems (CADSWES) RiverWare modeling framework. The first of these models covers the spatial extent of the Snake River basin from the headwaters to Brownlee inflow. The second model takes the results of the first and regulates the flows through the Hells Canyon Complex (HCC). The planning models have been updated to include hydrologic conditions for water years 1981 through 2018.

The second modeling method uses the Eastern Snake Plain Aquifer Model (ESPAM) from the Idaho Department of Water Resources (IDWR) to model aquifer management practices implemented on the Eastern Snake Plain Aquifer (ESPA). ESPAM version 2.2 has been used for this modeling, which is the latest version and was released in 2020.

Hydro Model Inputs

The inputs for the 2023 IRP were derived, in part, from management practices outlined in an agreement between the Surface Water Coalition (SWC) and Idaho Groundwater Appropriators (IGWA). The agreement set out specific targets for several management practices that include aquifer recharge, irrigation system conversions from groundwater to surface water, and a total reduction in groundwater diversions of 240,000 acre-ft annually. The modeling also included inputs from other entities diverting groundwater on the ESPA who have separate mitigation agreements with SWC. Model inputs also included a long-term analysis of trends in reach gains to the Snake River from Palisades Dam to King Hill. Weather modification activities conducted by Idaho Power and other participating entities were included in the modeling effort. The modeling also included aquifer recharge by the Idaho Water Resource Board (IWRB) targeting an average annual natural flow recharge of 250,000 acre-ft per year.

Recharge capacity modeled for the 2023 IRP included diversions with the capability of diverting all available water at the Snake River below Milner Dam during the winter months under typical release conditions. These diversions can have a significant impact to flows downstream of Milner Dam.

The number of system conversion acres modeled and associated water savings was based on data provided by IDWR and local groundwater districts. The current model assumes approximately 57,000 acres of converted land on the ESPA. Water savings for conversion projects are calculated at a rate of 2 acre-ft/converted acre. Diversions for conversion projects are modeled at approximately 114,000 acre-ft and are held essentially constant through all years of the IRP. The model accounted for an approximately 140,000 acre-ft decrease in groundwater pumping from ESPA. These reflect the same assumptions of conversion projects as modeled in the 2021 IRP.

The decrease was spread evenly over groundwater irrigated lands subject to the agreement between SWC and IGWA. The SWC agreement requires a total reduction of 240,000 acre-ft/year, but the agreement allows for a portion to be offset by aquifer recharge activities. Based on recent management activity, an approximate 100,000 acre-ft/year reduction is accomplished through other forms of mitigation, such as private aquifer recharge.

The 2023 IRP modeling also recognized ongoing declines in specific reaches. Future reach declines were determined using statistical analysis. Trend data indicate reach gains from Blackfoot to Neely and from Lower Salmon Falls Dam to King Hill demonstrated a statistically significant decline from 1992 to 2021. The long-term declines are still present, and are relatively the same as the declines used in the 2021 IRP.

Weather modification was added to the model at various levels of development. For IRP years 2024 through 2029, weather modification reflects the 2022 level of program development in the Upper Snake, Wood, Boise, and Payette river basins. From IRP year 2030 and onward, weather modification levels in Upper Snake, Wood, and Boise river basins were increased due to an anticipation of expanding the cloud seeding program. The level of weather modification was held constant at the current level in the Payette River Basin throughout the IRP planning horizon. The modeling also accounts for changes in reach gains from observed water management activities on the ESPA since 2014. Idaho Power used data from IDWR and other sources to determine the magnitude of the management activities and ESPAM was used to model the projected reach gains. Those management activities can have impacts on reach gains for up to 30 years.

Hydro Model Results

Overall inflow to Brownlee Reservoir increases from IRP modeled year 2024 through 2031. Flows peak in 2031 with the 50% exceedance water year annual inflow to Brownlee Reservoir at 11.9 million acre-ft/year. In 2043, those flows declined to approximately 11.8 million acre-ft/year.

The Brownlee inflow volumes for the 2023 IRP are lower than those reported in the 2021 IRP. There are several factors leading to the decrease in modeled flows. Updates to recharge capacity to reflect current infrastructure availability and capacities was likely the largest impact. While this does have some improvement in the modeled aquifer health and reach gains, the surface water impacts, reducing releases at Milner, significantly outweigh the groundwater impacts over the 20-year planning window. Another notable change was the use of ESPAM 2.2, which has a better calibration of the groundwater system, and reduced aquifer response below Milner which better reflects observations over the last several years. As a result, groundwater management activities produce lower reach gains throughout Idaho Power’s hydro system.

Hydro Modeling Potential Energy Limits (aMW)

		50th Percentile (planning case)			Extreme Weather Scenario		
Year	Month	HCC	ROR	Total	HCC	ROR	Total
2024	Jan	642	276	917	1155	505	1,660
	Feb	828	291	1,119	1151	474	1,625
	Mar	739	339	1,078	990	505	1,494
	Apr	873	355	1,229	1093	527	1,620
	May	894	328	1,222	1131	531	1,662
	June	846	362	1,208	1224	489	1,713
	July	567	371	938	902	403	1,305
	Aug	457	283	741	646	420	1,065
	Sept	508	236	744	737	260	998
	Oct	388	213	601	446	236	682
	Nov	339	184	522	330	205	535
	Dec	457	178	635	625	378	1,003
Annual aMW		**628**	**285**	**913**	**869**	**411**	**1,280**
2025	Jan	645	279	925	1185	497	1,683
	Feb	831	294	1,125	1129	474	1,603
	Mar	741	340	1,081	954	504	1,458
	Apr	874	357	1,231	934	505	1,439
	May	895	331	1,226	1047	513	1,560
	June	847	363	1,210	1253	515	1,767
	July	568	373	940	844	397	1,241
	Aug	458	284	742	670	434	1,104
	Sept	509	236	745	696	263	959
	Oct	388	214	602	408	236	644
	Nov	339	184	523	328	203	530
	Dec	458	178	636	649	431	1,080
Annual aMW		**629**	**286**	**915**	**841**	**414**	**1,256**

*HCC=Hells Canyon Complex, **ROR=Run of River

Year	Month	50th Percentile (planning case) HCC	ROR	Total	Extreme Weather Scenario HCC	ROR	Total
2026	Jan	647	282	929	1104	497	1,601
	Feb	833	296	1,130	1077	467	1,544
	Mar	744	340	1,084	1069	385	1,454
	Apr	874	358	1,232	1127	475	1,602
	May	895	331	1,227	915	499	1,414
	June	848	363	1,211	897	415	1,312
	July	568	373	941	624	402	1,025
	Aug	458	284	742	463	285	748
	Sept	509	237	745	616	243	858
	Oct	388	214	602	391	225	617
	Nov	339	184	523	334	193	527
	Dec	459	178	637	447	182	629
Annual aMW		**630**	**287**	**917**	**755**	**356**	**1,111**
2027	Jan	648	283	931	543	261	805
	Feb	834	298	1,132	587	252	840
	Mar	744	341	1,085	520	281	800
	Apr	874	359	1,233	544	223	767
	May	895	332	1,227	533	230	763
	June	848	364	1,211	510	355	865
	July	568	373	941	474	273	747
	Aug	458	284	742	403	211	614
	Sept	509	237	746	409	195	604
	Oct	388	214	602	350	194	544
	Nov	339	184	523	339	175	514
	Dec	459	179	638	427	169	596
Annual aMW		**630**	**287**	**918**	**470**	**235**	**705**

*HCC=Hells Canyon Complex, **ROR=Run of River

		50th Percentile (planning case)			Extreme Weather Scenario		
Year	Month	HCC	ROR	Total	HCC	ROR	Total
2028	Jan	649	283	932	548	171	719
	Feb	835	300	1,135	582	169	751
	Mar	745	342	1,087	600	181	781
	Apr	874	360	1,234	859	200	1,058
	May	895	332	1,227	649	279	928
	June	848	364	1,212	740	239	979
	July	568	373	941	487	262	750
	Aug	458	284	742	417	215	631
	Sept	509	237	745	383	197	581
	Oct	388	214	602	358	193	551
	Nov	339	184	523	345	176	521
	Dec	460	179	638	424	170	595
Annual aMW		**631**	**288**	**918**	**533**	**204**	**737**
2029	Jan	650	283	933	577	176	753
	Feb	832	301	1,133	682	178	860
	Mar	743	342	1,085	503	176	679
	Apr	874	360	1,234	713	230	943
	May	892	332	1,224	958	241	1,199
	June	839	363	1,203	860	238	1,098
	July	567	371	938	501	345	846
	Aug	460	284	744	421	249	669
	Sept	508	237	745	370	216	586
	Oct	388	214	602	359	195	554
	Nov	339	184	523	349	174	523
	Dec	460	179	639	416	171	587
Annual aMW		**629**	**288**	**917**	**559**	**216**	**775**

*HCC=Hells Canyon Complex, **ROR=Run of River

Year	Month	50th Percentile (planning case) HCC	ROR	Total	Extreme Weather Scenario HCC	ROR	Total
2030	Jan	710	288	998	535	202	737
	Feb	850	325	1,176	687	214	901
	Mar	795	348	1,143	722	257	979
	Apr	883	380	1,263	794	268	1,062
	May	926	362	1,288	728	233	961
	June	880	381	1,261	654	261	915
	July	573	376	949	567	333	900
	Aug	463	288	751	452	217	670
	Sept	511	238	749	462	199	661
	Oct	388	215	603	375	187	563
	Nov	339	185	523	331	170	501
	Dec	464	180	644	446	166	612
Annual aMW		**649**	**297**	**946**	**563**	**226**	**788**
2031	Jan	714	290	1,003	489	169	658
	Feb	849	327	1,177	508	161	669
	Mar	796	350	1,146	378	162	540
	Apr	884	382	1,266	559	229	788
	May	926	365	1,291	926	315	1,241
	June	882	381	1,263	701	283	984
	July	573	376	949	586	382	968
	Aug	463	288	752	451	277	727
	Sept	511	239	750	455	225	680
	Oct	388	215	603	366	202	568
	Nov	339	185	523	347	171	518
	Dec	464	180	644	616	172	788
Annual aMW		**649**	**298**	**947**	**532**	**229**	**761**

*HCC=Hells Canyon Complex, **ROR=Run of River

Year	Month	50th Percentile (planning case) HCC	ROR	Total	Extreme Weather Scenario HCC	ROR	Total
2032	Jan	714	290	1,004	1123	292	1,415
	Feb	847	327	1,174	1086	225	1,310
	Mar	801	350	1,151	1045	422	1,467
	Apr	885	391	1,276	1050	513	1,562
	May	926	366	1,292	1152	514	1,667
	June	882	381	1,263	1173	468	1,640
	July	573	376	949	633	420	1,053
	Aug	463	289	752	488	289	778
	Sept	511	239	750	563	239	802
	Oct	388	215	603	389	211	600
	Nov	339	185	524	337	177	514
	Dec	464	180	644	480	172	652
Annual aMW		**649**	**299**	**948**	**793**	**328**	**1,122**
2033	Jan	714	290	1,004	575	287	862
	Feb	848	328	1,177	685	312	997
	Mar	796	350	1,146	614	366	980
	Apr	884	382	1,266	622	292	913
	May	926	363	1,289	670	238	908
	June	881	382	1,263	524	342	866
	July	573	376	949	488	286	774
	Aug	463	289	751	408	230	638
	Sept	510	239	749	510	219	730
	Oct	388	215	603	366	195	561
	Nov	339	185	524	334	176	510
	Dec	464	180	644	419	169	589
Annual aMW		**649**	**298**	**947**	**518**	**259**	**777**

*HCC=Hells Canyon Complex, **ROR=Run of River

Year	Month	50th Percentile (planning case) HCC	ROR	Total	Extreme Weather Scenario HCC	ROR	Total
2034	Jan	714	289	1,003	509	163	672
	Feb	849	328	1,176	610	161	771
	Mar	796	350	1,145	631	169	800
	Apr	884	381	1,265	831	335	1,166
	May	926	363	1,289	934	247	1,181
	June	881	381	1,262	977	269	1,245
	July	572	376	949	595	316	910
	Aug	462	289	751	504	350	853
	Sept	510	238	748	482	232	714
	Oct	388	215	603	391	205	596
	Nov	338	185	524	341	173	514
	Dec	463	180	644	415	169	584
Annual aMW		**649**	**298**	**947**	**601**	**232**	**834**
2035	Jan	713	289	1,002	711	416	1,127
	Feb	848	328	1,176	806	399	1,205
	Mar	796	350	1,145	863	475	1,337
	Apr	884	381	1,265	1072	511	1,583
	May	925	363	1,289	1007	429	1,437
	June	881	381	1,262	1112	492	1,604
	July	572	376	948	629	374	1,003
	Aug	462	288	751	515	351	866
	Sept	509	238	747	482	235	717
	Oct	388	215	602	388	213	601
	Nov	338	185	523	346	174	519
	Dec	463	180	643	427	169	595
Annual aMW		**648**	**298**	**946**	**696**	**353**	**1,050**

*HCC=Hells Canyon Complex, **ROR=Run of River

Year	Month	50th Percentile (planning case) HCC	ROR	Total	Extreme Weather Scenario HCC	ROR	Total
2036	Jan	713	289	1,001	625	303	928
	Feb	849	327	1,176	696	300	996
	Mar	795	349	1,144	628	310	938
	Apr	884	381	1,264	712	256	968
	May	925	363	1,288	815	310	1,125
	June	880	381	1,261	1107	315	1,422
	July	572	376	948	513	285	798
	Aug	462	288	750	443	242	685
	Sept	508	238	747	494	229	723
	Oct	388	215	602	390	211	601
	Nov	338	185	523	339	176	515
	Dec	463	180	643	519	174	693
Annual aMW		**648**	**298**	**946**	**607**	**260**	**866**
2037	Jan	710	288	999	822	269	1,091
	Feb	851	327	1,178	1053	303	1,356
	Mar	794	349	1,143	945	479	1,424
	Apr	883	381	1,264	915	465	1,380
	May	925	363	1,288	976	444	1,420
	June	880	381	1,261	1235	520	1,755
	July	571	376	947	1096	512	1,609
	Aug	461	288	750	695	441	1,136
	Sept	508	238	746	659	258	917
	Oct	387	215	602	419	219	638
	Nov	338	185	523	339	184	523
	Dec	463	180	643	618	444	1,062
Annual aMW		**648**	**298**	**945**	**814**	**378**	**1,193**

*HCC=Hells Canyon Complex, **ROR=Run of River

Year	Month	50th Percentile (planning case) HCC	ROR	Total	Extreme Weather Scenario HCC	ROR	Total
2038	Jan	709	288	997	1068	488	1,556
	Feb	852	326	1,178	1083	447	1,530
	Mar	794	348	1,142	939	441	1,381
	Apr	883	380	1,264	934	451	1,386
	May	925	363	1,288	676	379	1,054
	June	879	381	1,260	573	326	899
	July	571	376	947	616	387	1,003
	Aug	461	288	749	462	281	743
	Sept	507	238	745	588	231	819
	Oct	387	214	602	370	210	580
	Nov	338	185	523	327	181	508
	Dec	463	180	642	431	180	611
Annual aMW		**647**	**297**	**945**	**672**	**334**	**1,006**
2039	Jan	708	287	995	478	182	660
	Feb	850	325	1,175	608	219	827
	Mar	793	348	1,141	429	189	618
	Apr	883	380	1,263	503	181	685
	May	924	363	1,287	525	232	756
	June	879	381	1,259	534	326	860
	July	570	376	946	440	310	750
	Aug	461	288	749	372	216	589
	Sept	507	238	745	432	210	643
	Oct	387	214	601	379	193	572
	Nov	339	185	523	343	171	514
	Dec	462	180	642	406	164	570
Annual aMW		**647**	**297**	**944**	**454**	**216**	**670**

*HCC=Hells Canyon Complex, **ROR=Run of River

Year	Month	50th Percentile (planning case) HCC	ROR	Total	Extreme Weather Scenario HCC	ROR	Total
2040	Jan	706	286	992	451	174	625
	Feb	849	325	1,174	595	174	769
	Mar	792	347	1,139	812	306	1,118
	Apr	883	385	1,268	759	417	1,176
	May	925	356	1,280	695	315	1,010
	June	878	380	1,258	622	297	919
	July	570	376	945	515	385	900
	Aug	460	288	748	436	282	718
	Sept	506	238	744	426	223	649
	Oct	387	214	601	369	211	580
	Nov	339	185	523	339	172	510
	Dec	462	180	642	499	174	672
Annual aMW		**646**	**297**	**943**	**543**	**261**	**804**
2041	Jan	704	287	991	667	328	994
	Feb	847	325	1,173	943	360	1,303
	Mar	791	348	1,139	561	332	892
	Apr	882	384	1,267	518	298	816
	May	924	355	1,279	449	282	731
	June	877	380	1,257	456	310	766
	July	570	375	945	497	375	872
	Aug	460	288	747	378	269	647
	Sept	505	238	743	384	226	610
	Oct	386	214	601	358	200	558
	Nov	339	185	523	341	168	509
	Dec	462	180	641	475	165	640
Annual aMW		**646**	**297**	**942**	**502**	**276**	**778**

*HCC=Hells Canyon Complex, **ROR=Run of River

Year	Month	50th Percentile (planning case) HCC	ROR	Total	Extreme Weather Scenario HCC	ROR	Total
2042	Jan	701	286	987	547	196	743
	Feb	846	324	1,171	697	206	903
	Mar	790	347	1,137	746	174	919
	Apr	882	383	1,265	932	243	1,175
	May	924	354	1,278	818	245	1,064
	June	877	380	1,256	575	244	819
	July	569	375	945	508	355	862
	Aug	459	288	747	400	242	642
	Sept	504	237	742	440	218	658
	Oct	386	214	600	371	190	561
	Nov	339	185	523	342	156	498
	Dec	461	179	641	437	158	595
Annual aMW		**645**	**296**	**941**	**568**	**219**	**787**
2043	Jan	701	268	969	734	226	960
	Feb	846	306	1,153	1098	406	1,504
	Mar	790	329	1,119	946	509	1,454
	Apr	882	366	1,248	952	499	1,450
	May	924	335	1,259	1089	514	1,603
	June	877	360	1,237	1187	456	1,643
	July	569	356	925	650	343	992
	Aug	459	269	728	553	360	913
	Sept	504	217	721	620	236	857
	Oct	386	195	581	407	212	618
	Nov	339	168	506	329	175	503
	Dec	461	162	623	454	196	650
Annual aMW		**645**	**278**	**922**	**751**	**344**	**1,096**

*HCC=Hells Canyon Complex, **ROR=Run of River

LONG-TERM CAPACITY EXPANSION RESULTS (MW)

Main Cases

Preferred Portfolio–Valmy 1 & 2 (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Geo	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	0	18
2026	-134	0	261	0	0	100	0	0	0	Jul B2H	0	0	19
2027	0	0	0	0	400	375	5	0	0	0	0	0	20
2028	0	0	0	0	400	150	5	0	0	0	0	0	21
2029	0	0	0	0	400	0	5	0	0	GWW1	0	20	22
2030	-350	0	350	0	100	500	155	0	0	0	30	0	21
2031	0	0	0	0	400	400	5	0	0	GWW2	0	0	21
2032	0	0	0	0	100	100	205	0	0	0	0	0	20
2033	0	0	0	0	0	0	105	0	0	0	0	20	20
2034	0	0	0	0	0	0	5	0	0	0	0	40	19
2035	0	0	0	0	0	0	5	0	0	0	0	40	18
2036	0	0	0	0	0	0	5	0	0	0	0	40	17
2037	0	0	0	0	0	0	55	50	0	0	0	0	17
2038	0	-706	0	340	0	0	155	50	200	0	0	0	17
2039	0	0	0	0	0	0	5	50	0	0	0	0	15
2040	0	0	0	0	0	400	5	0	0	GWW3	0	0	14
2041	0	0	0	0	0	200	5	0	0	0	0	0	14
2042	0	0	0	0	0	200	55	0	0	0	0	0	14
2043	0	0	0	0	0	600	0	0	0	0	0	0	14
Subtotal	-841	-706	967	340	1,800	3,325	1,103	150	200		30	160	360
Total	**6,888**	**Portfolio Cost: $9,746M**											

Valmy 2 (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Geo	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	0	18
2026	-134	0	134	0	0	0	5	0	0	Jul B2H	0	0	19
2027	0	0	0	0	400	475	5	0	0	0	0	0	20
2028	0	0	0	0	400	150	5	0	0	0	0	20	21
2029	0	0	0	0	400	0	55	150	0	GWW1	0	20	22
2030	-350	0	350	0	300	300	5	0	0	0	30	20	21
2031	0	0	0	0	300	100	5	0	0	GWW2	0	0	21
2032	0	0	0	0	0	600	105	0	0	0	0	0	20
2033	0	0	0	0	0	0	105	0	0	0	0	40	20
2034	0	0	0	0	0	0	155	0	0	0	0	0	19
2035	0	0	0	0	0	0	205	0	0	0	0	0	18
2036	0	0	0	0	0	0	5	0	0	0	0	0	17
2037	0	0	0	0	0	0	5	0	0	0	0	40	17
2038	0	-706	340	340	0	0	55	50	50	0	0	0	17
2039	0	0	0	0	0	0	5	0	0	0	0	0	15
2040	0	0	0	0	0	200	5	0	0	GWW3	0	0	14
2041	0	0	0	0	0	500	0	0	0	0	0	0	14
2042	0	0	0	0	0	0	0	0	50	0	0	0	14
2043	0	0	0	0	0	0	5	0	0	0	0	0	14
Subtotal	-841	-706	1,180	340	1,800	2,625	1,053	200	100		30	140	360
Total	**6,281**	**Portfolio Cost: $9,795M**											

Without Valmy (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	18
2026	-134	0	0	0	0	100	5	0	0	Jul B2H	20	19
2027	0	0	0	0	400	375	5	0	0	0	40	20
2028	0	0	0	0	400	150	155	0	0	0	40	21
2029	0	0	170	0	400	200	5	0	0	GWW1	0	22
2030	-350	0	350	0	400	0	5	0	0	0	0	21
2031	0	0	0	0	200	400	5	0	0	GWW2	0	21
2032	0	0	0	0	0	400	205	0	0	0	0	20
2033	0	0	0	0	0	0	205	0	0	0	0	20
2034	0	0	0	0	0	0	55	0	0	0	20	19
2035	0	0	0	0	0	0	55	0	0	0	20	18
2036	0	0	0	0	0	0	5	100	0	0	0	17
2037	0	0	0	0	0	0	5	0	0	0	0	17
2038	0	-706	170	340	0	0	5	50	200	0	0	17
2039	0	0	0	0	0	0	5	50	0	0	0	15
2040	0	0	0	0	0	0	5	0	0	0	20	14
2041	0	0	0	0	0	500	0	0	0	GWW3	0	14
2042	0	0	0	0	0	400	5	0	0	0	0	14
2043	0	0	0	0	0	600	0	0	0	0	0	14
Subtotal	-841	-706	1,046	340	1,800	3,425	1,053	200	200		160	360
Total	**7,037**	**Portfolio Cost: $9,824M**										

November 2026 B2H Valmy 1 & 2 (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	18
2026	-134	0	261	0	0	400	155	0	0	Nov B2H	40	19
2027	0	0	0	0	400	375	5	0	0	0	0	20
2028	0	0	0	0	100	150	5	0	0	0	0	21
2029	0	0	0	0	400	200	5	0	0	GWW1	0	22
2030	-350	0	350	0	400	0	5	0	0	0	0	21
2031	0	0	0	0	400	500	55	0	0	GWW2	0	21
2032	0	0	0	0	100	0	5	0	0	0	20	20
2033	0	0	0	0	0	0	55	0	0	0	40	20
2034	0	0	0	0	0	0	55	0	0	0	40	19
2035	0	0	0	0	0	0	55	0	0	0	0	18
2036	0	0	0	0	0	0	5	50	0	0	0	17
2037	0	0	170	0	0	0	5	50	0	0	0	17
2038	0	-706	0	340	0	0	55	0	200	0	20	17
2039	0	0	0	0	0	0	50	0	0	0	20	15
2040	0	0	0	0	0	0	5	50	0	0	0	14
2041	0	0	0	0	0	300	5	0	0	GWW3	0	14
2042	0	0	0	0	0	300	5	0	0	0	0	14
2043	0	0	0	0	0	300	55	0	0	0	0	14
Subtotal	-841	-706	1,137	340	1,800	2,825	908	150	200		180	360
Total	**6,353**	**Portfolio Cost: $9,767M**										

November 2026 B2H Valmy 2 (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Demand Response	Energy Efficiency Forecast	Energy Efficiency Bundles
2024	-357	0	357	0	0	100	96	0	0	0	0	17	0
2025	0	0	0	0	0	200	227	0	0	0	0	18	0
2026	-134	0	134	0	0	400	205	100	0	Nov B2H	20	19	0
2027	0	0	0	0	400	375	5	0	0	0	0	20	0
2028	0	0	0	0	100	150	5	0	0	0	0	21	0
2029	0	0	0	0	400	100	5	0	0	GWW1	20	22	0
2030	-350	0	350	0	400	0	5	0	0	0	20	21	0
2031	0	0	0	0	400	0	5	0	0	GWW2	0	21	0
2032	0	0	0	0	100	0	5	0	50	0	0	20	0
2033	0	0	0	0	0	0	5	0	50	0	20	20	0
2034	0	0	0	0	0	200	5	0	50	0	0	19	0
2035	0	0	0	0	0	0	5	0	0	0	0	18	0
2036	0	0	0	0	0	0	5	0	0	0	40	17	0
2037	0	0	170	0	0	0	5	0	0	0	0	17	0
2038	0	-706	0	340	0	200	705	0	50	0	0	17	0
2039	0	0	0	0	0	200	55	0	0	0	20	15	0
2040	0	0	0	0	0	300	5	0	0	GWW3	20	14	0
2041	0	0	0	0	0	300	5	0	0	0	0	14	14
2042	0	0	0	0	0	400	55	0	0	0	0	14	0
2043	0	0	0	0	0	400	5	0	0	0	0	14	0
Subtotal	-841	-706	1,010	340	1,800	3,325	1,413	100	200		160	360	14
Total	**7,175**	**Portfolio Cost: $9,880M**											

November 2026 B2H Without Valmy (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Geo	Demand Response	Energy Efficiency Forecast	Energy Efficiency Bundles
2024	-357	0	357	0	0	100	96	0	0	0	0	0	17	0
2025	0	0	0	0	0	200	227	0	0	0	0	0	18	0
2026	-134	0	0	0	0	400	100	300	0	Nov B2H	0	40	19	27
2027	0	0	0	0	400	375	5	0	0	0	0	0	20	0
2028	0	0	0	0	100	150	5	0	0	0	0	0	21	0
2029	0	0	0	0	400	200	5	0	0	GWW1	0	20	22	0
2030	-350	0	350	0	400	0	0	0	0	0	30	0	21	0
2031	0	0	0	0	400	100	5	0	0	GWW2	0	0	21	0
2032	0	0	0	0	100	400	205	0	0	0	0	0	20	0
2033	0	0	0	0	0	0	105	0	0	0	0	0	20	0
2034	0	0	0	0	0	0	55	0	0	0	0	40	19	0
2035	0	0	0	0	0	0	5	0	0	0	0	40	18	0
2036	0	0	0	0	0	0	5	0	0	0	0	40	17	0
2037	0	0	340	0	0	0	0	0	0	0	0	0	17	0
2038	0	-706	0	340	0	0	5	0	100	0	0	0	17	0
2039	0	0	0	0	0	0	0	0	50	0	0	0	15	0
2040	0	0	0	0	0	0	0	0	0	0	0	0	14	0
2041	0	0	0	0	0	600	0	0	0	GWW3	0	0	14	0
2042	0	0	0	0	0	300	5	0	0	0	0	0	14	0
2043	0	0	0	0	0	500	5	0	0	0	0	0	14	0
Subtotal	-841	-706	1,046	340	1,800	3,325	833	300	150		30	180	360	27
Total	**6,844**	**Portfolio Cost: $10,192M**												

Without GWW Segments (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	Pumped Storage	100-Hr	Trans.	Geo	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	0	18
2026	-134	0	261	0	0	0	0	0	0	Jul B2H	0	0	19
2027	0	0	0	0	100	375	0	0	0	0	0	20	20
2028	0	0	0	0	0	150	0	0	0	0	0	40	21
2029	0	0	300	0	0	0	150	0	0	0	0	40	22
2030	-350	0	350	0	200	0	0	0	0	0	30	0	21
2031	0	0	0	0	100	0	0	0	0	0	0	0	21
2032	0	0	0	0	200	0	0	0	0	0	0	0	20
2033	0	0	170	0	100	0	5	0	0	0	0	0	20
2034	0	0	0	0	0	0	0	0	0	0	0	0	19
2035	0	0	0	0	200	0	0	0	0	0	0	0	18
2036	0	0	0	0	0	0	0	0	0	0	0	0	17
2037	0	0	0	170	0	0	0	0	0	0	0	0	17
2038	0	-706	300	0	0	0	0	0	0	0	30	0	17
2039	0	0	0	170	0	0	0	0	0	0	0	0	15
2040	0	0	0	0	0	0	0	0	0	0	0	0	14
2041	0	0	0	0	0	0	0	0	0	0	0	0	14
2042	0	0	0	0	0	0	0	0	50	0	0	0	14
2043	0	0	0	0	0	0	0	250	0	0	0	0	14
Subtotal	-841	-706	1,737	340	900	825	478	250	50		60	100	360
Total	**3,553**	**Portfolio Cost: $10,326M**											

GWW Segment 1 Only (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	Pumped Storage	100-Hr	Trans.	Geo	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	0	0	18
2026	-134	0	261	0	0	400	0	0	0	0	Jul B2H	0	0	19
2027	0	0	0	0	200	675	5	0	0	0	0	0	0	20
2028	0	0	0	0	0	150	5	0	0	0	0	0	0	21
2029	0	0	170	0	0	200	155	0	0	0	GWW1	0	20	22
2030	-350	0	350	0	0	0	5	0	0	0	0	0	20	21
2031	0	0	0	0	200	0	5	0	0	0	0	0	20	21
2032	0	0	0	0	400	0	5	0	0	0	0	30	20	20
2033	0	0	300	0	200	0	5	0	0	0	0	0	0	20
2034	0	0	0	0	0	0	5	0	0	0	0	0	0	19
2035	0	0	0	0	0	0	5	0	0	0	0	0	0	18
2036	0	0	0	0	0	0	5	0	0	0	0	0	0	17
2037	0	0	0	0	0	0	5	0	0	0	0	0	0	17
2038	0	-706	0	170	0	0	5	300	0	100	0	0	60	17
2039	0	0	0	170	0	0	0	0	0	50	0	0	0	15
2040	0	0	0	0	0	0	0	0	0	0	0	0	0	14
2041	0	0	0	0	0	0	0	0	0	50	0	0	0	14
2042	0	0	0	0	0	0	0	0	0	0	0	0	0	14
2043	0	0	0	0	0	0	0	0	250	0	0	0	0	14
Subtotal	-841	-706	1,437	340	1,000	1,725	533	300	250	200		30	140	360
Total	**4,768**	**Portfolio Cost: $10,263M**												

GWW Segments 1 & 2 Only (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	100-Hr	Trans.	Geo	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	18
2026	-134	0	261	0	0	100	5	0	Jul B2H	0	0	19
2027	0	0	0	0	400	375	5	0	0	0	0	20
2028	0	0	0	0	400	150	5	0	0	0	0	21
2029	0	0	0	0	400	0	105	0	GWW1	0	0	22
2030	-350	0	350	0	200	400	55	0	0	0	0	21
2031	0	0	0	0	300	0	5	0	GWW2	0	0	21
2032	0	0	0	0	100	300	305	0	0	0	0	20
2033	0	0	0	0	0	300	150	0	0	0	0	20
2034	0	0	0	0	0	0	5	0	0	0	0	19
2035	0	0	0	0	0	0	5	0	0	0	20	18
2036	0	0	0	0	0	0	5	0	0	0	40	17
2037	0	0	0	170	0	0	50	50	0	0	40	17
2038	0	-706	340	170	0	0	5	0	0	0	40	17
2039	0	0	0	0	0	0	0	50	0	0	0	15
2040	0	0	0	0	0	0	0	0	0	0	0	14
2041	0	0	0	0	0	0	0	50	0	0	0	14
2042	0	0	0	0	0	0	0	0	0	0	0	14
2043	0	0	0	0	0	0	5	0	0	30	0	14
Subtotal	-841	-706	1,307	340	1,800	1,925	1,033	150		30	140	360
Total	**5,538**	**Portfolio Cost: $9,759M**										

Scenarios and Sensitivities

High Gas High Carbon (MW)

Year	Coal Exits	Gas Exits	New Gas	Wind	Solar	4-Hr	8-Hr	Pumped Storage	100-Hr	Trans.	Geo	Demand Response	Energy Efficiency Forecast	Energy Efficiency Bundles
2024	-357	0	357	0	100	96	0	0	0	0	0	0	17	0
2025	0	0	0	0	200	227	0	0	0	0	0	0	18	0
2026	-134	0	134	0	100	0	0	0	0	Jul B2H	0	0	19	0
2027	0	0	0	400	375	0	0	0	0	0	0	0	20	0
2028	0	0	0	400	150	5	0	0	0	0	0	0	21	9
2029	0	0	170	400	100	5	50	0	0	GWW1	0	0	22	9
2030	-350	-134	820	200	0	5	50	0	0	0	30	0	21	11
2031	0	0	0	400	600	5	200	250	0	GWW2	30	40	21	12
2032	0	0	0	0	100	5	0	0	0	0	0	0	20	0
2033	0	0	0	0	200	50	0	0	0	0	0	0	20	0
2034	0	0	0	0	0	0	0	0	0	0	0	0	19	0
2035	0	0	0	0	0	0	0	0	0	0	0	0	18	0
2036	0	0	0	0	0	0	0	0	0	0	0	20	17	0
2037	0	0	0	0	0	150	0	0	0	0	0	20	17	0
2038	0	-706	0	0	0	355	0	0	50	0	0	20	17	0
2039	0	0	0	0	0	5	0	0	0	0	0	40	15	0
2040	0	0	0	0	0	5	0	0	0	0	0	40	14	0
2041	0	0	0	0	0	0	0	0	50	0	0	0	14	0
2042	0	0	0	0	0	0	0	0	0	0	0	0	14	0
2043	0	0	0	0	600	0	0	0	0	GWW3	0	0	14	0
Subtotal	-841	-840	1,480	1,800	2,525	913	300	250	100		60	180	360	41
Total	**6,328**	**Portfolio Cost: $12,520M**												

Low Gas Zero Carbon (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	18
2026	-134	0	261	0	0	0	0	0	0	Jul B2H	0	19
2027	0	0	0	0	400	375	5	0	0	0	0	20
2028	0	0	0	0	200	150	5	0	0	0	0	21
2029	0	0	0	0	400	300	5	0	0	GWW1	0	22
2030	-350	0	350	0	400	200	155	0	0	0	0	21
2031	0	0	0	0	400	400	155	0	0	GWW2	0	21
2032	0	0	0	0	0	200	155	0	0	0	0	20
2033	0	0	0	0	0	0	55	0	0	0	0	20
2034	0	0	0	0	0	0	5	0	0	0	20	19
2035	0	0	0	0	0	0	5	0	0	0	40	18
2036	0	0	0	0	0	0	5	0	0	0	40	17
2037	0	0	340	0	0	0	5	0	0	0	0	17
2038	0	-706	0	340	0	0	5	0	100	0	0	17
2039	0	0	0	0	0	0	5	50	0	0	0	15
2040	0	0	0	0	0	0	5	0	0	0	40	14
2041	0	0	0	0	0	500	0	0	0	GWW3	0	14
2042	0	0	0	0	0	400	5	0	0	0	0	14
2043	0	0	0	0	0	600	5	0	0	0	0	14
Subtotal	-841	-706	1,307	340	1,800	3,425	903	50	100		140	360
Total	**6,878**	**Portfolio Cost: $8,594M**										

Constrained Storage (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Geo	Demand Response	Energy Efficiency Forecast	Energy Efficiency Bundles
2024	-357	0	357	0	0	100	96	0	0	0	0	0	17	0
2025	0	0	0	0	0	200	227	0	0	0	0	0	18	0
2026	-134	0	134	0	0	0	0	0	0	Jul B2H	0	0	19	0
2027	0	0	0	0	400	475	5	0	0	0	0	20	20	0
2028	0	0	0	0	400	150	5	0	0	0	0	40	21	0
2029	0	0	0	0	400	400	55	0	0	GWW1	0	40	22	0
2030	-350	0	350	0	200	0	5	200	0	0	0	0	21	0
2031	0	-134	0	0	400	500	5	100	0	GWW2	30	20	21	0
2032	0	0	0	0	0	100	5	0	0	0	30	20	20	0
2033	0	0	0	0	0	0	5	100	0	0	30	0	20	0
2034	0	0	0	0	0	0	5	0	0	0	30	0	19	0
2035	0	0	0	0	0	0	5	50	0	0	0	0	18	0
2036	0	0	0	0	0	0	5	50	0	0	0	0	17	0
2037	0	0	170	0	0	0	5	0	50	0	0	0	17	0
2038	0	-706	170	340	0	0	5	0	50	0	0	0	17	0
2039	0	0	0	0	0	0	5	50	0	0	0	0	15	0
2040	0	0	0	0	0	0	5	0	50	0	0	0	14	0
2041	0	0	0	0	0	0	5	0	0	0	0	0	14	0
2042	0	0	0	0	0	200	5	0	0	GWW3	0	0	14	0
2043	0	0	0	0	0	300	5	0	0	0	0	20	14	14
Subtotal	-841	-840	1,180	340	1,800	2,425	458	550	150		120	160	360	14
Total	**5,876**	**Portfolio Cost: $10,007M**												

100% Clean by 2045 (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Geo	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	0	18
2026	-134	0	134	0	0	100	0	0	0	Jul B2H	0	0	19
2027	0	0	0	0	400	375	5	0	0	0	0	0	20
2028	0	0	0	0	400	150	5	0	0	0	0	20	21
2029	-175	0	340	0	400	0	305	0	0	GWW1	0	40	22
2030	-174	0	0	0	400	200	205	0	50	0	30	40	21
2031	0	0	0	0	200	100	5	0	0	GWW2	0	20	21
2032	0	0	0	0	0	300	5	0	0	0	0	0	20
2033	0	0	0	0	0	400	5	50	0	0	0	0	20
2034	0	0	0	0	0	0	5	0	100	0	0	0	19
2035	0	-134	0	0	0	0	5	0	0	0	0	0	18
2036	0	0	0	0	0	0	5	0	0	0	0	40	17
2037	0	0	0	170	0	0	5	0	0	0	0	0	17
2038	0	-357	0	170	0	0	5	100	50	0	0	0	17
2039	0	0	0	0	0	0	0	50	0	0	0	0	15
2040	0	0	0	0	0	200	55	0	0	GWW3	0	0	14
2041	0	0	0	0	0	100	55	0	0	0	0	0	14
2042	0	0	0	0	0	200	0	50	0	0	0	0	14
2043	0	0	0	0	0	300	0	0	0	0	0	0	14
Subtotal	-841	-491	831	340	1,800	2,725	993	250	200		30	160	360
Total	**6,357**	**Portfolio Cost: $9,808M**											

Additional Large Load 100 MW (MW)

Year	Coal Exits	Gas	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Geo	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	0	18
2026	-134	0	261	0	0	0	5	0	0	Jul B2H	0	0	19
2027	0	0	0	0	400	475	5	0	0	0	0	0	20
2028	0	0	0	0	400	150	5	0	0	0	0	40	21
2029	0	0	0	0	400	0	55	50	0	GWW1	0	40	22
2030	-350	0	350	0	300	300	105	0	0	0	30	0	21
2031	0	0	0	0	300	0	5	0	0	GWW2	0	0	21
2032	0	0	0	0	0	600	155	0	0	0	0	0	20
2033	0	0	0	0	0	0	205	0	0	0	0	20	20
2034	0	0	0	0	0	100	155	0	0	0	0	0	19
2035	0	0	0	0	0	0	105	0	0	0	0	0	18
2036	0	0	0	0	0	0	5	0	0	0	0	20	17
2037	0	0	0	170	0	0	5	0	0	0	0	0	17
2038	0	-706	170	170	0	0	5	100	200	0	0	40	17
2039	0	0	0	0	0	0	5	50	0	0	0	0	15
2040	0	0	0	0	0	500	5	0	0	GWW3	0	0	14
2041	0	0	0	0	0	200	5	0	0	0	0	0	14
2042	0	0	0	0	0	200	55	0	0	0	0	0	14
2043	0	0	0	0	0	500	5	0	0	0	0	0	14
Subtotal	-841	-706	1,137	340	1,800	3,325	1,213	200	200		30	160	360
Total	**7,218**	**Portfolio Cost: $10,236M**											

Additional Large Load 200 MW (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Geo	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	0	18
2026	-134	0	261	0	0	0	5	0	0	Jul B2H	0	20	19
2027	0	0	0	0	400	475	5	0	0	0	0	20	20
2028	0	0	0	0	400	150	5	100	0	0	0	20	21
2029	0	0	0	0	400	300	255	0	0	GWW1	0	40	22
2030	-350	0	350	0	300	0	205	0	0	0	30	0	21
2031	0	0	0	0	300	500	5	0	0	GWW2	30	0	21
2032	0	0	0	0	0	200	5	0	0	0	30	40	20
2033	0	0	0	0	0	0	5	100	0	0	0	20	20
2034	0	0	0	0	0	0	5	50	0	0	0	20	19
2035	0	0	0	0	0	0	0	0	50	0	0	0	18
2036	0	0	0	0	0	0	0	0	0	0	0	0	17
2037	0	0	170	0	0	0	5	0	0	0	0	0	17
2038	0	-706	170	340	0	0	5	0	150	0	0	0	17
2039	0	0	0	0	0	0	5	0	0	0	0	0	15
2040	0	0	0	0	0	100	5	0	0	GWW3	0	0	14
2041	0	0	0	0	0	400	5	0	0	0	0	0	14
2042	0	0	0	0	0	100	55	0	0	0	0	0	14
2043	0	0	0	0	0	200	100	0	0	0	0	0	14
Subtotal	-841	-706	1,307	340	1,800	2,725	998	250	200		90	180	360
Total	**6,703**	**Portfolio Cost: $10,747**											

100% Clean by 2035 (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	Pumped Storage	100-Hr	Trans.	Geo	Biomass	Demand Response	Energy Efficiency Forecast	Energy Efficiency Bundles
2024	-357	0	357	0	0	100	96	0	0	0	0	0	0	0	17	0
2025	0	0	0	0	0	200	227	0	0	0	0	0	0	0	18	0
2026	-134	0	134	0	0	100	105	0	0	0	Jul B2H	0	0	0	19	0
2027	0	0	0	0	400	375	5	0	0	0	0	0	0	0	20	0
2028	0	0	0	0	400	150	5	0	0	0	0	0	0	20	21	0
2029	-175	0	0	0	400	0	5	250	0	0	GWW1	0	0	40	22	0
2030	-174	0	0	0	400	200	105	0	0	50	0	30	30	20	21	0
2031	0	0	0	0	200	500	5	50	0	0	GWW2	30	0	0	21	0
2032	0	0	0	0	0	200	105	50	0	50	0	30	30	0	20	0
2033	0	0	0	0	0	100	205	0	0	0	0	30	30	0	20	0
2034	0	0	0	0	0	0	55	100	0	50	0	0	30	40	19	0
2035	0	-1,260	0	0	0	0	5	150	500	50	0	30	30	60	18	43
2036	0	0	0	0	0	0	55	0	0	0	0	0	0	0	17	0
2037	0	0	0	170	0	0	0	0	0	0	0	0	0	0	17	0
2038	0	0	0	170	0	0	0	0	0	0	0	0	0	0	17	0
2039	0	0	0	0	0	0	5	0	0	0	0	0	0	0	15	0
2040	0	0	0	0	0	100	5	0	0	0	GWW3	0	0	0	14	0
2041	0	0	0	0	0	0	5	0	0	0	0	0	0	0	14	0
2042	0	0	0	0	0	100	5	0	0	0	0	0	0	0	14	42
2043	0	0	0	0	0	0	55	250	0	0	0	0	0	0	14	41
Subtotal	-841	-1,260	491	340	1,800	2,125	1,053	850	500	200		150	150	180	360	127
Total	**7,168**	**Portfolio Cost: $11,351M**														

New Forecasted PURPA (MW)

Year	Coal Exits	Gas Exits	New Gas	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Hydro	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	100	96	0	0	0	0	0	17
2025	0	0	0	0	200	227	0	0	0	0	0	18
2026	-134	0	261	0	100	0	0	0	Jul B2H	0	0	19
2027	0	0	0	400	775	5	0	0	0	0	0	20
2028	0	0	0	23	182	5	0	0	0	2	0	21
2029	0	0	0	423	32	5	0	0	GWW1	2	0	22
2030	-350	0	350	423	232	5	0	0	0	2	0	21
2031	0	0	0	423	32	55	100	0	GWW2	2	0	21
2032	0	0	0	223	432	5	0	0	0	2	0	20
2033	0	0	0	23	32	5	0	0	0	2	0	20
2034	0	0	0	23	32	55	0	0	0	2	0	19
2035	0	0	0	23	32	5	0	0	0	2	20	18
2036	0	0	0	23	32	5	0	0	0	2	40	17
2037	0	0	0	23	32	5	0	0	0	2	40	17
2038	0	-706	0	23	32	505	200	150	0	2	40	17
2039	0	0	0	23	32	5	0	0	0	2	20	15
2040	0	0	0	23	32	0	0	0	0	2	0	14
2041	0	0	0	23	32	5	0	0	0	2	0	14
2042	0	0	0	23	32	5	0	0	0	2	0	14
2043	0	0	0	23	132	5	0	0	GWW3	2	0	14
Subtotal	-841	-706	967	2,168	2,537	1,003	300	150		32	160	360
Total	**6,130**	**Portfolio Cost: $10,720M**										0

Extreme Weather (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	18
2026	-134	0	261	0	0	100	5	100	0	Jul B2H	20	19
2027	0	0	0	0	400	375	5	0	0	0	40	20
2028	0	0	0	0	400	150	55	50	0	0	20	21
2029	0	0	170	0	400	0	0	0	0	GWW1	0	22
2030	-350	0	350	0	300	300	5	0	0	0	0	21
2031	0	0	0	0	300	0	5	0	0	GWW2	0	21
2032	0	0	0	0	0	300	5	0	0	0	0	20
2033	0	0	0	0	0	400	205	0	0	0	0	20
2034	0	0	0	0	0	0	5	0	0	0	0	19
2035	0	0	0	0	0	0	5	0	0	0	0	18
2036	0	0	0	0	0	0	5	0	0	0	20	17
2037	0	0	0	0	0	0	105	50	0	0	20	17
2038	0	-706	170	340	0	0	5	0	200	0	20	17
2039	0	0	0	0	0	0	5	0	0	0	0	15
2040	0	0	0	0	0	0	55	0	0	0	0	14
2041	0	0	0	0	0	0	5	0	0	0	40	14
2042	0	0	0	0	0	200	55	0	0	GWW3	0	14
2043	0	0	0	0	0	500	5	100	0	0	0	14
Subtotal	-841	-706	1,307	340	1,800	2,625	858	300	200		180	360
Total	**6,423**	**Portfolio Cost: $10,211M**										

Rapid Electrification Air-Source Heat Pump (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Geo	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	0	18
2026	-134	0	261	0	0	100	5	0	0	Jul B2H	0	0	19
2027	0	0	0	0	400	375	5	50	0	0	0	20	20
2028	0	0	0	0	400	150	5	200	0	0	0	40	21
2029	0	0	300	0	400	300	5	0	0	GWW1	0	0	22
2030	-350	0	350	0	300	0	5	0	0	0	30	0	21
2031	0	0	170	0	300	400	5	0	0	GWW2	0	0	21
2032	0	0	0	0	0	300	355	0	0	0	0	0	20
2033	0	0	0	0	0	0	705	0	0	0	0	0	20
2034	0	0	340	0	0	0	5	0	0	0	0	20	19
2035	0	0	0	0	0	0	5	0	50	0	0	20	18
2036	0	0	0	0	0	0	5	0	0	0	0	0	17
2037	0	0	340	0	0	0	5	0	0	0	0	0	17
2038	0	-706	170	340	0	0	5	0	150	0	30	20	17
2039	0	0	0	0	0	0	5	0	150	0	0	20	15
2040	0	0	0	0	0	400	0	0	200	GWW3	0	0	14
2041	0	0	0	0	0	400	0	0	0	0	0	0	14
2042	0	0	0	0	0	300	5	0	0	0	0	0	14
2043	0	0	0	0	0	400	5	100	50	0	0	20	14
Subtotal	-841	-706	2,287	340	1,800	3,425	1,453	350	600		60	160	360
Total	**9,288**	**Portfolio Cost: $12,271M**											

Rapid Electrification Ground-Source Heat Pump (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	18
2026	-134	0	261	0	0	0	5	0	0	Jul B2H	0	19
2027	0	0	0	0	400	475	5	0	0	0	0	20
2028	0	0	0	0	400	150	5	0	0	0	0	21
2029	0	0	300	0	400	0	5	0	0	GWW1	0	22
2030	-350	0	350	0	200	400	5	0	0	0	0	21
2031	0	0	0	0	400	0	5	0	0	GWW2	0	21
2032	0	0	170	0	0	300	5	50	0	0	20	20
2033	0	0	0	0	0	300	5	250	0	0	20	20
2034	0	0	0	0	0	0	5	0	0	0	20	19
2035	0	0	0	0	0	0	5	0	0	0	0	18
2036	0	0	170	0	0	0	5	0	0	0	0	17
2037	0	0	340	0	0	0	5	0	0	0	20	17
2038	0	-706	340	170	0	0	5	0	0	0	20	17
2039	0	0	0	0	0	0	5	0	0	0	40	15
2040	0	0	0	170	0	0	5	0	0	0	0	14
2041	0	0	0	0	0	0	5	0	0	0	20	14
2042	0	0	0	0	0	100	5	0	0	GWW3	20	14
2043	0	0	0	0	0	100	5	0	50	0	0	14
Subtotal	-841	-706	2,287	340	1,800	2,125	413	300	50		180	360
Total	**6,308**	**Portfolio Cost: $11,175M**										

Load Flattening (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Geo	Demand Response	Energy Efficiency Forecast	Energy Efficiency Bundles
2024	-357	0	357	0	0	100	96	0	0	0	0	0	17	0
2025	0	0	0	0	0	200	227	0	0	0	0	0	18	0
2026	-134	0	261	0	0	100	5	0	0	Jul B2H	0	20	19	0
2027	0	0	0	0	400	375	5	0	0	0	0	20	20	0
2028	0	0	0	0	400	150	55	50	0	0	0	40	21	0
2029	0	0	0	0	400	0	255	0	0	GWW1	0	0	22	0
2030	-350	0	350	0	300	300	205	0	0	0	30	0	21	0
2031	0	0	0	0	300	600	205	0	0	GWW2	30	0	21	0
2032	0	0	0	0	0	100	55	0	0	0	0	20	20	0
2033	0	0	0	0	0	0	5	0	0	0	0	20	20	0
2034	0	0	0	0	0	0	5	0	50	0	0	0	19	0
2035	0	0	0	0	0	0	5	0	0	0	0	20	18	0
2036	0	0	0	0	0	0	5	0	0	0	0	20	17	0
2037	0	0	170	0	0	0	5	0	0	0	0	0	17	0
2038	0	-706	170	340	0	0	5	0	150	0	0	0	17	0
2039	0	0	0	0	0	0	5	0	0	0	0	0	15	0
2040	0	0	0	0	0	400	5	0	0	GWW3	0	0	14	0
2041	0	0	0	0	0	200	5	0	0	0	0	0	14	0
2042	0	0	0	0	0	500	5	0	0	0	0	0	14	0
2043	0	0	0	0	0	300	5	0	0	0	0	20	14	14
Subtotal	-841	-706	1,307	340	1,800	3,325	1,163	50	200		60	180	360	14
Total	**7,252**	**Portfolio Cost: $10,663M**												

Validation and Verification

Valmy 1 & 2 Early Exit (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Geo	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	0	18
2026	-134	0	261	0	0	100	0	0	0	Jul B2H	0	0	19
2027	0	0	0	0	400	375	5	0	0	0	0	0	20
2028	0	0	0	0	400	150	5	0	0	0	0	0	21
2029	0	0	0	0	400	0	5	0	0	GWW1	0	20	22
2030	-350	0	350	0	100	500	155	0	0	0	30	0	21
2031	0	-127	0	0	400	400	155	0	0	GWW2	0	0	21
2032	0	-134	170	0	100	100	205	0	0	0	0	0	20
2033	0	0	0	0	0	0	105	0	0	0	0	20	20
2034	0	0	0	0	0	0	5	0	0	0	0	40	19
2035	0	0	0	0	0	0	5	0	0	0	0	40	18
2036	0	0	0	0	0	0	5	0	0	0	0	40	17
2037	0	0	0	0	0	0	55	50	0	0	0	0	17
2038	0	-706	170	340	0	0	5	50	200	0	0	0	17
2039	0	0	0	0	0	0	5	50	0	0	0	0	15
2040	0	0	0	0	0	400	5	0	0	GWW3	0	0	14
2041	0	0	0	0	0	200	5	0	0	0	0	0	14
2042	0	0	0	0	0	200	55	0	0	0	0	0	14
2043	0	0	0	0	0	600	0	0	0	0	0	0	14
Subtotal	-841	-967	1,307	340	1,800	3,325	1,103	150	200		30	160	360
Total	**6,967**	**Portfolio Cost: $9,803M**											

Valmy 2 Early Exit (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Geo	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	0	18
2026	-134	0	134	0	0	100	5	0	0	Jul B2H	0	40	19
2027	0	0	0	0	400	375	5	0	0	0	0	0	20
2028	0	0	0	0	400	150	5	0	0	0	0	0	21
2029	0	-134	170	0	400	0	5	0	0	GWW1	0	20	22
2030	-350	0	350	0	400	0	5	0	50	0	0	20	21
2031	0	0	0	0	100	0	5	0	0	GWW2	0	20	21
2032	0	0	0	0	0	0	5	100	0	0	30	0	20
2033	0	0	0	0	0	0	5	100	0	0	0	0	20
2034	0	0	0	0	100	600	205	0	0	0	0	20	19
2035	0	0	0	0	0	400	205	0	0	0	0	20	18
2036	0	0	170	0	0	0	150	0	0	0	0	0	17
2037	0	0	0	170	0	0	5	0	0	0	0	0	17
2038	0	-706	0	170	0	0	5	0	100	0	0	40	17
2039	0	0	0	0	0	0	5	0	50	0	0	0	15
2040	0	0	0	0	0	200	5	0	0	GWW3	0	0	14
2041	0	0	0	0	0	100	5	0	0	0	0	0	14
2042	0	0	0	0	0	200	55	0	0	0	0	0	14
2043	0	0	0	0	0	300	55	0	0	0	0	0	14
Subtotal	-841	-840	1,180	340	1,800	2,725	1,058	200	200		30	180	360
Total	**6,392**	**Portfolio Cost: $9,878M**											

November 2026 B2H Valmy 1 & 2 Early Exit (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Geo	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	0	18
2026	-134	0	261	0	0	200	205	0	0	Nov B2H	0	20	19
2027	0	0	0	0	400	375	5	0	0	0	0	0	20
2028	0	0	0	0	300	150	5	0	0	0	0	0	21
2029	0	-127	0	0	400	200	5	0	0	GWW1	0	40	22
2030	-350	-134	520	0	400	0	55	0	0	0	0	0	21
2031	0	0	0	0	300	0	155	0	0	GWW2	0	0	21
2032	0	0	0	0	0	600	5	0	0	0	0	0	20
2033	0	0	0	0	0	100	5	50	0	0	0	0	20
2034	0	0	0	0	0	0	5	50	0	0	0	20	19
2035	0	0	0	0	0	0	55	0	0	0	0	0	18
2036	0	0	0	0	0	0	55	0	0	0	0	0	17
2037	0	0	0	0	0	0	5	50	0	0	0	40	17
2038	0	-706	170	340	0	0	5	50	200	0	0	20	17
2039	0	0	0	0	0	0	5	0	0	0	0	20	15
2040	0	0	0	0	0	300	0	50	0	GWW3	0	0	14
2041	0	0	0	0	0	200	0	0	0	0	0	0	14
2042	0	0	0	0	0	300	5	0	0	0	0	0	14
2043	0	0	0	0	0	600	0	0	0	0	0	0	14
Subtotal	-841	-967	1,307	340	1,800	3,325	898	250	200		0	160	360
Total	**6,832**	**Portfolio Cost: $9,880M**											

November 2026 B2H Valmy 2 Early Exit (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	18
2026	-134	0	134	0	0	400	205	100	0	Nov B2H	20	19
2027	0	0	0	0	400	375	0	0	0	0	0	20
2028	0	0	0	0	100	150	5	0	0	0	0	21
2029	0	-134	170	0	400	200	5	0	0	GWW1	0	22
2030	-350	0	350	0	400	0	5	0	0	0	0	21
2031	0	0	0	0	400	100	5	0	0	GWW2	0	21
2032	0	0	0	0	100	400	0	0	50	0	0	20
2033	0	0	0	0	0	0	5	0	50	0	0	20
2034	0	0	0	0	0	0	5	0	0	0	0	19
2035	0	0	0	0	0	0	55	0	0	0	0	18
2036	0	0	0	0	0	0	55	0	0	0	0	17
2037	0	0	170	0	0	0	105	0	0	0	20	17
2038	0	-706	0	340	0	0	405	0	100	0	40	17
2039	0	0	0	0	0	0	5	0	0	0	40	15
2040	0	0	0	0	0	500	0	0	0	GWW3	0	14
2041	0	0	0	0	0	400	5	0	0	0	0	14
2042	0	0	0	0	0	200	55	0	0	0	0	14
2043	0	0	0	0	0	400	5	0	0	0	20	14
Subtotal	-841	-840	1,180	340	1,800	3,425	1,248	100	200		140	360
Total	**7,112**	**Portfolio Cost: $9,956M**										

Without Bridger 3 & 4 (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Geo	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	0	18
2026	-134	0	261	0	0	0	5	0	0	Jul B2H	0	0	19
2027	0	0	0	0	400	575	5	0	0	0	0	20	20
2028	0	0	0	0	300	150	5	0	0	0	0	20	21
2029	0	0	170	0	400	0	5	0	0	GWW1	0	20	22
2030	-350	0	0	0	400	200	105	0	50	0	30	40	21
2031	0	0	0	0	300	100	155	0	0	GWW2	0	0	21
2032	0	0	0	0	0	600	205	0	0	0	0	0	20
2033	0	0	0	0	0	0	155	0	0	0	0	0	20
2034	0	0	0	0	0	0	155	0	0	0	0	0	19
2035	0	0	0	0	0	0	5	0	0	0	0	0	18
2036	0	0	0	0	0	0	5	0	0	0	0	40	17
2037	0	0	0	0	0	0	5	0	50	0	0	0	17
2038	0	-357	170	170	0	0	5	150	0	0	0	0	17
2039	0	0	0	0	0	0	5	0	0	0	0	0	15
2040	0	0	0	0	0	400	5	0	0	GWW3	0	0	14
2041	0	0	0	0	0	200	5	0	0	0	0	20	14
2042	0	0	0	0	0	500	5	0	0	0	0	0	14
2043	0	0	0	0	0	400	5	0	0	0	0	0	14
Subtotal	-841	-357	958	170	1,800	3,425	1,163	150	100		30	160	360
Total	**7,468**	**Portfolio Cost: $9,945M**											

Nuclear (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Nuclear	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	0	18
2026	-134	0	261	0	0	300	5	0	0	Jul B2H	0	0	19
2027	0	0	0	0	400	375	5	0	0	0	0	0	20
2028	0	0	0	0	200	150	5	0	0	0	0	20	21
2029	0	0	0	0	400	200	5	0	0	GWW1	0	20	22
2030	-350	0	350	0	400	0	5	0	0	0	0	0	21
2031	0	0	0	0	400	200	5	0	0	GWW2	0	0	21
2032	0	0	0	0	0	0	205	0	0	0	0	0	20
2033	0	0	0	0	0	400	205	0	0	0	0	0	20
2034	0	0	0	0	0	0	155	0	0	0	0	0	19
2035	0	0	0	0	0	0	5	0	0	0	0	0	18
2036	0	0	0	0	0	0	0	0	0	0	0	20	17
2037	0	0	170	0	0	0	5	0	0	0	100	0	17
2038	0	-706	0	340	0	0	5	200	50	0	0	40	17
2039	0	0	0	0	0	0	5	0	0	0	0	40	15
2040	0	0	0	0	0	200	5	0	0	GWW3	0	20	14
2041	0	0	0	0	0	300	55	0	0	0	0	0	14
2042	0	0	0	0	0	200	5	0	0	0	0	0	14
2043	0	0	0	0	0	400	50	0	0	0	0	0	14
Subtotal	-841	-706	1,137	340	1,800	3,025	1,053	200	50		100	160	360
Total	**6,678**	**Portfolio Cost: $10,013M**											

Wind +30% Cost (MW)

Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	18
2026	-134	0	261	0	0	0	5	0	0	Jul B2H	0	19
2027	0	0	0	0	400	475	5	0	0	0	0	20
2028	0	0	0	0	200	350	5	0	0	0	0	21
2029	0	0	0	0	400	400	55	0	0	GWW1	20	22
2030	-350	0	350	0	100	100	155	0	0	0	0	21
2031	0	0	0	0	200	600	155	0	0	GWW2	0	21
2032	0	0	0	0	100	100	205	0	0	0	0	20
2033	0	0	0	0	0	0	155	0	0	0	0	20
2034	0	0	0	0	0	0	155	0	0	0	0	19
2035	0	0	0	0	0	0	5	0	0	0	0	18
2036	0	0	0	0	0	0	5	0	0	0	20	17
2037	0	0	340	0	0	0	5	0	0	0	0	17
2038	0	-706	0	340	0	0	5	100	50	0	20	17
2039	0	0	0	0	0	0	5	0	0	0	20	15
2040	0	0	0	0	0	300	5	0	0	GWW3	20	14
2041	0	0	0	0	100	0	0	0	0	0	0	14
2042	0	0	0	0	100	0	5	0	0	0	0	14
2043	0	0	0	0	0	600	0	0	0	0	0	14
Subtotal	-841	-706	1,307	340	1,600	3,225	1,253	100	50		100	360
Total	**6,788**	**Portfolio Cost: $10,397M**										

Energy Efficiency (MW)

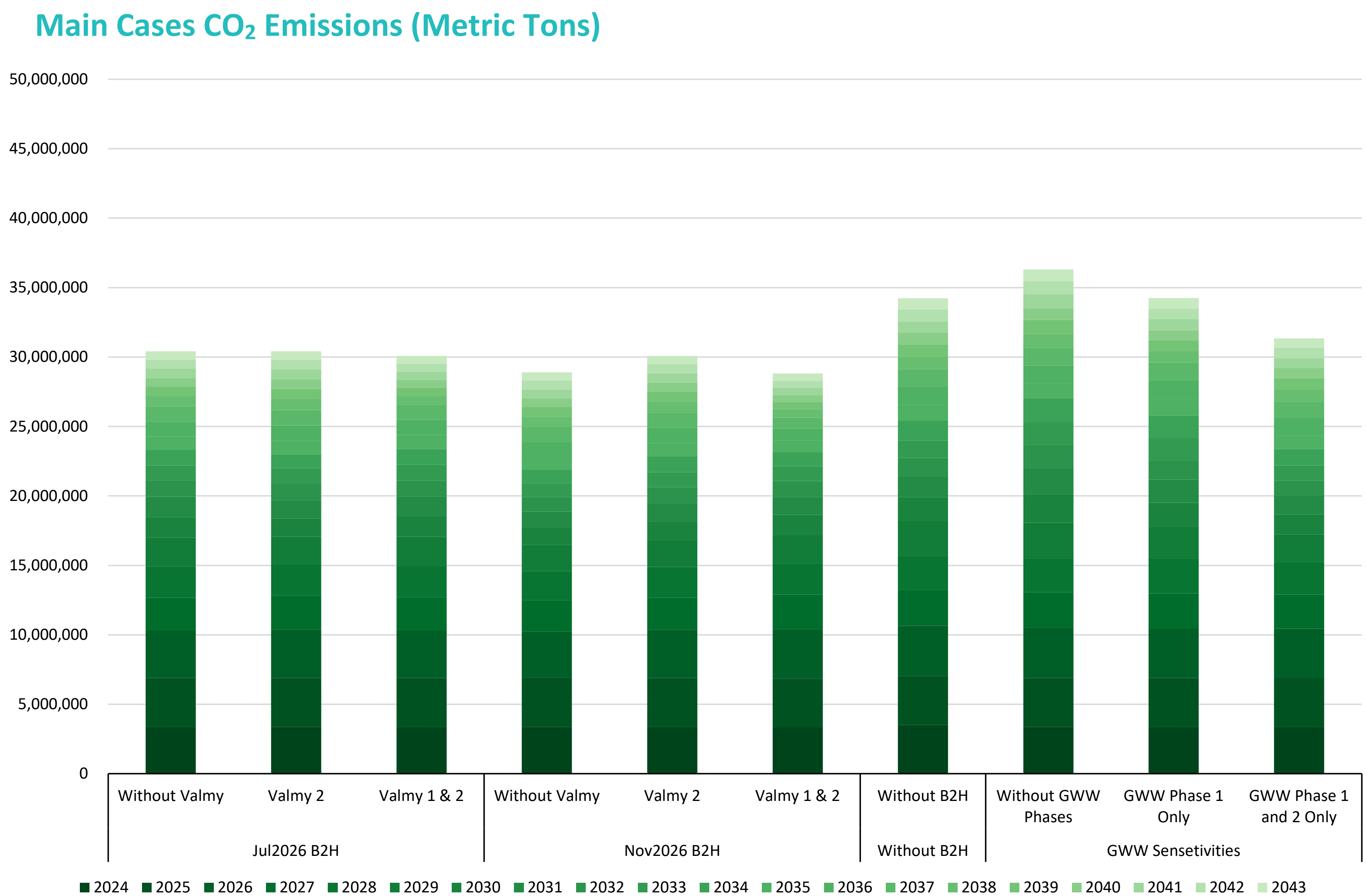
Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Demand Response	Energy Efficiency Forecast	Energy Efficiency Bundles
2024	-357	0	357	0	0	100	96	0	0	0	0	17	0
2025	0	0	0	0	0	200	227	0	0	0	0	18	0
2026	-134	0	261	0	0	0	5	0	0	Jul B2H	0	19	27
2027	0	0	0	0	400	675	5	0	0	0	0	20	33
2028	0	0	0	0	200	150	5	0	0	0	20	21	38
2029	0	0	0	0	400	200	5	0	0	GWW1	20	22	0
2030	-350	0	350	0	400	0	5	0	0	0	0	21	0
2031	0	0	0	0	400	100	205	0	0	GWW2	0	21	0
2032	0	0	0	0	0	100	205	0	0	0	0	20	0
2033	0	0	0	0	0	400	205	0	0	0	0	20	0
2034	0	0	0	0	0	0	5	0	0	0	0	19	0
2035	0	0	0	0	0	0	0	0	0	0	0	18	0
2036	0	0	0	0	0	0	5	0	0	0	20	17	0
2037	0	0	0	0	0	0	55	0	0	0	0	17	0
2038	0	-706	0	340	0	0	5	50	200	0	40	17	0
2039	0	0	0	0	0	0	5	0	0	0	40	15	0
2040	0	0	0	0	0	300	5	0	0	GWW3	20	14	0
2041	0	0	0	0	0	100	5	0	50	0	0	14	0
2042	0	0	0	0	0	100	5	0	0	0	0	14	0
2043	0	0	0	0	0	200	5	0	0	0	0	14	0
Subtotal	-841	-706	967	340	1,800	2,625	1,048	50	250		160	360	98
Total	**6,151**	**Portfolio Cost: $10,042M**											

Demand Response (MW)

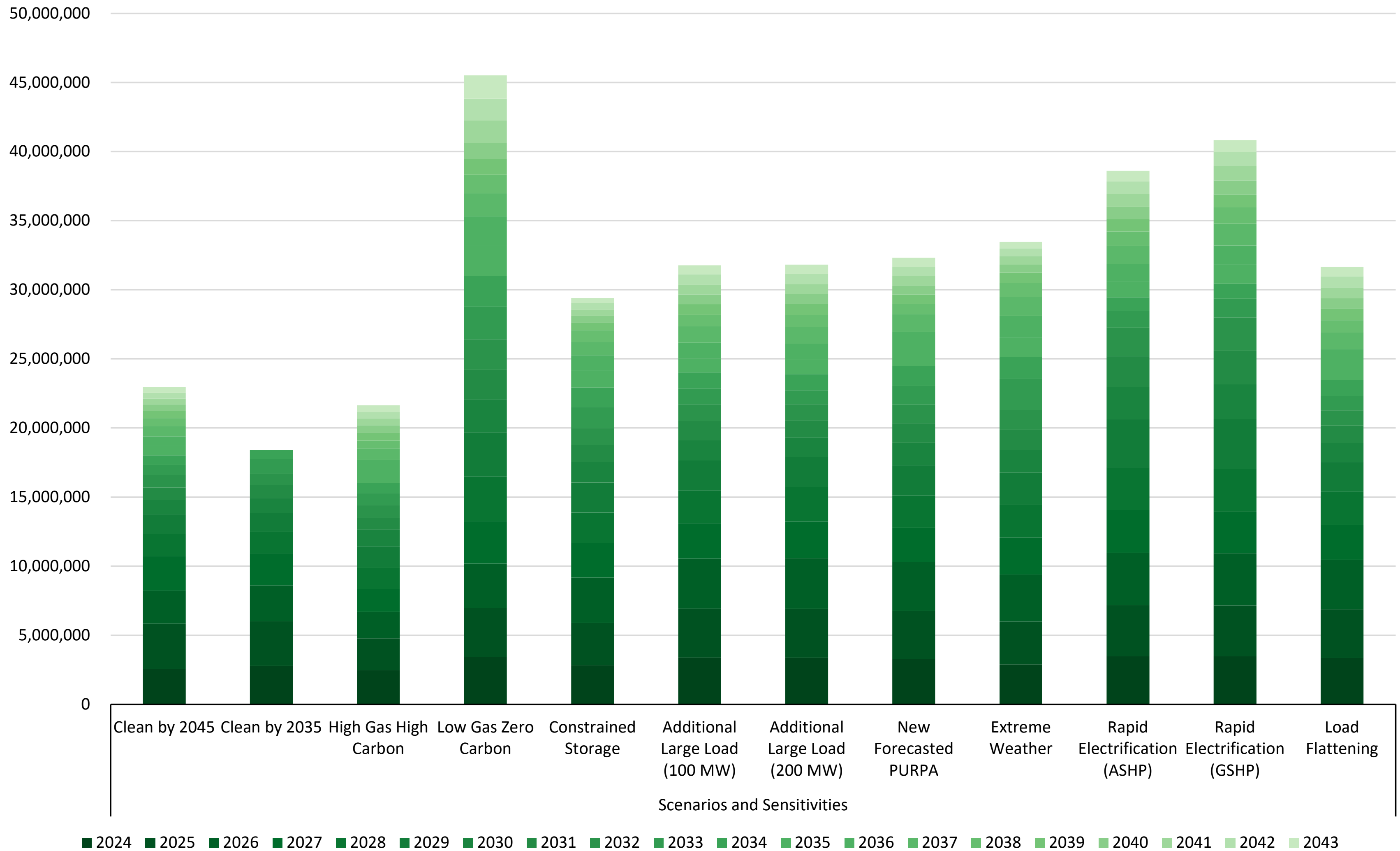
Year	Coal Exits	Gas Exits	New Gas	H2	Wind	Solar	4-Hr	8-Hr	100-Hr	Trans.	Demand Response	Energy Efficiency Forecast
2024	-357	0	357	0	0	100	96	0	0	0	0	17
2025	0	0	0	0	0	200	227	0	0	0	0	18
2026	-134	0	261	0	0	300	0	0	0	Jul B2H	40	19
2027	0	0	0	0	400	375	5	0	0	0	0	20
2028	0	0	0	0	200	150	5	0	0	0	20	21
2029	0	0	0	0	400	0	5	0	0	GWW1	0	22
2030	-350	0	350	0	400	200	105	0	0	0	0	21
2031	0	0	0	0	400	400	205	0	0	GWW2	0	21
2032	0	0	0	0	0	0	205	0	0	0	0	20
2033	0	0	0	0	0	200	155	0	0	0	0	20
2034	0	0	0	0	0	0	5	0	0	0	0	19
2035	0	0	0	0	0	0	55	0	0	0	0	18
2036	0	0	0	0	0	0	5	0	0	0	0	17
2037	0	0	0	170	0	0	5	0	0	0	20	17
2038	0	-706	0	170	0	0	55	100	200	0	20	17
2039	0	0	0	0	0	0	5	0	0	0	40	15
2040	0	0	0	0	0	400	0	0	0	GWW3	20	14
2041	0	0	0	0	0	200	5	0	0	0	20	14
2042	0	0	0	0	0	400	5	0	0	0	0	14
2043	0	0	0	0	0	100	0	50	0	0	0	14
Subtotal	-841	-706	967	340	1,800	3,025	1,148	150	200		180	360
Total	**6,623**	**Portfolio Cost: $9,816M**										

PORTFOLIO EMISSIONS FORECAST

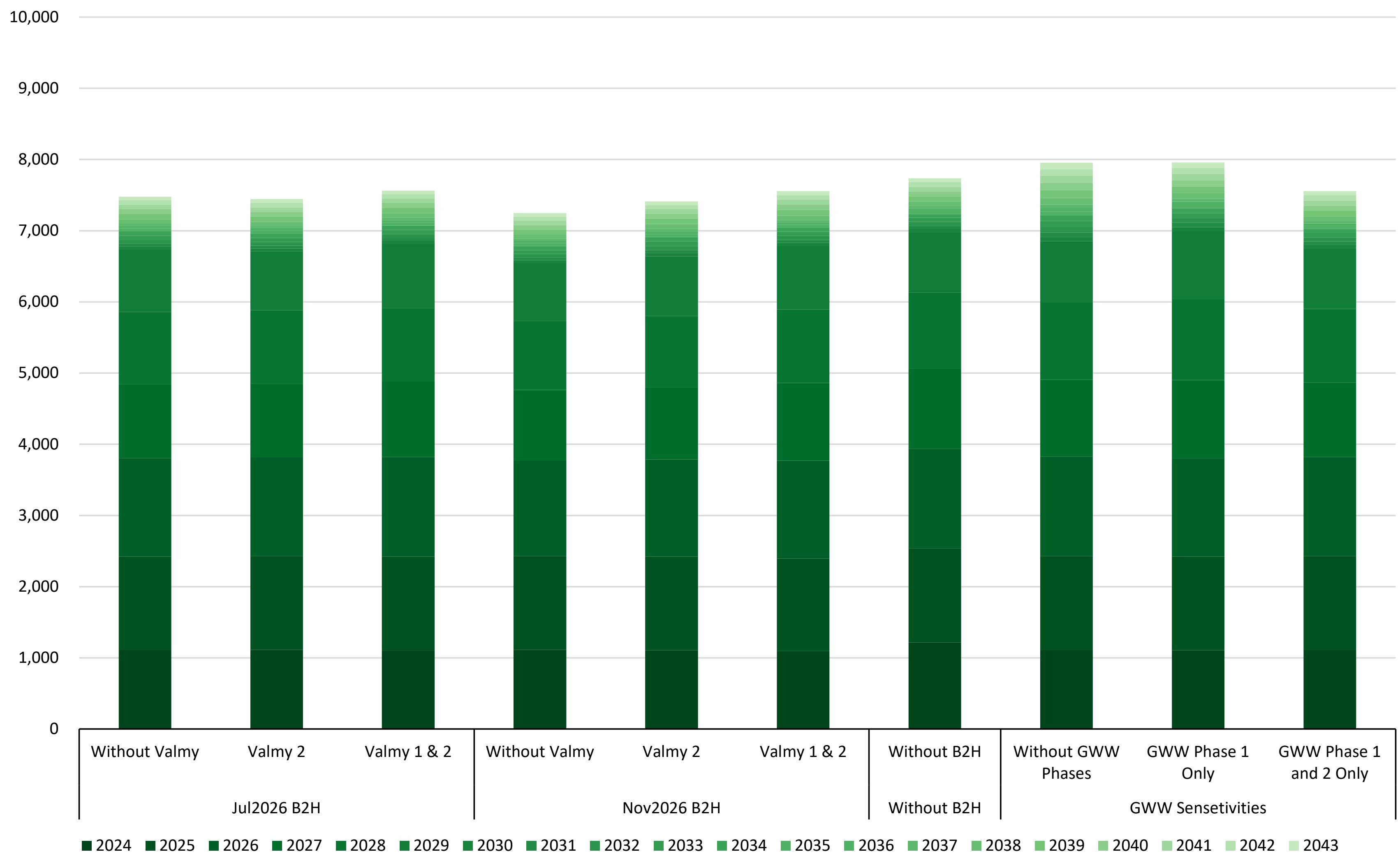
Total emissions forecasts for Idaho Power's resources are outputs of the AURORA model and are presented below.



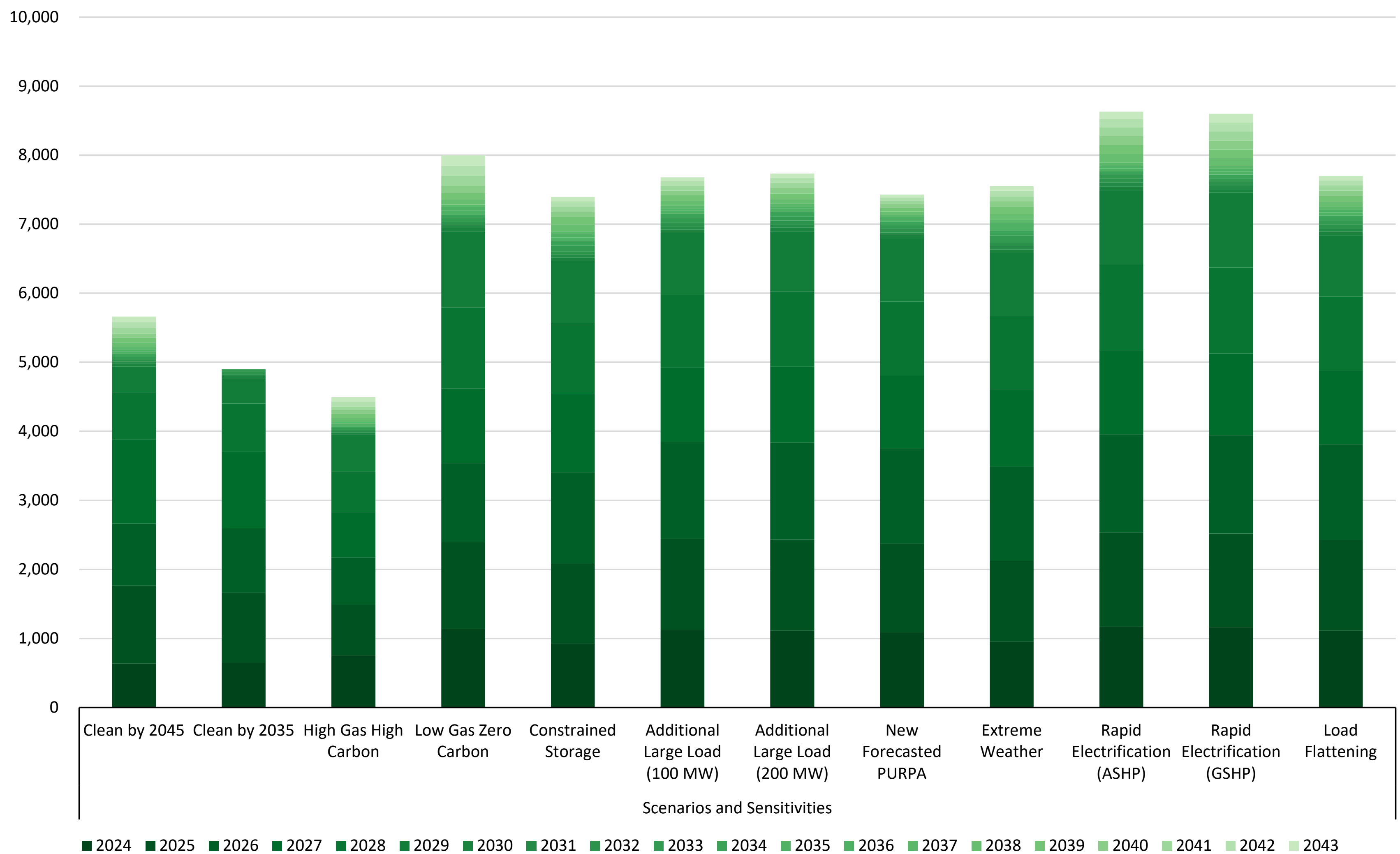
Scenarios and Sensitivities CO_2 Emissions (Metric Tons):



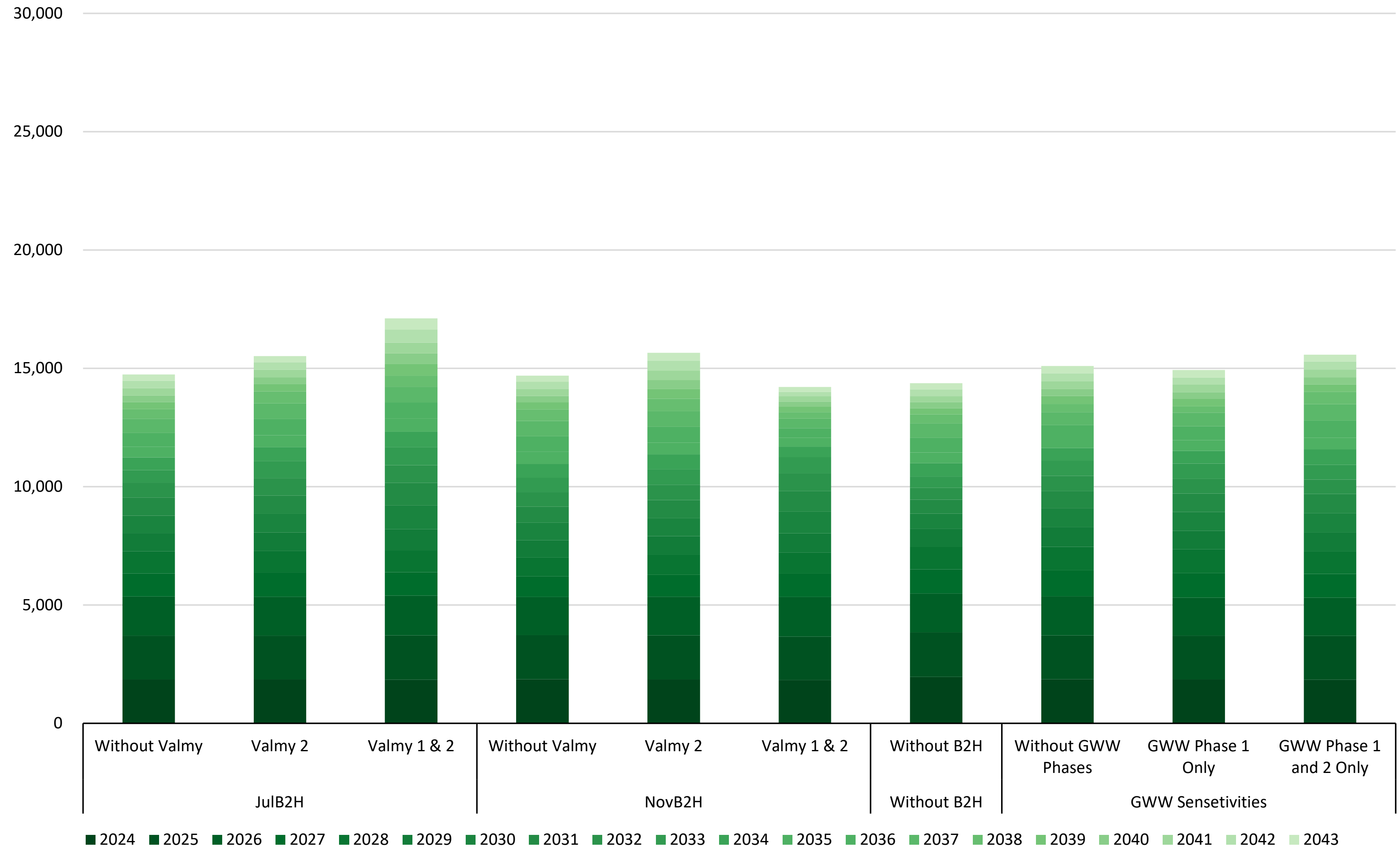
Main Cases SO_2 Emissions (Metric Tons)



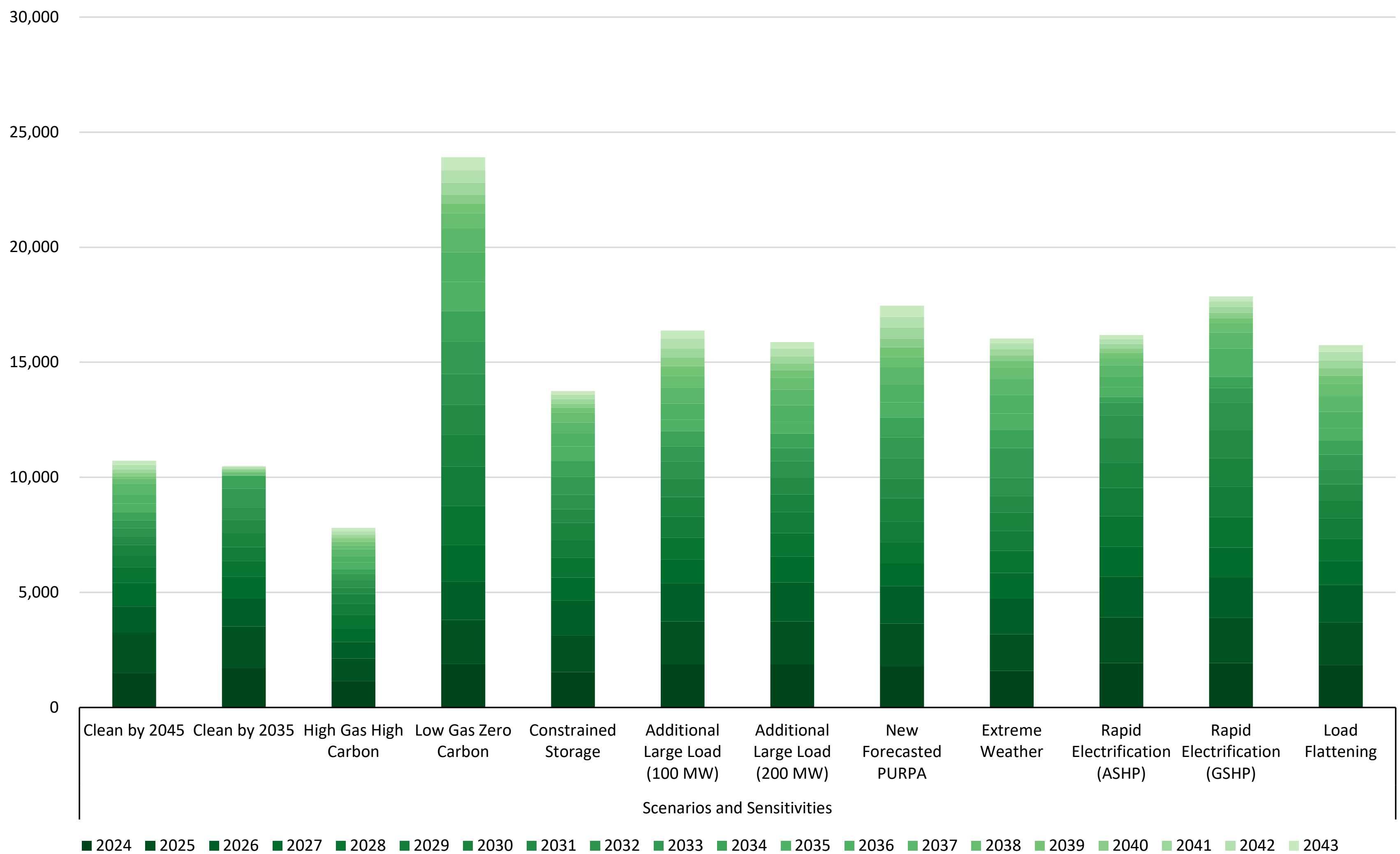
Scenarios and Sensitivities SO_2 Emissions (Metric Tons)



Main Cases NOx Emissions (Metric Tons)



Scenarios and Sensitivities NOx Emissions (Metric Tons)



Portfolio Emissions

Main Cases CO_2 Emissions (Metric Tons)

	Jul 2026 B2H			Nov 2026 B2H			Without B2H	GWW Sensitivities		
Year	Without Valmy	Valmy 2	Valmy 1 & 2	Without Valmy	Valmy 2	Valmy 1 & 2	Without B2H	Without GWW Phases	GWW Phase 1 Only	GWW Phase 1 & 2 Only
2024	3,366,607	3,367,669	3,357,617	3,379,473	3,363,060	3,320,049	3,505,699	3,372,487	3,363,600	3,361,768
2025	3,521,270	3,524,571	3,536,838	3,529,678	3,535,784	3,511,761	3,545,252	3,525,218	3,527,529	3,518,734
2026	3,421,105	3,486,914	3,421,537	3,335,433	3,467,332	3,565,157	3,587,283	3,611,925	3,531,603	3,564,589
2027	2,364,726	2,423,051	2,372,879	2,243,730	2,311,886	2,498,553	2,600,665	2,560,169	2,569,174	2,449,896
2028	2,244,285	2,281,218	2,278,820	2,096,509	2,215,993	2,217,390	2,425,029	2,439,040	2,524,128	2,330,484
2029	2,085,818	1,961,086	2,076,325	1,887,008	1,936,454	2,066,820	2,536,951	2,561,134	2,243,672	2,007,467
2030	1,477,117	1,340,036	1,496,445	1,267,148	1,331,183	1,462,190	1,702,552	2,041,235	1,751,621	1,443,322
2031	1,458,780	1,285,705	1,425,949	1,140,020	1,337,016	1,277,913	1,495,017	1,864,447	1,680,097	1,360,531
2032	1,172,307	1,184,680	1,140,766	1,028,873	1,130,518	1,154,399	1,345,738	1,686,763	1,343,955	1,073,175
2033	1,088,608	1,139,628	1,137,758	970,416	1,074,124	1,063,863	1,249,073	1,642,284	1,633,253	1,082,760
2034	1,102,207	1,014,563	1,129,448	1,038,398	1,147,504	1,016,265	1,418,127	1,736,761	1,607,203	1,185,587
2035	969,045	954,940	1,017,423	930,579	962,194	875,927	1,141,263	1,070,749	1,209,862	1,000,129
2036	1,077,427	1,113,226	1,083,840	1,006,886	1,091,843	819,126	1,290,885	1,272,803	1,326,011	1,229,695
2037	1,090,301	1,096,750	1,064,933	1,099,131	1,112,048	779,574	1,280,417	1,260,130	1,303,552	1,186,632
2038	743,217	806,782	628,576	753,154	774,355	594,170	912,474	1,014,657	790,423	896,369
2039	685,923	731,854	616,514	685,672	707,627	521,610	878,149	1,011,587	800,412	789,588
2040	622,696	679,881	574,580	628,354	674,372	520,401	825,877	847,676	711,556	719,350
2041	673,577	731,911	580,115	645,700	655,082	525,143	812,933	989,300	798,559	726,832
2042	642,186	673,392	601,119	635,835	676,903	497,737	869,267	948,793	752,595	759,144
2043	607,501	607,373	543,147	597,090	578,131	529,398	803,878	846,165	775,112	650,958
Total	**30,414,704**	**30,405,231**	**30,084,630**	**28,899,086**	**30,083,409**	**28,817,444**	**34,226,528**	**36,303,324**	**34,243,917**	**31,337,010**

Scenarios and Sensitivities CO_2 Emissions (Metric Tons)

Year	Clean by 2045	Clean by 2035	High Gas High Carbon	Low Gas Zero Carbon	Constrained Storage	Additional Large Load (100 MW)	Additional Large Load (200 MW)	New Forecasted PURPA	Extreme Weather	Rapid Electrification (ASHP)	Rapid Electrification (GSHP)	Load Flattening
2024	2,572,462	2,788,395	2,459,954	3,413,958	2,819,296	3,392,946	3,376,949	3,275,537	2,893,122	3,474,577	3,469,601	3,357,763
2025	3,259,121	3,223,349	2,306,435	3,543,104	3,065,046	3,532,625	3,535,449	3,475,413	3,100,913	3,705,229	3,677,727	3,523,437
2026	2,406,086	2,597,012	1,925,374	3,216,503	3,279,298	3,621,864	3,660,011	3,548,596	3,393,467	3,785,269	3,781,453	3,566,612
2027	2,489,885	2,317,189	1,638,136	3,076,668	2,502,057	2,554,003	2,652,083	2,464,076	2,669,099	3,081,909	3,016,419	2,520,532
2028	1,596,254	1,542,255	1,550,767	3,256,017	2,205,721	2,384,873	2,495,377	2,338,139	2,402,382	3,113,073	3,108,384	2,418,106
2029	1,413,765	1,370,321	1,529,683	3,174,843	2,181,757	2,161,617	2,176,872	2,186,954	2,306,365	3,483,681	3,575,556	2,135,205
2030	1,047,247	1,090,560	1,230,354	2,365,063	1,490,599	1,465,961	1,385,654	1,632,989	1,647,326	2,330,532	2,522,836	1,383,329
2031	916,489	929,948	866,374	2,160,803	1,217,032	1,383,323	1,262,529	1,410,813	1,456,834	2,226,891	2,434,331	1,250,750
2032	876,033	829,906	910,590	2,207,182	1,218,345	1,202,806	1,172,400	1,356,313	1,417,330	2,051,860	2,423,357	1,118,555
2033	746,999	1,067,784	846,866	2,353,038	1,534,567	1,142,774	1,020,460	1,351,844	2,288,038	1,220,937	1,342,934	1,052,518
2034	694,949	656,800	746,704	2,229,880	1,417,643	1,177,205	1,161,662	1,455,013	1,555,519	976,138	1,078,904	1,137,265
2035	668,646	0	857,657	2,187,898	1,258,748	990,771	1,029,449	1,144,189	1,416,909	1,156,242	1,373,717	1,030,143
2036	702,143	0	818,176	2,132,573	1,077,717	1,161,334	1,178,978	1,311,954	1,560,046	1,244,090	1,395,180	1,207,898
2037	733,896	0	826,401	1,647,646	950,335	1,202,837	1,196,169	1,283,968	1,368,145	1,315,306	1,575,520	1,198,405
2038	592,944	0	569,757	1,363,592	851,923	813,425	863,271	733,943	1,011,075	1,042,721	1,179,398	902,311
2039	504,911	0	582,999	1,129,455	547,078	771,230	815,822	697,520	748,979	921,425	946,707	813,825
2040	479,076	0	531,306	1,163,529	494,451	708,366	702,658	634,022	584,837	873,019	1,015,758	777,044
2041	423,743	0	498,185	1,617,905	461,334	703,574	725,831	693,229	619,930	911,629	1,015,080	751,549
2042	419,399	0	465,932	1,603,036	470,795	752,596	751,711	670,367	563,178	932,952	1,026,588	817,762
2043	418,697	0	477,896	1,671,359	369,659	646,428	664,168	653,545	460,393	763,139	870,710	681,926
Total	**22,962,745**	**18,413,520**	**21,639,546**	**45,514,053**	**29,413,400**	**31,770,558**	**31,827,503**	**32,318,424**	**33,463,885**	**38,610,619**	**40,830,159**	**31,644,936**

Main Cases SO_2 Emissions (Metric Tons)

Year	Jul 2026 B2H			Nov 2026 B2H			Without B2H	GWW Sensitivities		
	Without Valmy	Valmy 2	Valmy 1 & 2	Without Valmy	Valmy 2	Valmy 1 & 2	Without B2H	Without GWW Phases	GWW Phase 1 Only	GWW Phase 1 & 2 Only
2024	1,110	1,114	1,104	1,115	1,106	1,092	1,218	1,112	1,107	1,110
2025	1,316	1,316	1,319	1,314	1,318	1,302	1,321	1,315	1,318	1,316
2026	1,380	1,388	1,399	1,342	1,360	1,376	1,400	1,400	1,372	1,396
2027	1,036	1,031	1,060	989	1,010	1,091	1,121	1,079	1,106	1,044
2028	1,017	1,032	1,032	971	1,008	1,033	1,074	1,085	1,133	1,033
2029	881	825	895	814	837	891	849	863	955	858
2030	40	41	47	41	46	43	46	59	60	46
2031	38	40	40	36	41	41	39	62	60	43
2032	55	54	56	51	58	59	56	78	68	59
2033	58	57	58	54	63	59	57	80	66	59
2034	60	61	61	57	64	58	54	80	69	60
2035	42	41	43	40	44	41	43	55	50	43
2036	34	34	35	32	37	33	36	50	43	36
2037	32	32	34	31	36	30	35	48	41	34
2038	60	59	62	56	67	62	63	95	78	63
2039	74	72	75	71	77	81	67	107	95	76
2040	70	66	67	64	66	73	70	104	89	71
2041	64	63	64	62	63	69	66	96	89	75
2042	60	61	63	58	59	65	65	96	81	72
2043	51	55	52	49	50	57	54	89	77	61
Total	**7,477**	**7,442**	**7,565**	**7,248**	**7,411**	**7,556**	**7,735**	**7,954**	**7,957**	**7,557**

Scenarios and Sensitivities SO_2 Emissions (Metric Tons)

Year	Clean by 2045	Clean by 2035	High Gas High Carbon	Low Gas Zero Carbon	Constrained Storage	Additional Large Load (100 MW)	Additional Large Load (200 MW)	New Forecasted PURPA	Extreme Weather	Rapid Electrification (ASHP)	Rapid Electrification (GSHP)	Load Flattening
2024	638	648	755	1,135	927	1,120	1,113	1,088	952	1,166	1,164	1,112
2025	1,126	1,012	727	1,257	1,150	1,320	1,316	1,290	1,168	1,366	1,357	1,311
2026	898	936	691	1,148	1,330	1,411	1,408	1,376	1,365	1,425	1,421	1,389
2027	1,219	1,112	643	1,082	1,130	1,067	1,102	1,058	1,127	1,203	1,186	1,061
2028	675	693	597	1,172	1,033	1,058	1,083	1,067	1,058	1,258	1,247	1,077
2029	381	358	544	1,101	897	898	876	922	913	1,075	1,081	890
2030	40	41	27	45	48	47	49	44	50	55	50	52
2031	31	29	22	47	45	44	43	37	51	58	58	43
2032	28	28	22	45	44	61	60	51	51	53	51	60
2033	46	34	24	52	85	62	63	52	103	51	50	64
2034	38	13	18	50	66	63	64	54	67	52	57	65
2035	32	0	21	60	54	44	45	37	56	42	42	47
2036	33	0	22	52	49	37	37	31	57	40	39	39
2037	34	0	24	39	42	36	36	29	48	43	43	37
2038	67	0	58	77	95	68	68	46	77	124	115	72
2039	66	0	57	87	107	82	83	55	107	132	124	89
2040	59	0	57	105	77	70	78	50	78	131	130	79
2041	85	0	53	152	71	69	75	50	75	123	132	77
2042	81	0	71	141	78	68	71	49	85	119	132	71
2043	84	0	60	151	67	55	63	42	64	110	122	62
Total	**5,662**	**4,903**	**4,494**	**7,998**	**7,395**	**7,679**	**7,733**	**7,429**	**7,553**	**8,629**	**8,599**	**7,698**

Main Cases NOx Emissions (Metric Tons)

Year	Jul 2026 B2H			Nov 2026 B2H			Without B2H	GWW Sensitivities		
	Without Valmy	Valmy 2	Valmy 1 & 2	Without Valmy	Valmy 2	Valmy 1 & 2	Without B2H	Without GWW Phases	GWW Phase 1 Only	GWW Phase 1 & 2 Only
2024	1,859	1,853	1,849	1,870	1,855	1,832	1,966	1,863	1,851	1,851
2025	1,849	1,859	1,867	1,862	1,867	1,839	1,879	1,851	1,860	1,845
2026	1,654	1,641	1,685	1,610	1,631	1,666	1,646	1,661	1,598	1,613
2027	980	1,020	986	872	925	987	1,020	1,088	1,042	1,005
2028	931	919	925	795	852	890	937	996	999	953
2029	764	783	895	733	779	813	777	838	786	791
2030	740	787	994	738	756	925	638	795	806	827
2031	769	765	963	676	775	862	595	729	777	805
2032	622	738	742	618	645	756	495	641	611	608
2033	535	726	758	606	641	673	482	651	648	631
2034	532	577	661	588	639	457	560	528	536	641
2035	446	509	561	520	502	377	447	405	449	500
2036	598	684	678	641	662	392	621	553	594	719
2037	588	670	659	655	658	415	614	551	569	700
2038	415	498	471	481	535	269	386	351	277	511
2039	299	310	489	306	407	228	257	337	307	326
2040	280	281	455	265	373	218	254	287	285	301
2041	307	324	446	300	402	227	249	326	320	323
2042	306	313	551	297	423	185	288	341	302	340
2043	267	264	478	263	332	203	262	315	312	286
Total	**14,740**	**15,522**	**17,112**	**14,695**	**15,659**	**14,214**	**14,374**	**15,105**	**14,927**	**15,576**

Scenarios and Sensitivities NOx Emissions (Metric Tons)

Year	Clean by 2045	Clean by 2035	High Gas High Carbon	Low Gas Zero Carbon	Constrained Storage	Additional Large Load (100 MW)	Additional Large Load (200 MW)	New Forecasted PURPA	Extreme Weather	Rapid Electrification (ASHP)	Rapid Electrification (GSHP)	Load Flattening
2024	1,507	1,721	1,135	1,885	1,534	1,872	1,869	1,797	1,589	1,928	1,926	1,842
2025	1,741	1,800	994	1,921	1,583	1,862	1,866	1,846	1,596	1,985	1,968	1,858
2026	1,141	1,225	713	1,656	1,523	1,652	1,700	1,624	1,555	1,762	1,760	1,633
2027	1,027	947	602	1,602	1,006	1,042	1,123	994	1,097	1,304	1,295	1,032
2028	673	658	575	1,700	865	955	1,016	912	970	1,329	1,326	969
2029	516	617	479	1,711	770	903	920	898	861	1,232	1,329	888
2030	447	603	428	1,363	742	861	763	1,022	798	1,094	1,216	771
2031	374	568	274	1,316	599	789	721	836	718	1,064	1,216	706
2032	366	540	310	1,333	624	758	719	894	787	990	1,212	618
2033	346	834	289	1,409	773	650	582	910	1,302	548	639	669
2034	340	543	197	1,327	695	665	625	868	792	254	482	622
2035	388	18	306	1,277	640	501	521	655	705	430	609	516
2036	398	17	282	1,276	536	693	712	786	801	457	620	724
2037	452	48	297	1,051	492	697	680	750	717	494	697	689
2038	213	64	158	647	431	513	506	423	478	307	404	532
2039	117	58	163	423	206	420	334	441	290	216	224	353
2040	126	60	152	387	192	362	294	379	243	196	228	326
2041	173	61	139	519	196	394	311	481	265	206	248	333
2042	187	62	158	536	189	442	333	465	268	207	246	376
2043	184	42	155	573	152	347	286	475	198	184	213	287
Total	**10,717**	**10,488**	**7,807**	**23,913**	**13,747**	**16,378**	**15,881**	**17,456**	**16,032**	**16,190**	**17,859**	**15,744**

STOCHASTIC RISK ANALYSIS

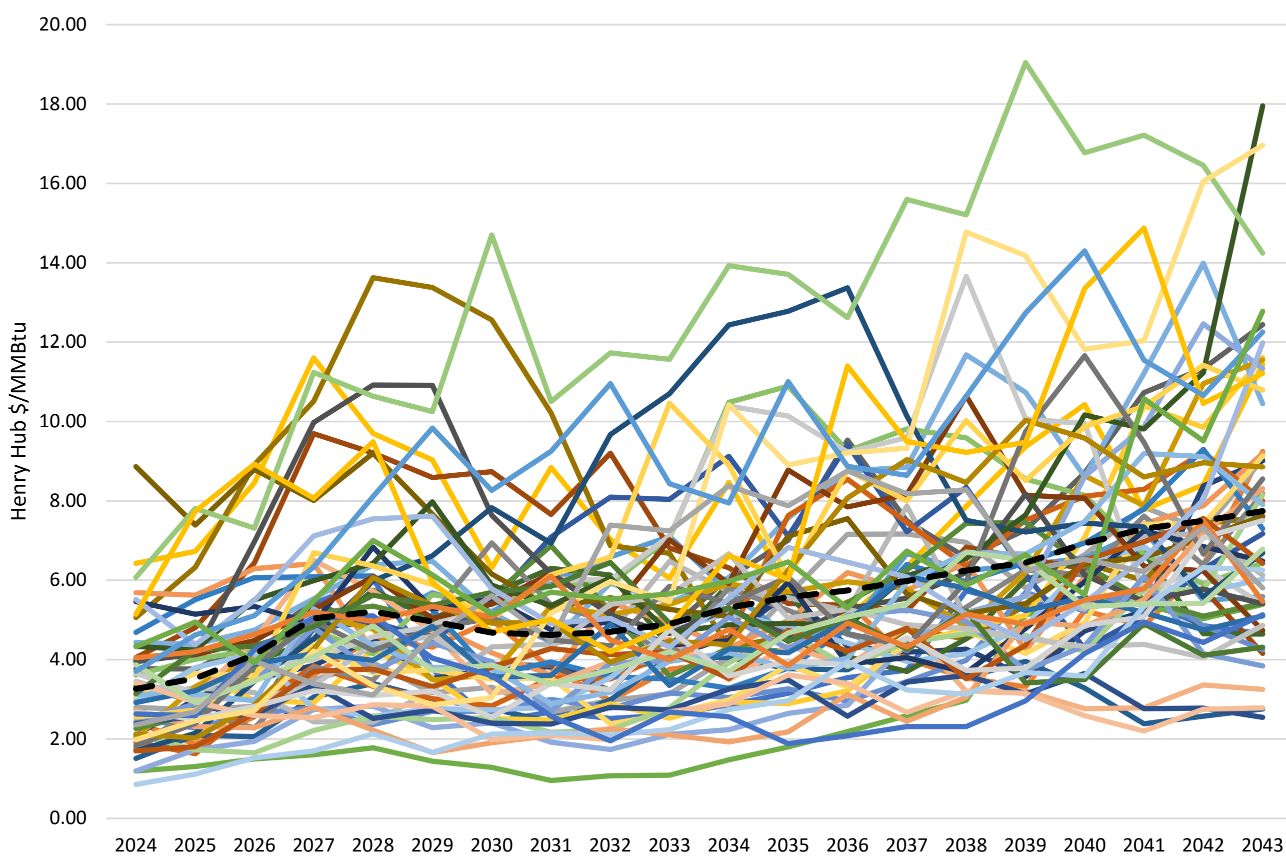
The stochastic analysis assesses the effect on portfolio costs when select variables take on values different from their planning-case levels. Stochastic variables are selected based on the degree to which there is uncertainty regarding their forecasts and the degree to which they can affect the analysis results (i.e., portfolio costs).

The purpose of the analysis is to understand the range of portfolio costs across a wide extent of stochastic shocks (i.e., across the full set of 60 stochastic iterations) and how the ranges for portfolios costs differ.

Idaho Power identified the following four variables for the stochastic analysis:

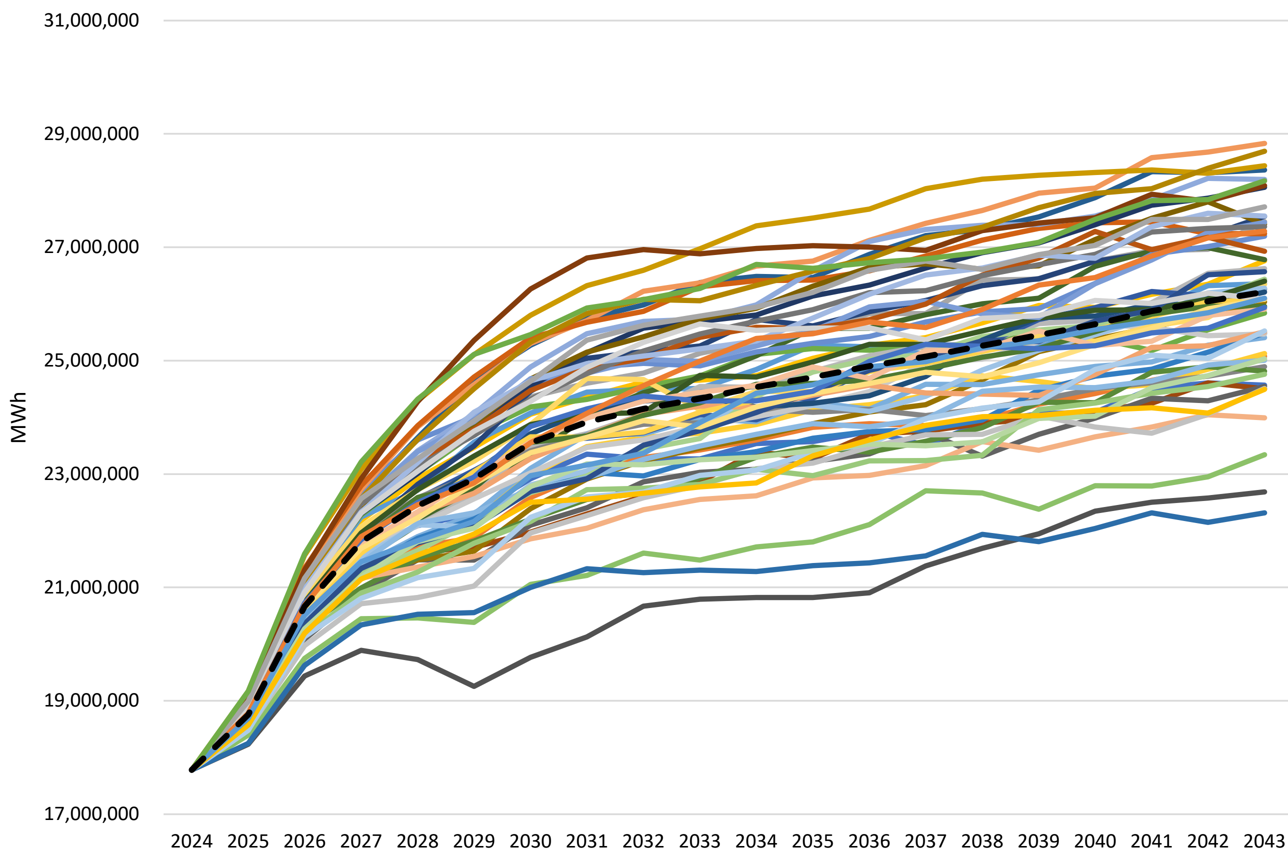
Natural Gas Sampling (Nominal $/MMBtu)

1. *Natural gas price*—Based on the historical Henry Hub natural gas price, it was determined that natural gas price variance around the trend approximates a log-normal distribution with a year-to-year correlation factor of 0.55. The graph below shows planning case average annual price in the black dashed line and the remaining-colored lines show the 60 different stochastic iterations for Henry Hub gas prices.



Customer Load Sampling (Annual MWh)

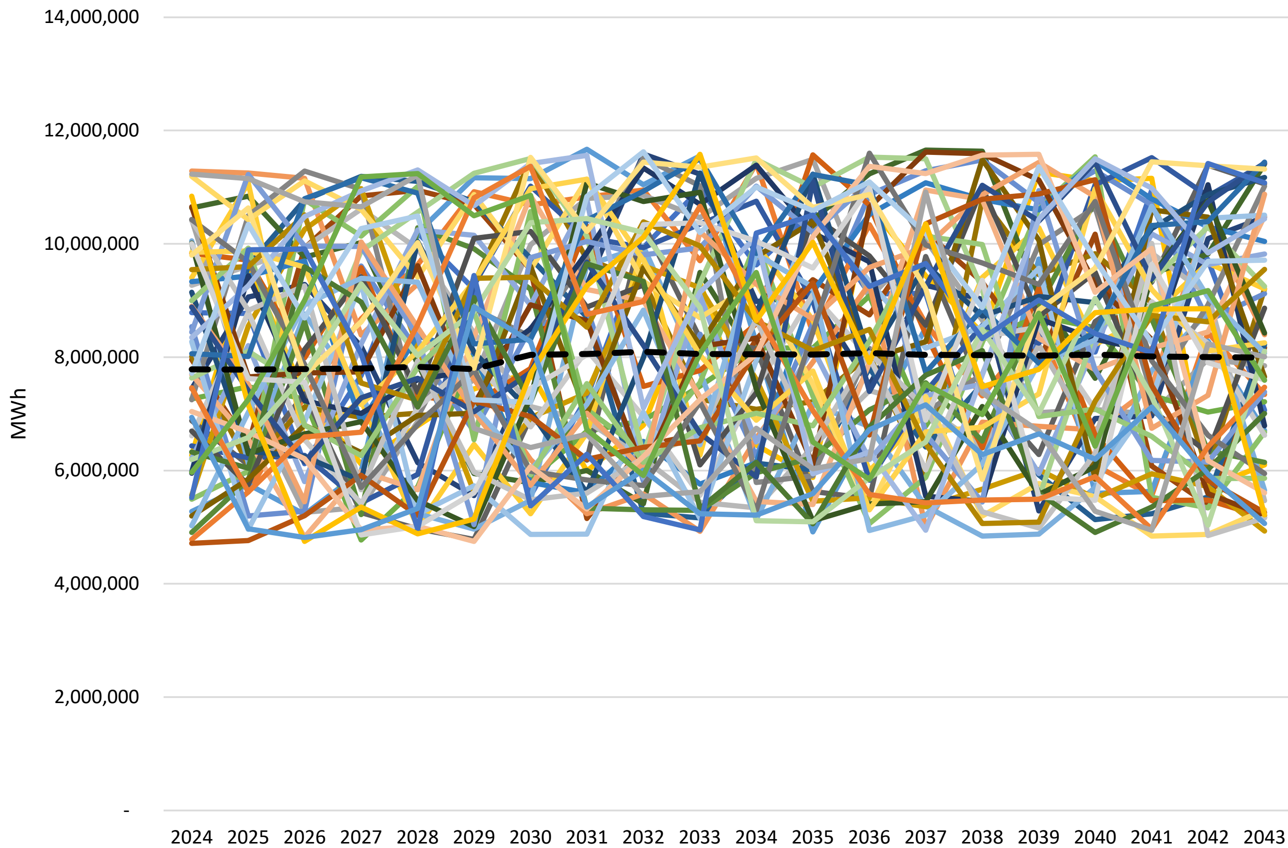
2. *Customer load*—Customer load follows a normal distribution and is adjusted around the planning case load forecast, which is shown as the dashed line in the figure below. To assess the reasonableness of the stochastic error bounds as they relate to customer load, the upper and lower bounds were compared to the load forecast 90/10 error bounds. For both the upper and lower bound, the stochastic values were found to fall slightly outside of the 90/10 bounds which is to be expected.



Hydro Generation Sampling (Annual MWh)

3. *Hydroelectric variability*—Hydroelectric generation variability was found to approximate a uniform distribution based on historical generation. Although an unexpected result based on the non-uniform distribution of rainfall across the Snake River Basin, the regulation of streamflow likely explains the difference between rainfall and generation distributions.

In addition to the distribution, the historical data also shows a correlation between years of 0.55.

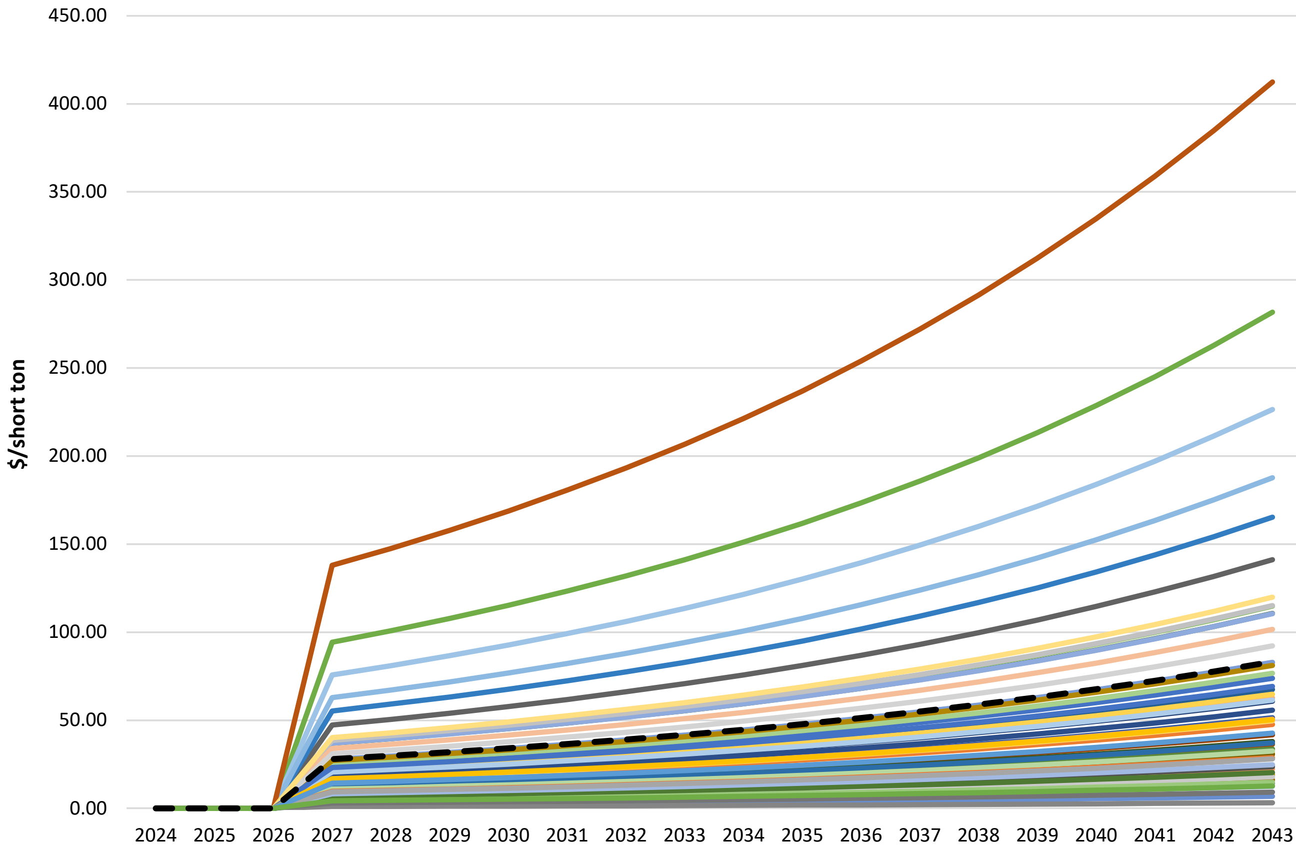


Carbon Price Sampling (Annual MWh)

4. *Carbon Price*—Though historical carbon price adder prices have always been zero, a wide-range of possible values are modeled into the future. The stochastic lower bound was set near zero and the upper bound was set to roughly approximate the Social Cost of Carbon[1] curve after

[1] epa.gov/system/files/documents/2022-11/epa_scghg_report_draft_0.pdf, page 67, retrieved September 7 2023

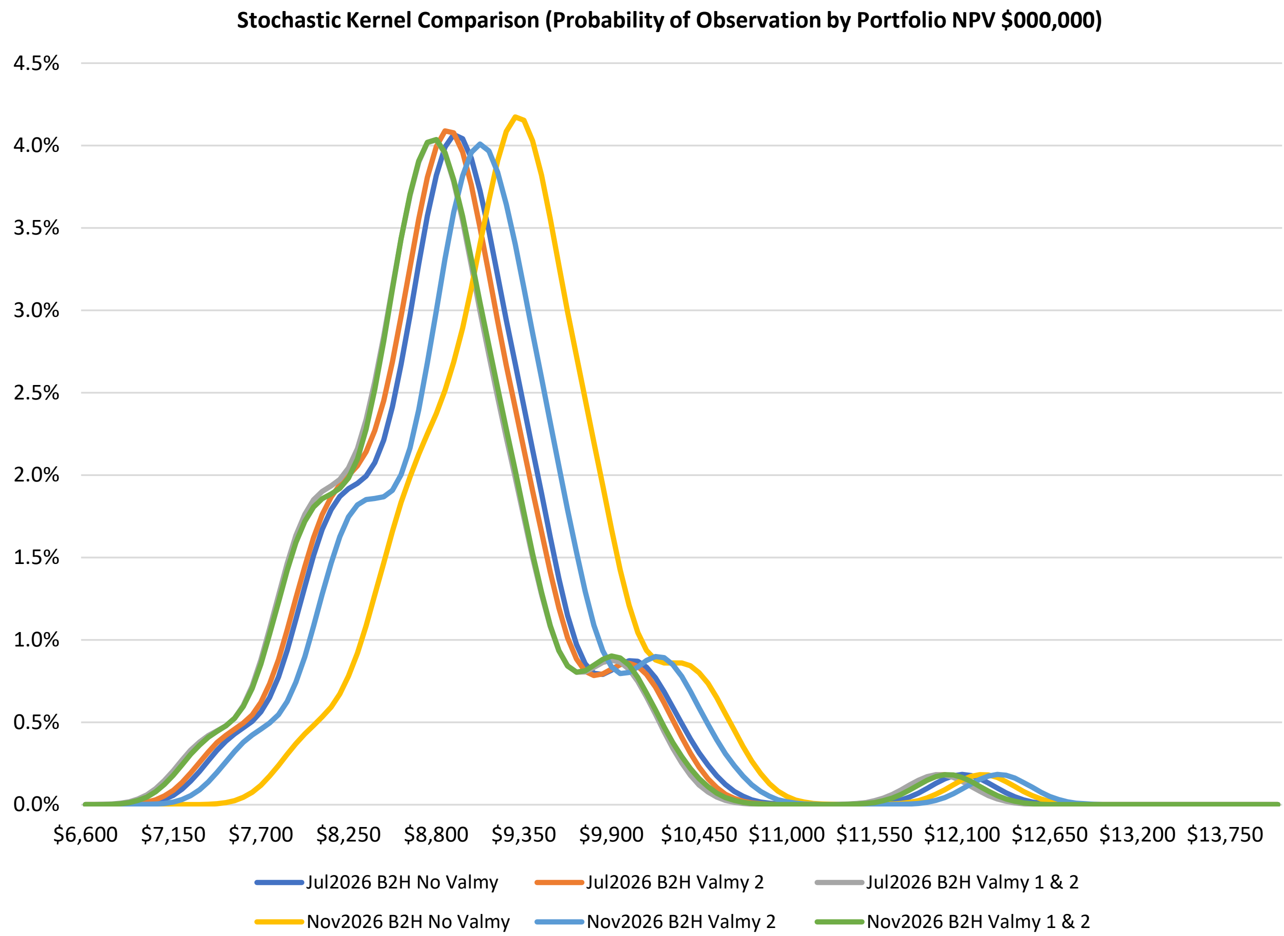
discussions with IRPAC. Stochastic values were then produced such that the average of all the values approximated the planning carbon price adder case.



The four selected stochastic variables are key drivers of variability in year-to-year power-supply costs and therefore provide suitable stochastic shocks to allow differentiated results for analysis.

Due to the significant time required to perform the stochastic risk analysis, Idaho Power was limited to performing a maximum of 60 risk iterations. Based on the sample size, the choice was made to use the Latin Hypercube sampling technique over a pure Monte Carlo method. The Latin Hypercube design samples the distribution range with a relatively smaller sample size, allowing a reduction in simulation run times. The Latin Hypercube method does this by sampling at regular intervals across the distribution spectrum. Contrast this to Monte Carlo methods where samples are taken randomly from the distribution range. The random Monte Carlo draw requires far more than 60 iterations to ensure a good distribution of draws. Once the stochastic elements are drawn, the company then calculated the

20-year NPV portfolio cost for each of the 60 iterations for all evaluated portfolios. The graph below shows the distribution of 20-year NPV portfolio costs for the portfolios.



Portfolio Stochastic Analysis, Total Portfolio Cost

NPV Years 2024–2043 ($ x 1,000)

In the figure above, each line represents the likelihood of occurrence by NPV. Higher values on the line represent a higher probability of occurrence with values near the horizontal axis representing improbable events. Values that occur toward the left have lower cost while values toward the right have higher cost. As indicated by the peak of the graph being furthest left, the results of the stochastic analysis show that the Preferred Portfolio is likely to have the lowest cost given a range of natural gas prices, load forecasts, carbon prices, and hydroelectric generation levels. Indeed, in all 60 risk iterations spanning the range of stochastic variables, the Preferred Portfolio (Jul2026 B2H Valmy 1 & 2) was the least-cost option.

LOSS OF LOAD EXPECTATION

As utilities continue to add more renewable energy to the electric grid, it is becoming more critical to analyze the effect Variable Energy Resources (VER) and Energy Limited Resources (ELR) have on system reliability.

VER: Variable energy resources include those whose generation is dependent upon weather, for example, solar and wind projects.

ELR: Energy limited resources are those whose generation can be called upon but are only able to dispatch for a limited amount of time and under certain conditions, for example, battery storage projects and demand response programs.

For the 2023 IRP, Idaho Power used the risk-based equations and methodologies described in this section to calculate the capacity contribution of different VERs and ELRs for the AURORA LTCE model and quantitatively analyze the risk associated with the portfolios. The company chose to conduct this study because of the recognition that VER output changes over time (VER hourly output being dependent on a multitude of factors like weather and environmental conditions) and that it is essential to capture that variability.

Methodology Components

The Loss of Load Probability (LOLP) is the likelihood of the system load exceeding the available generating capacity during a given time period (typically an hour). The LOLP can be calculated by determining the probability that the available generation at any given hour is able to meet the net load during that same hour. The LOLP can be defined as:

$$LOLP = P_i(G_i - L_i)$$

where P_i is the cumulative probability of the available generation required to meet the system demand at hour i, G_i is the available generation required to meet the system demand at hour i, and L_i is the net system demand at hour i.

The Loss of Load Expectation (LOLE) is the expected number of days per time period for which the available generation capacity is insufficient to serve the demand at least once per day. The LOLE can be calculated by adding the maximum LOLP from each day for a time period (typically over the course of a year). LOLE can be defined as:

$$LOLE = \sum_{d=1}^{D} max[_{i=1}^{H} (LOLP_i)]$$

where $LOLP_i$ is the LOLP at hour i. For the 2023 IRP, Idaho Power has adopted a LOLE threshold of 0.1 event-days per year.

The Effective Load Carrying Capability (ELCC) is a reliability-based metric used to assess the contribution to peak of any given generation unit or power plant. ELCC decomposes an individual generator's contribution to the overall system reliability and is driven by the timing of high LOLP hours. To calculate the ELCC of a resource, there are two definitions that should first be stated:

EFORd:	The Equivalent Forced Outage Rate during Demand (EFORd) represents the number of hours a generation unit is forced off-line compared to the number of hours the unit runs; for example, an EFORd of 3% means a generator is forced off 3% of its running time.
Perfect Generator:	A generation unit whose EFORd value is 0%, meaning that it is always available and never forced off-line.

The ELCC of a resource is determined by first calculating the perfect generation required to achieve a LOLE of 0.1 event-days per year. Then, the resource being evaluated is added to the system and the perfect generation required is calculated once again. The ELCC (%) of a given resource will be equal to the difference in the size of the perfect generators from the two runs divided by the resource's nameplate:

$$ELCC = \frac{PG_1 - PG_2}{Resource_{NM}} * 100$$

where PG_1 is the perfect generation required to achieve a LOLE of 0.1 event-days per year without including the evaluated resource, PG_2 is the perfect generation required to achieve the same LOLE of 0.1 event-days per year with the evaluated resource included, and $Resource_{NM}$ is the nameplate of the evaluated resource.

Modeling Idaho Power's System

Idaho Power developed the Reliability and Capacity Assessment Tool (RCAT) to implement the LOLE methodology and maximize computational efficiency for modeling Idaho Power's existing and potential resource stack. Within this tool, the company's resources were split into three categories: dispatchable resources, VERs, and ELRs. Dispatchable resources were modeled using a monthly outage table that was calculated using their monthly capacity and EFORd. The outage table is comprised of the following four components:

Capacity In:	capacity available to serve load (MW)
Capacity Out:	forced outage capacity (MW)
Individual Probability:	probability that a specific event will occur
Cumulative Probability:	cumulative distribution of the individual probabilities

Existing dispatchable resources include hydro with reservoir storage (the Hells Canyon Complex), thermal resources, and various transmission assets with access to the market.

VERs were modeled by using six years of historical hourly output data to maintain the relationship between load and renewable generation. Other resources for which Idaho Power does not have direct control over dispatch were also modeled using the six years of historical hourly output data. Examples of these resources include dairy digestors, non-wind and non-solar PURPA projects, ROR hydroelectric plants, and geothermal generation. In the model, these variable resources are subtracted from the system-adjusted load to produce a net load that is then used in the LOLE calculations.

Because resources, such as battery storage and demand response, are dispatched based on the daily load shape, Idaho Power devised a separate way to model ELRs. The RCAT begins by sorting the days in a year from high to low based on their net load peak. After verifying that the operating parameters of the demand response portfolio or storage resource are met on that day, the algorithm optimizes the daily dispatch based on the sorted updated net load.

This customization functionality of the RCAT allows for a detailed approach to modeling Idaho Power's system. As system needs continue to change, new analyses such as LOLE are essential in best evaluating the company's reliability and highest-risk hours.

Western Resource Adequacy Program Modeling

The Western Resource Adequacy Program (WRAP) is a regional planning and capacity-sharing program in which Idaho Power is a participant. The function and purpose of WRAP is provided in Chapter 2 of the IRP. Because the WRAP is designed as program of last resort, Idaho Power assumed for the 2023 IRP that it will leverage WRAP only once per year. As Idaho Power gains operational experience with WRAP, the company will develop a more refined understanding of how often it is likely to leverage the WRAP operations program.

To model the benefit of leveraging WRAP once per year, Idaho Power first performed an LOLP analysis on six historical test years of load and resource data and identified the highest-risk day in each historical test year. Using Idaho Power's RCAT, 100 MW of capacity was then added to the resource stack for each of the six identified highest-risk days. The 100 MW resource addition represents the amount of capacity leveraged from WRAP required to bring the LOLP values of the highest-risk day in the worst-performing historical test year down to a similar risk profile as other days in that year.

The RCAT analysis found that, on average, an additional 100 MW from WRAP on the company's highest-risk day results in Idaho Power needing 14 MW *less* perfect generation to meet a 0.1 event-days per year LOLE. In other words, leveraging WRAP to significantly reduce the risk of the highest-risk day each year is the equivalent of avoiding 14 MW of perfect generation.

For the 2023 IRP, Idaho Power included the 14 MW of WRAP capacity benefit beginning in 2027—the assumed date of binding participation—and continuing each year through the planning horizon. Idaho Power is working with other WRAP participants to align on a collective binding date. Should that date change from 2027, the company will adjust the first benefit year in future IRPs.

Effective Load-Carrying Capability Results

The ELCC of future VERs and ELRs are dependent upon the resources built before them, making the ELCC calculation of future resources challenging. For the 2023 IRP AURORA LTCE model, Idaho Power implemented seasonal saturation ELCC curves for each of the VERs and ELRs. The seasonal saturation ELCC curves assist in synchronizing the RCAT and AURORA models in terms of recognizing similar capacity needs and allow for recognition of how quickly a particular resource can become saturated. For example, the capacity contribution of solar during the summer declines as the net peak shifts to later in the day; however, during the winter, solar has a significantly lower capacity contribution when the highest-risk hours (typically) occur outside the limited sunlight hours.

The ELCC of future and existing resources can be calculated by using the "last-in" ELCC method, where each resource is assumed to be the last one added to the mix independent of the order on which they were added to the system. For example, the ELCC of demand response appears to be lower than in past IRPs but it is primarily due to the amount of battery storage included in the resource buildout. The ELCC values in the table below are provided for informational purposes.

ELCC of Existing and Expected Resources		ELCC of Future Resources	
Resource	**Average**	**Resource**	**Average**
Solar	51.3%	Solar	27.7%
Wind	20.0%	Wind (ID)	15.5%
Demand Response	34.0%	Wind (WY)	20.8%
4-Hour Stand-Alone Battery Storage	81.2%	4-Hour Stand-Alone Battery Storage	38.5%
Solar + 4-Hour Battery Storage (1:1)	85.1%	8-Hour Stand-Alone Battery Storage	79.2%
Solar + 4-Hour Battery Storage (1:0.6)	61.2%	Incremental Existing Demand Response	19.4%
		Storage Demand Response	35.0%
		Pricing Demand Response	32.2%

Timing of Highest Risk

The calculation of LOLE involves determining the LOLP for each hour, which Idaho Power performs for each of the test years used in the RCAT. In terms of capacity, the hourly LOLP values were used to determine the seasons and hours of highest risk for the 2023 IRP.

The seasons of highest risk were determined by first selecting the LOLP values that made up 90% of the total hourly risk (i.e., sum of all LOLPs). These LOLPs were then grouped by their time of occurrence to create the seasons of highest risk. The seasons of highest risk for the 2023 IRP were identified to be November 1 through February 28 for winter and June 1 through September 15 for summer.

To establish the hours of medium and highest risk, the RCAT was set to select the top LOLP daily hours that resulted in 50% of the risk of each month in the season for each of the test years; the results from the different test years were then combined. Using the test year combined top LOLP hours, a percent of occurrences threshold was developed to identify the medium-risk and high-risk hours.

The 2023 IRP hours of high, medium, and low risk by season are provided in the tables below.

Summer Risk Hours (June 1–September 15)

Hour End	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Holiday
1	SLR	SLR	SLR	SLR	SLR	SLR	SLR	SLR
2	SLR	SLR	SLR	SLR	SLR	SLR	SLR	SLR
3	SLR	SLR	SLR	SLR	SLR	SLR	SLR	SLR
4	SLR	SLR	SLR	SLR	SLR	SLR	SLR	SLR
5	SLR	SLR	SLR	SLR	SLR	SLR	SLR	SLR
6	SLR	SLR	SLR	SLR	SLR	SLR	SLR	SLR
7	SLR	SLR	SLR	SLR	SLR	SLR	SLR	SLR
8	SLR	SLR	SLR	SLR	SLR	SLR	SLR	SLR
9	SLR	SLR	SLR	SLR	SLR	SLR	SLR	SLR
10	SLR	SLR	SLR	SLR	SLR	SLR	SLR	SLR
11	SLR	SLR	SLR	SLR	SLR	SLR	SLR	SLR
12	SLR	SLR	SLR	SLR	SLR	SLR	SLR	SLR
13	SLR	SLR	SLR	SLR	SLR	SLR	SLR	SLR
14	SLR	SLR	SLR	SLR	SLR	SLR	SLR	SLR
15	SLR	SLR	SLR	SLR	SLR	SLR	SLR	SLR
16	SLR	SLR	SLR	SLR	SLR	SLR	SLR	SLR
17	SLR	SLR	SLR	SLR	SLR	SLR	SLR	SLR
18	SLR	SMR	SMR	SMR	SMR	SMR	SMR	SLR
19	SLR	SMR	SMR	SMR	SMR	SMR	SMR	SLR
20	SLR	SHR	SHR	SHR	SHR	SHR	SHR	SLR
21	SLR	SHR	SHR	SHR	SHR	SHR	SHR	SLR
22	SLR	SHR	SHR	SHR	SHR	SHR	SHR	SLR
23	SLR	SMR	SMR	SMR	SMR	SMR	SMR	SLR
24	SLR	SLR	SLR	SLR	SLR	SLR	SLR	SLR

SLR—Summer Low-Risk
SMR—Summer Medium-Risk
SHR—Summer High-Risk

Winter Risk Hours (November 1–February 28/29)

Hour End	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Holiday
1	WLR	WLR	WLR	WLR	WLR	WLR	WLR	WLR
2	WLR	WLR	WLR	WLR	WLR	WLR	WLR	WLR
3	WLR	WLR	WLR	WLR	WLR	WLR	WLR	WLR
4	WLR	WLR	WLR	WLR	WLR	WLR	WLR	WLR
5	WLR	WLR	WLR	WLR	WLR	WLR	WLR	WLR
6	WLR	WLR	WLR	WLR	WLR	WLR	WLR	WLR
7	WLR	WHR	WHR	WHR	WHR	WHR	WHR	WLR
8	WLR	WHR	WHR	WHR	WHR	WHR	WHR	WLR
9	WLR	WHR	WHR	WHR	WHR	WHR	WHR	WLR
10	WLR	WHR	WHR	WHR	WHR	WHR	WHR	WLR
11	WLR	WMR	WMR	WMR	WMR	WMR	WMR	WLR
12	WLR	WMR	WMR	WMR	WMR	WMR	WMR	WLR
13	WLR	WLR	WLR	WLR	WLR	WLR	WLR	WLR
14	WLR	WLR	WLR	WLR	WLR	WLR	WLR	WLR
15	WLR	WLR	WLR	WLR	WLR	WLR	WLR	WLR
16	WLR	WLR	WLR	WLR	WLR	WLR	WLR	WLR
17	WLR	WMR	WMR	WMR	WMR	WMR	WMR	WLR
18	WLR	WHR	WHR	WHR	WHR	WHR	WHR	WLR
19	WLR	WHR	WHR	WHR	WHR	WHR	WHR	WLR
20	WLR	WHR	WHR	WHR	WHR	WHR	WHR	WLR
21	WLR	WMR	WMR	WMR	WMR	WMR	WMR	WLR
22	WLR	WLR	WLR	WLR	WLR	WLR	WLR	WLR
23	WLR	WLR	WLR	WLR	WLR	WLR	WLR	WLR
24	WLR	WLR	WLR	WLR	WLR	WLR	WLR	WLR

WLR—Winter Low-Risk
WMR—Winter Medium-Risk
WHR—Winter High-Risk

Off-Season Risk Hours (March 1–May 31, September 16–October 31)

Hour End	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Holiday
1	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
2	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
3	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
4	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
5	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
6	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
7	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
8	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
9	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
10	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
11	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
12	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
13	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
14	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
15	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
16	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
17	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
18	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
19	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
20	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
21	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
22	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
23	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR
24	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR	OFLR

OFLR —Off-Season Low-Risk

While the identified seasons and hours capture over 95% of the total hourly risk, the magnitude of LOLP values vary. Planning to the 0.1 event-days per year LOLE threshold, the percentage of risk distribution can be visualized through the lens of the monthly LOLE results, as shown in the following table.

Month	LOLE Percentage
Jan	*0.6%
Feb	*0.0%
Mar	0.0%
Apr	0.0%
May	0.0%
Jun	2.8%
Jul	58.5%
Aug	19.3%
Sep	3.6%
Oct	1.0%
Nov	6.7%
Dec	7.4%
Total	100.0%

*January and February are expected to be as high as November and Decemberf for the 2025–2026 winter season due to forecasted industrial customer load ramps.

COMPLIANCE WITH STATE OF OREGON IRP GUIDELINES

Guideline 1: Substantive Requirements

a. All resources must be evaluated on a consistent and comparable basis.
   - All known resources for meeting the utility's load should be considered, including supply-side options which focus on the generation, purchase and transmission of power or gas purchases, transportation, and storage and demand side options which focus on conservation and demand response.
   - Utilities should compare different resource fuel types, technologies, lead times, in-service dates, durations and locations in portfolio risk modeling.
   - Consistent assumptions and methods should be used for evaluation of all resources.
   - The after-tax marginal weighted-average cost of capital (WACC) should be used to discount all future resource costs.

Idaho Power response:

Idaho Power considered a range of resource types including renewables (e.g., wind and solar), demand-side management, transmission, market purchases, thermal resources, and energy storage. Each of these resources was included as options in the AURORA capacity expansion modeling.

Supply-side and purchased resources for meeting the utility's load are discussed in *Chapter 4. Idaho Power Today;* demand-side options are discussed in *Chapter 6. Demand-Side Resources*; and transmission resources are discussed in *Chapter 7. Transmission Planning*.

New resource options including fuel types, technologies, lead times, in-service dates, durations, and locations are described in *Chapter 5. Future Supply-Side Generation and Storage Resources*, *Chapter 6. Demand-Side Resources*, *Chapter 7. Transmission Planning*, and *Chapter 8. Planning Period Forecasts*.

The consistent modeling method for evaluating new resource options is described in *Chapter 8. Planning Period Forecasts* and *Chapter 10. Modeling Analysis*.

The after-tax marginal WACC rate used to discount all future resource costs is discussed in Appendix C: Technical Appendix *Supply-Side Resource Data – Key Financial and Forecast Assumptions*.

b. Risk and uncertainty must be considered.
   - At a minimum, utilities should address the following sources of risk and uncertainty:
     1. Electric utilities: load requirements, hydroelectric generation, plant forced outages, fuel prices, electricity prices, and costs to comply with any regulation of greenhouse gas emissions.
     2. Natural gas utilities: demand (peak, swing, and baseload), commodity supply and price, transportation availability and price, and costs to comply with any regulation of greenhouse gas emissions.
   - Utilities should identify in their plans any additional sources of risk and uncertainty.

Idaho Power response:

Electric utility risk and uncertainty factors (load, natural gas, and hydroelectric generation) for resource portfolios are considered in Chapter 10. Modeling Analysis. Plant forced outages are modeled in RCAT on a unit basis and are discussed in *Appendix C: Technical Appendix Loss of Load Expectation*. Risk and uncertainty associated with fuel prices and greenhouse gas emissions are discussed in *Chapter 9 Portfolios*. The AURORA generated electricity prices are impacted by the above assumptions and are considered in the analysis.

Additional sources of risk and uncertainty including qualitative risks are discussed in *Chapter 10. Modeling Analysis*.

c. The primary goal must be the selection of a portfolio of resources with the best combination of expected costs and associated risks and uncertainties for the utility and its customers.
   - The planning horizon for analyzing resource choices should be at least 20 years and account for end effects. Utilities should consider all costs with a reasonable likelihood of being included in rates over the long term, which extends beyond the planning horizon and the life of the resource.
   - Utilities should use present value of revenue requirement (PVRR) as the key cost metric. The plan should include analysis of current and estimated future costs for all long-lived resources such as power plants, gas storage facilities, and pipelines, as well as all short-lived resources such as gas supply and short-term power purchases.
   - To address risk, the plan should include, at a minimum:
     a. Two measures of PVRR risk: one that measures the variability of costs and one that measures the severity of bad outcomes.
     b. Discussion of the proposed use and impact on costs and risks of physical and financial hedging.
   - The utility should explain in its plan how its resource choices appropriately balance cost and risk.

Idaho Power response:

The IRP methodology and the planning horizon of 20 years are discussed in *Chapter 1. Background*.

Modeling analysis of current and estimated future costs for all long-lived resources such as power plants, gas storage facilities, and pipelines, as well as all short-lived resources such as gas supply and short-term power purchases is discussed in *Chapter 10. Modeling Analysis*.

The discussion of cost variability and extreme outcomes, including bad outcomes is discussed in *Chapter 10. Modeling Analysis*.

Idaho Power's Risk Management Policy regarding physical and financial hedging is discussed in *Chapter 1. Background*. Idaho Power's Energy Risk Management Program is designed to systematically identify, quantify, and manage the exposure of the company and its customers to the uncertainties related to the energy markets in which the company is an active participant. The company's Risk Management Standards limit term purchases to the prompt 18 months of the forward curve.

Idaho Power's plan and how the resource choices appropriately balance cost and risk is presented in *Chapter 11. Preferred Portfolio and Action Plan.*

d. The plan must be consistent with the long-run public interest as expressed in Oregon and federal energy policies.

Idaho Power response:

Long-run public interest issues are discussed in *Chapter 2. Political, Regulatory, and Operational Issues* and *Chapter 3. Clean Energy & Climate Change*. The company also evaluated four future scenarios, including rapid electrification, climate change, 100% clean by 2035, and 100% clean by 2045. These are discussed in *Chapter 9. Portfolios*.

Guideline 2: Procedural Requirements

a. The public, which includes other utilities, should be allowed significant involvement in the preparation of the IRP. Involvement includes opportunities to contribute information and ideas, as well as to receive information. Parties must have an opportunity to make relevant inquiries of the utility formulating the plan. Disputes about whether information requests are relevant or unreasonably burdensome, or whether a utility is being properly responsive, may be submitted to the Commission for resolution.

Idaho Power response:

The IRPAC meetings are open to the public. A roster of the IRPAC members along with meeting schedules and agendas is provided in *Appendix C: Technical Appendix*, *IRP Advisory Council*..

b. While confidential information must be protected, the utility should make public, in its plan, any non-confidential information that is relevant to its resource evaluation and action plan. Confidential information may be protected through use of a protective order, through aggregation or shielding of data, or through any other mechanism approved by the Commission.

Idaho Power response:

Idaho Power makes public extensive information relevant to its resource evaluation and action plan. This information is discussed in IRPAC meetings and found throughout the 2021 IRP, the 2021 Load and Sales Forecast and in the 2021 Technical Appendix.

c. The utility must provide a draft IRP for public review and comment prior to filing a final plan with the Commission.

Idaho Power response:

Prior to filing, Idaho Power posted online a draft 2023 IRP Report for public review and comment in September 2023..

Guideline 3: Plan Filing, Review, and Updates

a. A utility must file an IRP within two years of its previous IRP acknowledgment order. If the utility does not intend to take any significant resource action for at least two years after its next IRP is due, the utility may request an extension of its filing date from the Commission.

Idaho Power response:

The OPUC acknowledged Idaho Power's 2021 IRP on December 6, 2022, in Order 23-004. Filing the 2023 IRP in September 2023 complies with the requirement to file the company's next IRP within two years of acknowledgement of the prior IRP.

b. The utility must present the results of its filed plan to the Commission at a public meeting prior to the deadline for written public comment.

Idaho Power response:

Idaho Power will work with Commission Staff and other interested parties to set a schedule for review of the 2023 IRP, including a public meeting with the Commission following the September 2023 filing.

c. Commission staff and parties should complete their comments and recommendations within six months of IRP filing.

Idaho Power response:

This will be conducted following the filing of this IRP.

d. The Commission will consider comments and recommendations on a utility's plan at a public meeting before issuing an order on acknowledgment. The Commission may provide the utility an opportunity to revise the plan before issuing an acknowledgment order.

Idaho Power response:

This will be conducted following the filing of this IRP.

e. The Commission may provide direction to a utility regarding any additional analyses or actions that the utility should undertake in its next IRP.

Idaho Power response:

No response needed.

f. Each utility must submit an annual update on its most recently acknowledged plan. The update is due on or before the acknowledgment order anniversary date. Once a utility anticipates a significant deviation from its acknowledged IRP, it must file an update with the Commission, unless the utility is within six months of filing its next IRP. The utility must summarize the update at a Commission public meeting. The utility may request acknowledgment of changes in proposed actions identified in an update.

Idaho Power response:

Idaho Power will file an annual update of the 2023 IRP, assuming the annual update will occur more than six months before filing the 2025 IRP.

g. Unless the utility requests acknowledgement of changes in proposed actions, the annual update is an informational filing that:
   - Describes what actions the utility has taken to implement the plan;
   - Provides an assessment of what has changed since the acknowledgment order that affects the action plan, including changes in such factors as load, expiration of resource contracts, supply-side and demand-side resource acquisitions, resource costs, and transmission availability; and
   - Justifies any deviations from the acknowledged action plan.

Idaho Power response:

Not applicable to this filling; this activity will be conducted at a later time.

Guideline 4: Plan Components

At a minimum, the plan must include the following elements:

a. An explanation of how the utility met each of the substantive and procedural requirements;

Idaho Power response:

The information in this section is intended to show how the company complied with this guideline.

b. Analysis of high and low load growth scenarios in addition to stochastic load risk analysis with an explanation of major assumptions;

Idaho Power response:

High-growth scenarios are tested using the Rapid Electrification case as discussed in *Chapter 9. Portfolios*. Stochastic analysis was performed on load (which creates high and low load conditions) and the details of that analysis are contained in *Chapter 10. Modeling Analysis.*

c. For electric utilities, a determination of the levels of peaking capacity and energy capability expected for each year of the plan, given existing resources; identification of capacity and energy needed to bridge the gap between expected loads and resources; modeling of all existing transmission rights, as well as future transmission additions associated with the resource portfolios tested;

Idaho Power response:

Peaking capacity and energy capability expected for existing resources are modeled in AURORA. Identification of capacity and energy needed to bridge the gap between expected loads and resources is an output of AURORA LTCE modeling; results of which are found in *Appendix C: Technical Appendix*. All existing transmission rights and future transmission additions are modeled in AURORA.

Detailed forecasts are provided in *Appendix C: Technical Appendix*, *Sales and Load Forecast Data* and *Existing Resource Data*. Identification of capacity and energy needed to bridge the gap between expected loads and resources is discussed in *Chapter 11. Preferred Portfolio and Action Plan*.

d. For natural gas utilities, a determination of the peaking, swing and base-load gas supply and associated transportation and storage expected for each year of the plan, given existing resources; and identification of gas supplies (peak, swing, and baseload), transportation and storage needed to bridge the gap between expected loads and resources;

Idaho Power response:

Not applicable to Idaho Power.

e. Identification and estimated costs of all supply-side and demand-side resource options, taking into account anticipated advances in technology;

Idaho Power response:

Supply-side resources are discussed in *Chapter 5. Future Supply-Side Generation and Storage Resources*.

Demand-side resources are discussed in *Chapter 6. Demand-Side Resources*.

Resource costs are discussed in *Chapter 8. Planning Period Forecasts* and presented in *Appendix C: Technical Appendix, Supply-Side Resource Data*.

f. Analysis of measures the utility intends to take to provide reliable service, including cost-risk tradeoffs;

Idaho Power response:

Resource reliability and cost-risk tradeoffs are covered in *Chapter 10. Modeling Analysis.*

g. Identification of key assumptions about the future (e.g., fuel prices and environmental compliance costs) and alternative scenarios considered;

Idaho Power response:

Key Assumptions including the natural gas price forecast are discussed in *Chapter 8. Planning Period Forecasts* and in *Appendix C: Technical Appendix, Key Financial and Forecast Assumptions*. Environmental compliance costs are addressed in *Chapter 10. Modeling Analysis*.

h. Construction of a representative set of resource portfolios to test various operating characteristics, resource types, fuels and sources, technologies, lead times, in-service dates, durations, and general locations – system-wide or delivered to a specific portion of the system;

Idaho Power response:
Resource portfolios considered for the 2023 IRP are described in *Chapter 9. Portfolios* and *Appendix C: Technical Appendix*, *Long-Term Capacity Expansion Results*.

i. Evaluation of the performance of the candidate portfolios over the range of identified risks and uncertainties;

Idaho Power response:
Evaluation of the portfolios over a range of risks and uncertainties is discussed in *Chapter 10. Modeling Analysis*.

j. Results of testing and rank ordering of the portfolios by cost and risk metric, and interpretation of those results;

Idaho Power response:
Portfolio cost, risk results, interpretations and the selection of the Preferred Portfolio are provided in *Chapter 10. Modeling Analysis.*

k. Analysis of the uncertainties associated with each portfolio evaluated;

Idaho Power response:
The quantitative and qualitative uncertainties associated with each portfolio are evaluated in *Chapter 10. Modeling Analysis*.

l. Selection of a portfolio that represents the best combination of cost and risk for the utility and its customers

Idaho Power response:
The Preferred Portfolio is identified in *Chapter 11. Preferred Portfolio and Action Plan* and represents the best combination of cost and risk.

m. Identification and explanation of any inconsistencies of the selected portfolio with any state and federal energy policies that may affect a utility's plan and any barriers to implementation; and

Idaho Power response:
The company has identified that its plans are consistent with all state and federal energy policies as of the time of filing.

n. An action plan with resource activities the utility intends to undertake over the next two to four years to acquire the identified resources, regardless of whether the activity was acknowledged in a previous IRP, with the key attributes of each resource specified as in portfolio testing.

Idaho Power response:
An action plan is provided in the *Executive Summary* and in *Chapter 11. Preferred Portfolio and Action Plan.*

Guideline 5: Transmission

Portfolio analysis should include costs to the utility for the fuel transportation and electric transmission required for each resource being considered. In addition, utilities should consider fuel transportation and electric transmission facilities as resource options, taking into account their value for making additional purchases and sales, accessing less costly resources in remote locations, acquiring alternative fuel supplies, and improving reliability.

Idaho Power response:
All identified requirements in Guideline 5: Transmission are met and modeled in AURORA. Transmission assumptions for supply-side resources and market access are included in *Chapter 7. Transmission Planning*. Transportation for natural gas is discussed in *Chapter 8. Planning Period Forecasts*.

Guideline 6: Conservation

a. Each utility should ensure that a conservation potential study is conducted periodically for its entire service territory.

Idaho Power response:
The contractor-provided conservation potential study for the 2023 IRP is described in *Chapter 6. Demand-Side Resources* and is included as *Appendix B: DSM Annual Report*.

b. To the extent that a utility controls the level of funding for conservation programs in its service territory, the utility should include in its action plan all best cost/risk portfolio conservation resources for meeting projected resource needs, specifying annual savings targets.

Idaho Power response:
A recast for energy efficiency is provided in Cha*pter 6. Demand-Side Resources*. The load forecast put into AURORA included the reduction to customer sales of all future achievable economic energy efficiency potential.

c. To the extent that an outside party administers conservation programs in a utility's service territory at a level of funding that is beyond the utility's control, the utility should:

- Determine the amount of conservation resources in the best cost/risk portfolio without regard to any limits on funding of conservation programs; and

- Identify the preferred portfolio and action plan consistent with the outside party's projection of conservation acquisition.

Idaho Power response:

Idaho Power administers all its conservation programs except market transformation. Third-party market transformation savings are provided by the Northwest Energy Efficiency Alliance (NEEA) and are discussed in *Appendix B: Idaho Power's Demand-Side Management 2020 Annual Report.* NEEA savings are included as savings to meet targets because of the overlap of NEEA initiatives and IPC's most recent potential study.

Guideline 7: Demand Response

Plans should evaluate demand response resources, including voluntary rate programs, on par with other options for meeting energy, capacity, and transmission needs (for electric utilities) or gas supply and transportation needs (for natural gas utilities).

Idaho Power response:

Idaho Power's examination of the potential for expanded DR resources is presented in *Chapter 6. Demand-Side Resources*.

Guideline 8: Environmental Costs

a. Base case and other compliance scenarios: The utility should construct a base-case scenario to reflect what it considers to be the most likely regulatory compliance future for carbon dioxide (CO_2), nitrogen oxides, sulfur oxides, and mercury emissions. The utility should develop several compliance scenarios ranging from the present CO_2 regulatory level to the upper reaches of credible proposals by governing entities. Each compliance scenario should include a time profile of CO_2 compliance requirements. The utility should identify whether the basis of those requirements, or "costs," would be CO_2 taxes, a ban on certain types of resources, or CO_2 caps (with or without flexibility mechanisms such as an allowance for credit trading as a safety valve). The analysis should recognize significant and important upstream emissions that would likely have a significant impact on resource decisions. Each compliance scenario should maintain logical consistency, to the extent practicable, between the CO_2 regulatory requirements and other key inputs.

Idaho Power response:

The carbon price forecasts used in the 2023 IRP are found in *Chapter 9. Portfolios*. Compliance with existing environmental regulation and emissions for each portfolio are discussed in *Chapter 10. Modeling Analysis*. Emissions for each portfolio are shown in *Appendix C: Technical Appendix*, *Portfolio Emissions Forecast*.

b. Testing alternative portfolios against the compliance scenarios: The utility should estimate, under each of the compliance scenarios, the present value revenue requirement (PVRR) costs and risk measures, over at least 20 years, for a set of reasonable alternative portfolios from which the preferred portfolio is selected. The utility should incorporate end-effect considerations in the analyses to allow for comparisons of portfolios containing resources with economic or physical lives that extend beyond the planning period. The utility should also modify projected lifetimes as necessary to be consistent with the compliance scenario under analysis. In addition, the utility should include, if material, sensitivity analyses on a range of reasonably possible regulatory futures for nitrogen oxides, sulfur oxides, and mercury to further inform the preferred portfolio selection.

Idaho Power response:

See *Chapter 9. Portfolios* and *Chapter 10. Modeling Analysis* for discussion on the various scenarios and comparative analysis of the scenarios. Economic lives were adjusted based on portfolio conditions.

c. Trigger point analysis: The utility should identify at least one CO2 compliance “turning point” scenario, which, if anticipated now, would lead to, or “trigger” the selection of a portfolio of resources that is substantially different from the preferred portfolio. The utility should develop a substitute portfolio appropriate for this trigger-point scenario and compare the substitute portfolio’s expected cost and risk performance to that of the preferred portfolio – under the base case and each of the above CO2 compliance scenarios. The utility should provide its assessment of whether a CO2 regulatory future that is equally or more stringent that the identified trigger point will be mandated.

Idaho Power response:

See *Chapter 9. Portfolios* and *Chapter 10. Modeling Analysis* for discussion on the various scenarios and comparative analysis of the scenarios.

d. Oregon compliance portfolio: If none of the above portfolios is consistent with Oregon energy policies (including state goals for reducing greenhouse gas emissions) as those policies are applied to the utility, the utility should construct the best cost/risk portfolio that achieves that consistency, present its cost and risk parameters, and compare it to those in the preferred and alternative portfolios.

Idaho Power response:

The company evaluated “100% Clean by 2035” and “100% Clean by 2045” scenarios. The results of the portfolios are presented in *Appendix C: Technical Appendix, Long-Term Capacity Expansion Results*..

Guideline 9: Direct Access Loads

An electric utility’s load-resource balance should exclude customer loads that are effectively committed to service by an alternative electricity supplier.

Idaho Power response:

Idaho Power does not have any customers served by alternative electricity suppliers and no direct access loads.

Guideline 10: Multi-state Utilities

Multi-state utilities should plan their generation and transmission systems, or gas supply and delivery, on an integrated-system basis that achieves a best cost/risk portfolio for all their retail customers.

Idaho Power response:

Idaho Power's analysis was performed on an integrated-system basis discussed in *Chapter 10. Modeling Analysis*. Idaho Power will file the 2023 IRP in both the Idaho and Oregon jurisdictions.

Guideline 11: Reliability

Electric utilities should analyze reliability within the risk modeling of the actual portfolios being considered. Loss of load probability, expected planning reserve margin, and expected and worst-case unserved energy should be determined by year for top-performing portfolios. Natural gas utilities should analyze, on an integrated basis, gas supply, transportation, and storage, along with demand-side resources, to reliably meet peak, swing, and base-load system requirements. Electric and natural gas utility plans should demonstrate that the utility's chosen portfolio achieves its stated reliability, cost, and risk objectives.

Idaho Power response:

The capacity planning margin and regulating reserves are discussed in *Chapter 9. Portfolios*. A loss of load expectation analysis to determine the company's annual capacity positions is discussed in *Chapter 10. Modeling Analysis* and Appendix C: Technical Appendix, *Loss of Load Expectation.*

Guideline 12: Distributed Generation

Electric utilities should evaluate distributed generation technologies on par with other supply-side resources and should consider, and quantify where possible, the additional benefits of distributed generation.

Idaho Power response:

Distribution-connected storage technologies were evaluated in *Chapter 5. Future Supply-Side Generation and Storage Resources* and in *Chapter 8. Planning Period Forecasts*.

Guideline 13: Resource Acquisition

a. An electric utility should, in its IRP:
    - Identify its proposed acquisition strategy for each resource in its action plan.

- Assess the advantages and disadvantages of owning a resource instead of purchasing power from another party.
- Identify any Benchmark Resources it plans to consider in competitive bidding.

Idaho Power response:

Idaho Power identifies its proposed acquisition strategy in *Chapter 11. Preferred Portfolio and Action Plan.* Idaho Power follows an all-source RFP process where possible to acquire resources which may or may not be owned by the company and are evaluated to provide maximum benefit to its customers.

b. Natural gas utilities should either describe in the IRP their bidding practices for gas supply and transportation, or provide a description of those practices following IRP acknowledgment.

Idaho Power response:

Not applicable to Idaho Power.

COMPLIANCE WITH EV GUIDELINES

Guideline 1: Forecast the Demand for Flexible Capacity

Forecast the Demand for Flexible Capacity: The electric utilities shall forecast the balancing reserves needed at different time intervals (e.g., ramping needed within 5 minutes) to respond to variation in load and intermittent renewable generation over the 20-year planning period;

Idaho Power response:

A discussion of Idaho Power's analysis for the flexibility guideline is provided in *Chapter 9. Portfolios.*

Guideline 2: Forecast the Supply for Flexible Capacity

Forecast the Supply of Flexible Capacity: The electric utilities shall forecast the balancing reserves available at different time intervals (e.g., ramping available within 5 minutes) from existing generating resources over the 20-year planning period;

Idaho Power response:

A discussion of the capacity planning reserve margin and regulating reserves is found at *Chapter 9. Portfolios.*

Guideline 3: Evaluate Flexible Resources on a Consistent and Comparable Basis

In planning to fill any gap between the demand and supply of flexible capacity, the electric utilities shall evaluate all resource options, including the use of EVs, on a consistent and comparable basis.

Idaho Power response:

Future supply-side resource options are discussed in *Chapter 5. Future Supply Side Generation and Storage Resources*. Future demand-side resource options are discussed in *Chapter 6. Demand-Side Resources*. Demand response storage-related programs, like EVs could provide, were modeled; this is discussed in *Chapter 6. Demand-Side Resources*.

STATE OF OREGON ACTION ITEMS REGARDING IDAHO POWER'S 2021 IRP

Action Item 1: B2H

Conduct ongoing Boardman to Hemingway (B2H) permitting activities. Negotiate and execute B2H partner construction agreements. Once the agreements are in place, file for a certificate of public convenience and necessity with state Commissions.

Idaho Power response:

Discussions of Idaho Power's B2H permitting activities, partner construction agreements, and CPCN filings are included in *Chapter 7: Transmission Planning.*

Action Item 2: SWIP–North

Discuss partnership opportunities related to SWIP-North with the project developer for more detailed evaluation in future IRPs with the condition that Idaho Power study the impact of the Greenlink transmission projects in reducing congestion between Idaho Power's service territory and southern wholesale energy markets.

Idaho Power response:

Opportunities related to SWIP-North are discussed in *Chapter 7: Transmission Planning.* Idaho Power also discusses SWIP-North and its impact on congestion and southern market opportunity in *Chapter 7: Transmission Planning.*

Action Item 3: Jackpot Solar

Solar is contracted to provide 120 MW starting December 2022. Work with the developer to determine, if necessary, mitigating measures if the project cannot meet the negotiated timeline.

Idaho Power response:

Not applicable. Jackpot Solar began commercial operations in December 2022, as scheduled.

Action Item 4: Jim Bridger Units 1 and 2

Plan and coordinate with PacifiCorp and regulators for conversion to natural gas operation with a 2034 exit date for Bridger Units 1 and 2. The conversion is targeted before the summer peak of 2024.

Idaho Power response:

In *Chapter 5: Future Supply-Side Generation and Storage Resources*, Idaho Power discusses its plans with PacifiCorp to convert Bridger Units 1 and 2 to natural gas operation in 2024. Coordination with PacifiCorp has led to a scheduled exit date of 2037 for Bridger Units 1 and 2.

Action Item 5: 2024 and 2025 RFP

Issue a Request for Proposal ("RFP") to procure resources to meet identified deficits in 2024 and 2025.

Idaho Power response:

Idaho Power completed an RFP process to meet the deficits identified in 2024 and 2025.

Action Item 6: Jim Bridger Units 3 and 4

Plan and coordinate with PacifiCorp and regulators for the exit/closure of Bridger Unit 3 by year-end 2025 with Bridger Unit 4 following the Action Plan window in 2028.

Idaho Power response:

In *Chapter 5: Future Supply-Side Generation and Storage Resources*, Idaho Power discusses updates to its plans with PacifiCorp regarding Bridger Units 3 and 4 conversion/exit dates.

Action Item 7: Demand Response

Redesign existing DR programs then determine the amount of additional DR necessary to meet the identified need.

Idaho Power response:

Idaho Power discusses its existing DR programs in *Chapter 6: Demand-Side Resources.* The amount of additional DR necessary to meet the identified need is included in *Chapter 11: Preferred Portfolio and Action Plan.*

Action Item 8: B2H

Conduct preliminary construction activities, acquire long lead materials, and construct the B2H project.

Idaho Power response:

Updates regarding B2H construction activities are included in *Chapter 7: Transmission Planning.*

Action Item 9: Energy Efficiency

Implement cost-effective energy efficiency measures each year as identified in the energy efficiency potential assessment.

Idaho Power response:

Idaho Power's implementation of cost-effective energy efficiency measures is discussed in *Chapter 6: Demand-Side Resources*.

Action Item 10: Large-Load Customers

Work with large-load customers to support their energy needs with solar resources.

Idaho Power response:

Idaho Power's Clean Energy Your Way–Construction program supports Idaho-based large-load customers' energy needs with renewable resources, including solar. The program is described in more detail in *Chapter 3: Clean Energy & Climate Change*. Examples of Clean Energy Your Way–Construction projects are included in *Chapter 4: Idaho Power Today*.

Action Item 11: Storage Projects

Finalize candidate locations for distributed storage projects and implement where possible to defer T&D investments as identified in the Action Plan.

Idaho Power response:

The implementation of four distribution-connected storage projects is discussed in *Chapter 5: Future Supply-Side Generation and Storage Resources.* The four projects are expected to be online in fall of 2023, and are located at Filer, Weiser, Melba, and Elmore substations.

Action Item 12: Valmy Unit 2

Exit Valmy unit 2 by December 31, 2025.

Idaho Power response:

The *Executive Summary* discusses Idaho Power's updated plans regarding Valmy Unit 2 exit/conversion.

Action Item 13: Jim Bridger Unit 3

Subject to coordination with PacifiCorp, and B2H in-service prior to summer 2026, exit Bridger Unit 3 by December 31, 2025.

Idaho Power response:

Idaho Power describes its updated plan with PacifiCorp regarding Bridger Unit 3 exit/conversion date in the *Executive Summary*.

Additional Recommendation 1: B2H

Direct Idaho Power to produce a fresh, rigorous estimate of the total cost of B2H and all associated swaps and investments, breaking the total cost down by component, disclosing all data and assumptions for each estimated component cost, and model cost contingencies based on this updated total cost estimate for the 2023 IRP or sooner if necessary to support procurement actions.

Idaho Power response:

B2H cost estimates were updated as of September 2023 and are included in *Chapter 7: Transmission Planning*. B2H-related swaps and investments, breaking the total down by component, and disclosing all data and assumptions for each estimated component cost were provided in OPUC Docket No. PCN 5 to support procurement actions.

Additional Recommendation 2: Wholesale Prices

Direct Idaho Power to work with stakeholders and demonstrate the impact of extremely high wholesale electricity prices and decreased liquidity on resource selection in the 2023 IRP. In addition, Idaho Power shall provide insight into volatility and need.

Idaho Power response:

Idaho Power worked with members of IRPAC to change its stochastic analysis to help incorporate a greater range of wholesale electricity prices derived from modeled periods of decreased liquidity in wholesale markets. The changes to the stochastic analysis generated a wide range of electricity prices and their influence on portfolio cost can be found in Appendix C: Technical Appendix, *Stochastic Risk Analysis.*

Additional Recommendation 3: Grant Opportunities

Direct Idaho Power to document the Company's monitoring and pursuit of grant opportunities in the regular reporting on transmission projects under Docket No. RE 136, including the items bulleted in Staff's Report.

Idaho Power response:

The monitoring and pursuit of Idaho Power's grant opportunities are discussed in *Chapter 7: Transmission Planning.*

Additional Recommendation 4: Demand Response

Direct Idaho Power to model new DR for the 2023 IRP based on the results of the IPC-specific DR potential study expected to be complete in the fall of 2022. Results should include exploring whether current programs have additional potential, additional kinds of DR programs including pricing programs, and more accurately estimating costs of future programs.

Idaho Power response:

Idaho Power completed the potential study and modeled new and expanded DR in the 2023 IRP; DR resource potential is discussed in *Chapter 6: Demand-Side Resources.*

Additional Recommendation 5: Large-Load Customers

For all clean energy special contracts with large load customers, direct Idaho power to include large-load customer resource acquisition sizing and timing needs in the 2023 IRP Action Plan in a manner that does not compromise Idaho Power or customer confidentiality.

Idaho Power response:

Clean Energy Your Way special contract timing needs are included in the Action Plan and can be found in the *Executive Summary*. Additionally, existing Clean Energy Your Way–Construction projects are discussed in *Chapter 3: Clean Energy & Climate Change.*

Additional Recommendation 6: WRAP

Direct Idaho Power to continue to explore how participating in the WRAP may alter transmission assumptions and implications for capacity contracts.

Idaho Power response:

Idaho Power provides a brief overview of WRAP in *Chapter 2: Political, Regulatory, and Operational Considerations.* Additionally, WRAP modeling assumptions are discussed in this appendix. As WRAP operations continue to mature, Idaho Power will monitor how participating in WRAP may alter planning assumptions.

Additional Recommendation 7: Reliability

Direct Idaho Power to include all necessary resources in scored portfolios to meet the Company's reliability standard.

Idaho Power response:

All main cases in the 2023 IRP include the resources necessary to produce an annual capacity position of surplus (to meet Idaho Power's 0.1 event-day/year LOLE threshold).

Additional Recommendation 8: QF Renewal Rate

Direct Idaho Power to revisit the assumed renewal rate of wind QFs.

Idaho Power response:

Idaho Power addresses the assumed renewal rates of wind QFs in *Chapter 9: Portfolios.* Idaho Power and IRPAC revisited the wind QF renewal rates, and the company conducted the New Forecasted PURPA scenario based on their input.

Additional Recommendation 9: QF Forecast

Direct Idaho Power to work with Staff and stakeholders to develop a reasonable forecast of new QFs in the 2023 IRP.

Idaho Power response:

Idaho Power addresses the QF forecast in *Chapter 9: Portfolios.* Idaho Power worked with IRPAC to add a QF forecast, and the company conducted the New Forecasted PURPA scenario based on their input.

Additional Recommendation 10: GHG Emissions

Direct Idaho Power to include, in the executive summary of the Company's 2023 IRP, a graph showing Idaho Power's GHG emissions for 2019-2022 and comparing those historical emissions to the IRP 20-year forecast of IRP emissions calculated in a reasonably similar method. The data should include emissions from market purchases and remove emissions from market sales.

Idaho Power response:

Idaho Power included a GHG historical/forecast comparison graph in the *Executive Summary*.

Additional Recommendation 11: Green Hydrogen Proxy

Direct Idaho Power to include the most reasonable proxy of green hydrogen as a potential resource in its next IRP, either available for selection in a portfolio or in a sensitivity.

Idaho Power response:

Idaho Power modeled green hydrogen resources in portfolios and sensitivities for the 2023 IRP.