Part and Chapter:	Power Team Consulting Report	**Page #:**	
Topic:	Reservation Agreement		
Subtopic			

PREAMBLE:

PUB/MH II-27b states the "2025 Fall Update" CT capital refers to the same vintage of capital costs as used in Manitoba Hydro's Major New Facilities Review filing.

Power Team Consulting writes on page 14 of its report:

"In the period that followed the initial proposals, MH concluded that 750 MW was required. MH returned to both OEMs seeking updated pricing, which was received in January 2026, delivery and a proposal for 3 units."

QUESTION:

a) Provide the capital cost for the Updated-High scenario shown in PUB/MH II-27b, reflecting the 2025 Fall update. Also provide the capital cost referred to by Power Team Consulting on page 14 of the Power Team Consulting report.

b) Please provide the results of additional capacity optimization model runs with the following parameters:

   i. Please use the most current cost identified in Power Team Consulting's report as the January 2026 update.

   ii. Allow full selectability of additional energy efficiency for every year as was allowed in the additional energy efficiency sensitivity described in Appendix 7.2 section 3.3.

   iii. Please perform optimization runs for the following scenarios: S1B, S1C, S2B, S2C.

   iv. Outputs should include the cumulative installed capacity at 2035 and 2050 (graphs and tables), annual and cumulative net system costs, and the year-by-

year build-out to 2050 (that is, show which resources and quantity are added each year, similar to CC/MH III-7).

v. In lieu of providing a financial analysis, please characterize the expected equal annual rate increases. That is, are they similar to another portfolio's increases, or between two other portfolios' increases?

RATIONALE FOR QUESTION:

Manitoba Hydro's most recent capital costs are not reflected in modelling results currently before the Board.

Manitoba Hydro's restriction of additional energy efficiency to a single sensitivity does not allow selection of additional efficiency in other sensitivities such as higher turbine capital cost.

RESPONSE:

a) The cost estimate submitted for the Major New Facility Review is the most current cost estimate that is available and is the same as the 2025 Fall Update. The Updated-High scenario shown in PUB/MH II-27b represents the P80 cost estimate. Power Team Consulting's report refers to updated pricing for the turbine and generator package from Original Equipment Manufacturers (OEMs). When a revised cost estimate is prepared, an updated risk analysis will be completed to establish a revised P80 contingency. No separate January 2026 cost estimate incorporating the updated T&G pricing currently exists.

b) Response to parts i) to iv):

Manitoba Hydro has performed additional modelling analysis with updated inputs for the representation of both combustion turbines (CT) and battery storage that have either been provided during the Information Request process or in Manitoba Hydro's Rebuttal Evidence Volume 1, as follows:

Combustion Turbine representation

- Cost – Updated cost estimates for the CTs that was used in the MNF Review submission

- Accredited capacity – Replaced the 100% accreditation for the CTs with an Effective Load Carrying Capability (ELCC) of 93%, based on MISO 2020-2024 winter class average forced outage of 7% for CTs over 50 MW.

Battery/Storage representation

- Cost – Updated battery costs based on 2026 levelized cost updates (including an increase in the useful life from 15 to 20 years)
- Duration - Reduced storage duration from five-hours to four-hours, to be consistent with cost benchmarks
- Accredited capacity – Replaced the single 350 MW increment @ 100% accreditation with four segments representing an updated ELCC curve as follows:
    - First increment – 100 MW @ 95%
    - Second increment – 150 MW @ 52%
    - Third increment – 250 MW @ 29%
    - Forth increment – 500 MW @ 18% (note this segment was extrapolated from the updated ELCC curve)

As requested, four runs were performed based on the S1B, S1C, S2B, and S2C sensitivities with additional selectable DSM included as a resource option, and labeled with a "(U)" to denote the updated versions (i.e. S1BEE(U), S1CEE(U), S2BEE(U), and S2CEE(U)). The following general findings/changes were observed in the timeframe of the IRP and Recommended Development Plan:

- **Battery** – Battery was consistently added in each of the four runs, with the amount increasing relative to the original sensitivity by 45 to 110 MW.

- **Combustion Turbines –** CTs continue to consistently be selected in 2030 in each of the four runs, with one or two 250 MW units selected for the 1-Baseline and 2-Medium load projections respectively. The 2-Medium load runs each added further CT units prior to 2035, however the S2CEE(U) run only added a smaller 50 MW unit resulting in a decrease of 200 MW from its original sensitivity.

- **Selectable DSM** – The results were mixed, with immaterial changes in S1BEE(U) and small timing decisions leading to ±45 MW in any given year for the remaining runs.

- **Hydropower Enhancements** – Similar enhancement projects were selected in both 1-Baseline load runs with both increasing relative to their original sensitivity (by 55 to 85 MW).

- **Market Purchases** – The only change was an extra 50 MW market purchase selected in S1BEE(U) starting in 2030.

- **Wind** – No changes were observed from the original runs.

The results of these new runs confirm that although the gap between CTs and battery has shrunk, particularly for the first segment (i.e. 100 MW) of battery installation, the selection of more than 500 MW of CTs prior to 2035 remains a consistent preferred resource option for serving the needs of the 2-Medium load projection. This consistency further confirms that the range of plans tested in the Least Regrets Analysis and subsequent IRP framework analyses were robust, and that the updated battery and combustion turbine inputs do not result in a change to the recommended number of CTs. While results indicate that larger amounts of batteries than the 5 MW included in the Recommended Development Plan may provide value to the system, the quantity of batteries that are viable on the Manitoba Hydro system is dependent on their ability to effectively support winter peak demand. In the Manitoba Hydro system and other power systems, the effective capacity value of battery energy storage declines with increasing storage capacities, driven by the broad winter load shape and the increased need for energy in all hours of the day. This was discussed in detail in the response to CC/MH II-14c and Section 7 of Manitoba Hydro's Volume 1 Rebuttal Evidence. Below are the figures and tables showing the updated results:

- Cumulative installed capacity additions to 2035 and 2050 are provided in Tables 2 and 3.
- The annual installed capacity tables for revised plans S1BEE(U), S1CEE(U), S2BEE(U), and S2CEE(U) under 1-Low and 2-Medium load projections have been provided in Tables 4 to 11 showing the resources and quantities added annually and cumulatively.

v) The expected equal annual rate increases can be characterized as follows:

S1BEE(U) and S1CEE(U):

- There is no financial analysis completed on any 1-Baseline load projection results to provide a basis of comparison for the S1BEE(U) and S1CEE(U) runs.

S2BEE(U) and S2CEE(U):

- The basis for comparison is the updated MNFR financial analysis completed on runs using the 2-Medium load projection. These include the results for P3, P5A, and P7 from the response to PUB/MH III-37 as shown in Table 1 below.
- Both of these two new runs would likely result in rates higher than 4.5%.
- This characterization is driven by a few findings:
  - Upward pressure in rates relative to P7 (MNFR update) due to higher adjusted net system costs.
  - Upward pressure in rates from the early timing and total amount of selectable DSM (similar to P7).

Table 1: Summary of results used for the characterization of equal annual rate increase for the S2BEE(U) and S2CEE(U) results.

			Run				
			P3	P5A	P7	S2CEE(U)	S2BEE(U)
MNFR Update	Modeled - Incremental Cumulative Present Value of Net System Costs	[M$]	$15,116	$15,307	$15,596		
	CT Cost Adjusted to P80 (MNF Vintage)	[M$]	$15,560	$15,741	$15,751		
	Rate Path - PUB/MH III-37	[%]	4.10%	4.30%	4.50%		
Pre-Ask Results	Modeled - Incremental Cumulative Present Value of Net System Costs	[M$]				$15,814	$15,791
	CT Cost Adjusted to P80 (MNF Vintage)	[M$]				$15,852	$15,904
	Rate Path - Pre-Ask #2	[%]	4.10%	4.30%	4.50%	> 4.50%	> 4.50%
Installed MW @ 2035	CT	[MW]	840*	744*	344**	544	744
	Battery	[MW]	5*	5*	215**	110	60
	Wind	[MW]	600	600	600	600	0
	SSE	[MW]	0	15	100	15	15
	DSM	[MW]	0	100	225	250	225

* Note that CT and Battery accreditation for P3 and P5A would change with the new ELCC representations. It is expected that reoptimization would require roughly 55MW of additional capacity, which would likely be via additional batteries.

** Note that CT and Battery accreditation for P7 would change with the new ELCC representations. It is expected that reoptimization would require roughly 85MW of additional capacity, which would likely be via additional CT capacity.

Table 2: Cumulative Installed Capacity Additions to 2035 (MW). Updated costs and ELCC for Battery and CTs. Note: (U) indicates an updated run.

Resource Type	S1B EE(U)	S1B EE	S1C EE(U)	S1C EE	S2B EE(U)	S2B EE	S2C EE(U)	S2C EE
Wind	0	0	600	600	0	0	600	600
CT – Nat. Gas & Biodiesel	248	344	248	248	744	744	544	744
CT - CCS	0	0	0	0	0	0	0	0
CT - Biomass	0	0	0	0	0	0	0	0
CT - H2	0	0	0	0	0	0	0	0
BECCS	0	0	0	0	0	0	0	0
Hydropower Enhancement	86	30	86	0	15	15	15	15
New Hydropower	0	0	0	0	0	0	0	0
Nuclear SMR	0	0	0	0	0	0	0	0
Solar	0	0	0	0	0	0	0	0
Battery	97	23	66	0	59	13	109	0
Market Purchases	0	0	0	0	0	0	0	0
Customer Side Solutions	125	131	125	98	219	260	257	209
Total	557	528	1125	946	1036	1032	1524	1568

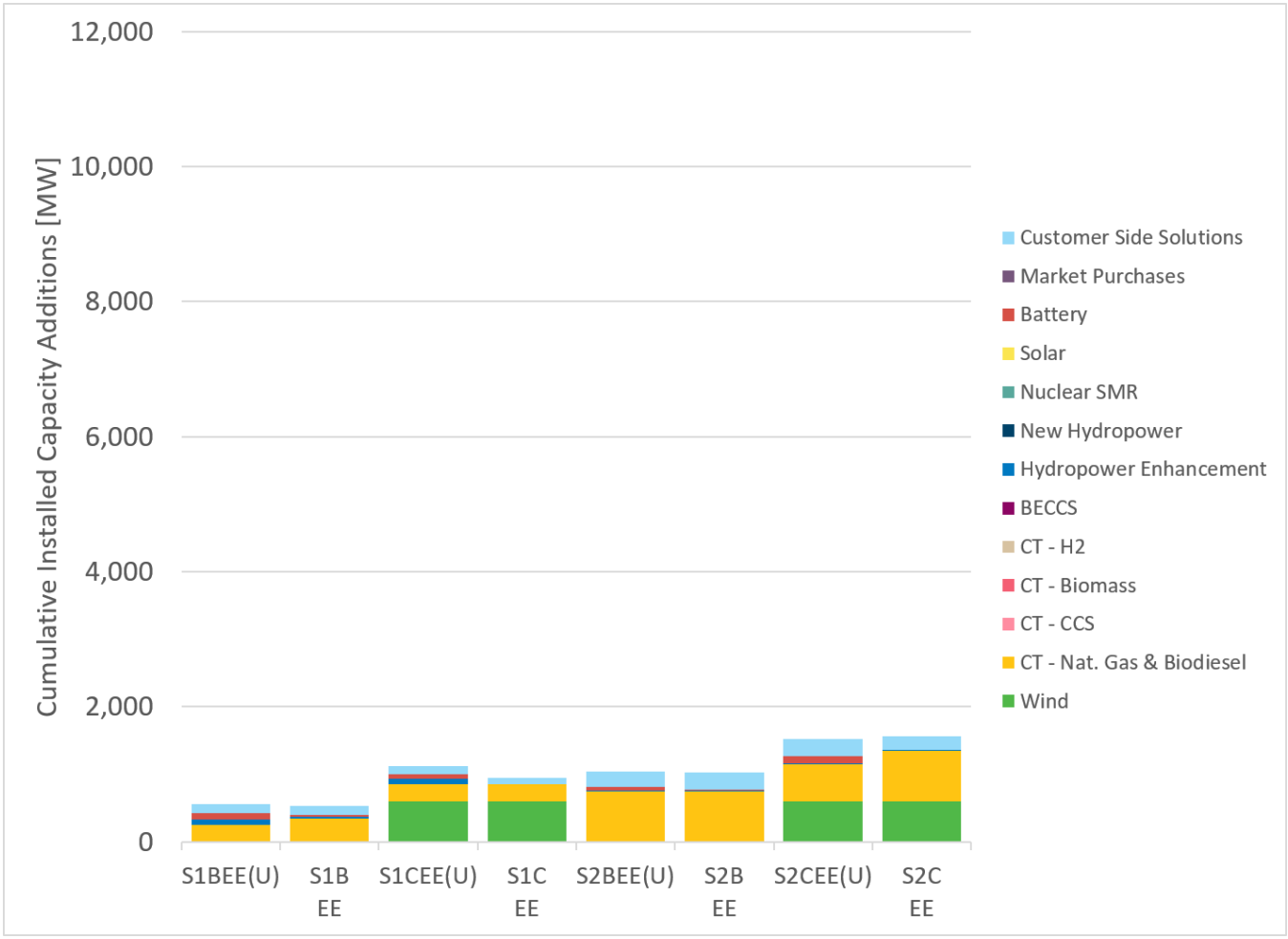


Figure 1: Cumulative Installed Capacity Additions to 2035. Note: (U) indicates an updated run.

Table 3: Cumulative Installed Capacity Additions to 2050 (MW). Updated costs and ELCC for Battery and CTs. Note: (U) indicates an updated run.

Resource Type	S1B EE(U)	S1B EE	S1C EE(U)	S1C EE	S2B EE(U)	S2B EE	S2C EE(U)	S2C EE
Wind	300	300	800	800	4269	4254	4318	4400
CT – Nat. Gas & Biodiesel	992	1088	792	1040	3180	3358	3036	3492
CT- CCS	0	0	0	0	344	1376	688	1032
CT- Biomass	0	0	0	0	0	0	0	0
CT- H2	0	0	0	0	248	0	0	0
BECCS	0	0	0	0	63	63	32	63
Hydropower Enhancement	86	30	86	0	15	15	15	15
New Hydropower	0	0	0	0	1485	0	1485	210
Nuclear SMR	0	0	0	0	231	0	77	77
Solar	0	0	0	0	0	316	0	0
Battery	100	0	235	0	254	22	319	0
Market Purchases	25	0	50	0	0	25	50	0
Customer Side Solutions	775	778	783	767	1157	1157	1157	1145
Total	2278	2196	2746	2607	11245	10585	11176	10434

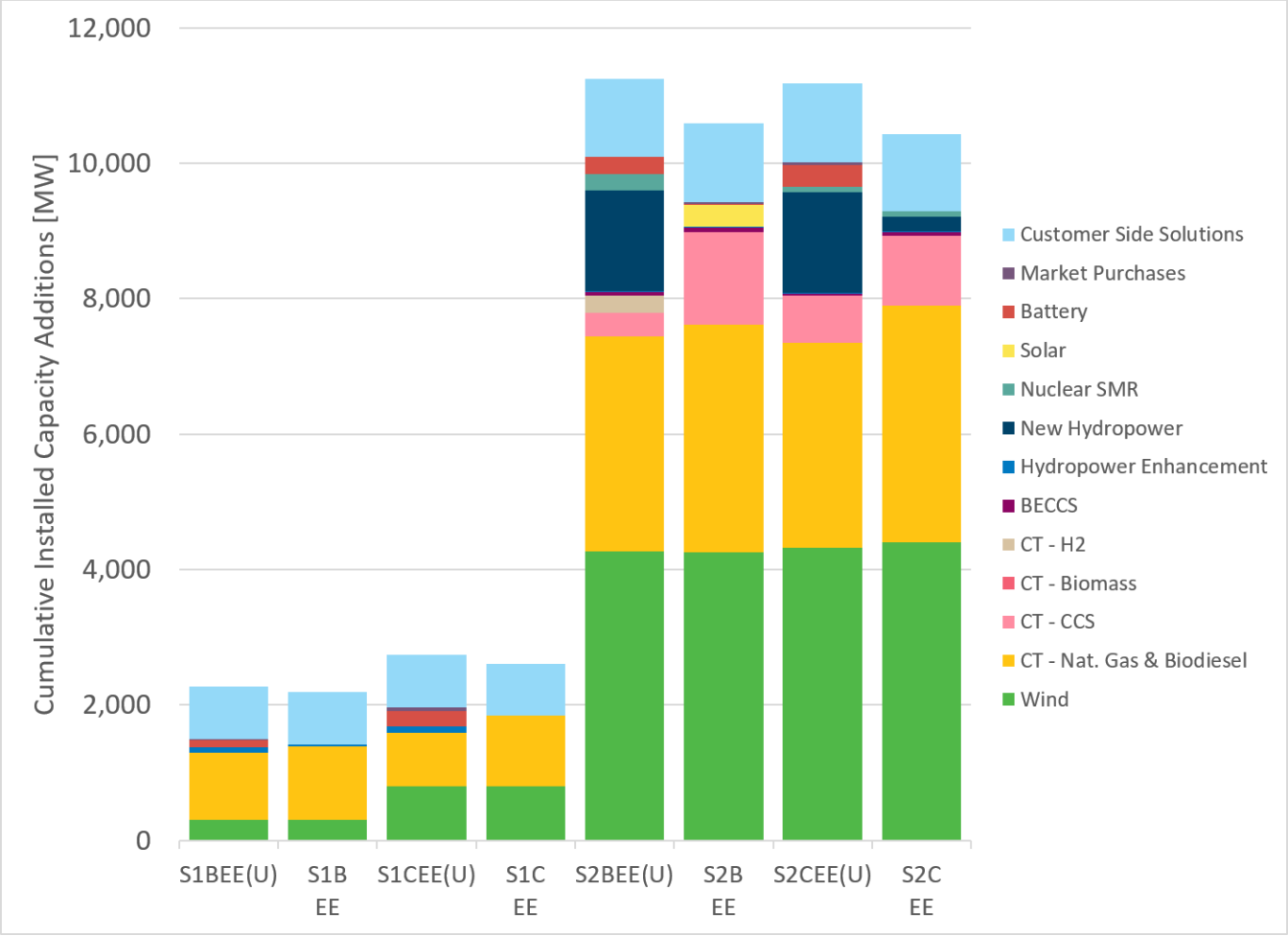


Figure 2: Cumulative Capacity Additions to 2050. Note: (U) indicates an updated run.

Table 4: S1BEE(U) Annual incrementally installed capacity (MW) with updated costs and ELCC for Battery and CTs with Load Projection 1-Low. Negative values indicate a resource has reached its end of life. Market Purchases (included as a dispatchable capacity resource) have a five-year life and Batteries have a 20-year life.

ANNUAL INSTALLED CAPACITY (MW)														
Year	Wind (PPA)	Dispatchable Capacity Resource	Market Purchases	BECCS	CT-CCS	CT-Biodiesel	SMR	Hydrogen	Battery	Additional Energy Efficiency	Refurb/SSE	New Hydropower	Demand Response	CRP Extension
2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	6	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	7	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	19	0	0	10	0
2029	0	0	0	0	0	0	0	0	0	12	0	0	23	151
2030	0	0	50	0	0	248	0	0	0	8	0	0	65	151
2031	0	0	0	0	0	0	0	0	97	21	55	0	96	151
2032	0	0	0	0	0	0	0	0	0	10	31	0	129	151
2033	0	0	0	0	0	0	0	0	0	14	0	0	137	151
2034	0	0	0	0	0	0	0	0	0	14	0	0	147	151
2035	0	0	-50	0	0	0	0	0	0	14	0	0	161	151
2036	0	0	0	0	0	0	0	0	0	14	0	0	179	151
2037	0	0	0	0	0	0	0	0	0	16	0	0	181	151
2038	100	0	0	0	0	0	0	0	0	16	0	0	183	151
2039	0	0	0	0	0	0	0	0	0	8	0	0	186	151
2040	0	0	0	0	0	0	0	0	0	23	0	0	137	151
2041	0	0	0	0	0	0	0	0	0	86	0	0	137	151
2042	0	0	0	0	0	0	0	0	0	158	0	0	190	151
2043	0	0	0	0	0	248	0	0	0	34	0	0	190	151
2044	0	0	0	0	0	0	0	0	0	50	0	0	194	151
2045	0	248	0	0	0	0	0	0	0	15	0	0	194	151
2046	200	0	0	0	0	0	0	0	0	63	0	0	194	151
2047	0	248	0	0	0	0	0	0	0	14	0	0	194	151
2048	0	0	0	0	0	0	0	0	0	34	0	0	194	151
2049	0	0	25	0	0	0	0	0	2	118	0	0	194	151
2050	0	0	0	0	0	0	0	0	0	0	0	0	194	151

Table 5: S1BEE(U) Cumulative installed capacity (MW) with updated costs and ELCC for Battery and CTs with Load Projection 1-Low.

CUMULATIVE INSTALLED CAPACITY (MW)														
Year	Wind (PPA)	Dispatchable Capacity Resource	Market Purchases	BECCS	CT-CCS	CT-Biodiesel	SMR	Hydrogen	Battery	Additional Energy Efficiency	Refurb/SSE	New Hydropower	Demand Response	CRP Extension
2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	6	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	12	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	12	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	32	0	0	10	0
2029	0	0	0	0	0	0	0	0	0	43	0	0	23	151
2030	0	0	50	0	0	248	0	0	0	52	0	0	65	151
2031	0	0	50	0	0	248	0	0	97	73	55	0	96	151
2032	0	0	50	0	0	248	0	0	97	83	86	0	129	151
2033	0	0	50	0	0	248	0	0	97	97	86	0	137	151
2034	0	0	50	0	0	248	0	0	97	112	86	0	147	151
2035	0	0	0	0	0	248	0	0	97	125	86	0	161	151
2036	0	0	0	0	0	248	0	0	97	140	86	0	179	151
2037	0	0	0	0	0	248	0	0	97	156	86	0	181	151
2038	100	0	0	0	0	248	0	0	97	171	86	0	183	151
2039	100	0	0	0	0	248	0	0	97	179	86	0	186	151
2040	100	0	0	0	0	248	0	0	97	203	86	0	137	151
2041	100	0	0	0	0	248	0	0	97	289	86	0	137	151
2042	100	0	0	0	0	248	0	0	97	447	86	0	190	151
2043	100	0	0	0	0	496	0	0	97	481	86	0	190	151
2044	100	0	0	0	0	496	0	0	97	531	86	0	194	151
2045	100	248	0	0	0	496	0	0	97	546	86	0	194	151
2046	300	248	0	0	0	496	0	0	98	609	86	0	194	151
2047	300	496	0	0	0	496	0	0	98	623	86	0	194	151
2048	300	496	0	0	0	496	0	0	98	658	86	0	194	151
2049	300	496	25	0	0	496	0	0	100	775	86	0	194	151
2050	300	496	25	0	0	496	0	0	100	775	86	0	194	151

Table 6: S1CEE(U) Annual incrementally installed capacity (MW) with updated costs and ELCC for Battery and CTs with Load Projection 1-Low. Negative values indicate a resource has reached its end of life. Market Purchases (included as a dispatchable capacity resource) have a five-year life and Batteries have a 20-year life.

ANNUAL INSTALLED CAPACITY MW)														
Year	Wind (PPA)	Dispatchable Capacity Resource	Market Purchases	BECCS	CT-CCS	CT-Biodiesel	SMR	Hydrogen	Battery	Additional Energy Efficiency	Refurb/SSE	New Hydropower	Demand Response	CRP Extension
2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	6	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	7	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	19	0	0	10	0
2029	200	0	0	0	0	0	0	0	0	12	0	0	23	151
2030	0	0	0	0	0	248	0	0	4	15	0	0	65	151
2031	200	0	0	0	0	0	0	0	61	15	55	0	96	151
2032	0	0	0	0	0	0	0	0	0	10	31	0	129	151
2033	200	0	0	0	0	0	0	0	0	14	0	0	137	151
2034	0	0	0	0	0	0	0	0	0	14	0	0	147	151
2035	0	0	0	0	0	0	0	0	0	14	0	0	161	151
2036	0	0	0	0	0	0	0	0	0	14	0	0	179	151
2037	0	0	0	0	0	0	0	0	0	16	0	0	181	151
2038	0	0	0	0	0	0	0	0	0	16	0	0	183	151
2039	0	0	0	0	0	0	0	0	0	8	0	0	186	151
2040	0	0	0	0	0	0	0	0	0	23	0	0	137	151
2041	0	0	0	0	0	0	0	0	0	28	0	0	137	151
2042	0	0	0	0	0	0	0	0	0	159	0	0	190	151
2043	0	0	0	0	0	0	0	0	34	122	0	0	190	151
2044	100	48	0	0	0	0	0	0	51	72	0	0	194	151
2045	0	248	0	0	0	0	0	0	0	15	0	0	194	151
2046	100	0	0	0	0	0	0	0	34	65	0	0	194	151
2047	0	0	0	0	0	248	0	0	0	14	0	0	194	151
2048	0	0	0	0	0	0	0	0	0	34	0	0	194	151
2049	0	0	50	0	0	0	0	0	47	70	0	0	194	151
2050	0	0	0	0	0	0	0	0	4	0	0	0	194	151

Table 7: S1CEE(U) Cumulative installed capacity (MW) with updated costs and ELCC for Battery and CTs with Load Projection 1-Low.

CUMULATIVE INSTALLED CAPACITY (MW)														
Year	Wind (PPA)	Dispatchable Capacity Resource	Market Purchases	BECCS	CT-CCS	CT-Biodiesel	SMR	Hydrogen	Battery	Additional Energy Efficiency	Refurb/SSE	New Hydropower	Demand Response	CRP Extension
2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	6	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	12	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	12	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	32	0	0	10	0
2029	200	0	0	0	0	0	0	0	0	43	0	0	23	151
2030	200	0	0	0	0	248	0	0	4	58	0	0	65	151
2031	400	0	0	0	0	248	0	0	66	73	55	0	96	151
2032	400	0	0	0	0	248	0	0	66	83	86	0	129	151
2033	600	0	0	0	0	248	0	0	66	97	86	0	137	151
2034	600	0	0	0	0	248	0	0	66	112	86	0	147	151
2035	600	0	0	0	0	248	0	0	66	125	86	0	161	151
2036	600	0	0	0	0	248	0	0	66	140	86	0	179	151
2037	600	0	0	0	0	248	0	0	66	156	86	0	181	151
2038	600	0	0	0	0	248	0	0	66	171	86	0	183	151
2039	600	0	0	0	0	248	0	0	66	179	86	0	186	151
2040	600	0	0	0	0	248	0	0	66	203	86	0	137	151
2041	600	0	0	0	0	248	0	0	66	230	86	0	137	151
2042	600	0	0	0	0	248	0	0	66	390	86	0	190	151
2043	600	0	0	0	0	248	0	0	100	512	86	0	190	151
2044	700	48	0	0	0	248	0	0	151	584	86	0	194	151
2045	700	296	0	0	0	248	0	0	151	598	86	0	194	151
2046	800	296	0	0	0	248	0	0	185	664	86	0	194	151
2047	800	296	0	0	0	496	0	0	185	678	86	0	194	151
2048	800	296	0	0	0	496	0	0	185	713	86	0	194	151
2049	800	296	50	0	0	496	0	0	232	783	86	0	194	151
2050	800	296	50	0	0	496	0	0	235	783	86	0	194	151

Table 8: S2BEE(U) Annual incrementally installed capacity (MW) with updated costs and ELCC for Battery and CTs with Load Projection 2-Medium. Negative values indicate a resource has reached its end of life. Market Purchases (included as a dispatchable capacity resource) have a five-year life and Batteries have a 20-year life.

ANNUAL INSTALLED CAPACITY (MW)														
Year	Wind (PPA)	Dispatchable Capacity Resource	Market Purchases	BECCS	CT-CCS	CT-Biodiesel	SMR	Hydrogen	Battery	Additional Energy Efficiency	Refurb/SSE	New Hydropower	Demand Response	CRP Extension
2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	20	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	45	0	0	0	0
2028	0	0	50	0	0	0	0	0	0	26	0	0	10	0
2029	0	0	0	0	0	0	0	0	0	27	15	0	23	151
2030	0	496	0	0	0	0	0	0	0	0	0	0	65	151
2031	0	0	0	0	0	0	0	0	59	30	0	0	96	151
2032	0	0	0	0	0	0	0	0	0	18	0	0	129	151
2033	0	248	-50	0	0	0	0	0	0	0	0	0	137	151
2034	0	0	0	0	0	0	0	0	0	52	0	0	147	151
2035	0	0	0	0	0	0	0	0	0	0	0	0	161	151
2036	0	0	0	0	0	0	0	0	0	7	0	0	179	151
2037	0	0	0	0	0	0	0	0	55	166	0	0	181	151
2038	0	248	0	0	0	0	0	0	0	0	0	0	183	151
2039	0	0	0	0	0	248	0	0	0	1	0	0	186	151
2040	600	0	0	0	0	0	0	0	0	98	0	0	137	151
2041	69	0	0	0	0	0	0	0	0	211	0	0	137	151
2042	0	0	0	0	0	248	0	0	0	31	0	0	190	151
2043	0	0	0	0	0	0	0	248	0	60	0	0	190	151
2044	0	0	0	0	0	248	0	0	0	11	0	0	194	151
2045	600	96	50	32	0	0	0	0	0	50	0	0	194	151
2046	600	0	0	0	0	248	0	0	0	38	0	0	194	151
2047	600	192	0	32	0	0	0	0	0	10	0	0	194	151
2048	600	478	0	0	0	0	0	0	0	0	0	1485	194	151
2049	600	430	0	0	344	0	231	0	140	254	0	0	194	151
2050	600	0	-50	0	0	0	0	0	0	0	0	0	194	151

Table 9: S2BEE(U) Cumulative installed capacity (MW) with updated costs and ELCC for Battery and CTs with Load Projection 2-Medium.

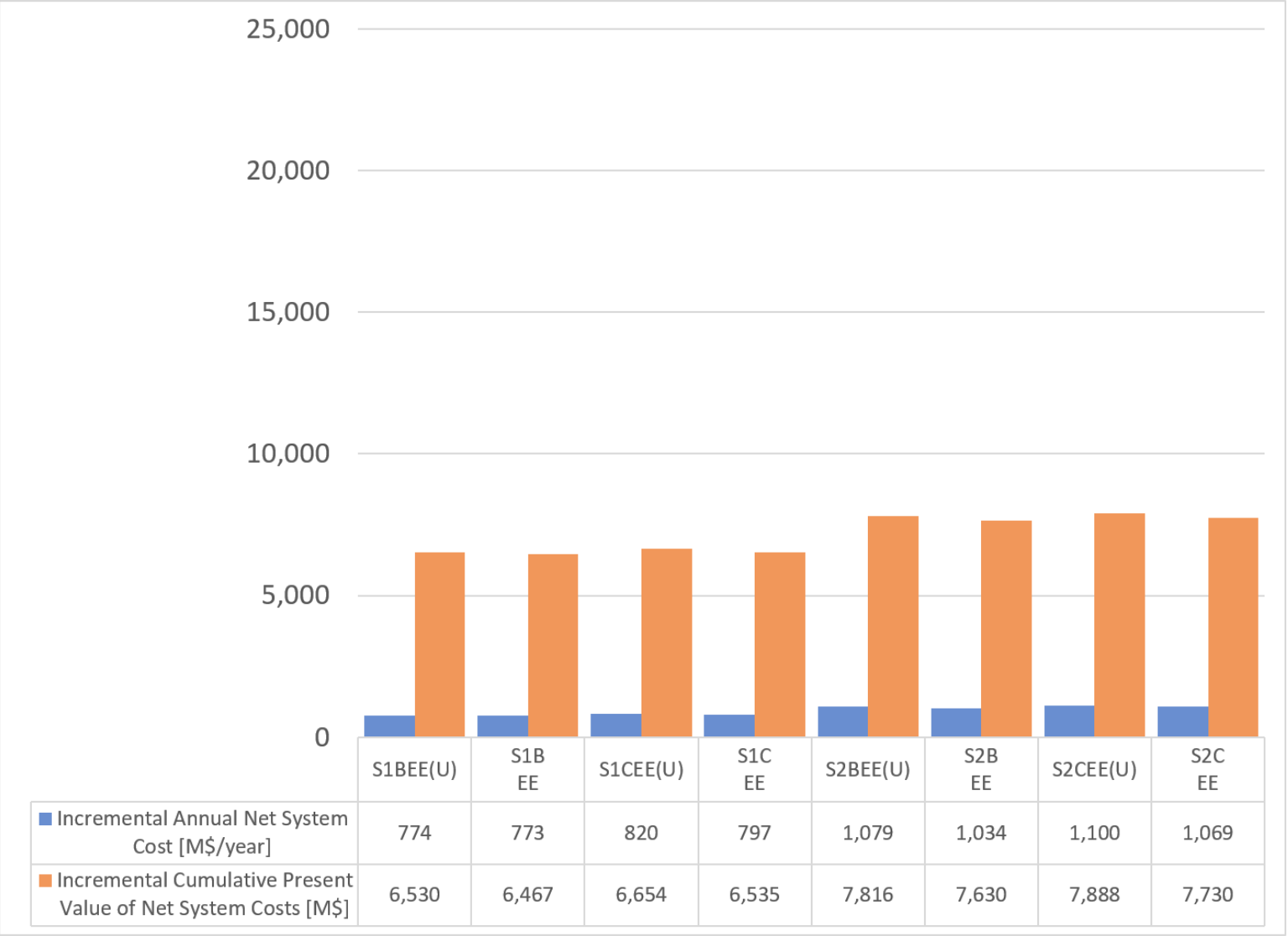
CUMULATIVE INSTALLED CAPACITY (MW)														
Year	Wind (PPA)	Dispatchable Capacity Resource	Market Purchases	BECCS	CT-CCS	CT-Biodiesel	SMR	Hydrogen	Battery	Additional Energy Efficiency	Refurb/SSE	New Hydropower	Demand Response	CRP Extension
2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	20	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	20	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	65	0	0	0	0
2028	0	0	50	0	0	0	0	0	0	91	0	0	10	0
2029	0	0	50	0	0	0	0	0	0	118	15	0	23	151
2030	0	496	50	0	0	0	0	0	0	118	15	0	65	151
2031	0	496	50	0	0	0	0	0	59	148	15	0	96	151
2032	0	496	50	0	0	0	0	0	59	166	15	0	129	151
2033	0	744	0	0	0	0	0	0	59	166	15	0	137	151
2034	0	744	0	0	0	0	0	0	59	219	15	0	147	151
2035	0	744	0	0	0	0	0	0	59	219	15	0	161	151
2036	0	744	0	0	0	0	0	0	59	225	15	0	179	151
2037	0	744	0	0	0	0	0	0	114	391	15	0	181	151
2038	0	992	0	0	0	0	0	0	114	391	15	0	183	151
2039	0	992	0	0	0	248	0	0	114	392	15	0	186	151
2040	600	992	0	0	0	248	0	0	114	490	15	0	137	151
2041	669	992	0	0	0	248	0	0	114	701	15	0	137	151
2042	669	992	0	0	0	496	0	0	114	733	15	0	190	151
2043	669	992	0	0	0	496	0	248	114	793	15	0	190	151
2044	669	992	0	0	0	744	0	248	114	804	15	0	194	151
2045	1269	1088	50	32	0	744	0	248	114	855	15	0	194	151
2046	1869	1088	50	32	0	992	0	248	114	893	15	0	194	151
2047	2469	1280	50	63	0	992	0	248	114	903	15	0	194	151
2048	3069	1758	50	63	0	992	0	248	114	903	15	1485	194	151
2049	3669	2188	50	63	344	992	231	248	254	1157	15	1485	194	151
2050	4269	2188	0	63	344	992	231	248	254	1157	15	1485	194	151

Table 10: S2CEE(U) Annual incrementally installed capacity (MW) with updated costs and ELCC for Battery and CTs with Load Projection 2-Medium. Negative values indicate a resource has reached its end of life. Market Purchases (included as a dispatchable capacity resource) have a five-year life and Batteries have a 20-year life.

ANNUAL INSTALLED CAPACITY (MW)														
Year	Wind (PPA)	Dispatchable Capacity Resource	Market Purchases	BECCS	CT-CCS	CT-Biodiesel	SMR	Hydrogen	Battery	Additional Energy Efficiency	Refurb/SSE	New Hydropower	Demand Response	CRP Extension
2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	20	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	45	0	0	0	0
2028	0	0	50	0	0	0	0	0	0	26	0	0	10	0
2029	200	0	0	0	0	0	0	0	0	16	15	0	23	151
2030	0	496	0	0	0	0	0	0	0	0	0	0	65	151
2031	200	0	0	0	0	0	0	0	0	14	0	0	96	151
2032	0	0	0	0	0	0	0	0	0	19	0	0	129	151
2033	200	0	-50	0	0	0	0	0	24	59	0	0	137	151
2034	0	48	0	0	0	0	0	0	85	58	0	0	147	151
2035	0	0	0	0	0	0	0	0	0	0	0	0	161	151
2036	0	0	0	0	0	0	0	0	0	6	0	0	179	151
2037	0	248	0	0	0	0	0	0	0	0	0	0	181	151
2038	0	0	25	0	0	0	0	0	18	161	0	0	183	151
2039	0	248	0	0	0	0	0	0	0	20	0	0	186	151
2040	100	0	0	0	0	248	0	0	0	13	0	0	137	151
2041	100	0	0	0	0	0	0	0	61	96	0	0	137	151
2042	0	0	0	0	0	248	0	0	0	18	0	0	190	151
2043	0	0	-25	0	0	248	0	0	57	66	0	0	190	151
2044	0	0	0	0	0	248	0	0	0	11	0	0	194	151
2045	518	144	0	32	0	0	0	0	0	62	0	0	194	151
2046	600	0	0	0	0	0	0	0	0	0	0	1485	194	151
2047	600	0	0	0	0	0	0	0	0	0	0	0	194	151
2048	600	764	0	0	0	0	0	0	0	0	0	0	194	151
2049	600	96	50	0	688	0	77	0	73	448	0	0	194	151
2050	600	0	0	0	0	0	0	0	0	0	0	0	194	151

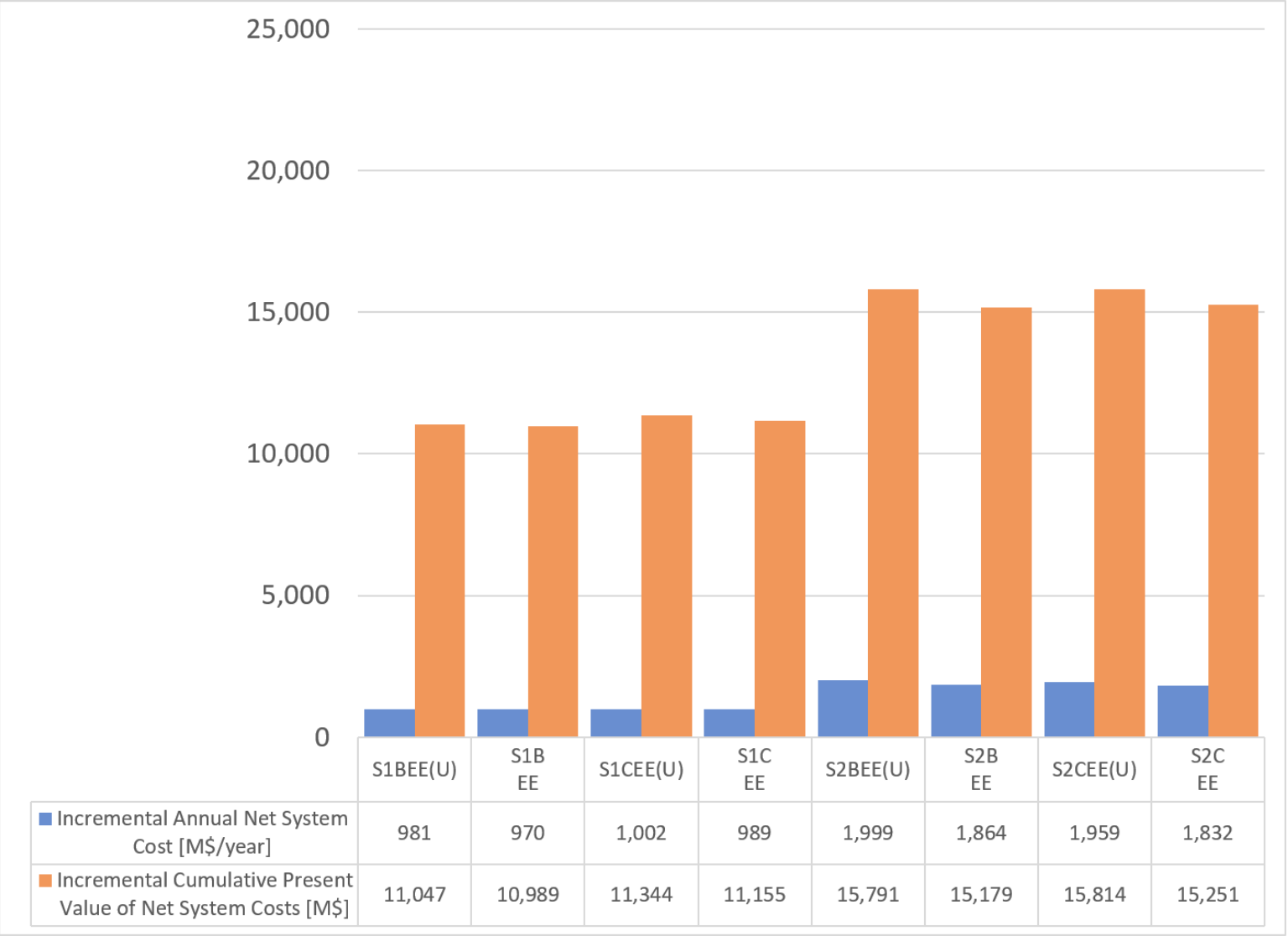
Table 11: S2CEE(U) Cumulative installed capacity (MW) with updated costs and ELCC for Battery and CTs with Load Projection 2-Medium.

CUMULATIVE INSTALLED CAPACITY (MW)														
Year	Wind (PPA)	Dispatchable Capacity Resource	Market Purchases	BECCS	CT-CCS	CT-Biodiesel	SMR	Hydrogen	Battery	Additional Energy Efficiency	Refurb/SSE	New Hydropower	Demand Response	CRP Extension
2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	20	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	20	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	65	0	0	0	0
2028	0	0	50	0	0	0	0	0	0	91	0	0	10	0
2029	200	0	50	0	0	0	0	0	0	107	15	0	23	151
2030	200	496	50	0	0	0	0	0	0	107	15	0	65	151
2031	400	496	50	0	0	0	0	0	0	121	15	0	96	151
2032	400	496	50	0	0	0	0	0	0	140	15	0	129	151
2033	600	496	0	0	0	0	0	0	24	199	15	0	137	151
2034	600	544	0	0	0	0	0	0	109	257	15	0	147	151
2035	600	544	0	0	0	0	0	0	109	257	15	0	161	151
2036	600	544	0	0	0	0	0	0	109	263	15	0	179	151
2037	600	792	0	0	0	0	0	0	109	263	15	0	181	151
2038	600	792	25	0	0	0	0	0	127	424	15	0	183	151
2039	600	1040	25	0	0	0	0	0	127	444	15	0	186	151
2040	700	1040	25	0	0	248	0	0	127	457	15	0	137	151
2041	800	1040	25	0	0	248	0	0	188	553	15	0	137	151
2042	800	1040	25	0	0	496	0	0	188	570	15	0	190	151
2043	800	1040	0	0	0	744	0	0	246	636	15	0	190	151
2044	800	1040	0	0	0	992	0	0	246	647	15	0	194	151
2045	1318	1184	0	32	0	992	0	0	246	709	15	0	194	151
2046	1918	1184	0	32	0	992	0	0	246	709	15	1485	194	151
2047	2518	1184	0	32	0	992	0	0	246	709	15	1485	194	151
2048	3118	1948	0	32	0	992	0	0	246	709	15	1485	194	151
2049	3718	2044	50	32	688	992	77	0	319	1157	15	1485	194	151
2050	4318	2044	50	32	688	992	77	0	319	1157	15	1485	194	151



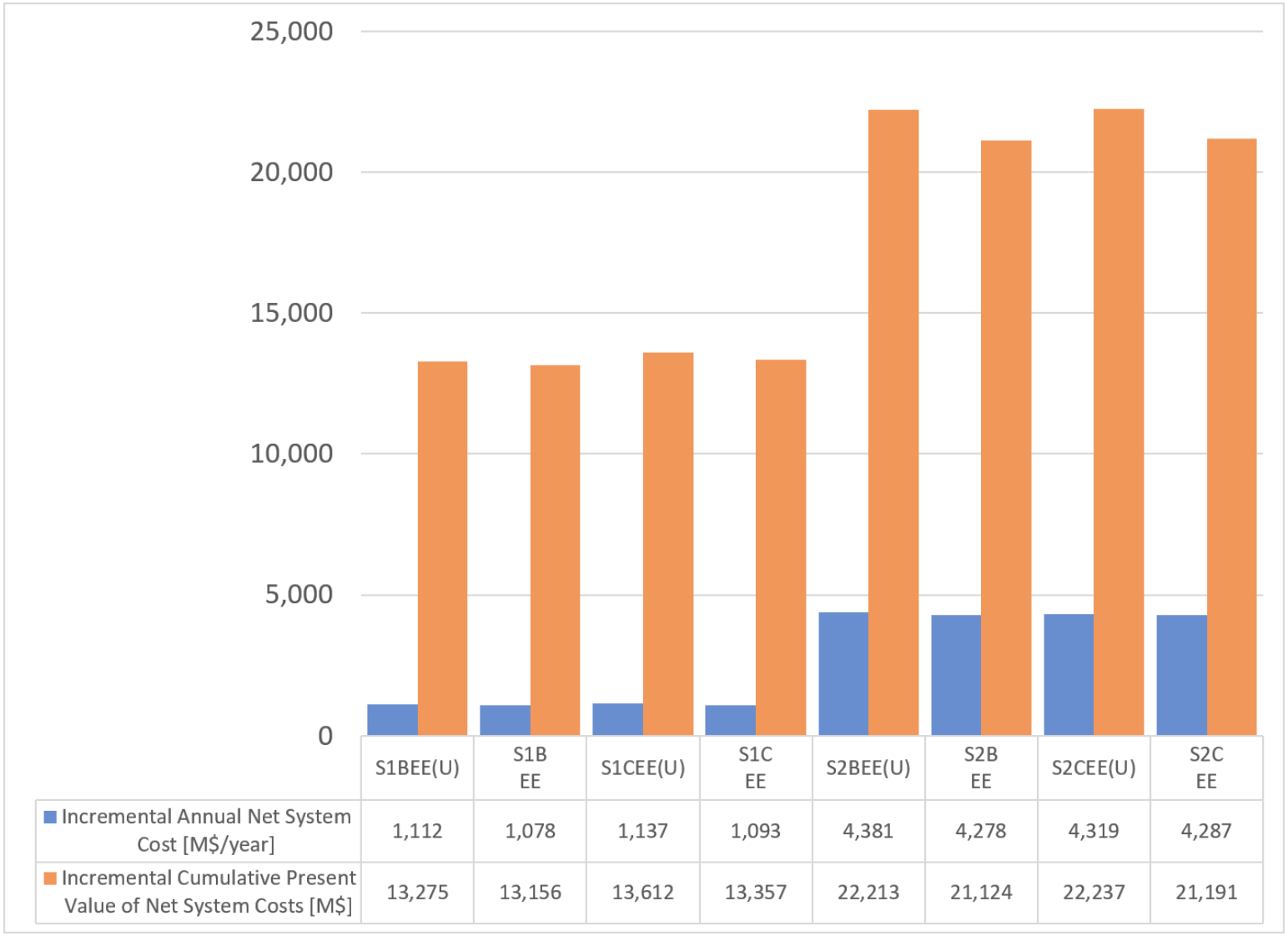
	S1BEE(U)	S1B EE	S1CEE(U)	S1C EE	S2BEE(U)	S2B EE	S2CEE(U)	S2C EE
Incremental Annual Net System Cost [M$/year]	774	773	820	797	1,079	1,034	1,100	1,069
Incremental Cumulative Present Value of Net System Costs [M$]	6,530	6,467	6,654	6,535	7,816	7,630	7,888	7,730

Figure 3: Incremental Cumulative Present Value of Net System Costs [M 2024 CAN$] and Incremental Annual System Costs [M 2024 CAN$/yr] to 2035. Note: (U) indicates an updated run.



	S1BEE(U)	S1B EE	S1CEE(U)	S1C EE	S2BEE(U)	S2B EE	S2CEE(U)	S2C EE
Incremental Annual Net System Cost [M$/year]	981	970	1,002	989	1,999	1,864	1,959	1,832
Incremental Cumulative Present Value of Net System Costs [M$]	11,047	10,989	11,344	11,155	15,791	15,179	15,814	15,251

Figure 4: Incremental Cumulative Present Value of Net System Costs [M 2024 CAN$] and Incremental Annual System Costs [M 2024 CAN$/yr] to 2045. Note: (U) indicates an updated run.



	S1BEE(U)	S1B EE	S1CEE(U)	S1C EE	S2BEE(U)	S2B EE	S2CEE(U)	S2C EE
Incremental Annual Net System Cost [M$/year]	1,112	1,078	1,137	1,093	4,381	4,278	4,319	4,287
Incremental Cumulative Present Value of Net System Costs [M$]	13,275	13,156	13,612	13,357	22,213	21,124	22,237	21,191

Figure 5: Incremental Cumulative Present Value of Net System Costs [M 2024 CAN$] and Incremental Annual System Costs [M 2024 CAN$/yr] to 2050. Note: (U) indicates an updated run.