New York ISO
Independent System Operator

Appendix G

2021-2040 System & Resource Outlook (The Outlook)

A Report from the New York Independent System Operator

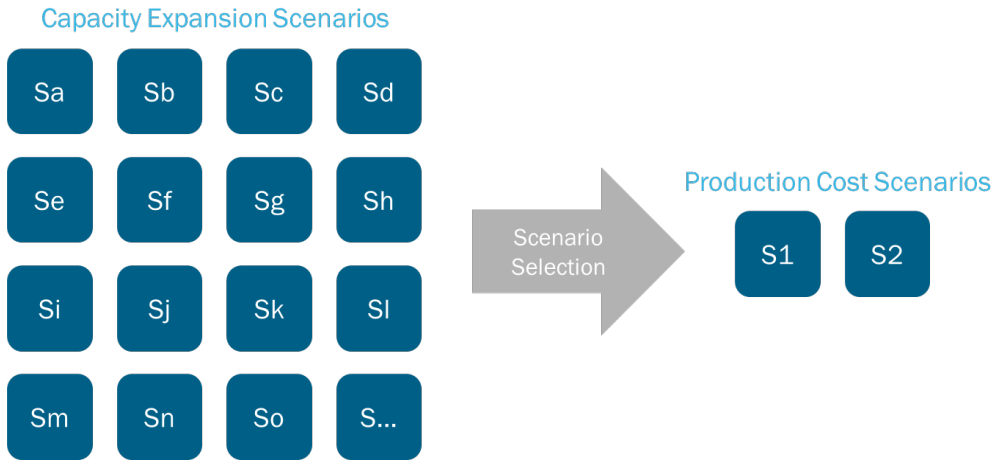
September 22, 2022

Appendix G: Detailed Policy Case Capacity Expansion Scenarios

Dozens of preliminary scenarios were evaluated in the capacity expansion model and presented to stakeholders over the course of multiple ESPWG meetings for use in the Policy Case. Key factors such as technology capital cost and load forecast were adjusted to investigate the key drivers for resource additions and impacts on the projections of resource growth in NYS. In addition to generator capital cost and load forecast, assumptions surrounding operating costs (fuel and/or emission price forecasts), existing generator retirements, energy output associated with certain generator types, and policy targets were analyzed through scenario testing. Through these scenarios, various assumption changes were examined to assess their impact on the capacity expansion model results. These scenarios were informative by showing trends in installed capacity and/or generation mix, as applicable to the scenario, throughout the study period. The scenarios provide insight on which assumptions drive certain results and the scale to which the capacity and/or generation mix is impacted.

Figure 95 portrays a visual representation of the myriad of scenarios conducted in the capacity expansion model, prior to the selection of the two final scenarios S1 and S2.

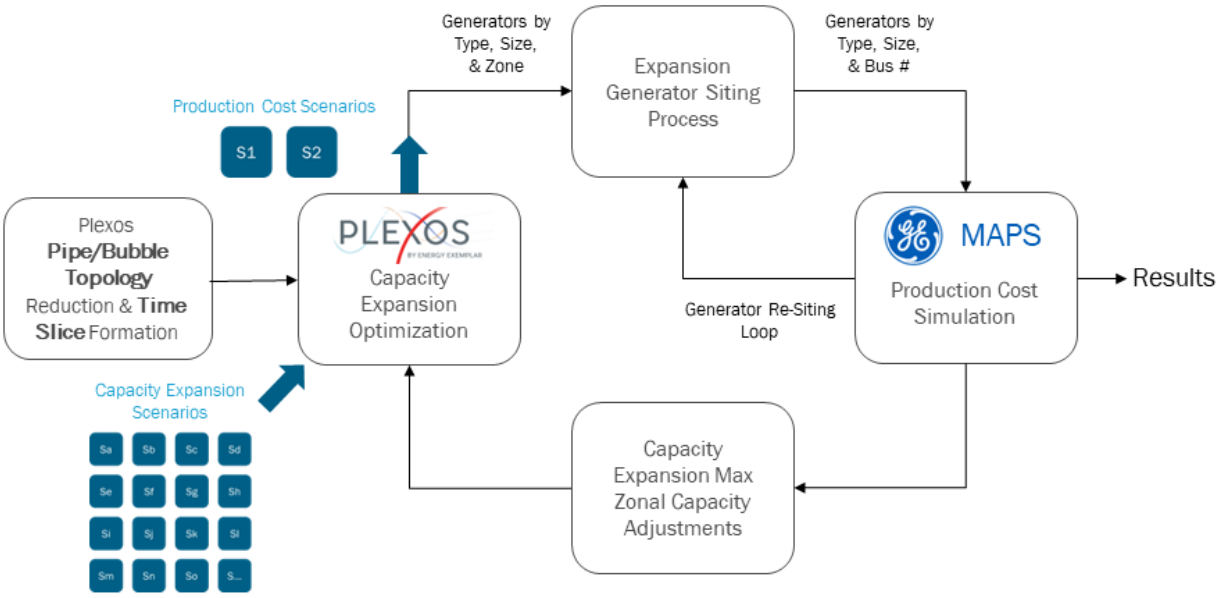
Figure 95: Policy Case Capacity Expansion Scenario Selection



Results from the capacity expansion model for scenarios S1 and S2 were the basis for the generation capacity input assumptions for the production cost modeling in the Policy Case. Further analysis was conducted in production cost modeling to assess the impacts of increased renewable and DEFR penetration on New York's system throughout the 20-year study period.

Figure 96 provides an overview of the process flow used for the Policy Case.

Figure 96: Policy Case Process Flow Chart



G.1 Capacity Expansion Scenario Assumptions

The following table describes some of the scenarios that were tested in the capacity expansion model for the Policy Case. A brief description of the assumption(s) as well as the scale to which the assumption(s) were adjusted in S1 and S2 are included below for each scenario.

Scenario	Assumption Adjusted	Value
High Natural Gas Price	Natural gas price forecast	2x baseline forecast
High CO_2 Price	CO_2 price forecast	2x baseline forecast
Higher CO_2 Price	CO_2 price forecast	10x baseline forecast
Increase ESR Policy Target	ESR specific policy target	6 GW by 2030
Nuclear Retirements at Relicensing	Retirement date for nuclear units	Set retirement date to relicense date for select units
OSW Distribution Zones J&K	Minimum amount of OSW capacity built in Zones J&K	At least 2/3 of total OSW capacity to be located in Zone J, remaining in Zone K
Reduced Hydro Output	Monthly hydro energy output	10% decrease in assumed energy for each month
Low Capital Cost UPV Candidate Generators	Capital cost for CapEx UPV	0.5x baseline costs
Low Capital Cost LBW Candidate Generators	Capital cost for CapEx LBW	0.5x baseline costs

Low Capital Cost UPV, LBW, & OSW Candidate Generators	Capital cost for CapEx UPV, LBW, and OSW units	0.5x baseline costs
Low Capital Cost DEFR Candidate Generators	Capital cost for CapEx DEFRs	0.5x baseline costs
High Capital Cost DEFR Candidate Generators	Capital cost for CapEx DEFRs	2x baseline costs
Low Operating Cost DEFR Candidate Generators	Operating cost for CapEx DEFRs	0.5x baseline forecast
High Operating Cost DEFR Candidate Generators	Operating cost for CapEx DEFRs	2x baseline forecast
Remove Declining Capacity Value Curves	UCAP rating of renewable and energy storage resources	Fixed at initial UCAP rating

A test scenario was evaluated in the analysis to test the model's selection of renewable technologies in the absence of DEFR technologies. There are many technical limitations to the validity of the scenario, but it provides information surrounding the marginal technology that will increase or decrease as more or less DEFRs are selected. The test scenarios found that the exclusion of DEFRs as a new technology option, while enforcing the retirement of fossil generators via the 100% emission-free by 2040 policy, exhausts the amount of land-based wind built and results in the replacement of 45 GW or 27 GW of DEFR capacity, for S1 and S2 respectively, with 30 GW of offshore wind and 40 GW of energy storage, and a significant reduction in UPV capacity in S2. Note that this capacity replacement estimate is not realistic and should only be considered as a directional proxy for information, which is not a substitute for all the attributes provided by either today's fossil-fueled fleet or future DEFRs. Further reliability concerns, such as voltage support and dynamic stability, may require other extensive system reinforcements.

G.2 Capacity Expansion Scenario Results

The following charts provide a comparison of the capacity expansion results for each of the scenarios examined as part of this Outlook. For both S1 and S2, there is a comparison of the 2040 Installed Capacity (GW) and 2040 Generation (TWh) for the range of scenarios. Detailed results pertaining to each of the scenarios examined are included in this section.

Figure 97: Policy Case S1 Scenario Installed Capacity Change in 2040

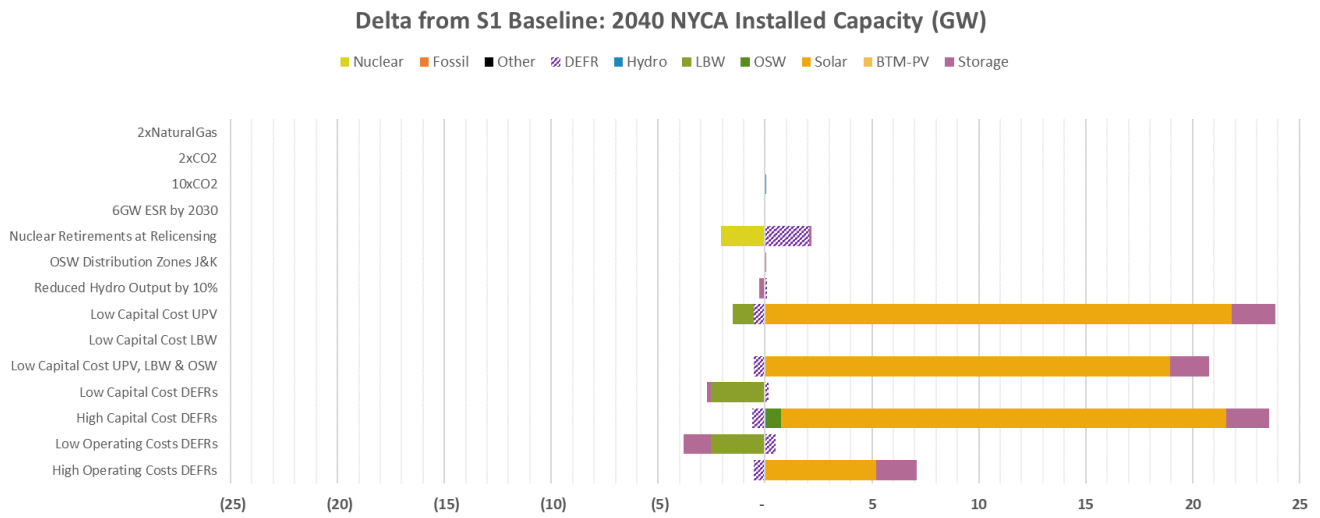


Figure 98: Policy Case S2 Scenario Installed Capacity Change in 2040

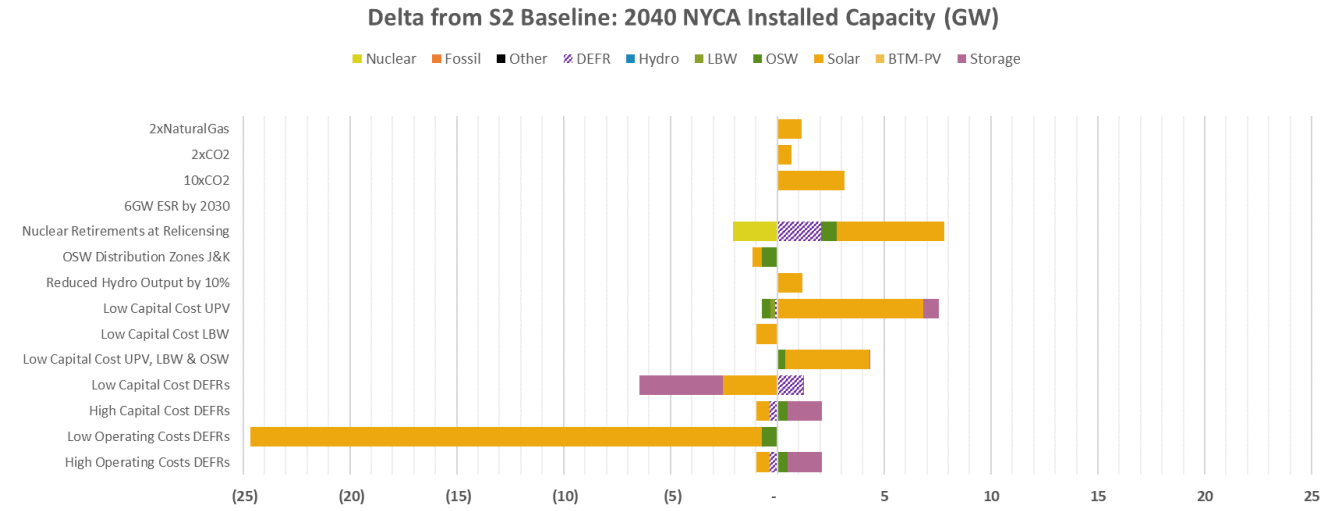


Figure 99: Policy Case S1 Scenario Annual Generation Change in 2040

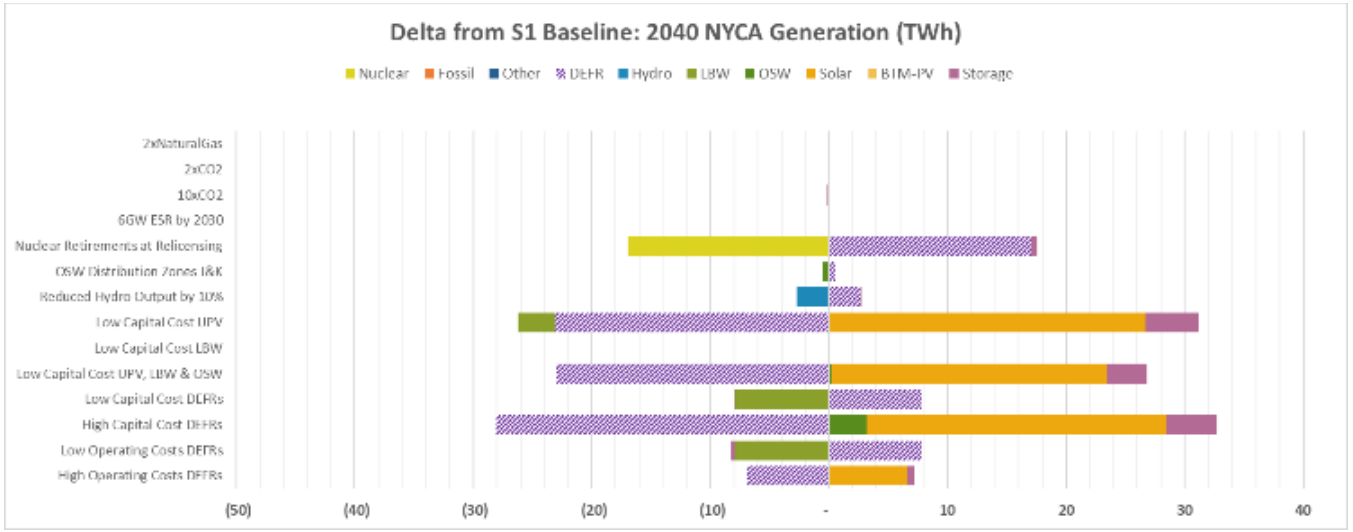
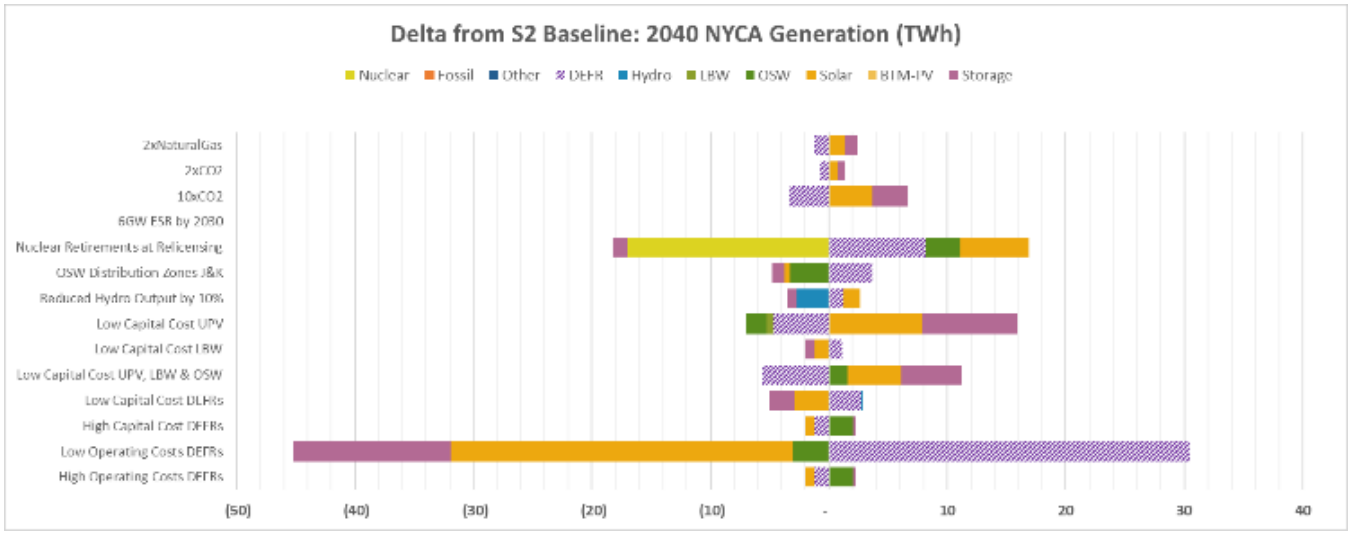
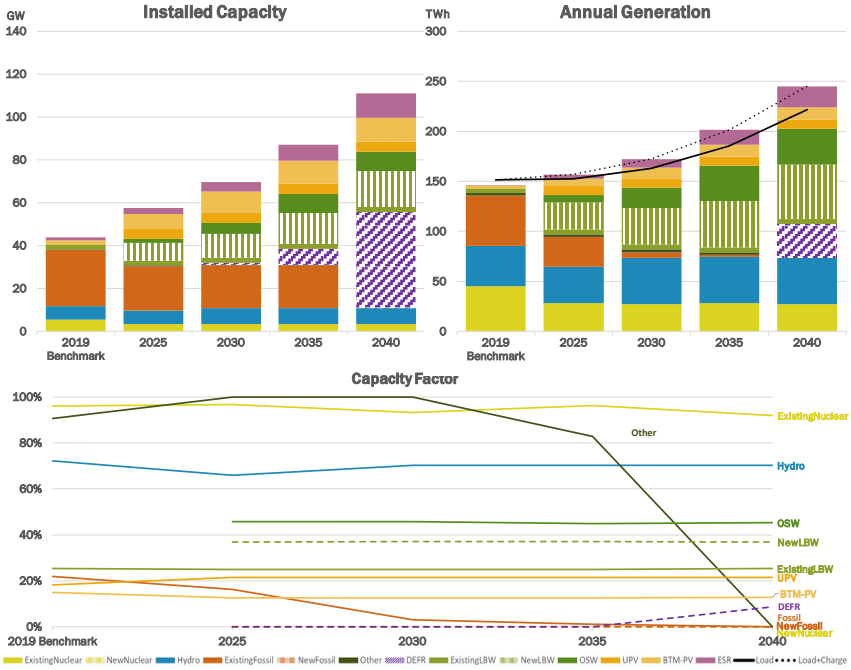


Figure 100: Policy Case S2 Scenario Annual Generation Change in 2040



S1 Scenario: High Natural Gas Price



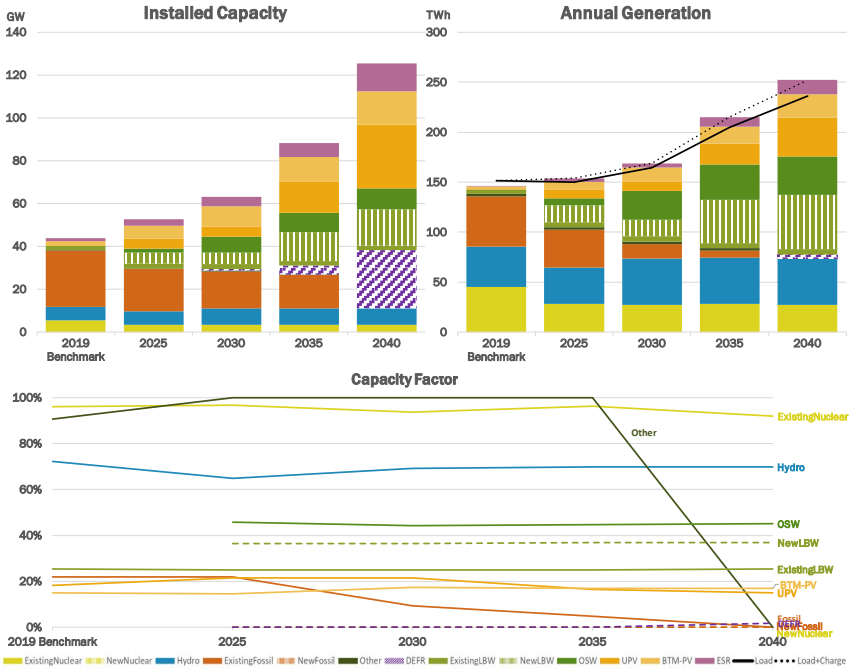
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,364	3,364	3,364
Fossil	26,262	20,755	19,913	19,915	-
DEFR - HcLo	-	-	-	-	3,811
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	856	7,394	40,939
Hydro	6,331	6,302	7,537	7,540	7,540
LBW	1,985	10,613	13,522	16,606	19,087
OSW	-	1,826	5,036	9,000	9,000
UPV	32	4,676	4,676	4,676	4,676
BTM-PV	2,116	6,834	10,055	10,828	11,198
Storage	1,405	2,910	4,410	7,357	11,450
Total	43,838	57,583	70,547	94,395	111,066

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	29,620	5,410	1,817	-
DEFR - HcLo	-	-	-	-	33,479
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	-	-	523
Hydro	40,034	36,418	46,342	46,359	46,391
LBW	4,416	31,894	41,461	51,439	59,362
OSW	-	7,331	20,186	35,463	35,651
UPV	51	8,817	8,816	8,817	8,819
BTM-PV	2,761	7,483	11,068	11,983	12,454
Storage	612	4,025	8,712	14,926	21,339
Total Generation	146,262	156,765	172,278	201,477	245,109
RE Generation	47,261	91,943	127,873	154,061	162,676
ZE Generation	93,301	124,305	164,030	197,325	245,109
Load	151,386	152,397	163,167	185,223	221,828
Load+Charge	151,773	156,765	172,279	201,478	245,109
% RE [RE/Load]	31%	60%	78%	83%	73%
% ZE [ZE/(Load+Charge)]	61%	79%	95%	98%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	12.92	2.26	0.76	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S2 Scenario: High Natural Gas Price



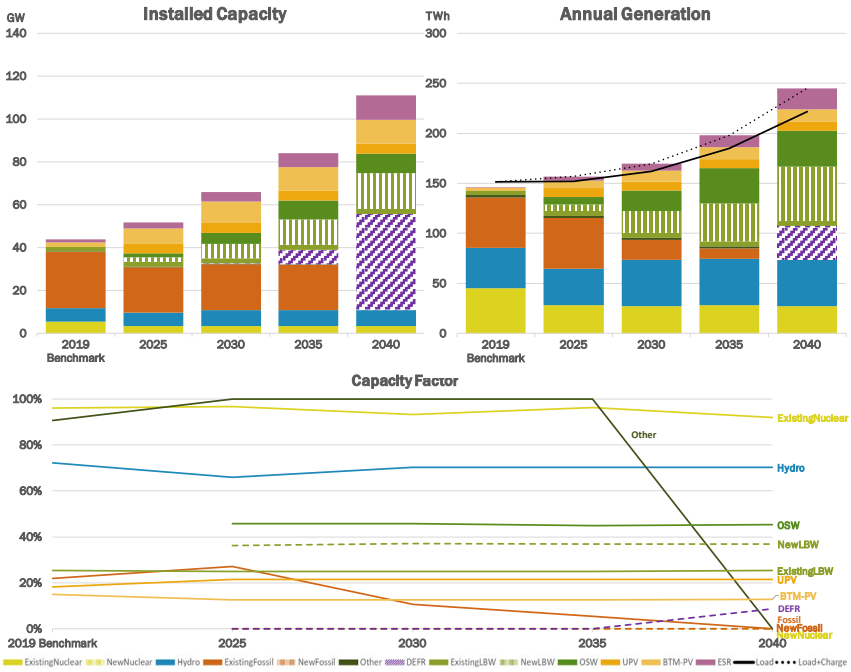
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,346	3,364	3,364
Fossil	26,262	19,620	17,282	15,691	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	819	3,990	27,200
DEFR - LcHo	-	-	-	-	-
Hydro	6,331	6,415	7,660	7,584	7,584
LBW	1,985	7,469	7,547	15,629	19,087
OSW	-	1,826	7,436	9,000	9,720
UPV	32	4,676	4,676	14,603	29,761
BTM-PV	2,116	6,000	9,523	11,601	15,764
Storage	1,405	2,910	4,410	6,376	12,810
Total	43,838	52,583	63,840	92,151	125,290

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	37,581	14,127	6,586	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	-	-	4,314
DEFR - LcHo	-	-	-	-	-
Hydro	40,034	36,418	46,342	46,392	46,391
LBW	4,416	21,559	21,815	48,088	59,362
OSW	-	7,331	28,865	35,247	38,388
UPV	51	8,817	8,816	21,047	39,091
BTM-PV	2,761	7,631	14,461	17,223	23,220
Storage	612	3,396	4,215	9,366	14,488
Total Generation	146,262	153,909	168,925	215,127	252,345
RE Generation	47,261	81,755	120,301	167,998	206,451
ZE Generation	93,301	113,489	151,959	205,701	252,345
Load	151,386	150,222	164,255	204,775	236,334
Load+Charge	151,773	153,910	168,926	215,127	252,345
% RE [RE/Load]	31%	54%	73%	82%	87%
% ZE [ZE/(Load+Charge)]	61%	74%	90%	96%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	16.41	6.51	3.42	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S1 Scenario: High CO2 Price



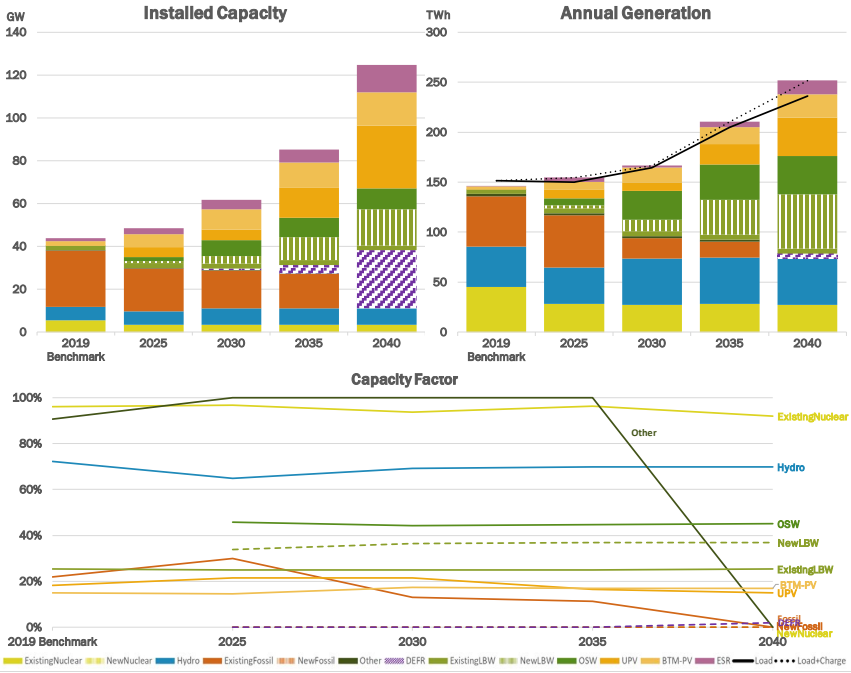
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,364	3,364	3,364
Fossil	26,262	21,258	21,218	21,169	-
DEFR - HcLo	-	-	-	-	3,812
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	420	6,760	40,938
Hydro	6,331	6,302	7,537	7,540	7,540
LBW	1,985	4,360	9,051	13,970	19,087
OSW	-	1,826	5,036	9,000	9,000
UPV	32	4,676	4,676	4,676	4,676
BTM-PV	2,116	6,834	10,055	10,828	11,198
Storage	1,405	2,910	4,410	6,485	11,450
Total	43,838	51,736	66,411	90,777	111,066

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	50,688	19,890	10,165	-
DEFR - HcLo	-	-	-	-	33,482
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	-	-	523
Hydro	40,034	36,418	46,342	46,392	46,391
LBW	4,416	11,572	26,971	42,781	59,362
OSW	-	7,331	20,186	35,460	35,647
UPV	51	8,817	8,816	8,817	8,819
BTM-PV	2,761	7,483	11,068	11,983	12,454
Storage	612	4,168	6,830	11,928	21,339
Total Generation	146,262	156,806	169,539	197,856	245,109
RE Generation	47,261	71,620	113,383	145,433	162,672
ZE Generation	93,301	104,126	147,658	185,700	245,109
Load	151,386	152,186	161,976	184,704	221,828
Load+Charge	151,773	156,806	169,540	197,857	245,109
% RE [RE/Load]	31%	47%	70%	79%	73%
% ZE [ZE/(Load+Charge)]	61%	66%	87%	94%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	21.93	8.43	4.36	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S2 Scenario: High CO2 Price



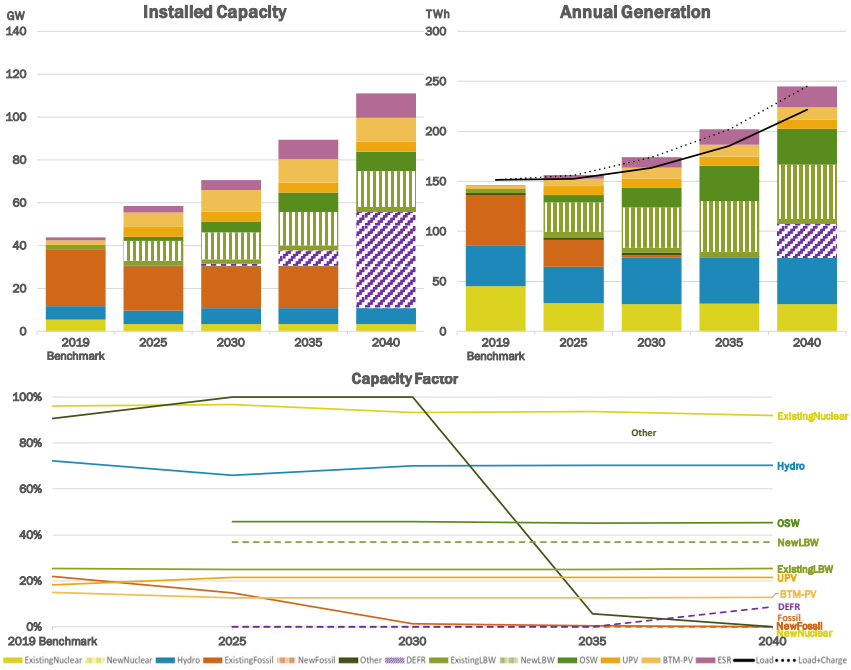
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,346	3,364	3,364
Fossil	26,262	19,978	17,640	16,059	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	819	3,990	27,200
DEFR - LcHo	-	-	-	-	-
Hydro	6,331	6,415	7,660	7,584	7,584
LBW	1,985	3,160	5,877	13,097	19,087
OSW	-	1,826	7,436	9,000	9,720
UPV	32	4,676	4,676	14,118	29,275
BTM-PV	2,116	6,000	9,523	11,601	15,764
Storage	1,405	2,910	4,410	6,050	12,810
Total	43,838	48,535	62,431	89,078	124,805

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	52,383	20,067	15,749	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	-	-	4,848
DEFR - LcHo	-	-	-	-	-
Hydro	40,034	36,418	46,342	46,392	46,391
LBW	4,416	7,593	16,494	39,895	59,362
OSW	-	7,331	28,865	35,247	38,388
UPV	51	8,817	8,816	20,458	38,501
BTM-PV	2,761	7,631	14,461	17,223	23,220
Storage	612	4,203	2,090	5,206	13,977
Total Generation	146,262	154,705	166,571	210,501	251,778
RE Generation	47,261	67,790	114,979	159,215	205,862
ZE Generation	93,301	100,331	144,512	192,760	251,778
Load	151,386	150,047	164,255	204,755	236,334
Load+Charge	151,773	154,706	166,572	210,502	251,778
% RE [RE/Load]	31%	45%	70%	78%	87%
% ZE [ZE/(Load+Charge)]	61%	65%	87%	92%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	22.76	8.97	7.17	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S1 Scenario: Higher CO2 Price



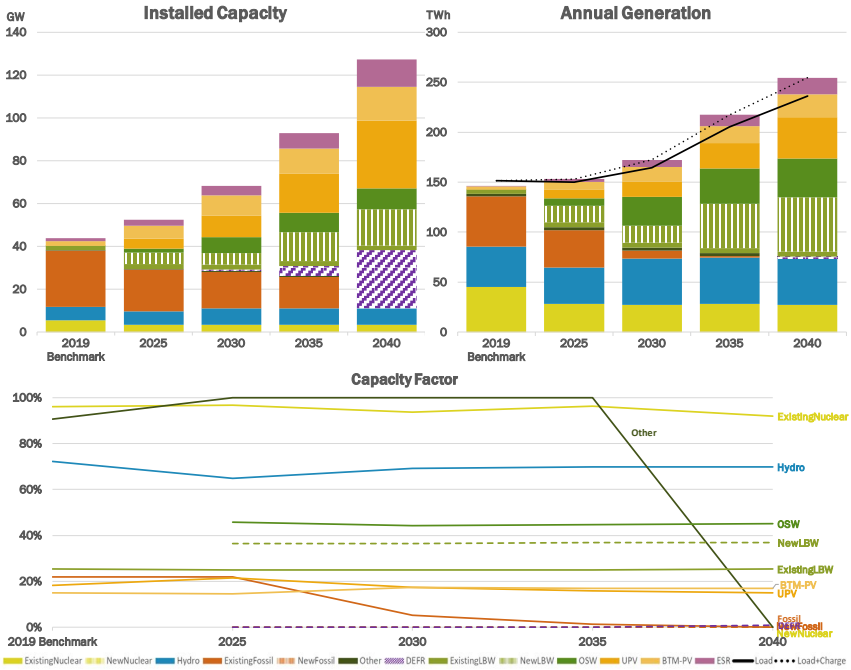
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,364	3,364	3,364
Fossil	26,262	20,708	19,349	19,349	-
DEFR - HcLo	-	-	-	-	3,803
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	856	7,234	40,949
Hydro	6,331	6,302	7,537	7,540	7,540
LBW	1,985	11,539	14,664	17,898	19,087
OSW	-	1,826	5,036	9,000	9,000
UPV	32	4,676	4,676	4,676	4,676
BTM-PV	2,116	6,834	10,055	10,828	11,198
Storage	1,405	2,910	4,699	9,170	11,444
Total	43,838	58,462	71,414	96,615	111,062

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	27,575	27,092
Fossil	50,520	26,652	2,180	609	-
DEFR - HcLo	-	-	-	-	33,408
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	-	-	525
Hydro	40,034	36,418	46,228	46,392	46,391
LBW	4,416	34,800	45,094	55,525	59,362
OSW	-	7,331	20,186	35,532	35,719
UPV	51	8,817	8,816	8,817	8,819
BTM-PV	2,761	7,483	11,068	11,983	12,454
Storage	612	3,424	10,239	15,347	21,336
Total Generation	146,262	156,101	174,094	201,939	245,105
RE Generation	47,261	94,848	131,392	158,250	162,745
ZE Generation	93,301	126,611	169,075	201,172	245,105
Load	151,386	152,400	163,477	185,203	221,828
Load+Charge	151,773	156,102	174,095	201,939	245,105
% RE [RE/Load]	31%	62%	80%	85%	73%
% ZE [ZE/(Load+Charge)]	61%	81%	97%	100%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	13.03	1.03	0.32	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S2 Scenario: Higher CO2 Price



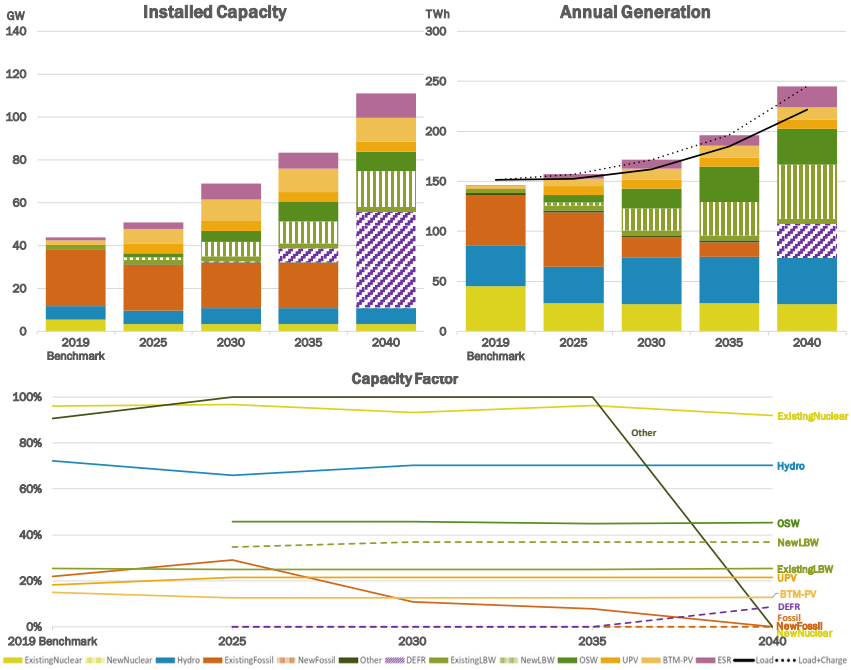
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,346	3,364	3,364
Fossil	26,262	19,432	17,094	14,811	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	828	4,680	27,200
DEFR - LcHo	-	-	-	-	-
Hydro	6,331	6,415	7,660	7,584	7,584
LBW	1,985	7,547	7,547	15,948	19,087
OSW	-	1,826	7,436	9,000	9,720
UPV	32	4,676	10,162	18,298	31,765
BTM-PV	2,116	6,000	9,523	11,601	15,764
Storage	1,405	2,910	4,410	7,230	12,810
Total	43,838	52,473	69,154	97,518	127,295

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	37,166	7,818	1,580	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	-	-	2,213
DEFR - LcHo	-	-	-	-	-
Hydro	40,034	36,418	46,342	46,392	46,391
LBW	4,416	21,802	21,815	49,098	59,362
OSW	-	7,331	28,865	35,247	38,388
UPV	51	8,817	15,524	25,479	41,403
BTM-PV	2,761	7,631	14,461	17,223	23,220
Storage	612	2,724	7,099	11,102	16,443
Total Generation	146,262	153,066	172,208	217,298	254,512
RE Generation	47,261	81,998	127,008	173,439	208,763
ZE Generation	93,301	113,060	161,551	212,880	254,512
Load	151,386	150,047	164,419	205,255	236,334
Load+Charge	151,773	153,066	172,209	217,299	254,512
% RE [RE/Load]	31%	55%	77%	84%	88%
% ZE [ZE/(Load+Charge)]	61%	74%	94%	98%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	16.10	3.94	0.85	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S1 Scenario: Increase ESR CLCPA to 6 GW by 2030



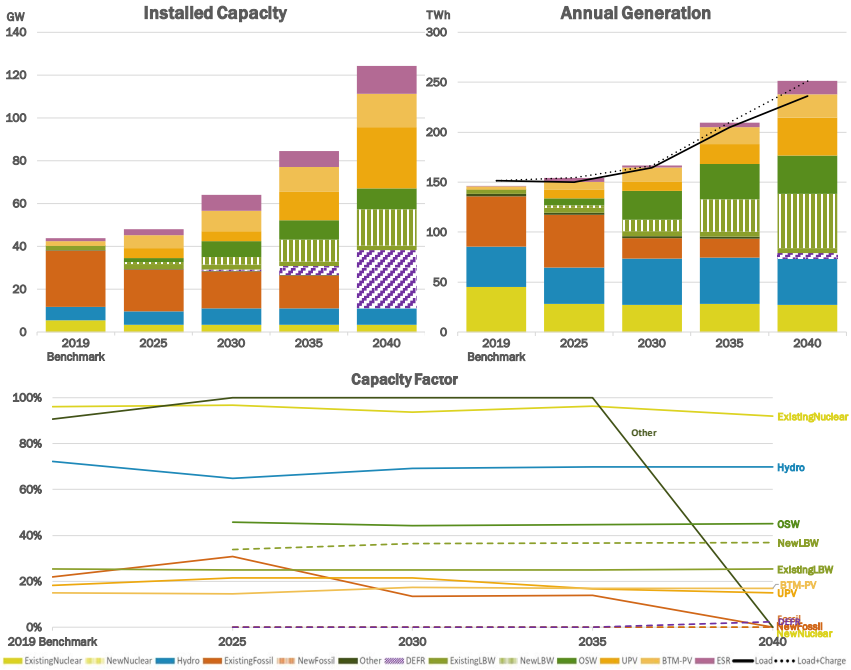
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,364	3,364	3,364
Fossil	26,262	21,310	21,112	21,114	-
DEFR - HcLo	-	-	-	-	3,812
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	420	6,511	40,938
Hydro	6,331	6,302	7,537	7,540	7,540
LBW	1,985	3,335	9,086	12,612	19,087
OSW	-	1,826	5,036	9,000	9,000
UPV	32	4,676	4,676	4,676	4,676
BTM-PV	2,116	6,834	10,055	10,828	11,198
Storage	1,405	2,910	7,410	7,410	11,450
Total	43,838	50,763	69,341	89,791	111,066

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	54,174	20,091	14,487	-
DEFR - HcLo	-	-	-	-	33,482
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	-	-	523
Hydro	40,034	36,418	46,342	46,392	46,391
LBW	4,416	8,189	26,971	38,297	59,362
OSW	-	7,331	20,186	35,460	35,647
UPV	51	8,817	8,816	8,817	8,819
BTM-PV	2,761	7,483	11,068	11,983	12,454
Storage	612	4,347	8,637	10,544	21,339
Total Generation	146,262	157,088	171,548	196,310	245,109
RE Generation	47,261	68,238	113,383	140,949	162,672
ZE Generation	93,301	100,922	149,464	179,830	245,109
Load	151,386	152,336	161,976	184,697	221,828
Load+Charge	151,773	157,089	171,548	196,310	245,109
% RE [RE/Load]	31%	45%	70%	76%	73%
% ZE [ZE/(Load+Charge)]	61%	64%	87%	92%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	23.53	8.46	6.20	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S2 Scenario: Increase ESR CLCPA to 6 GW by 2030



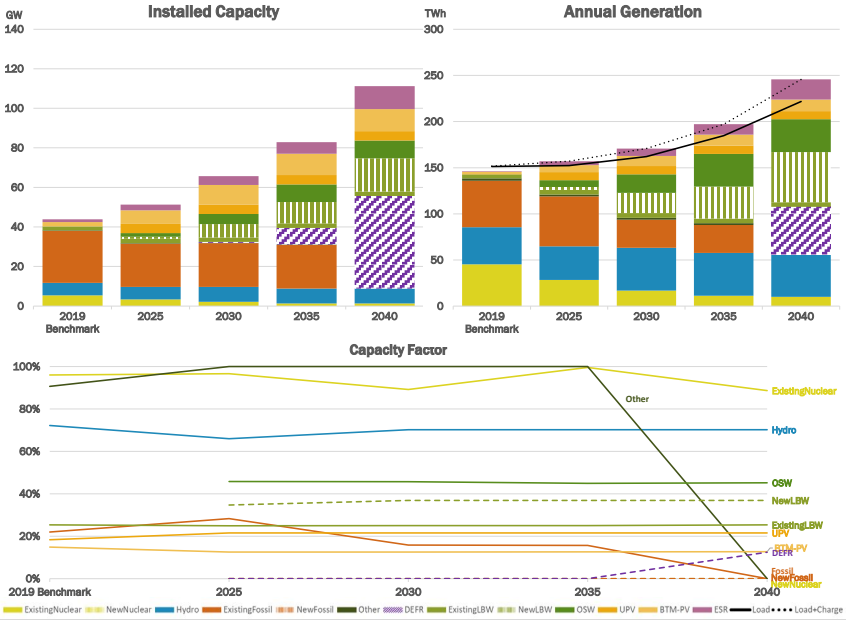
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,346	3,364	3,364
Fossil	26,262	19,480	17,142	15,549	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	819	3,990	27,200
DEFR - LcHo	-	-	-	-	-
Hydro	6,331	6,415	7,660	7,584	7,584
LBW	1,985	3,138	5,890	12,366	19,087
OSW	-	1,826	7,436	9,000	9,720
UPV	32	4,676	4,676	13,448	28,606
BTM-PV	2,116	6,000	9,523	11,601	15,764
Storage	1,405	2,910	7,410	7,410	12,810
Total	43,838	48,015	64,946	88,528	124,135

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	52,437	20,080	18,903	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	-	-	5,584
DEFR - LcHo	-	-	-	-	-
Hydro	40,034	36,418	46,342	46,392	46,391
LBW	4,416	7,518	16,494	37,460	59,362
OSW	-	7,331	28,865	35,247	38,388
UPV	51	8,817	8,816	19,661	37,705
BTM-PV	2,761	7,631	14,461	17,223	23,220
Storage	612	4,007	2,199	4,498	13,414
Total Generation	146,262	154,488	166,694	209,714	251,155
RE Generation	47,261	67,715	114,979	155,984	205,065
ZE Generation	93,301	100,059	144,622	188,820	251,155
Load	151,386	150,047	164,255	204,754	236,334
Load+Charge	151,773	154,488	166,694	209,715	251,155
% RE [RE/Load]	31%	45%	70%	76%	87%
% ZE [ZE/(Load+Charge)]	61%	65%	87%	90%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	22.87	8.99	8.50	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S1 Scenario: Nuclear Retirements at Relicensing



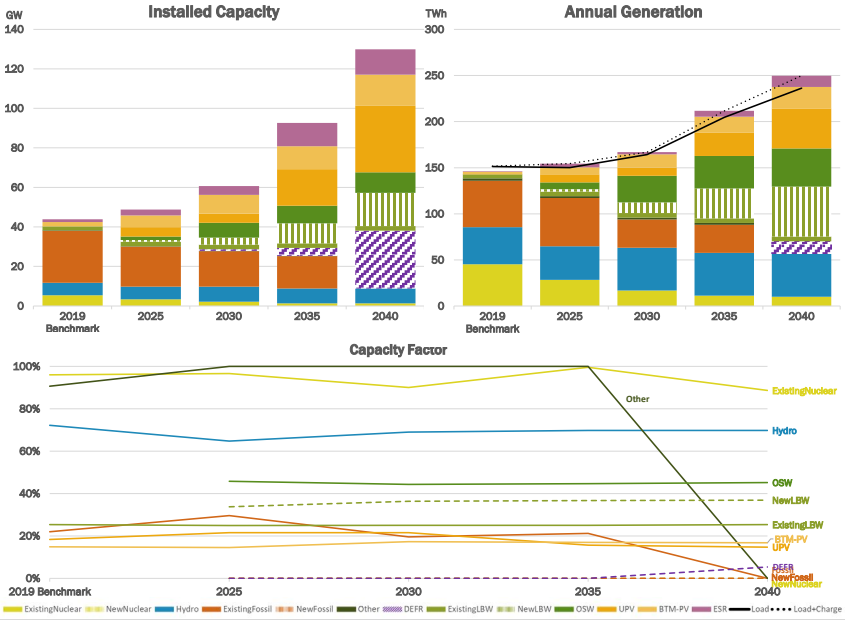
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	2,154	1,299	1,299
Fossil	26,262	21,879	22,062	22,064	-
DEFR - HoLo	-	-	-	-	5,754
DEFR - MoMo	-	-	-	-	-
DEFR - LoHo	-	-	420	8,403	41,051
Hydro	6,331	6,302	7,537	7,540	7,540
LBW	1,985	3,335	9,086	13,027	19,087
OSW	-	1,826	5,036	9,000	9,000
UPV	32	4,676	4,676	4,676	4,676
BTM-PV	2,116	6,834	10,055	10,828	11,198
Storage	1,405	2,910	4,410	5,857	11,566
Total	43,838	51,332	66,081	91,322	111,171

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	16,829	11,330	10,086
Fossil	50,520	54,174	30,627	30,197	-
DEFR - HoLo	-	-	-	-	50,543
DEFR - MoMo	-	-	-	-	-
DEFR - LoHo	-	-	-	-	524
Hydro	40,034	36,418	46,342	46,392	46,391
LBW	4,416	8,189	26,971	39,679	59,362
OSW	-	7,331	20,186	35,460	35,647
UPV	51	8,817	8,816	8,817	8,819
BTM-PV	2,761	7,483	11,068	11,983	12,454
Storage	612	4,347	7,983	11,283	21,863
Total Generation	146,262	157,088	170,814	197,132	245,689
RE Generation	93,301	100,922	138,195	164,943	245,689
ZE Generation	151,386	152,336	161,976	184,697	221,828
Load	151,773	157,089	170,815	197,133	245,689
Load+Charge	31%	45%	70%	77%	73%
% RE [RE/Load]	61%	64%	81%	84%	100%
% ZE [ZE/(Load+Charge)]					

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	23.52	12.97	12.80	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HoLo)

S2 Scenario: Nuclear Retirements at Relicensing



Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	2,133	1,299	1,299
Fossil	26,262	20,234	17,896	16,320	-
DEFR - HoLo	-	-	-	-	-
DEFR - MoMo	-	-	819	3,990	29,253
DEFR - LoHo	-	-	-	-	-
Hydro	6,331	6,415	7,660	7,584	7,584
LBW	1,985	3,138	5,890	12,366	19,087
OSW	-	1,826	7,436	9,000	10,440
UPV	32	4,676	4,676	18,472	33,630
BTM-PV	2,116	6,000	9,523	11,601	15,764
Storage	1,405	2,910	4,410	11,775	12,810
Total	43,838	48,768	61,487	96,623	129,867

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	16,829	11,330	10,086
Fossil	50,520	52,436	30,718	30,337	-
DEFR - HoLo	-	-	-	-	-
DEFR - MoMo	-	-	-	-	13,755
DEFR - LoHo	-	-	-	-	-
Hydro	40,034	36,418	46,342	46,392	46,391
LBW	4,416	7,518	16,494	37,460	59,362
OSW	-	7,331	28,865	35,247	41,340
UPV	51	8,817	8,816	25,406	43,450
BTM-PV	2,761	7,631	14,461	17,223	23,220
Storage	612	3,999	2,414	6,323	12,143
Total Generation	146,262	154,479	166,931	211,710	249,747
RE Generation	47,261	67,715	114,979	161,729	213,762
ZE Generation	93,301	100,051	134,222	179,381	249,747
Load	151,386	150,047	164,255	204,701	236,334
Load+Charge	151,773	154,480	166,931	211,711	249,747
% RE [RE/Load]	31%	45%	70%	79%	90%
% ZE [ZE/(Load+Charge)]	61%	65%	80%	85%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	22.86	13.42	13.25	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HoLo)

S1 Scenario: OSW Distribution Specified in Zones J&K

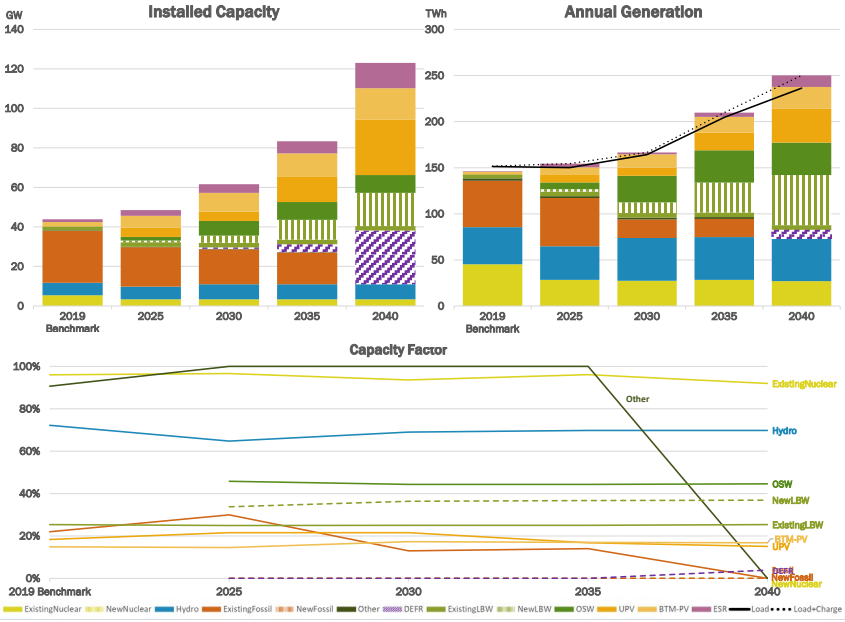
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,364	3,364	3,364
Fossil	26,262	21,318	21,255	21,257	-
DEFR - HoLo	-	-	-	-	3,871
DEFR - MoMo	-	-	-	-	-
DEFR - LoHo	-	-	319	6,877	40,866
Hydro	6,331	6,302	7,537	7,540	7,540
LBW	1,985	3,138	6,035	12,366	19,087
OSW	-	1,826	7,749	9,000	9,000
UPV	32	4,676	4,676	4,676	4,676
BTM-PV	2,116	6,834	10,055	10,828	11,198
Storage	1,405	2,910	4,410	6,052	11,492
Total	43,838	50,574	65,943	89,062	111,095

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	54,873	20,030	15,845	-
DEFR - HoLo	-	-	-	-	34,004
DEFR - MoMo	-	-	-	-	-
DEFR - LoHo	-	-	-	-	510
Hydro	40,034	36,418	46,342	46,392	46,391
LBW	4,416	7,518	17,014	37,460	59,362
OSW	-	7,331	30,142	34,949	35,141
UPV	51	8,817	8,816	8,817	8,819
BTM-PV	2,761	7,483	11,068	11,983	12,454
Storage	612	4,399	7,450	10,346	21,365
Total Generation	146,262	157,168	170,299	196,123	245,137
RE Generation	47,261	67,567	113,383	139,602	162,166
ZE Generation	93,301	100,304	148,277	178,286	245,137
Load	151,386	152,376	162,111	184,754	221,828
Load+Charge	151,773	157,169	170,299	196,124	245,137
% RE [RE/Load]	31%	44%	70%	76%	73%
% ZE [ZE/(Load+Charge)]	61%	64%	87%	91%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	23.82	8.58	6.88	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HoLo)

S2 Scenario: OSW Distribution Specified in Zones J&K



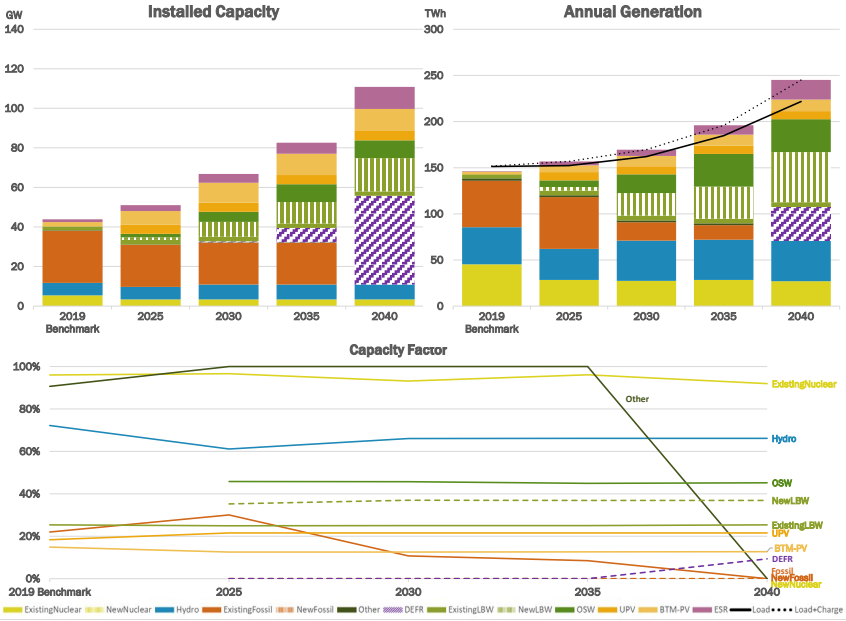
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,346	3,364	3,364
Fossil	26,262	19,988	17,650	16,071	-
DEFR - HoLo	-	-	-	-	-
DEFR - MoMo	-	-	819	3,990	27,237
DEFR - LoHo	-	-	-	-	-
Hydro	6,331	6,415	7,660	7,584	7,584
LBW	1,985	3,138	5,890	12,366	19,087
OSW	-	1,826	7,436	9,000	9,000
UPV	32	4,676	4,676	13,011	28,169
BTM-PV	2,116	6,000	9,523	11,601	15,764
Storage	1,405	2,910	4,410	6,147	12,810
Total	43,838	48,523	62,454	87,350	123,016

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	52,437	20,066	19,720	-
DEFR - HoLo	-	-	-	-	-
DEFR - MoMo	-	-	-	-	9,242
DEFR - LoHo	-	-	-	-	-
Hydro	40,034	36,418	46,342	46,392	46,390
LBW	4,416	7,518	16,494	37,460	59,362
OSW	-	7,331	28,865	34,949	35,141
UPV	51	8,817	8,816	19,142	37,186
BTM-PV	2,761	7,631	14,461	17,223	23,220
Storage	612	4,007	2,086	4,582	12,414
Total Generation	146,262	154,488	166,567	209,799	250,047
RE Generation	47,261	67,715	114,979	155,167	201,299
ZE Generation	93,301	100,059	144,509	188,087	250,047
Load	151,386	150,047	164,255	204,737	236,334
Load+Charge	151,773	154,488	166,567	209,799	250,047
% RE [RE/Load]	31%	45%	70%	76%	85%
% ZE [ZE/(Load+Charge)]	61%	65%	87%	90%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	22.87	8.98	8.85	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HoLo)

S1 Scenario: Reduced Hydro Output by 10%



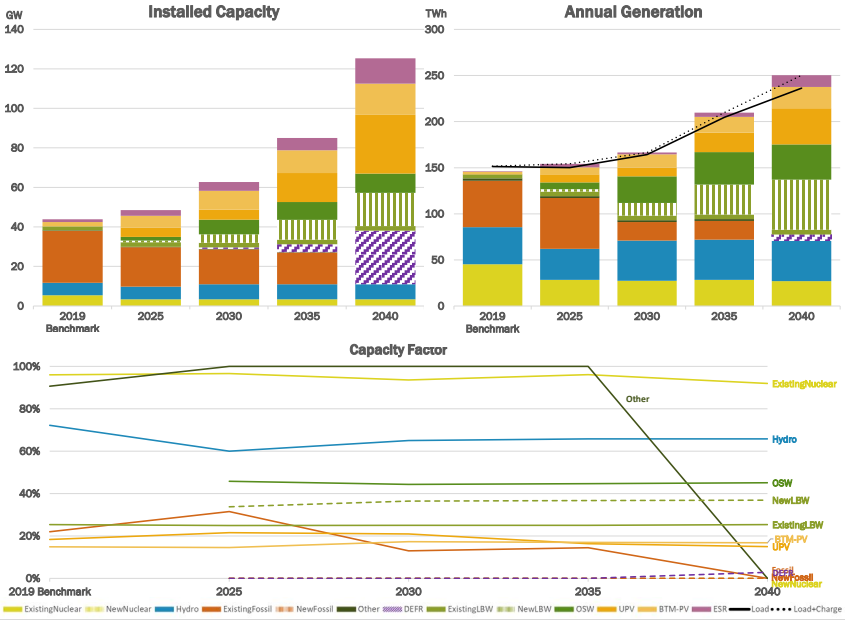
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,364	3,364	3,364
Fossil	26,262	21,300	21,168	21,170	-
DEFR - HoLo	-	-	-	-	4,119
DEFR - MoMo	-	-	-	-	-
DEFR - LoHo	-	-	420	7,167	40,721
Hydro	6,331	6,302	7,537	7,539	7,540
LBW	1,985	3,564	9,897	13,095	19,087
OSW	-	1,826	5,036	9,000	9,000
UPV	32	4,676	4,676	4,676	4,676
BTM-PV	2,116	6,834	10,055	10,828	11,198
Storage	1,405	2,910	4,410	5,555	11,162
Total	43,838	50,982	67,208	89,789	110,868

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	56,052	19,893	15,638	-
DEFR - HoLo	-	-	-	-	36,178
DEFR - MoMo	-	-	-	-	-
DEFR - LoHo	-	-	-	-	521
Hydro	40,034	33,727	43,652	43,695	43,700
LBW	4,416	8,943	29,662	39,898	59,362
OSW	-	7,331	20,186	35,460	35,647
UPV	51	8,817	8,816	8,817	8,819
BTM-PV	2,761	7,483	11,068	11,983	12,454
Storage	612	4,203	6,865	10,125	21,355
Total Generation	146,262	156,886	169,577	195,945	245,128
RE Generation	47,261	66,301	113,383	139,853	159,981
ZE Generation	93,301	98,842	147,692	178,316	245,128
Load	151,386	152,260	161,980	184,860	221,828
Load+Charge	151,773	156,887	169,577	195,946	245,128
% RE [RE/Load]	31%	44%	70%	76%	72%
% ZE [ZE/(Load+Charge)]	61%	63%	87%	91%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	24.31	8.47	6.69	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HoLo)

S2 Scenario: Reduced Hydro Output by 10%



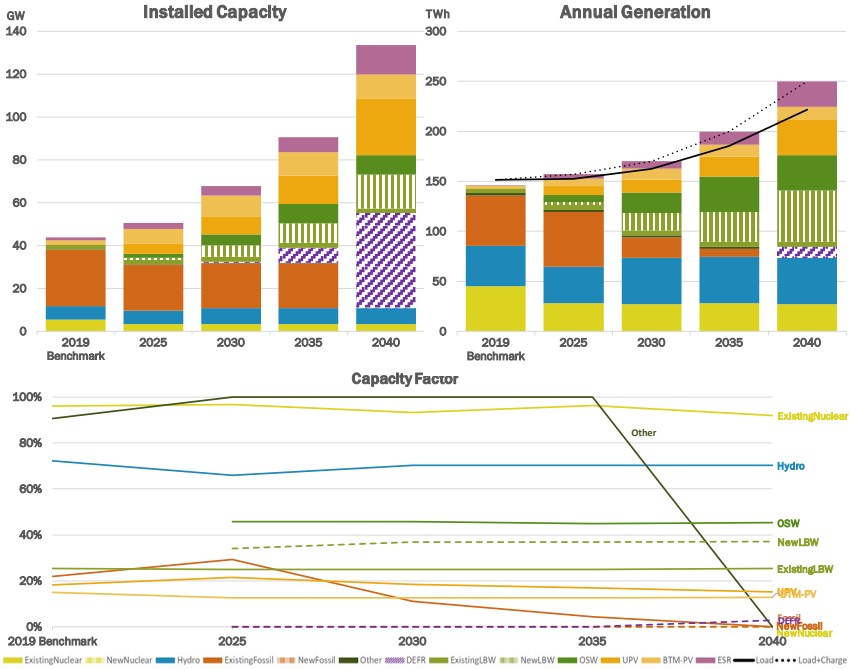
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,346	3,364	3,364
Fossil	26,262	19,988	17,650	16,071	-
DEFR - HoLo	-	-	-	-	-
DEFR - MoMo	-	-	819	3,990	27,200
DEFR - LoHo	-	-	-	-	-
Hydro	6,331	6,414	7,660	7,584	7,584
LBW	1,985	3,138	6,545	12,366	19,087
OSW	-	1,826	7,436	9,000	9,720
UPV	32	4,676	5,106	14,632	29,790
BTM-PV	2,116	6,000	9,523	11,601	15,764
Storage	1,405	2,910	4,410	6,147	12,810
Total	43,838	48,523	63,539	88,970	125,319

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	55,110	20,058	20,278	-
DEFR - HoLo	-	-	-	-	-
DEFR - MoMo	-	-	-	-	6,857
DEFR - LoHo	-	-	-	-	-
Hydro	40,034	33,727	43,652	43,695	43,700
LBW	4,416	7,518	18,626	37,460	59,362
OSW	-	7,331	28,865	35,247	38,388
UPV	51	8,817	9,374	20,992	39,035
BTM-PV	2,761	7,631	14,461	17,223	23,220
Storage	612	3,842	2,004	4,538	12,612
Total Generation	146,262	154,305	166,476	209,763	250,267
RE Generation	47,261	65,024	114,979	154,618	203,705
ZE Generation	93,301	97,204	144,427	187,493	250,267
Load	151,386	150,047	164,255	204,762	236,334
Load+Charge	151,773	154,306	166,477	209,764	250,267
% RE [RE/Load]	31%	43%	70%	76%	86%
% ZE [ZE/(Load+Charge)]	61%	63%	87%	89%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	24.00	8.98	9.07	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HoLo)

S1 Scenario: Low Capital Cost UPV



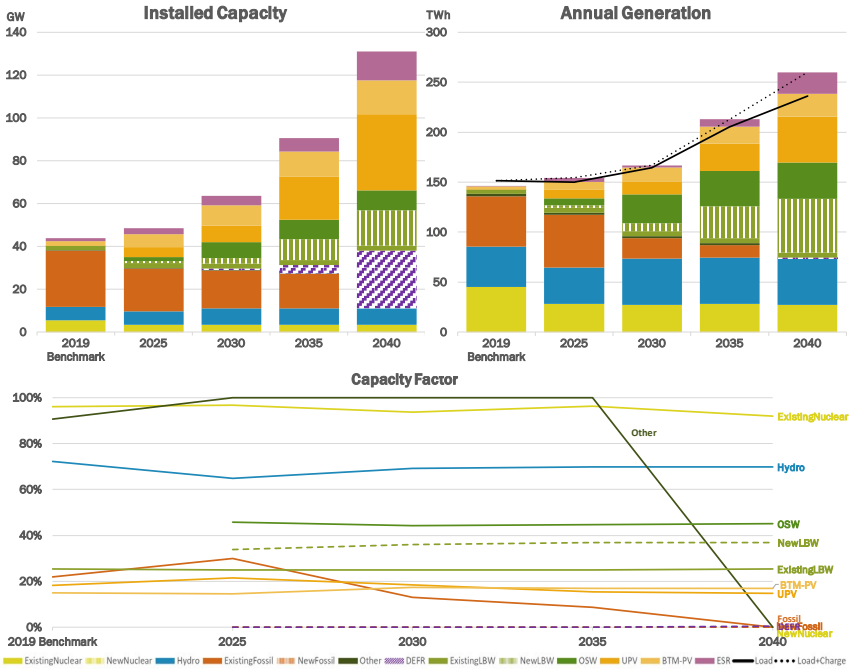
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,364	3,364	3,364
Fossil	26,262	21,318	20,884	20,835	-
DEFR - HcLo	-	-	-	-	1,167
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	420	6,934	43,059
Hydro	6,331	6,302	7,537	7,540	7,540
LBW	1,985	3,188	7,738	11,462	18,085
OSW	-	1,826	5,036	9,000	9,000
UPV	32	4,676	8,132	13,272	26,509
BTM-PV	2,116	6,834	10,055	10,828	11,198
Storage	1,405	2,910	4,410	7,010	13,492
Total	43,838	50,625	68,221	97,406	133,413

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	54,695	20,150	7,958	-
DEFR - HcLo	-	-	-	-	10,247
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	-	-	647
Hydro	40,034	36,418	46,342	46,392	46,391
LBW	4,416	7,688	22,616	34,694	56,259
OSW	-	7,331	20,186	35,460	35,647
UPV	51	8,817	13,172	19,629	35,512
BTM-PV	2,761	7,483	11,068	11,983	12,454
Storage	612	4,381	7,164	13,208	25,838
Total Generation	146,262	157,143	170,134	199,650	250,087
RE Generation	47,261	67,737	113,383	148,158	186,263
ZE Generation	93,301	100,456	147,992	189,704	250,087
Load	151,386	152,366	162,376	185,443	221,828
Load+Charge	151,773	157,144	170,134	199,650	250,087
% RE [RE/Load]	31%	44%	70%	80%	84%
% ZE [ZE/(Load+Charge)]	61%	64%	87%	95%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	23.74	8.56	3.46	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S2 Scenario: Low Capital Cost UPV



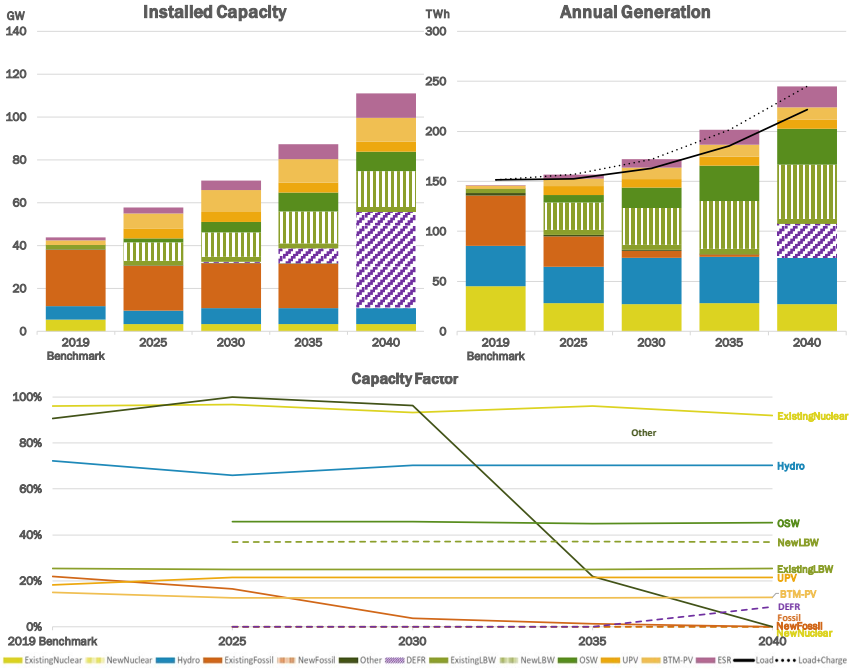
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,346	3,364	3,364
Fossil	26,262	19,969	17,631	16,051	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	819	3,990	27,084
DEFR - LcHo	-	-	-	-	-
Hydro	6,331	6,415	7,660	7,584	7,584
LBW	1,985	3,138	4,765	12,165	18,885
OSW	-	1,826	7,436	9,000	9,297
UPV	32	4,676	7,712	20,289	35,447
BTM-PV	2,116	6,000	9,523	11,601	15,764
Storage	1,405	2,910	4,410	6,244	13,512
Total	43,838	48,493	64,335	94,492	130,938

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	52,528	20,196	12,299	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	-	-	952
DEFR - LcHo	-	-	-	-	-
Hydro	40,034	36,418	46,342	46,392	46,385
LBW	4,416	7,518	12,843	36,840	58,741
OSW	-	7,331	28,865	35,247	36,654
UPV	51	8,817	12,467	27,517	45,560
BTM-PV	2,761	7,631	14,461	17,223	23,220
Storage	612	3,983	2,413	7,220	21,440
Total Generation	146,262	154,461	166,930	212,975	260,045
RE Generation	47,261	67,715	114,979	163,219	210,561
ZE Generation	93,301	100,036	144,836	198,778	260,045
Load	151,386	150,047	164,255	205,194	236,334
Load+Charge	151,773	154,462	166,930	212,975	260,045
% RE [RE/Load]	31%	45%	70%	80%	89%
% ZE [ZE/(Load+Charge)]	61%	65%	87%	93%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	22.91	9.02	5.77	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S1 Scenario: Low Capital Cost LBW



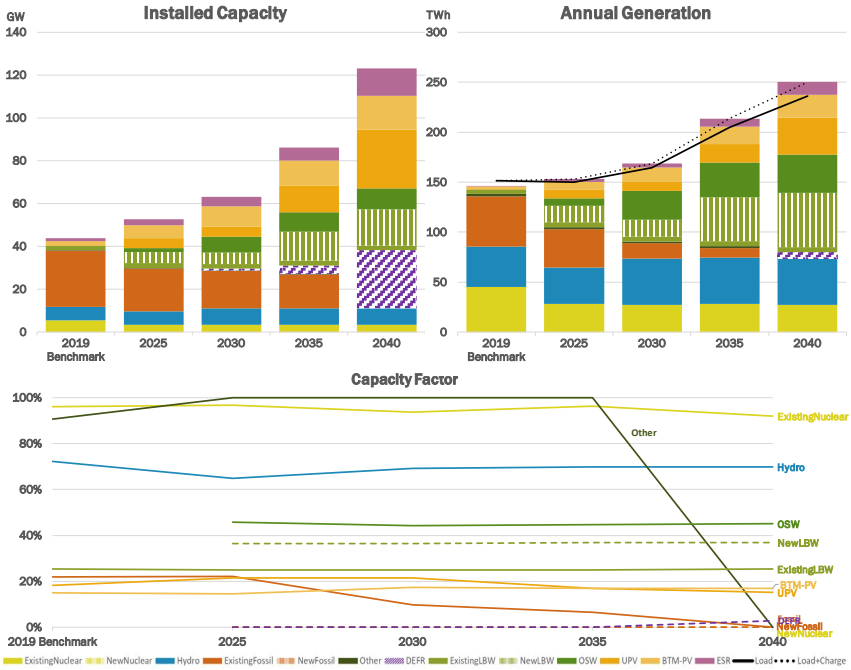
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,364	3,364	3,364
Fossil	26,262	20,919	20,891	20,705	-
DEFR - HcLo	-	-	-	-	3,812
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	469	7,001	40,938
Hydro	6,331	6,302	7,537	7,540	7,540
LBW	1,985	10,892	13,644	17,087	19,087
OSW	-	1,826	5,036	9,000	9,000
UPV	32	4,676	4,676	4,676	4,676
BTM-PV	2,116	6,834	10,055	10,828	11,198
Storage	1,405	2,910	4,410	7,010	11,450
Total	43,838	57,836	70,682	94,342	111,066

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,311	27,092
Fossil	50,520	30,363	6,643	2,406	-
DEFR - HcLo	-	-	-	-	33,482
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	-	-	523
Hydro	40,034	36,418	46,342	46,359	46,391
LBW	4,416	32,790	41,883	52,988	59,362
OSW	-	7,331	20,186	35,460	35,647
UPV	51	8,817	8,816	8,817	8,819
BTM-PV	2,761	7,483	11,068	11,983	12,454
Storage	612	4,118	8,491	14,958	21,339
Total Generation	146,262	156,824	171,974	201,532	245,109
RE Generation	47,261	92,838	128,295	155,606	162,672
ZE Generation	93,301	125,294	164,231	198,876	245,109
Load	151,386	152,317	163,040	185,263	221,828
Load+Charge	151,773	156,824	171,975	201,533	245,109
% RE [RE/Load]	31%	61%	79%	84%	73%
% ZE [ZE/(Load+Charge)]	61%	80%	95%	99%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	13.28	2.92	1.09	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S2 Scenario: Low Capital Cost LBW



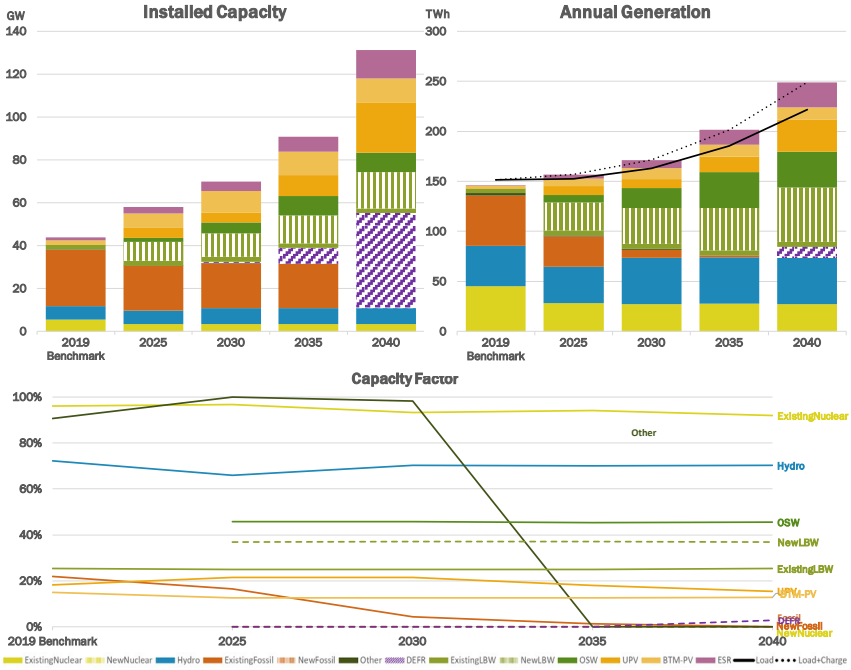
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,346	3,364	3,364
Fossil	26,262	19,854	17,516	15,932	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	819	3,990	27,200
DEFR - LcHo	-	-	-	-	-
Hydro	6,331	6,415	7,660	7,584	7,584
LBW	1,985	7,469	7,547	15,870	19,087
OSW	-	1,826	7,436	9,000	9,720
UPV	32	4,676	4,676	12,453	27,610
BTM-PV	2,116	6,000	9,523	11,601	15,764
Storage	1,405	2,910	4,410	6,068	12,810
Total	43,838	52,710	63,967	90,067	123,140

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	38,349	15,032	9,178	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	-	-	6,702
DEFR - LcHo	-	-	-	-	-
Hydro	40,034	36,418	46,342	46,392	46,391
LBW	4,416	21,559	21,815	48,855	59,362
OSW	-	7,331	28,865	35,203	38,344
UPV	51	8,817	8,816	18,497	36,540
BTM-PV	2,761	7,631	14,461	17,223	23,220
Storage	612	2,708	3,879	8,160	12,577
Total Generation	146,262	153,048	168,553	213,743	250,228
RE Generation	47,261	81,755	120,301	166,170	203,857
ZE Generation	93,301	112,801	151,624	202,668	250,228
Load	151,386	150,047	164,255	204,701	236,334
Load+Charge	151,773	153,049	168,554	213,744	250,228
% RE [RE/Load]	31%	54%	73%	81%	86%
% ZE [ZE/(Load+Charge)]	61%	74%	90%	95%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	16.79	6.88	4.48	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S1 Scenario: Low Capital Cost UPV, LBW & OSW



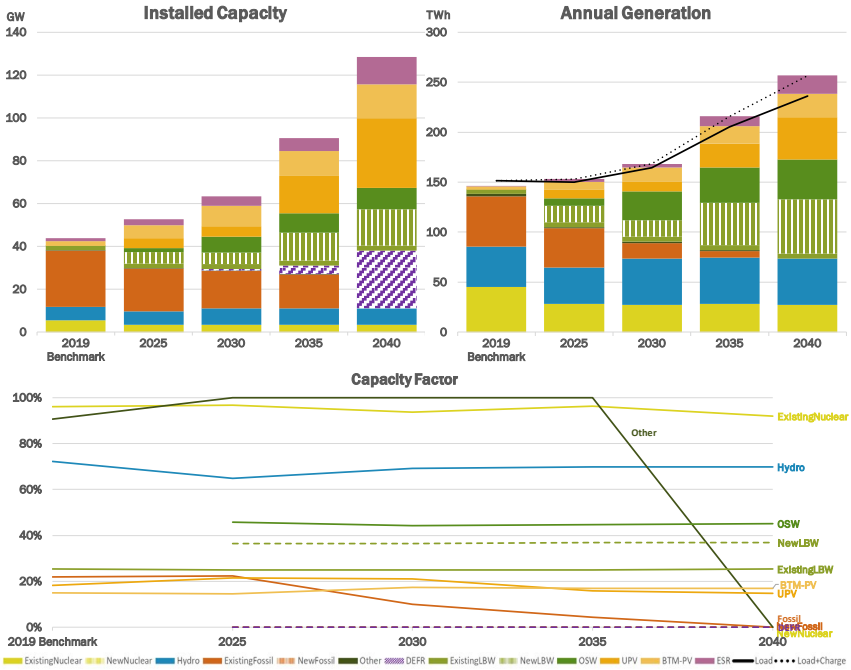
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,364	3,364	3,364
Fossil	26,262	20,913	20,922	20,539	-
DEFR - HcLo	-	-	-	-	1,178
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	469	7,390	43,050
Hydro	6,331	6,302	7,537	7,540	7,540
LBW	1,985	10,967	13,278	15,299	19,087
OSW	-	1,826	5,036	9,000	9,000
UPV	32	4,676	4,676	9,804	23,614
BTM-PV	2,116	6,834	10,055	10,828	11,198
Storage	1,405	2,910	4,410	7,010	13,280
Total	43,838	57,906	70,328	98,165	131,312

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	27,726	27,092
Fossil	50,520	30,122	7,873	2,337	-
DEFR - HcLo	-	-	-	-	10,350
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	-	-	623
Hydro	40,034	36,418	46,342	46,200	46,391
LBW	4,416	33,017	40,671	47,217	59,362
OSW	-	7,331	20,186	35,716	35,902
UPV	51	8,817	8,816	15,433	31,961
BTM-PV	2,761	7,483	11,068	11,983	12,454
Storage	612	4,086	8,011	14,788	24,774
Total Generation	146,262	156,778	171,370	201,400	248,908
RE Generation	47,261	93,066	127,083	156,550	186,069
ZE Generation	93,301	125,490	162,538	199,063	248,908
Load	151,386	152,300	162,910	185,379	221,828
Load+Charge	151,773	156,779	171,371	201,401	248,908
% RE [RE/Load]	31%	61%	78%	84%	84%
% ZE [ZE/(Load+Charge)]	61%	80%	95%	99%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	13.18	3.42	0.97	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S2 Scenario: Low Capital Costs UPV, LBW & OSW



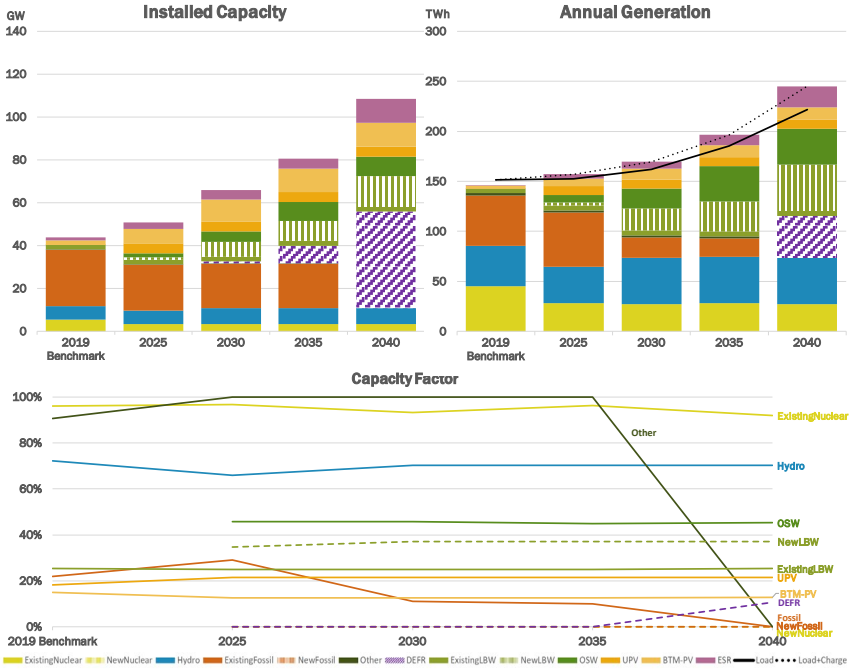
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,346	3,364	3,364
Fossil	26,262	19,897	17,559	15,976	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	819	3,990	27,170
DEFR - LcHo	-	-	-	-	-
Hydro	6,331	6,415	7,660	7,584	7,584
LBW	1,985	7,469	7,547	15,379	19,087
OSW	-	1,826	7,436	9,000	10,098
UPV	32	4,676	5,011	17,385	32,543
BTM-PV	2,116	6,000	9,523	11,601	15,764
Storage	1,405	2,910	4,410	6,218	12,861
Total	43,838	52,669	64,261	94,619	128,471

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	39,100	15,347	6,175	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	-	-	-
Hydro	40,034	36,418	46,342	46,392	46,385
LBW	4,416	21,559	21,815	47,281	59,362
OSW	-	7,331	28,865	35,247	39,936
UPV	51	8,817	9,223	24,252	42,296
BTM-PV	2,761	7,631	14,461	17,223	23,220
Storage	612	2,888	3,787	9,816	18,500
Total Generation	146,262	153,247	168,452	215,891	256,790
RE Generation	47,261	81,755	120,708	170,396	211,198
ZE Generation	93,301	112,981	151,939	208,550	256,790
Load	151,386	150,047	164,255	205,228	236,334
Load+Charge	151,773	153,248	168,452	215,891	256,790
% RE [RE/Load]	31%	54%	73%	83%	89%
% ZE [ZE/(Load+Charge)]	61%	74%	90%	97%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	17.11	7.02	3.25	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S1 Scenario: Low Capital Cost DEFRs



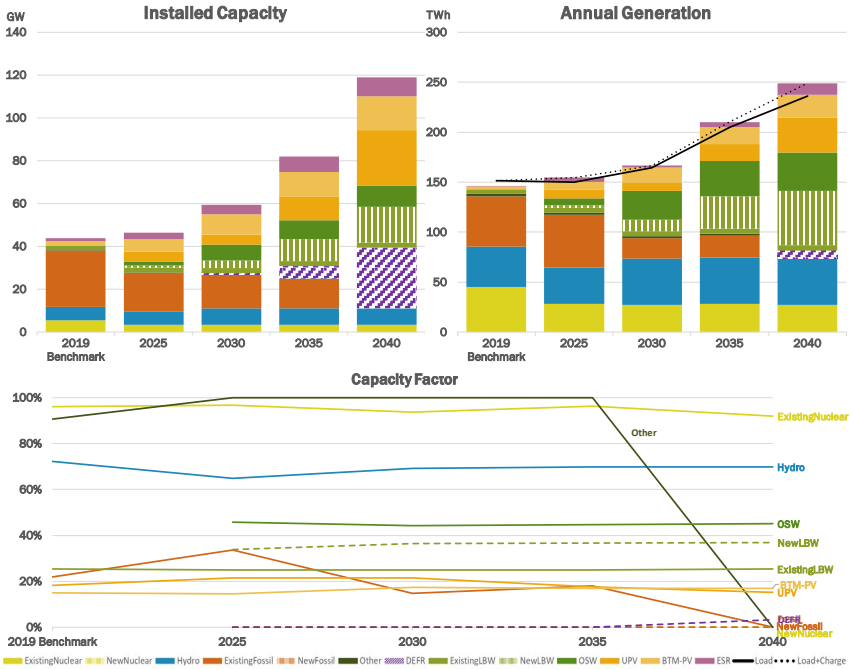
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,364	3,364	3,364
Fossil	26,262	21,310	20,596	20,598	-
DEFR - HcLo	-	-	-	-	4,703
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	856	8,179	40,216
Hydro	6,331	6,302	7,537	7,540	7,540
LBW	1,985	3,335	9,062	11,498	16,561
OSW	-	1,826	5,036	9,000	9,000
UPV	32	4,676	4,676	4,676	4,676
BTM-PV	2,116	6,834	10,055	10,828	11,198
Storage	1,405	2,910	4,410	4,691	11,247
Total	43,838	50,763	66,672	88,778	108,505

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	54,174	19,992	18,190	-
DEFR - HcLo	-	-	-	-	41,312
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	-	-	562
Hydro	40,034	36,418	46,342	46,392	46,377
LBW	4,416	8,189	26,971	34,943	51,495
OSW	-	7,331	20,186	35,460	35,647
UPV	51	8,817	8,816	8,817	8,819
BTM-PV	2,761	7,483	11,068	11,983	12,454
Storage	612	4,347	6,856	10,368	21,226
Total Generation	146,262	157,088	169,667	196,483	244,985
RE Generation	47,261	68,238	113,383	137,595	154,792
ZE Generation	93,301	100,922	147,683	176,301	244,985
Load	151,386	152,336	162,154	185,347	221,828
Load+Charge	151,773	157,089	169,668	196,483	244,985
% RE [RE/Load]	31%	45%	70%	74%	70%
% ZE [ZE/(Load+Charge)]	61%	64%	87%	90%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	23.53	8.33	7.61	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S2 Scenario: Low Capital Cost DEFRs



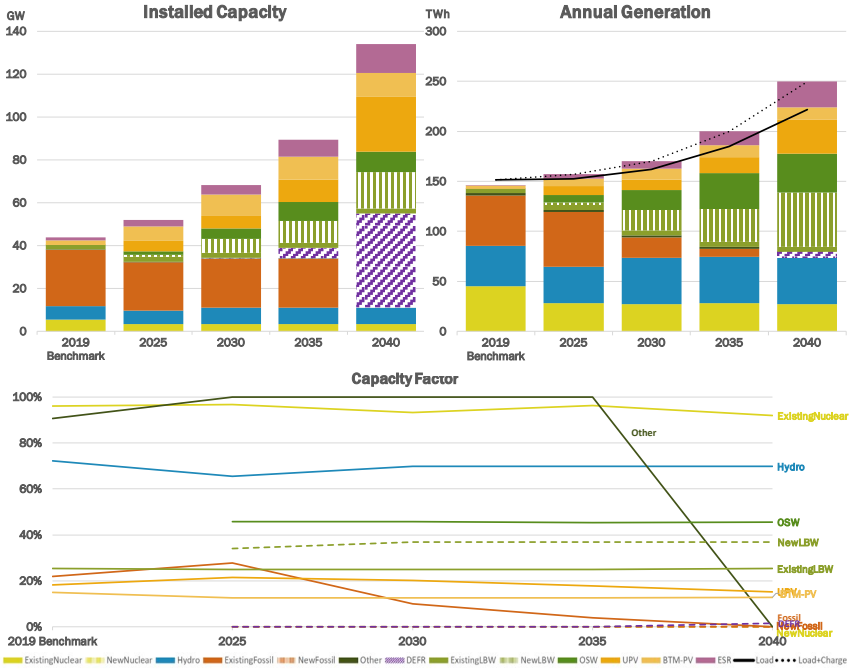
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,346	3,364	3,364
Fossil	26,262	17,844	15,506	13,858	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	819	5,872	28,418
DEFR - LcHo	-	-	-	-	-
Hydro	6,331	6,415	7,661	7,584	7,585
LBW	1,985	3,138	5,890	12,366	19,087
OSW	-	1,826	7,436	9,000	9,720
UPV	32	4,676	4,676	10,959	26,070
BTM-PV	2,116	6,000	9,523	11,601	15,764
Storage	1,405	2,910	4,410	7,010	8,907
Total	43,838	46,379	60,310	87,713	118,915

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	52,443	20,078	21,754	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	-	-	8,314
DEFR - LcHo	-	-	-	-	-
Hydro	40,034	36,418	46,342	46,392	46,391
LBW	4,416	7,518	16,494	37,460	59,362
OSW	-	7,331	28,865	35,247	38,388
UPV	51	8,817	8,816	16,820	34,801
BTM-PV	2,761	7,631	14,461	17,223	23,220
Storage	612	4,071	2,194	4,854	11,335
Total Generation	146,262	154,558	166,687	210,080	248,903
RE Generation	47,261	67,715	114,979	153,142	202,162
ZE Generation	93,301	100,123	144,617	186,334	248,903
Load	151,386	150,047	164,255	204,701	236,403
Load+Charge	151,773	154,559	166,687	210,081	248,903
% RE [RE/Load]	31%	45%	70%	75%	86%
% ZE [ZE/(Load+Charge)]	61%	65%	87%	89%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	22.88	8.98	9.67	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S1 Scenario: High Capital Cost DEFRs



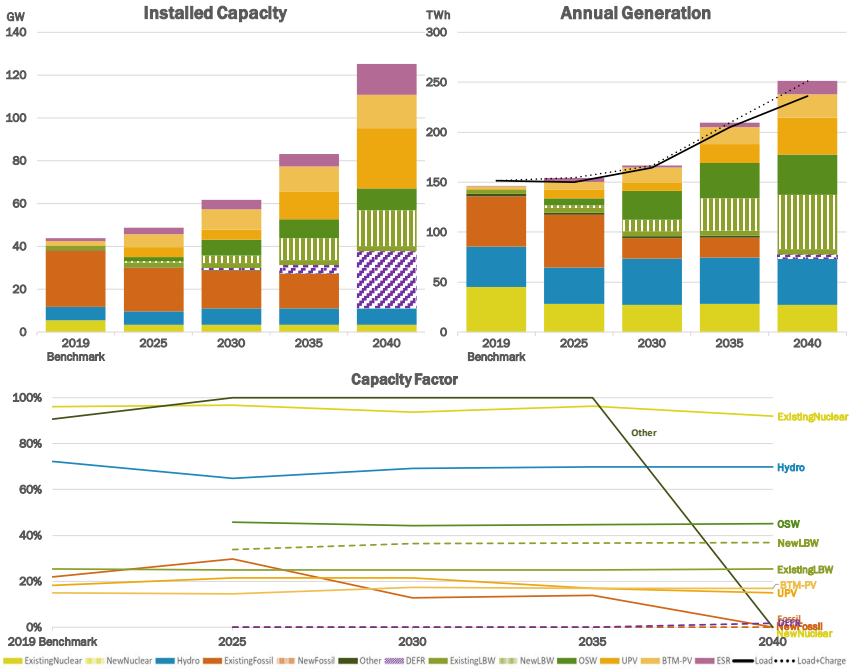
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,364	3,364	3,364
Fossil	26,262	22,494	22,921	22,935	-
DEFR - HcLo	-	-	-	-	582
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	276	4,811	43,555
Hydro	6,331	6,346	7,581	7,584	7,584
LBW	1,985	3,188	8,656	12,465	19,087
OSW	-	1,826	5,036	9,000	9,720
UPV	32	4,676	5,783	10,372	25,483
BTM-PV	2,116	6,834	10,055	10,828	11,198
Storage	1,405	2,910	4,410	7,797	13,467
Total	43,838	51,843	68,585	94,192	134,040

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	54,677	20,059	7,781	-
DEFR - HcLo	-	-	-	-	5,111
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	-	-	796
Hydro	40,034	36,418	46,342	46,392	46,391
LBW	4,416	7,688	25,543	37,796	59,362
OSW	-	7,331	20,186	35,716	38,854
UPV	51	8,817	10,244	16,114	34,095
BTM-PV	2,761	7,483	11,068	11,983	12,454
Storage	612	4,351	7,241	13,747	25,595
Total Generation	146,262	157,094	170,119	199,860	249,750
RE Generation	47,261	67,737	113,383	148,002	191,155
ZE Generation	93,301	100,426	148,068	190,087	249,750
Load	151,386	152,339	162,198	184,697	221,679
Load+Charge	151,773	157,095	170,119	199,860	249,750
% RE [RE/Load]	31%	44%	70%	80%	86%
% ZE [ZE/(Load+Charge)]	61%	64%	87%	95%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	23.74	8.58	3.43	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S2 Scenario: High Capital Cost DEFRs



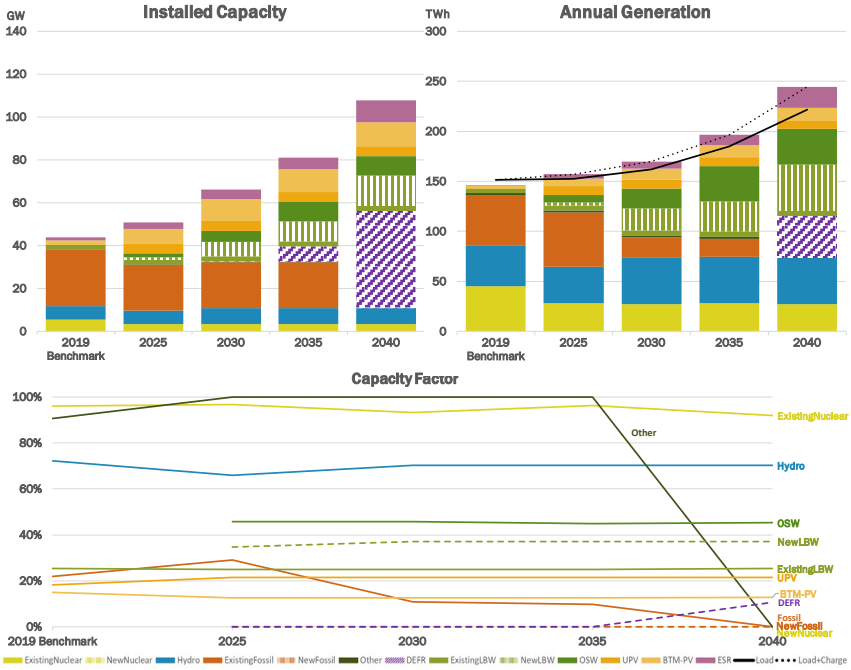
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,346	3,364	3,364
Fossil	26,262	20,112	17,773	16,195	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	819	3,990	26,842
DEFR - LcHo	-	-	-	-	-
Hydro	6,331	6,415	7,660	7,584	7,584
LBW	1,985	3,138	5,890	12,366	19,087
OSW	-	1,826	7,436	9,000	10,211
UPV	32	4,676	4,676	12,870	27,981
BTM-PV	2,116	6,000	9,523	11,601	15,764
Storage	1,405	2,910	4,410	5,843	14,410
Total	43,838	48,646	62,577	87,029	125,244

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	52,437	20,066	19,594	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	-	-	4,341
DEFR - LcHo	-	-	-	-	-
Hydro	40,034	36,418	46,342	46,392	46,391
LBW	4,416	7,518	16,494	37,460	59,362
OSW	-	7,331	28,865	35,247	40,402
UPV	51	8,817	8,816	18,968	36,949
BTM-PV	2,761	7,631	14,461	17,223	23,220
Storage	612	4,007	2,086	4,281	13,613
Total Generation	146,262	154,488	166,567	209,495	251,370
RE Generation	47,261	67,715	114,979	155,291	206,324
ZE Generation	93,301	100,059	144,509	187,910	251,370
Load	151,386	150,047	164,255	204,791	236,334
Load+Charge	151,773	154,488	166,567	209,496	251,370
% RE [RE/Load]	31%	45%	70%	76%	87%
% ZE [ZE/(Load+Charge)]	61%	65%	87%	90%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	22.86	8.98	8.78	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S1 Scenario: Low Operating Costs DEFRs



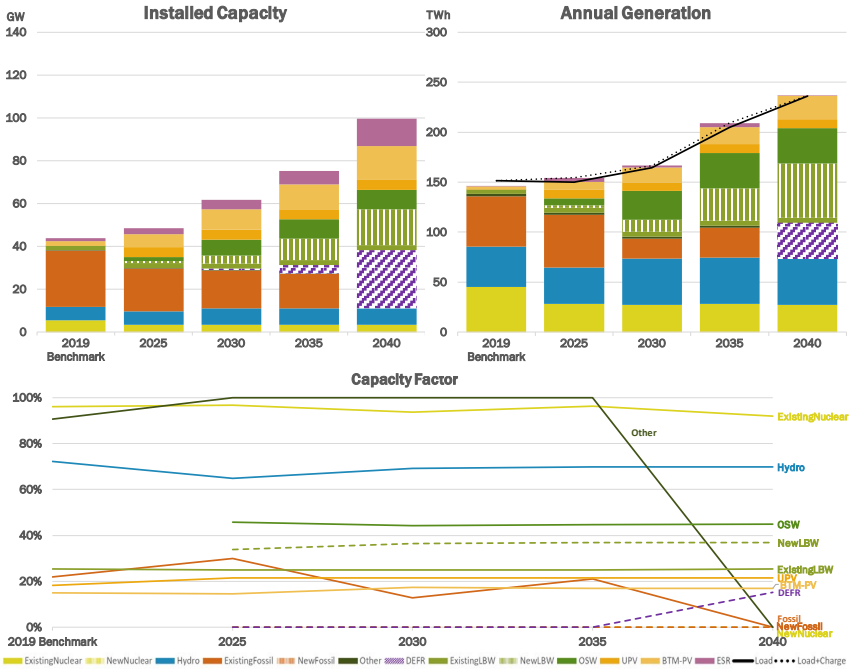
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,364	3,364	3,364
Fossil	26,262	21,310	21,234	21,236	-
DEFR - HcLo	-	-	-	-	4,621
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	420	7,371	40,639
Hydro	6,331	6,302	7,537	7,540	7,540
LBW	1,985	3,335	9,062	11,494	16,557
OSW	-	1,826	5,036	9,000	9,000
UPV	32	4,676	4,676	4,676	4,676
BTM-PV	2,116	6,834	10,055	10,828	11,198
Storage	1,405	2,910	4,410	5,191	10,155
Total	43,838	50,763	66,438	88,296	107,750

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	54,174	19,986	18,019	-
DEFR - HcLo	-	-	-	-	40,587
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	-	-	1,255
Hydro	40,034	36,418	46,342	46,392	46,391
LBW	4,416	8,189	26,971	34,929	51,482
OSW	-	7,331	20,186	35,460	35,647
UPV	51	8,817	8,816	8,817	8,819
BTM-PV	2,761	7,483	11,068	11,983	12,454
Storage	612	4,347	7,015	10,454	20,895
Total Generation	146,262	157,088	169,820	196,385	244,621
RE Generation	47,261	68,238	113,383	137,581	154,792
ZE Generation	93,301	100,922	147,842	176,374	244,621
Load	151,386	152,336	162,117	184,969	221,828
Load+Charge	151,773	157,089	169,820	196,385	244,621
% RE [RE/Load]	31%	45%	70%	74%	70%
% ZE [ZE/(Load+Charge)]	61%	64%	87%	90%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	23.53	8.53	7.75	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S2 Scenario: Low Operating Costs DEFRs



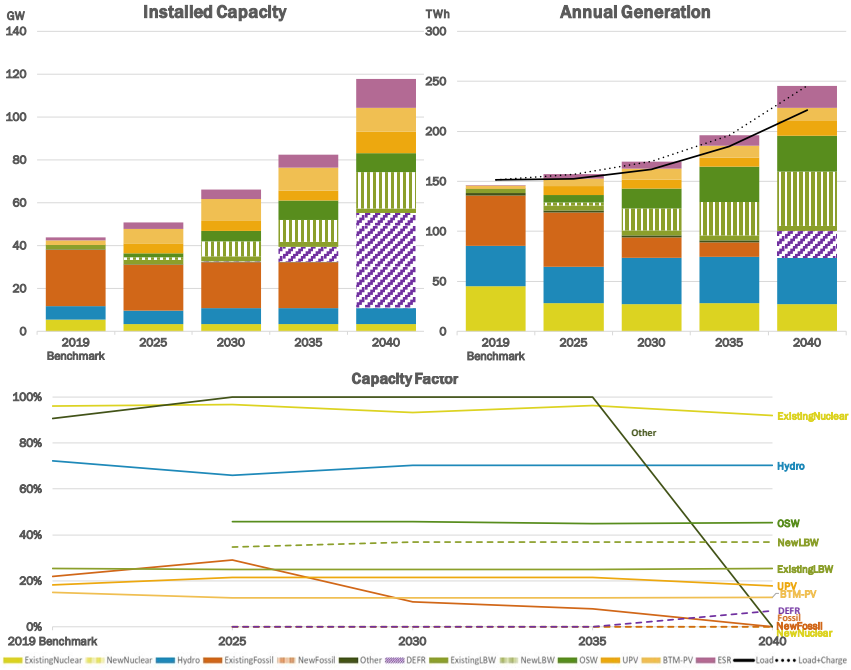
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,346	3,364	3,364
Fossil	26,262	19,988	17,650	16,071	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	819	3,990	27,237
DEFR - LcHo	-	-	-	-	-
Hydro	6,331	6,415	7,660	7,584	7,584
LBW	1,985	3,138	5,979	12,437	19,087
OSW	-	1,826	7,436	9,000	9,000
UPV	32	4,676	4,676	4,676	4,676
BTM-PV	2,116	6,000	9,523	11,601	15,764
Storage	1,405	2,910	4,410	6,137	12,810
Total	43,838	48,523	62,543	79,075	99,523

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	52,437	19,778	29,494	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	-	-	36,031
DEFR - LcHo	-	-	-	-	-
Hydro	40,034	36,418	46,342	46,392	46,391
LBW	4,416	7,518	16,790	37,701	59,362
OSW	-	7,331	28,865	35,203	35,392
UPV	51	8,817	8,816	8,817	8,819
BTM-PV	2,761	7,631	14,461	17,223	23,220
Storage	612	4,007	2,147	4,118	136
Total Generation	146,262	154,488	166,636	209,278	236,442
RE Generation	47,261	67,715	115,276	145,336	173,184
ZE Generation	93,301	100,059	144,866	177,792	236,442
Load	151,386	150,047	164,255	204,725	236,334
Load+Charge	151,773	154,488	166,637	209,279	236,442
% RE [RE/Load]	31%	45%	70%	71%	73%
% ZE [ZE/(Load+Charge)]	61%	65%	87%	85%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	22.87	8.87	12.92	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S1 Scenario: High Operating Costs DEFRs



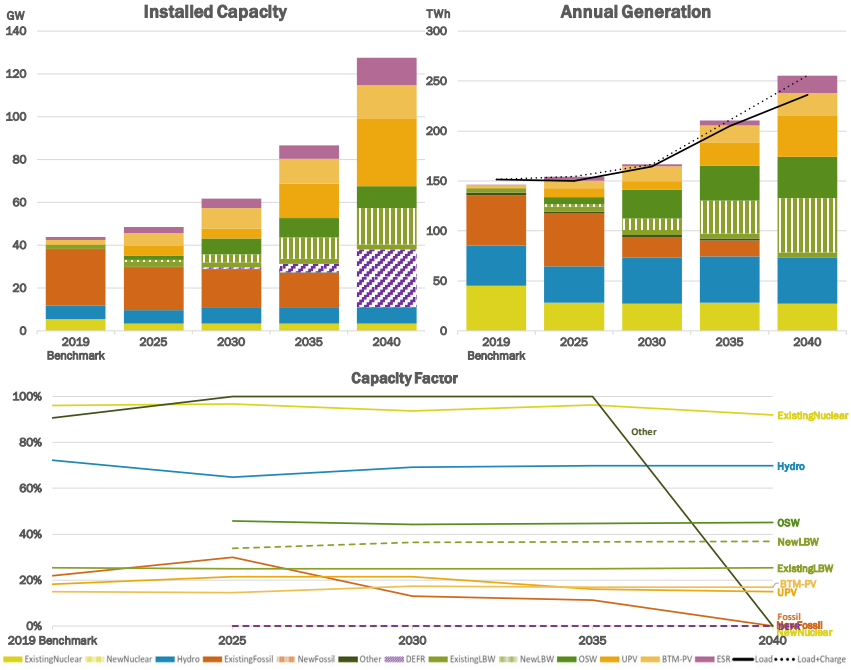
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,364	3,364	3,364
Fossil	26,262	21,310	21,232	21,234	-
DEFR - HcLo	-	-	-	-	3,049
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	420	6,985	41,163
Hydro	6,331	6,302	7,537	7,540	7,540
LBW	1,985	3,335	9,086	12,612	19,087
OSW	-	1,826	5,036	9,000	9,000
UPV	32	4,676	4,676	4,676	9,863
BTM-PV	2,116	6,834	10,055	10,828	11,198
Storage	1,405	2,910	4,410	5,956	13,357
Total	43,838	50,763	66,461	89,404	117,622

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	54,174	19,987	14,459	-
DEFR - HcLo	-	-	-	-	26,783
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	-	-	374
Hydro	40,034	36,418	46,342	46,392	46,377
LBW	4,416	8,189	26,971	38,297	59,362
OSW	-	7,331	20,186	35,460	35,647
UPV	51	8,817	8,816	8,817	15,440
BTM-PV	2,761	7,483	11,068	11,983	12,454
Storage	612	4,347	7,004	10,141	21,886
Total Generation	146,262	157,088	169,810	195,879	245,415
RE Generation	47,261	68,238	113,383	140,949	169,280
ZE Generation	93,301	100,922	147,831	179,428	245,415
Load	151,386	152,336	162,122	184,697	221,277
Load+Charge	151,773	157,088	169,811	195,879	245,415
% RE [RE/Load]	31%	45%	70%	76%	77%
% ZE [ZE/(Load+Charge)]	61%	64%	87%	92%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	23.53	8.50	6.20	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S2 Scenario: High Operating Costs DEFRs



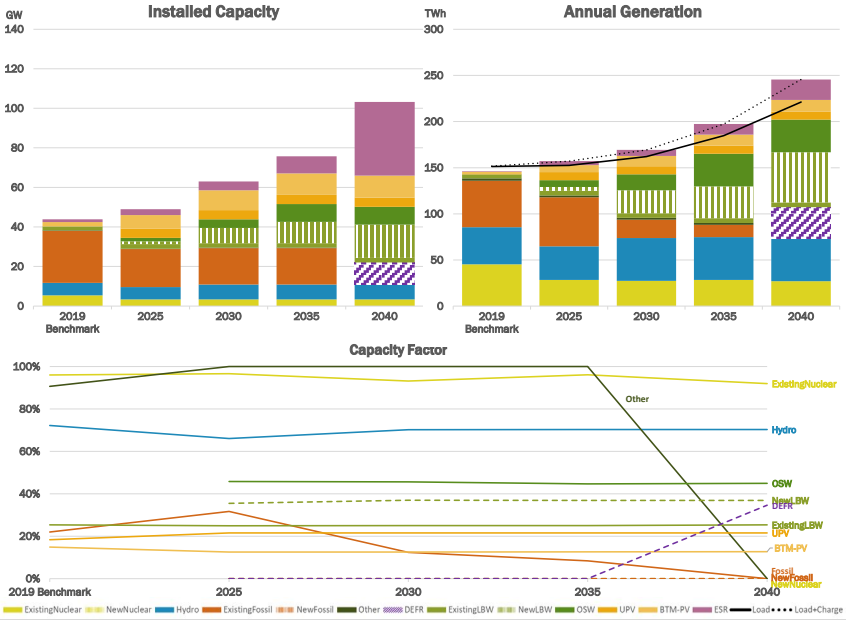
Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,346	3,364	3,364
Fossil	26,262	19,988	17,650	16,071	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	819	3,990	27,163
DEFR - LcHo	-	-	-	-	-
Hydro	6,331	6,415	7,660	7,584	7,584
LBW	1,985	3,138	5,890	12,366	19,087
OSW	-	1,826	7,436	9,000	10,440
UPV	32	4,676	4,676	16,130	31,288
BTM-PV	2,116	6,000	9,523	11,601	15,764
Storage	1,405	2,910	4,410	6,147	12,810
Total	43,838	48,523	62,454	90,469	127,500

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	52,437	20,066	15,953	-
DEFR - HcLo	-	-	-	-	-
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	-	-	-
Hydro	40,034	36,418	46,342	46,392	46,391
LBW	4,416	7,518	16,494	37,460	59,362
OSW	-	7,331	28,865	35,232	41,325
UPV	51	8,817	8,816	22,740	40,784
BTM-PV	2,761	7,631	14,461	17,223	23,220
Storage	612	4,007	2,086	5,374	17,419
Total Generation	146,262	154,488	166,567	210,706	255,593
RE Generation	47,261	67,715	114,979	159,048	211,082
ZE Generation	93,301	100,059	144,509	192,761	255,593
Load	151,386	150,047	164,255	204,789	236,334
Load+Charge	151,773	154,488	166,567	210,706	255,593
% RE [RE/Load]	31%	45%	70%	78%	89%
% ZE [ZE/(Load+Charge)]	61%	65%	87%	91%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	22.87	8.98	7.28	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo)

S1 Scenario: Remove Declining Capacity Value Curves



Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,364	3,364	3,364
Fossil	26,262	19,186	18,424	18,426	-
DEFR - HoLo	-	-	-	-	3,853
DEFR - MoMo	-	-	-	-	-
DEFR - LoHo	-	-	-	-	7,306
Hydro	6,331	6,294	7,529	7,532	7,532
LBW	1,985	3,636	9,969	13,013	19,087
OSW	-	1,826	4,316	9,000	9,000
UPV	32	4,676	4,676	4,676	4,676
BTM-PV	2,116	6,834	10,055	10,828	11,198
Storage	1,405	2,910	4,410	8,668	37,247
Total	43,838	48,932	62,968	75,732	103,264

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	53,251	19,896	13,467	-
DEFR - HoLo	-	-	-	-	33,849
DEFR - MoMo	-	-	-	-	-
DEFR - LoHo	-	-	-	-	-
Hydro	40,034	36,416	46,341	46,392	46,391
LBW	4,416	9,192	29,910	39,633	59,362
OSW	-	7,331	17,248	35,247	35,436
UPV	51	8,817	8,816	8,817	8,819
BTM-PV	2,761	7,483	11,068	11,983	12,454
Storage	612	4,374	6,598	11,496	22,176
Total Generation	146,262	157,194	169,313	197,365	245,579
RE Generation	47,261	69,239	113,383	142,072	162,461
ZE Generation	93,301	101,951	147,426	181,906	245,579
Load	151,386	152,472	162,015	184,697	221,132
Load+Charge	151,773	157,194	169,314	197,365	245,579
% RE [RE/Load]	31%	45%	70%	77%	73%
% ZE [ZE/(Load+Charge)]	61%	65%	87%	92%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	23.15	8.32	5.58	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HoLo)

S2 Scenario: Remove Declining Capacity Value Curve

Installed Capacity (MW)	2019	2025	2030	2035	2040
Nuclear	5,400	3,346	3,346	3,364	3,364
Fossil	26,262	15,271	11,088	9,341	-
DEFR - HoLo	-	-	-	-	-
DEFR - MoMo	-	-	-	-	-
DEFR - LoHo	-	-	-	-	-
Hydro	6,331	6,370	7,616	7,539	7,539
LBW	1,985	3,138	7,547	12,904	19,087
OSW	-	1,826	4,316	9,000	10,440
UPV	32	4,676	9,870	16,110	31,220
BTM-PV	2,116	6,000	9,523	11,601	15,764
Storage	1,405	3,565	4,410	8,595	27,997
Total	43,838	44,416	57,939	78,679	115,412

Generation (GWh)	2019	2025	2030	2035	2040
Nuclear	45,429	28,338	27,444	28,338	27,092
Fossil	50,520	52,539	20,279	14,248	-
DEFR - HoLo	-	-	-	-	-
DEFR - MoMo	-	-	-	-	-
DEFR - LoHo	-	-	-	-	-
Hydro	40,034	36,418	46,342	46,392	46,391
LBW	4,416	7,518	21,815	39,247	59,362
OSW	-	7,331	17,248	35,247	41,340
UPV	51	8,817	15,112	22,738	40,719
BTM-PV	2,761	7,631	14,461	17,223	23,220
Storage	612	4,962	4,058	6,694	17,428
Total Generation	146,262	155,545	168,752	212,119	255,551
RE Generation	47,261	67,715	114,979	160,847	211,031
ZE Generation	93,301	101,014	146,481	195,879	255,551
Load	151,386	150,047	164,255	204,701	236,334
Load+Charge	151,773	155,545	168,753	212,119	255,551
% RE [RE/Load]	31%	45%	70%	79%	89%
% ZE [ZE/(Load+Charge)]	61%	65%	87%	92%	100%

Emissions (million tons)	2019	2025	2030	2035	2040
CO_2 Emissions	22.24	23.36	8.42	5.86	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HoLo)