Preliminary Generation Expansion and Retirement Results for 2024-LTSA Current Trends

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Assumptions for Current Trends

- Energy Exemplar (vendor for the capacity expansion model) implemented the ORDC modifications for the bridging solution to Phase 2 of Market Redesign.
- The amount of Large Flexible Loads (LFLs) are assumed to start with 5.84 GW at 2025 and increase to 7.36 GW by 2028 and stay constant for the rest of the study period.
- LFL curtailment is modeled as price-responsive demand
  - 60% of LFLs at $100/MWh, this is an energy only curtailment for the standard mining equipment
  - 30% of LFLs at $200/MWh, this is also an energy only curtailment targeted toward LFLs with more efficient/newer crypto mining equipment that can curtail at higher price
  - 10% of LFLs at $1,000/MWh, this is for miners that are less price responsive to real time price swings
- None of the EPA proposed environmental regulations are modeled in Current Trends. Some of these environmental regulations will be considered in the other 2024 LTSA scenarios.

New Unit Capital Costs for 2024 LTSA, Overnight Costs, Nominal $/KW

	Combined Cycle single-shaft	Combined Cycle multi-shaft	Combustion turbine	Combustion Turbine Advanced	Nuclear light water reactor	Wind	Solar	Battery storage 2 hours	Battery Storage 4 hours	Battery Storage 8 hours
2023	975	862	925	561	11,200	1,362	1,050	891	1,535	2,822
2024	987	850	936	543	11,062	1,379	1,022	888	1,529	2,811
2025	997	847	946	536	11,142	1,393	1,015	883	1,520	2,795
2026	1,009	849	957	534	11,230	1,409	1,016	878	1,512	2,780
2027	1,019	850	967	531	11,305	1,423	1,011	872	1,501	2,760
2028	1,029	854	976	531	11,373	1,437	1,009	865	1,489	2,738
2029	1,037	859	984	534	11,428	1,449	1,007	857	1,475	2,712
2030	1,045	863	991	535	11,472	1,460	1,005	847	1,459	2,682
2031	1,053	868	999	538	11,518	1,471	1,004	838	1,442	2,652
2032	1,061	873	1,006	540	11,562	1,481	1,006	828	1,425	2,620
2033	1,069	877	1,014	541	11,609	1,493	1,008	818	1,408	2,589
2034	1,077	882	1,022	544	11,659	1,505	1,011	808	1,391	2,557
2035	1,085	889	1,029	548	11,701	1,516	1,012	797	1,372	2,522
2036	1,093	896	1,036	552	11,738	1,526	1,013	789	1,358	2,497
2037	1,101	904	1,045	557	11,785	1,538	1,016	798	1,373	2,525
2038	1,109	911	1,052	562	11,827	1,549	1,017	806	1,388	2,552
2039	1,117	918	1,060	567	11,867	1,561	1,019	815	1,403	2,579

- Sources of capital cost assumptions:
  - Lazard's Levelized Cost of Energy Analysis (V16), April 2023
  - NREL Cost Projections for Utility-Scale Battery Storage 2022
  - EIA AEO 2022

Sources:
https://www.lazard.com/research-insights/levelized-cost-of-energyplus/
https://atb.nrel.gov/electricity/2022/utility-scale_battery_storage
https://www.eia.gov/outlooks/aeo/

Starting Capacity Mix Overview

- Operational resources are from the May 2023 CDR report, and planned resources meeting Planning Guide Section 6.9(1) requirements are obtained from the March 2023 GIS report .

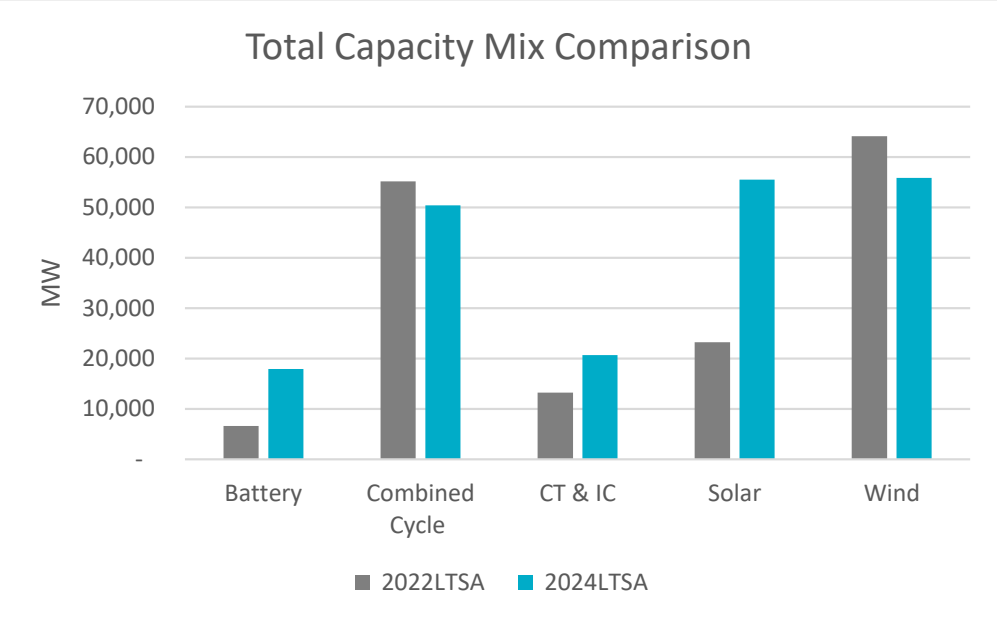
	2022LTSA - Current Trends (MW)				2024LTSA - Current Trends (MW)			
	Operational Resources	Planned Resources	Retirements	Net Total Starting Capacity	Operational Resources	Planned Resources	Retirements	Net Total Starting Capacity
Battery	235	1,807	-	2,042	2,335	6,523	-	8,858
Combined Cycle	37,478	86	1,918	35,645	40,138	551	4,352	36,337
CT & IC	12,616	860	711	12,765	11,733	900	1,206	11,427
Gas Steam	11,620	60	8,819	2,861	11,155	60	10,766	449
Solar	4,095	13,332	-	17,427	9,940	23,312	-	33,252
Wind	25,203	11,821	-	37,024	31,495	7,276	-	38,771
Coal	13,630	-	8,116	5,513	13,630	-	10,987	2,643
Hydro	536	-	-	536	593	-	-	593
Nuclear	5,153	-	-	5,153	5,153	-	-	5,153
Other	920	-	105	815	790	-	105	685
Total	111,485	27,965	19,670	119,781	126,961	38,622	27,416	138,168

- Two combined cycles, Midlothian and Hays, are recategorized from CT to Combined Cycles in 2024 LTSA
- Retirements include economic retirements from model, fixed age retirements (Coal units retire after 45 years and gas units retire after 60 years), permanent mothballed units and unconfirmed retirement capacities from May 2023 CDR

15-Year Total Capacity Mix Comparison (2025 to 2039)

- The total capacity mix of 2024LTSA include an additional 32 GW of Solar, 11 GW of Battery and 2.7 GW of CC and CT resources compare to 2022LTSA.

	2022LTSA - Current Trends (MW)			2024LTSA - Current Trends (MW)		
	Net Total Starting Capacity	Capacity Expansion	Total Capacity Mix	Net Total Starting Capacity	Capacity Expansion	Total Capacity Mix
Battery	2,042	4,557	6,598	8,858	9,032	17,890
Combined Cycle	35,645	19,494	55,139	36,337	14,079	50,416
CT & IC	12,765	474	13,239	11,427	9,243	20,670
Gas Steam	2,861	-	2,861	449	-	449
Solar	17,427	5,800	23,227	33,252	22,217	55,469
Wind	37,024	27,100	64,124	38,771	17,100	55,871
Coal	5,513	-	5,513	2,643	-	2,643
Hydro	536	-	536	593	-	593
Nuclear	5,153	-	5,153	5,153	-	5,153
Other	815	-	815	685	-	685
Total	119,781	57,425	177,205	138,168	71,671	209,838



Preliminary Results of 2024 LTSA Current Trends

Description	Units	2025	2029	2034	2039	Total
CC Adds	MW	-	3,249	5,415	5,415	14,079
CT Adds	MW	-	2,133	3,555	3,555	9,243
Storage Adds	MW	-	3,895	1,412	3,724	9,032
Solar Adds	MW	800	4,900	11,400	5,117	22,217
Wind Adds	MW	1,800	6,300	4,800	4,200	17,100
Annual Capacity Additions	MW	2,600	20,477	26,582	22,011	
Cumulative Capacity Additions	MW	2,600	23,077	49,660	71,671	
Retirements	MW	11,992	3,241	7,259	4,924	
Cumulative Retirements	MW	11,992	15,233	22,492	27,416	
Coincident Peak	MW	96,122	102,055	108,811	115,734	
Peak Net Load (1)	MW	70,871	74,453	79,955	86,884	
Minimum Net load (1)	MW	10,794	9,176	9,734	9,415	
Annual Energy	GWh	561,975	613,690	659,772	711,078	
Average LMP	$/MWh	32.28	31.06	40.49	52.88	
Natural Gas Price	$/MMbtu	3.80	3.35	4.75	5.64	
Average Market Heat Rate	MMbtu/MWh	8.49	9.26	8.52	9.38	
Natural Gas Generation	%	42.0	44.3	40.7	40.6	
Coal Generation	%	9.6	3.3	2.9	2.5	
Wind Generation	%	27.0	30.2	31.6	32.2	
Solar Generation	%	13.6	15.2	18.3	18.6	
Scarcity Hours	HRS	-	-	-	1	
Unserved Energy	GWhs	-	-	-	1.9	
Large Flexible Load Curtailment Hours	Hours	131	99	144	336	
Large Flexible Load Curtailment Energy	GWhs	310	287	432	1,007	

(1) Hourly Net Load = Total Demand – Hourly Wind Output – Hourly Solar Output

Questions

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