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Jimmy Glotfelty
Commissioner



Greg Abbott
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Thomas J. Gleeson
Executive Director

Public Utility Commission of Texas

TO: Interested Persons

FROM: Therese Harris, Infrastructure Division

DATE: November 5, 2021

RE: Project No. 38578 - Energy Efficiency Implementation Project under 16 TAC
§ 25.181(q)

Avoided Cost of Capacity for the 2022 Program Year

As shown below from the United States Department of Energy's Energy Information Administration's (EIA) Cost and Performance Characteristics of New Central Station Electricity Generating Technologies associated with EIA's Annual Energy Outlook 2021, the base overnight cost of a combustion turbine—industrial frame is \$626 per kilowatt (kW) in the Texas Reliability Entity or Electric Reliability Council of Texas (ERCOT) region. Because this amount is less than the \$700 per kW threshold set by 16 Texas Administrative Code (TAC) § 25.181(d)(2)(A)(ii), the avoided cost of capacity is \$80 per kW-year for 2022.

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Table 1. Cost and performance characteristics of new central station electricity generating technologies

Technology	First available year ¹	Size (MW)	Lead time (years)	Base overnight cost ² (2020 \$/kW)	Technological optimism factor ³	Total overnight cost ^{4,5} (2020 \$/kW)	Variable O&M ⁶ (2020 \$/MWh)	Fixed O&M (2020\$/kW-yr)	Heat rate ⁷ (Btu/kWh)
Ultra-supercritical coal (USC)	2024	650	4	3,672	1.00	3,672	4.52	40.79	8,638
USC with 30% carbon capture and sequestration (CCS)	2024	650	4	4,550	1.01	4,595	7.11	54.57	9,751
USC with 90% CCS	2024	650	4	5,861	1.02	5,978	11.03	59.85	12,507
Combined-cycle—single shaft	2023	418	3	1,082	1.00	1,082	2.56	14.17	6,431
Combined-cycle—multi shaft	2023	1,083	3	957	1.00	957	1.88	12.26	6,370
Combined-cycle with 90% CCS	2023	377	3	2,471	1.04	2,570	5.87	27.74	7,124
Internal combustion engine	2022	21	2	1,813	1.00	1,813	5.72	35.34	8,295
Combustion turbine— aeroderivative ⁸	2022	105	2	1,169	1.00	1,169	4.72	16.38	9,124
Combustion turbine—industrial frame	2022	237	2	709	1.00	709	4.52	7.04	9,905
Fuel cells	2023	10	3	6,277	1.09	6,866	0.59	30.94	6,469
Nuclear—light water reactor	2026	2,156	6	6,034	1.05	6,336	2.38	122.26	10,455
Nuclear—small modular reactor	2028	600	6	6,183	1.10	6,802	3.02	95.48	10,455
Distributed generation—base	2023	2	3	1,560	1.00	1,560	8.65	19.46	8,935
Distributed generation—peak	2022	1	2	1,874	1.00	1,874	8.65	19.46	9,921
Battery storage	2021	50	1	1,165	1.00	1,165	0.00	24.93	NA
Biomass	2024	50	4	4,077	1.00	4,078	4.85	126.36	13,500
Geothermal ^{9,10}	2024	50	4	2,772	1.00	2,772	1.17	137.50	8,946
Municipal solid waste—landfill gas	2023	36	3	1,566	1.00	1,566	6.23	20.20	8,513
Conventional hydropower ¹⁰	2024	100	4	2,769	1.00	2,769	1.40	42.01	NA
Wind ⁵	2023	200	3	1,846	1.00	1,846	0.00	26.47	NA
Wind offshore ⁹	2024	400	4	4,362	1.25	5,453	0.00	110.56	NA
Solar thermal ⁹	2023	115	3	7,116	1.00	7,116	0.00	85.82	NA
Solar photovoltaic (PV) with tracking ^{5,9,11}	2022	150	2	1,248	1.00	1,248	0.00	15.33	NA
Solar PV with storage ^{9,11}	2022	150	2	1,612	1.00	1,612	0.00	32.33	NA

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Table 2. Total overnight capital costs of new electricity generating technologies by region

2020 dollars per kilowatt

Technology	1 TRE	2 FRCC	3 MISW	4 MISC	5 MISE	6 MISS	7 ISNE	8 NYCW	9 NYUP	10 PJME	11 PJMW	12 PJMC	13 PJMD
Ultra-supercritical coal (USC)	3,412	3,512	3,838	3,939	3,985	3,531	4,255	NA	4,159	4,293	3,662	4,614	3,952
USC with 30% CCS	4,308	4,422	4,774	4,903	4,942	4,450	5,272	NA	5,167	5,306	4,594	5,640	4,939
USC with 90% CCS	5,642	5,786	6,173	6,381	6,387	5,841	6,764	NA	6,590	6,775	5,956	7,214	6,331
CC—single shaft	977	997	1,112	1,122	1,151	1,006	1,298	1,722	1,301	1,300	1,078	1,302	1,241
CC—multi shaft	851	872	989	1,006	1,032	882	1,134	1,554	1,115	1,140	934	1,196	1,054
CC with 90% CCS	2,410	2,432	2,599	2,605	2,645	2,455	2,729	3,091	2,667	2,707	2,489	2,822	2,593
Internal combustion engine	1,705	1,743	1,862	1,936	1,915	1,766	1,984	2,487	1,909	1,985	1,778	2,164	1,847
CT—aeroderivative	1,034	1,056	1,223	1,226	1,263	1,077	1,315	1,684	1,269	1,308	1,122	1,437	1,190
CT—industrial frame	626	639	742	746	768	653	801	1,033	771	797	680	877	723
Fuel cells	6,589	6,691	6,997	7,299	7,160	6,804	7,428	8,745	7,126	7,364	6,784	7,851	6,993
Nuclear—light water reactor	5,981	6,110	6,450	7,036	6,786	6,309	7,177	NA	6,696	7,013	6,199	7,711	6,451
Nuclear—small modular reactor	6,338	6,486	7,066	7,369	7,366	6,567	7,608	NA	7,246	7,623	6,648	8,506	6,904
Dist. generation—base	1,408	1,437	1,603	1,618	1,659	1,450	1,871	2,482	1,876	1,874	1,554	1,877	1,788
Dist. Generation—peak	1,657	1,692	1,959	1,965	2,024	1,727	2,108	2,698	2,034	2,096	1,798	2,303	1,907
Battery storage	1,165	1,168	1,151	1,207	1,168	1,192	1,201	1,196	1,169	1,173	1,162	1,177	1,173
Biomass	3,784	3,887	4,208	4,348	4,358	3,919	4,842	6,572	4,857	4,942	4,156	4,951	4,736
Geothermal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MSW—landfill gas	1,476	1,508	1,606	1,673	1,652	1,530	1,713	2,133	1,647	1,711	1,538	1,861	1,596
Conventional hydropower	4,040	4,935	1,963	1,305	2,657	3,932	1,819	NA	3,722	3,866	3,370	NA	3,420
Wind	2,477	NA	1,395	1,268	1,518	1,268	1,680	NA	2,049	1,680	1,268	1,846	1,750
Wind offshore	5,325	6,390	6,304	NA	6,529	NA	6,360	5,486	6,652	6,097	4,985	7,219	5,679
Solar thermal	6,865	6,969	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Solar PV with tracking	1,214	1,191	1,232	1,278	1,264	1,202	1,276	1,501	1,264	1,301	1,229	1,341	1,226
Solar PV with storage	1,561	1,577	1,624	1,677	1,653	1,593	1,687	1,917	1,656	1,690	1,588	1,757	1,643

NA = not available; plant type cannot be built in the region because of a lack of resources, sites, or specific state legislation.

USC = ultra-supercritical, CCS = carbon capture and sequestration, CC = combined cycle, CT = combustion turbine, PV = photovoltaic, MSW = municipal solid waste

[Electricity Market Module region map](#)

Source: U.S. Energy Information Administration, Office of Electricity, Coal, Nuclear and Renewables Analysis

Notes: Costs include contingency factors, regional cost, and ambient conditions multipliers. Interest charges are excluded. The costs are shown before investment tax credits are applied.

https://www.eia.gov/outlooks/aeo/assumptions/pdf/table_8.2.pdf