

Energy Tidbits

Macron “Ironic, Because We are Building a System Where in the Medium & Long Term Fossil Energy Will Cost More & More”

Produced by: Dan Tsubouchi

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Dan Tsubouchi
Principal, Chief Market Strategist
dsubouchi@safgroup.ca

Ryan Dunfield
Principal, CEO
rdunfield@safgroup.ca

Aaron Bunting
Principal, COO, CFO
abunting@safgroup.ca

Ryan Haughn
Principal, Energy
rhaughn@safgroup.ca

Table 1. Summary of natural gas supply and disposition in the United States, 2016-2021

(billion cubic feet)

Year and Month	Gross Withdrawals	Marketed Production	NGPL Production ^a	Dry Gas Production ^b	Supplemental Gaseous Fuels ^c	Net Imports	Net Storage Withdrawals ^d	Balancing Item ^e	Consumption ^f
2016 Total	32,592	28,400	1,808	26,592	57	671	340	-216	27,444
2017 Total	33,292	29,238	1,897	27,341	66	-121	254	-400	27,140
2018 Total	37,326	33,009	2,235	30,774	69	-719	314	-300	30,139
2019									
January	3,377	2,975	208	2,767	5	-74	722	4	3,424
February	3,057	2,705	189	2,516	5	-97	580	16	3,019
March	3,383	3,009	210	2,798	5	-121	253	-8	2,928
April	3,315	2,926	205	2,721	5	-132	-389	7	2,212
May	3,424	3,046	213	2,833	5	-161	-480	-63	2,134
June	3,300	2,956	207	2,750	5	-159	-439	-37	2,119
July	3,396	3,072	215	2,857	5	-163	-260	-45	2,394
August	3,448	3,146	220	2,926	5	-165	-292	-40	2,434
September	3,397	3,057	214	2,843	5	-186	-427	-28	2,206
October	3,552	3,186	223	2,963	5	-215	-353	-94	2,307
November	3,509	3,134	219	2,915	5	-218	156	-74	2,784
December	3,623	3,235	226	3,009	5	-226	428	-45	3,171
Total	40,780	36,447	2,548	33,899	61	-1,916	-503	-408	31,132
2020									
January	3,597	3,194	240	2,954	6	-248	581	8	3,300
February	3,363	2,985	224	2,761	5	-216	545	-53	3,041
March	3,582	3,196	240	2,956	6	-284	53	-24	2,707
April	3,374	3,012	226	2,786	5	-231	-311	-8	2,241
May	3,285	2,927	220	2,707	5	-209	-454	18	2,067
June	3,217	2,873	216	2,657	5	-151	-363	-18	2,131
July	3,374	3,021	227	2,795	5	-139	-165	-7	2,489
August	3,350	3,012	226	2,786	5	-148	-232	-9	2,401
September	3,265	2,918	219	2,699	5	-221	-329	18	2,172
October	3,364	2,992	225	2,767	5	-282	-96	-74	2,320
November	3,352	2,985	224	2,761	5	-316	-6	-8	2,435
December	3,490	3,089	232	2,857	5	-287	597	-5	3,168
Total	40,614	36,202	2,717	33,485	63	-2,732	-180	-164	30,472
2021									
January	E3,506	RE3,110	232	RE2,878	5	-279	707	R-25	3,286
February	E2,924	RE2,586	R171	RE2,416	6	-152	781	R-8	R3,043
March	E3,482	RE3,092	R230	RE2,862	5	-357	59	R38	R2,608
April	E3,409	RE3,036	R238	RE2,798	5	-356	-174	R-35	R2,238
May	E3,510	RE3,130	245	RE2,885	3	-373	-416	R-4	2,094
June	RE3,391	RE3,036	238	RE2,798	5	-331	-248	R-9	2,214
July	RE3,498	RE3,158	245	RE2,913	5	-338	-170	R-28	R2,383
August	E3,557	E3,199	251	E2,948	4	-342	-162	-42	2,407
2021 8-Month YTD	E27,277	E24,347	1,849	E22,498	39	-2,529	378	-113	20,273
2020 8-Month YTD	27,143	24,220	1,818	22,402	42	-1,626	-346	-94	20,378
2019 8-Month YTD	26,700	23,836	1,666	22,169	40	-1,071	-307	-166	20,665

^a Monthly natural gas plant liquid (NGPL) production, gaseous equivalent, is derived from sample data reported by gas processing plants on Form EIA-816, *Monthly Natural Gas Liquids Report*, and Form EIA-64A, *Annual Report of the Origin of Natural Gas Liquids Production*.

^b Equal to marketed production minus NGPL production.

^c Supplemental gaseous fuels data are collected only on an annual basis except for the Dakota Gasification Co. coal gasification facility which provides data each month. The ratio of annual supplemental fuels (excluding Dakota Gasification Co.) to the sum of dry gas production, net imports, and net withdrawals from storage is calculated. This ratio is applied to the monthly sum of these three elements. The Dakota Gasification Co. monthly value is added to the result to produce the monthly supplemental fuels estimate.

^d Monthly and annual data for 2016 through 2020 include underground storage and liquefied natural gas storage. Data for January 2021 forward include underground storage only. See Appendix A, Explanatory Note 5, for discussion of computation procedures.

^e Represents quantities lost and imbalances in data due to differences among data sources. Net imports and balancing item excludes net intransit deliveries. These net intransit deliveries were (in billion cubic feet): -24 for 2020; -8 for 2019; -12 for 2018; 14 for 2017; and 70 for 2016. See Appendix A, Explanatory Note 7, for full discussion.

^f Consists of pipeline fuel use, lease and plant fuel use, vehicle fuel, and deliveries to consuming sectors as shown in Table 2.

^R Revised data.

^E Estimated data.

^{RE} Revised estimated data.

Notes: Data for 2016 through 2019 are final. All other data are preliminary unless otherwise indicated. Geographic coverage is the 50 states and the District of Columbia. Totals may not equal sum of components because of independent rounding.

Sources: 2016-2020: U.S. Energy Information Administration (EIA), *Natural Gas Annual 2020*. January 2021 through current month: Form EIA-914, *Monthly Crude Oil and Lease Condensate, and Natural Gas Production Report*; Form EIA-857, *Monthly Report of Natural Gas Purchases and Deliveries to Consumers*; Form EIA-191, *Monthly Underground Gas Storage Report*; EIA computations and estimates; and Office of Fossil Energy, *Natural Gas Imports and Exports*. See Table 7 for detailed source notes for Marketed Production. See Appendix A, Notes 3 and 4, for discussion of computation and estimation procedures and revision policies.

Table 4. U.S. natural gas imports, 2019-2021

(volumes in million cubic feet; prices in dollars per thousand cubic feet)

	2021 8-Month YTD	2020 8-Month YTD	2019 8-Month YTD	August	July	June	May	2021 April
Imports								
Volume (million cubic feet)								
Pipeline								
Canada ^a	1,846,073	1,658,202	1,808,021	220,762	225,984	207,811	203,154	208,290
Mexico	1,310	1,406	683	99	49	24	40	52
Total Pipeline Imports	1,847,383	1,659,608	1,808,703	220,861	226,033	207,835	203,194	208,342
LNG								
By Truck								
Canada	88	18	222	22	22	11	13	8
By Vessel								
France	0	0	2,651	0	0	0	0	0
Nigeria	0	4,277	0	0	0	0	0	0
Norway	0	3,032	0	0	0	0	0	0
Trinidad/Tobago	16,845	32,303	31,236	0	1,714	0	1,662	0
United Kingdom	0	0	0	0	0	0	0	0
Total LNG Imports	16,933	39,630	34,108	22	1,735	11	1,675	8
CNG								
Canada	138	218	263	9	10	13	21	19
Total CNG Imports	138	218	263	9	10	13	21	19
Total Imports	1,864,454	1,699,455	1,843,075	220,891	227,779	207,859	204,890	208,369
Average Price (dollars per thousand cubic feet)								
Pipeline								
Canada	3.26	1.78	2.51	3.52	3.37	2.83	2.66	2.44
Mexico	12.08	3.54	3.13	6.37	4.33	2.08	2.52	2.47
Total Pipeline Imports	3.27	1.79	2.51	3.52	3.37	2.83	2.66	2.44
LNG								
By Truck								
Canada	6.65	6.78	7.14	7.27	7.76	7.55	3.68	3.68
By Vessel								
France	--	--	10.39	--	--	--	--	--
Nigeria	--	3.12	--	--	--	--	--	--
Norway	--	6.16	--	--	--	--	--	--
Trinidad/Tobago	8.37	4.33	8.14	--	8.42	--	7.58	--
United Kingdom	--	--	--	--	--	--	--	--
Total LNG Imports	8.36	4.34	8.31	7.27	8.41	7.55	7.55	3.68
CNG								
Canada	4.30	3.35	3.36	4.21	3.98	3.21	3.06	3.09
Total CNG Imports	4.30	3.35	3.36	4.21	3.98	3.21	3.06	3.09
Total Imports	3.39	1.95	2.77	3.52	3.47	2.83	2.76	2.44
Net Imports - Volume	-2,528,976	-1,625,721	-1,070,595	-342,241	-337,786	-331,393	-373,243	-356,049

See footnotes at end of table.

Table 4. U.S. natural gas imports, 2019-2021

(volumes in million cubic feet; prices in dollars per thousand cubic feet) – continued

	2021				2020			
	March	February	January	Total	December	November	October	September
Imports								
Volume (million cubic feet)								
Pipeline								
Canada ^a	237,236	265,227	277,608	2,500,122	261,053	208,814	199,184	172,869
Mexico	56	933	57	1,706	56	57	89	99
Total Pipeline Imports	237,292	266,160	277,665	2,501,828	261,108	208,871	199,273	172,968
LNG								
By Truck								
Canada	2	7	3	43	7	4	8	6
By Vessel								
France	0	0	0	0	0	0	0	0
Nigeria	0	0	0	6,906	2,629	0	0	0
Norway	0	0	0	3,032	0	0	0	0
Trinidad/Tobago	1,406	5,688	6,376	39,233	2,853	2,841	0	1,235
United Kingdom	0	0	0	0	0	0	0	0
Total LNG Imports	1,409	5,694	6,379	49,214	5,489	2,846	8	1,241
CNG								
Canada	23	23	21	300	20	20	25	17
Total CNG Imports	23	23	21	300	20	20	25	17
Total Imports	238,724	271,877	284,065	2,551,342	266,618	211,736	199,306	174,225
Average Price (dollars per thousand cubic feet)								
Pipeline								
Canada	2.63	5.51	2.75	2.02	2.72	2.64	2.17	1.99
Mexico	3.10	15.39	2.91	3.48	3.07	3.20	2.97	3.41
Total Pipeline Imports	2.63	5.54	2.75	2.02	2.72	2.64	2.17	1.99
LNG								
By Truck								
Canada	8.24	8.07	6.92	6.09	6.52	4.69	4.74	6.40
By Vessel								
France	--	--	--	--	--	--	--	--
Nigeria	--	--	--	3.50	4.11	--	--	--
Norway	--	--	--	6.16	--	--	--	--
Trinidad/Tobago	8.36	9.44	7.62	4.67	6.86	6.94	--	3.38
United Kingdom	--	--	--	--	--	--	--	--
Total LNG Imports	8.36	9.44	7.62	4.60	5.54	6.93	4.74	3.40
CNG								
Canada	4.59	5.83	5.41	3.26	3.82	3.86	2.27	2.26
Total CNG Imports	4.59	5.83	5.41	3.26	3.82	3.86	2.27	2.26
Total Imports	2.71	5.82	3.03	2.07	2.89	2.79	2.17	2.02
Net Imports - Volume	-356,687	-152,127	-279,450	-2,732,265	-286,558	-316,474	-282,314	-221,199

See footnotes at end of table.

Table 4. U.S. natural gas imports, 2019-2021

(volumes in million cubic feet; prices in dollars per thousand cubic feet) – continued

								2020
	August	July	June	May	April	March	February	January
Imports								
Volume (million cubic feet)								
Pipeline								
Canada ^a	208,069	206,195	182,539	183,618	186,752	210,237	232,269	248,524
Mexico	376	119	32	63	60	100	355	300
Total Pipeline Imports	208,445	206,315	182,571	183,681	186,812	210,337	232,624	248,824
LNG								
By Truck								
Canada	9	4	0	*	0	3	1	1
By Vessel								
France	0	0	0	0	0	0	0	0
Nigeria	0	0	2,693	0	0	0	0	1,584
Norway	0	0	0	0	0	0	0	3,032
Trinidad/Tobago	2,874	4,078	2,178	2,811	3,214	2,857	5,689	8,602
United Kingdom	0	0	0	0	0	0	0	0
Total LNG Imports	2,883	4,083	4,871	2,811	3,214	2,860	5,689	13,218
CNG								
Canada	24	22	36	26	23	34	15	38
Total CNG Imports	24	22	36	26	23	34	15	38
Total Imports	211,352	210,419	187,478	186,518	190,049	213,231	238,328	262,080
Average Price (dollars per thousand cubic feet)								
Pipeline								
Canada	1.87	1.58	1.53	1.58	1.49	1.62	1.94	2.43
Mexico	7.81	1.89	0.84	1.51	1.26	1.64	2.11	2.34
Total Pipeline Imports	1.88	1.58	1.53	1.58	1.49	1.62	1.94	2.43
LNG								
By Truck								
Canada	5.31	9.96	--	5.75	--	6.30	6.74	8.81
By Vessel								
France	--	--	--	--	--	--	--	--
Nigeria	--	--	1.84	--	--	--	--	5.30
Norway	--	--	--	--	--	--	--	6.16
Trinidad/Tobago	1.50	4.59	1.33	4.26	1.48	4.34	5.66	6.11
United Kingdom	--	--	--	--	--	--	--	--
Total LNG Imports	1.52	4.59	1.61	4.26	1.48	4.34	5.67	6.03
CNG								
Canada	2.39	2.24	2.13	2.37	2.27	2.92	3.99	7.16
Total CNG Imports	2.39	2.24	2.13	2.37	2.27	2.92	3.99	7.16
Total Imports	1.90	1.73	1.57	1.68	1.51	1.71	2.16	2.91
Net Imports - Volume	-147,807	-138,748	-151,009	-208,954	-230,717	-284,206	-215,917	-248,363

See footnotes at end of table.

Table 4. U.S. natural gas imports, 2019-2021

(volumes in million cubic feet; prices in dollars per thousand cubic feet) – continued

								2019
	Total	December	November	October	September	August	July	June
Imports								
Volume (million cubic feet)								
Pipeline								
Canada ^a	2,686,564	244,590	220,843	204,908	208,201	217,054	227,488	201,069
Mexico	1,873	949	109	69	63	114	62	64
Total Pipeline Imports	2,688,436	245,539	220,952	204,977	208,264	217,167	227,550	201,133
LNG								
By Truck								
Canada	226	3	1	*	0	*	*	5
By Vessel								
France	2,651	0	0	0	0	0	0	0
Nigeria	3,154	3,154	0	0	0	0	0	0
Norway	0	0	0	0	0	0	0	0
Trinidad/Tobago	46,872	7,323	2,780	5,532	0	2,886	2,832	0
United Kingdom	0	0	0	0	0	0	0	0
Total LNG Imports	52,903	10,481	2,781	5,532	0	2,886	2,832	5
CNG								
Canada	377	33	31	28	22	23	26	26
Total CNG Imports	377	33	31	28	22	23	26	26
Total Imports	2,741,717	256,053	223,765	210,537	208,286	220,076	230,407	201,163
Average Price (dollars per thousand cubic feet)								
Pipeline								
Canada	2.46	2.84	2.66	1.96	1.65	1.63	1.72	1.54
Mexico	2.83	2.72	2.71	2.28	2.09	2.24	2.29	2.08
Total Pipeline Imports	2.46	2.84	2.66	1.96	1.65	1.63	1.72	1.54
LNG								
By Truck								
Canada	7.19	9.98	8.98	6.33	--	6.00	6.33	8.44
By Vessel								
France	10.39	--	--	--	--	--	--	--
Nigeria	5.56	5.56	--	--	--	--	--	--
Norway	--	--	--	--	--	--	--	--
Trinidad/Tobago	7.40	6.42	7.12	4.65	--	4.57	6.73	--
United Kingdom	--	--	--	--	--	--	--	--
Total LNG Imports	7.44	6.17	7.12	4.65	--	4.57	6.73	8.44
CNG								
Canada	3.43	5.80	4.52	2.48	0.36	0.61	0.68	0.85
Total CNG Imports	3.43	5.80	4.52	2.48	0.36	0.61	0.68	0.85
Total Imports	2.55	3.23	2.80	2.15	1.65	1.73	1.86	1.54
Net Imports - Volume	-1,915,941	-225,704	-218,180	-215,237	-186,225	-164,907	-162,993	-159,063

See footnotes at end of table.

Table 4. U.S. natural gas imports, 2019-2021

(volumes in million cubic feet; prices in dollars per thousand cubic feet) – continued

	2019				
	May	April	March	February	January
Imports					
Volume (million cubic feet)					
Pipeline					
Canada ^a	207,535	203,620	249,309	225,650	276,296
Mexico	78	65	133	100	67
Total Pipeline Imports	207,613	203,685	249,443	225,750	276,363
LNG					
By Truck					
Canada	9	31	44	56	78
By Vessel					
France	0	0	0	0	2,651
Nigeria	0	0	0	0	0
Norway	0	0	0	0	0
Trinidad/Tobago	0	2,811	3,456	7,499	11,753
United Kingdom	0	0	0	0	0
Total LNG Imports	9	2,842	3,499	7,555	14,482
CNG					
Canada	29	32	47	39	42
Total CNG Imports	29	32	47	39	42
Total Imports	207,651	206,559	252,989	233,344	290,886
Average Price (dollars per thousand cubic feet)					
Pipeline					
Canada	1.81	1.97	3.63	3.60	3.55
Mexico	1.89	2.40	4.06	5.29	3.55
Total Pipeline Imports	1.81	1.97	3.63	3.60	3.55
LNG					
By Truck					
Canada	7.66	7.20	7.07	7.06	7.08
By Vessel					
France	--	--	--	--	10.39
Nigeria	--	--	--	--	--
Norway	--	--	--	--	--
Trinidad/Tobago	--	7.33	7.71	8.98	9.14
United Kingdom	--	--	--	--	--
Total LNG Imports	7.66	7.32	7.70	8.97	9.36
CNG					
Canada	0.94	1.57	3.48	6.48	8.08
Total CNG Imports	0.94	1.57	3.48	6.48	8.08
Total Imports	1.81	2.14	3.79	4.06	4.30
Net Imports - Volume	-160,917	-131,654	-120,550	-96,610	-73,900

^a EIA has reduced the reported volume of gas imported by pipeline from Canada by the amount of natural gas liquids removed from the saturated natural gas carried by Alliance Pipeline. Alliance moves saturated natural gas from the border to a processing plant in Illinois. After the adjustment, volumes of imported natural gas on this pipeline are on the same physical basis as other reported volumes of pipeline imports.

^b For the "Other" area the point of origin for volumes of imported LNG was unassigned in the reports to the Office of Fossil Energy.

-- Not applicable.

* Volume is less than 500 Mcf.

Note: In the case of missing import or export reports on Form FE-746R, *Import and Export of Natural Gas*, EIA estimates the missing volumes using pipeline flows or other available information. Prices are in nominal dollars. LNG prices are a volume-weighted average of the prices reported by cargo. See the "LNG Monthly" (<https://www.energy.gov/fe/services/natural-gas-regulation>) from the Office of Fossil Energy, U.S. Department of Energy, for more information on what is included in the individual LNG prices.

Source: Office of Fossil Energy, U.S. Department of Energy, *Natural Gas Imports and Exports*.

Table 5. U.S. natural gas exports, 2019-2021

(volumes in million cubic feet; prices in dollars per thousand cubic feet)

	2021	2020	2019	2021				
	8-Month YTD	8-Month YTD	8-Month YTD	August	July	June	May	April
Exports								
Volume (million cubic feet)								
Pipeline								
Canada	608,933	601,741	622,250	71,586	68,264	69,528	70,561	74,567
Mexico	1,458,161	1,292,229	1,221,204	193,270	197,141	198,329	192,625	183,004
Total Pipeline Exports	2,067,093	1,893,970	1,843,454	264,857	265,405	267,857	263,186	257,571
LNG								
Exports								
By Vessel								
Argentina	79,422	15,068	39,293	14,363	22,798	19,312	16,226	4,485
Bahamas	337	144	120	56	46	48	45	46
Bangladesh	34,458	10,660	0	7,085	0	3,493	6,948	10,219
Barbados	178	170	130	27	31	22	19	30
Belgium	5,584	25,028	3,390	0	0	0	2,100	0
Brazil	193,702	29,281	41,556	34,204	39,637	32,293	19,726	11,615
Chile	101,694	57,457	63,246	16,262	19,913	0	17,598	10,293
China	291,603	77,432	6,851	51,662	42,222	42,319	37,731	46,837
Colombia	1,811	2,078	6,518	919	0	0	0	892
Croatia	23,600	0	0	2,980	3,299	2,923	3,364	3,666
Dominican Republic	38,726	10,036	4,049	5,901	1,806	4,670	5,283	2,905
Egypt	0	0	0	0	0	0	0	0
France	110,957	76,456	55,118	7,111	0	3,683	11,926	36,120
Greece	24,459	34,451	6,891	3,607	6,651	0	6,796	0
Haiti	98	72	8	24	8	18	12	3
India	143,719	75,586	56,142	20,592	13,090	16,503	28,259	13,752
Israel	6,051	12,793	0	0	0	0	0	3,225
Italy	34,210	65,370	46,317	3,401	6,826	3,425	2,923	6,896
Jamaica	19,659	9,554	8,993	2,907	0	2,927	2,925	2,370
Japan	248,747	162,292	109,448	19,979	24,895	39,783	25,058	28,756
Jordan	0	3,294	28,716	0	0	0	0	0
Kuwait	17,950	10,183	10,308	3,298	0	7,126	0	3,705
Lithuania	27,637	9,467	0	1,677	6,469	3,285	3,049	3,078
Malaysia	0	0	0	0	0	0	0	0
Malta	2,928	2,648	413	0	0	0	0	2,928
Mexico	14,112	20,669	113,523	0	758	0	0	0
Netherlands	114,574	65,298	50,970	7,347	10,597	3,030	26,611	17,060
Nicaragua	1	0	0	0	1	0	0	0
Pakistan	30,548	13,636	10,304	3,319	13,428	3,376	0	3,323
Panama	7,526	7,384	9,743	1,390	0	0	2,341	0
Poland	38,824	26,709	24,108	0	6,619	10,635	3,581	7,382
Portugal	36,700	16,964	37,451	6,382	3,296	5,538	10,765	7,358
Singapore	20,827	17,267	24,602	0	3,449	0	3,089	7,297
South Korea	319,284	181,142	153,873	50,101	39,314	55,918	46,033	21,683
Spain	92,750	147,152	81,184	23,068	8,630	7,833	5,234	22,974
Taiwan	70,999	33,035	16,865	6,728	20,653	3,097	10,157	6,594
Thailand	14,548	28,917	3,401	3,707	0	0	3,453	7,388
Turkey	59,537	87,341	19,281	0	5,591	0	3,017	0
United Arab Emirates	0	10,110	17,236	0	0	0	0	0
United Kingdom	97,682	82,422	19,087	0	0	0	10,586	13,877
By Truck								
Canada	74	2	1	18	16	7	18	15
Mexico	610	584	692	147	97	105	48	48
Re-Exports								
By Vessel								
Argentina	0	2,164	0	0	0	0	0	0
Brazil	0	0	0	0	0	0	0	0
Japan	0	305	221	0	0	0	0	0
South Korea	0	305	0	0	0	0	0	0
United Kingdom	0	0	0	0	0	0	0	0
Total LNG Exports	2,326,126	1,430,927	1,070,051	298,262	300,143	271,368	314,922	306,818
CNG								
Canada	211	278	165	14	16	27	25	29
Total CNG Exports	211	278	165	14	16	27	25	29
Total Exports	4,393,430	3,325,176	2,913,670	563,133	565,564	539,252	578,132	564,418

See footnotes at end of table.

Table 5. U.S. natural gas exports, 2019-2021

(volumes in million cubic feet; prices in dollars per thousand cubic feet) – continued

	2021				2020			
	March	February	January	Total	December	November	October	September
Exports								
Volume (million cubic feet)								
Pipeline								
Canada	91,301	78,198	84,927	902,449	84,307	81,358	72,833	62,211
Mexico	183,051	137,381	173,360	1,990,809	164,577	166,135	185,799	182,068
Total Pipeline Exports	274,352	215,579	258,287	2,893,258	248,884	247,493	258,632	244,279
LNG								
Exports								
By Vessel								
Argentina	2,238	0	0	15,068	0	0	0	0
Bahamas	39	29	28	257	36	31	25	20
Bangladesh	3,566	0	3,148	10,660	0	0	0	0
Barbados	14	19	17	241	25	15	17	14
Belgium	3,484	0	0	31,946	0	3,633	3,285	0
Brazil	21,977	13,118	21,132	111,826	29,927	30,191	22,427	0
Chile	21,320	6,524	9,784	80,615	9,793	3,252	6,836	3,277
China	28,476	3,415	38,940	214,401	45,525	45,083	35,115	11,245
Colombia	0	0	0	4,626	0	0	0	2,548
Croatia	7,367	0	0	3,275	3,275	0	0	0
Dominican Republic	5,577	5,689	6,895	26,050	5,000	5,106	5,909	0
Egypt	0	0	0	0	0	0	0	0
France	33,678	14,851	3,587	90,237	3,752	3,390	6,639	0
Greece	6,805	0	600	48,403	3,382	3,543	0	7,027
Haiti	10	11	12	118	17	11	9	8
India	17,381	13,776	20,367	124,402	10,241	10,299	17,762	10,514
Israel	2,826	0	0	15,834	0	0	0	3,041
Italy	10,739	0	0	68,453	0	3,083	0	0
Jamaica	2,458	2,365	3,708	17,052	2,374	0	2,514	2,610
Japan	27,673	18,271	64,331	287,672	54,004	32,967	31,554	6,855
Jordan	0	0	0	6,872	0	0	0	3,578
Kuwait	3,821	0	0	17,293	0	0	3,603	3,508
Lithuania	3,228	6,851	0	28,879	6,291	3,621	6,191	3,308
Malaysia	0	0	0	0	0	0	0	0
Malta	0	0	0	2,648	0	0	0	0
Mexico	0	13,354	0	34,408	0	3,056	7,398	3,285
Netherlands	24,204	22,777	2,949	85,573	3,316	6,684	3,603	6,671
Nicaragua	0	0	0	0	0	0	0	0
Pakistan	3,421	0	3,682	36,934	0	3,436	10,009	9,853
Panama	3,279	0	516	12,764	271	1,448	433	3,228
Poland	3,507	7,099	0	36,900	7,033	0	3,157	0
Portugal	0	3,360	0	36,922	3,711	5,830	3,564	6,853
Singapore	3,303	0	3,688	28,341	0	7,658	3,416	0
South Korea	32,203	18,094	55,936	316,227	39,617	49,103	14,239	32,126
Spain	13,900	3,733	7,377	199,966	13,583	9,907	14,118	15,206
Taiwan	13,450	0	10,319	64,363	12,470	6,216	3,636	9,007
Thailand	0	0	0	32,622	0	3,705	0	0
Turkey	3,619	20,652	26,659	123,957	20,188	12,817	0	3,611
United Arab Emirates	0	0	0	10,110	0	0	0	0
United Kingdom	17,440	34,343	21,436	160,199	30,378	26,544	17,191	3,664
By Truck								
Canada	0	0	0	10	8	0	0	0
Mexico	19	63	83	822	46	52	68	73
Re-Exports								
By Vessel								
Argentina	0	0	0	2,164	0	0	0	0
Brazil	0	0	0	82	0	0	82	0
Japan	0	0	0	387	0	0	82	0
South Korea	0	0	0	387	0	0	82	0
United Kingdom	0	0	0	0	0	0	0	0
Total LNG Exports	321,023	208,394	305,196	2,389,963	304,263	280,682	222,963	151,128
CNG								
Canada	36	32	32	386	29	35	26	17
Total CNG Exports	36	32	32	386	29	35	26	17
Total Exports	595,411	424,004	563,515	5,283,607	553,176	528,210	481,621	395,424

See footnotes at end of table.

Table 5. U.S. natural gas exports, 2019-2021

(volumes in million cubic feet; prices in dollars per thousand cubic feet) – continued

								2020
	August	July	June	May	April	March	February	January
Exports								
Volume (million cubic feet)								
Pipeline								
Canada	60,810	71,778	66,516	67,752	71,722	86,579	77,354	99,231
Mexico	185,867	181,152	162,927	145,242	138,544	166,550	151,071	160,875
Total Pipeline Exports	246,677	252,930	229,442	212,994	210,266	253,130	228,425	260,106
LNG								
Exports								
By Vessel								
Argentina	2,249	2,218	2,229	8,372	0	0	0	0
Bahamas	21	15	18	20	23	20	13	15
Bangladesh	0	3,614	0	3,406	0	0	0	3,640
Barbados	14	15	20	20	15	28	26	33
Belgium	0	0	0	1,348	3,324	3,724	9,872	6,761
Brazil	3,520	0	0	0	0	6,891	10,433	8,438
Chile	7,428	1,515	3,313	11,068	14,098	3,216	10,731	6,087
China	13,699	10,358	0	14,535	21,140	17,699	0	0
Colombia	550	0	0	0	0	0	1,003	525
Croatia	0	0	0	0	0	0	0	0
Dominican Republic	2,772	0	0	2,554	1,838	2,872	0	0
Egypt	0	0	0	0	0	0	0	0
France	0	0	0	9,546	16,336	23,491	20,520	6,563
Greece	0	6,544	1,076	3,430	3,233	8,892	0	11,276
Haiti	11	8	7	10	8	9	11	7
India	10,319	7,404	10,100	10,534	16,674	17,245	0	3,309
Israel	3,001	3,317	3,277	0	0	3,197	0	0
Italy	6,734	3,232	12,998	6,452	3,135	9,895	16,616	6,308
Jamaica	0	0	0	0	5,770	1	2,914	869
Japan	22,541	10,618	21,836	13,729	18,387	21,845	21,360	31,975
Jordan	0	0	0	3,294	0	0	0	0
Kuwait	6,886	0	0	0	3,297	0	0	0
Lithuania	0	0	3,049	3,473	2,945	0	0	0
Malaysia	0	0	0	0	0	0	0	0
Malta	0	0	0	0	0	0	48	2,600
Mexico	3,701	0	0	0	0	7,037	3,167	6,764
Netherlands	0	6,746	6,870	6,826	10,305	13,772	14,099	6,681
Nicaragua	0	0	0	0	0	0	0	0
Pakistan	3,412	0	0	0	3,334	0	3,567	3,323
Panama	0	0	0	3,070	0	906	3,408	0
Poland	0	0	3,385	6,258	3,523	3,583	6,677	3,282
Portugal	0	0	0	0	10,777	0	6,187	0
Singapore	2,967	3,690	0	0	0	10,610	0	0
South Korea	13,814	10,492	28,171	20,921	24,258	28,095	11,071	44,320
Spain	3,222	13,679	9,640	29,360	22,943	23,657	20,240	24,412
Taiwan	0	0	2,953	6,662	0	6,987	7,115	9,317
Thailand	0	3,254	0	7,397	11,049	3,783	3,435	0
Turkey	0	3,222	0	6,661	14,030	6,489	24,303	32,637
United Arab Emirates	3,359	3,277	0	3,474	0	0	0	0
United Kingdom	0	2,908	0	0	0	20,202	28,884	30,428
By Truck								
Canada	0	0	0	0	0	0	0	2
Mexico	78	72	61	18	23	123	87	122
Re-Exports								
By Vessel								
Argentina	2,164	0	0	0	0	0	0	0
Brazil	0	0	0	0	0	0	0	0
Japan	0	0	0	0	0	0	0	305
South Korea	0	0	0	0	0	0	0	305
United Kingdom	0	0	0	0	0	0	0	0
Total LNG Exports	112,462	96,200	109,002	182,438	210,466	244,269	225,786	250,305
CNG								
Canada	20	37	43	39	35	38	34	33
Total CNG Exports	20	37	43	39	35	38	34	33
Total Exports	359,159	349,167	338,486	395,472	420,767	497,437	454,245	510,444

See footnotes at end of table.

Table 5. U.S. natural gas exports, 2019-2021

(volumes in million cubic feet; prices in dollars per thousand cubic feet) – continued

	2019							2020	2021
	Total	December	November	October	September	August	July	June	
Exports									
Volume (million cubic feet)									
Pipeline									
Canada	972,519	109,779	92,671	76,246	71,573	78,302	68,613	61,809	
Mexico	1,865,329	151,308	158,633	171,535	162,649	168,089	167,902	156,440	
Total Pipeline Exports	2,837,848	261,086	251,305	247,781	234,222	246,391	236,515	218,249	
LNG									
Exports									
By Vessel									
Argentina	39,293	0	0	0	0	0	13,066	13,120	
Bahamas	156	11	14	8	2	20	11	25	
Bangladesh	3,419	3,419	0	0	0	0	0	0	
Barbados	211	20	20	25	17	17	17	13	
Belgium	23,897	10,407	3,293	3,402	3,404	0	0	0	
Brazil	54,298	0	3,279	3,345	6,117	12,868	6,949	9,116	
Chile	90,357	7,207	3,484	6,608	9,811	6,297	9,382	19,012	
China	6,851	0	0	0	0	0	0	0	
Colombia	6,518	0	0	0	0	649	0	0	
Croatia	0	0	0	0	0	0	0	0	
Dominican Republic	10,334	501	0	2,927	2,857	0	0	1,108	
Egypt	0	0	0	0	0	0	0	0	
France	117,791	14,758	26,946	14,228	6,740	3,249	0	0	
Greece	14,643	7,752	0	0	0	0	0	0	
Haiti	42	12	8	4	9	3	2	3	
India	91,481	7,090	6,933	6,961	14,355	7,294	3,485	3,215	
Israel	0	0	0	0	0	0	0	0	
Italy	68,655	12,764	6,345	0	3,230	6,082	9,963	3,072	
Jamaica	13,892	2,435	2,464	0	0	2,946	837	0	
Japan	200,864	21,226	17,603	24,504	28,084	17,506	21,242	14,582	
Jordan	32,332	0	0	0	3,616	3,277	3,449	7,342	
Kuwait	10,308	0	0	0	0	3,401	3,405	0	
Lithuania	3,455	3,455	0	0	0	0	0	0	
Malaysia	3,698	0	3,698	0	0	0	0	0	
Malta	413	0	0	0	0	0	0	0	
Mexico	143,371	9,696	3,273	6,437	10,442	13,681	24,209	16,955	
Netherlands	81,361	13,405	10,099	3,456	3,431	6,688	3,386	3,310	
Nicaragua	0	0	0	0	0	0	0	0	
Pakistan	26,935	3,400	3,247	3,472	6,512	0	3,656	0	
Panama	10,221	0	478	0	0	0	0	3,282	
Poland	38,042	7,013	3,432	3,489	0	3,537	3,694	0	
Portugal	53,342	6,345	0	6,621	2,924	6,051	6,994	6,908	
Singapore	31,440	3,375	0	3,463	0	0	3,570	3,435	
South Korea	270,025	38,139	24,962	42,233	10,818	16,995	32,663	20,402	
Spain	166,684	13,874	19,985	13,704	37,938	15,861	3,297	13,506	
Taiwan	27,397	3,658	3,736	3,138	0	7,207	0	0	
Thailand	6,635	0	0	0	3,234	0	0	0	
Turkey	30,611	536	7,266	3,528	0	0	0	0	
United Arab Emirates	20,561	0	0	0	3,325	3,502	3,487	3,459	
United Kingdom	118,357	29,749	39,957	26,260	3,303	1,335	0	0	
By Truck									
Canada	25	0	1	14	9	0	0	0	
Mexico	1,105	93	86	139	95	113	101	92	
Re-Exports									
By Vessel									
Argentina	0	0	0	0	0	0	0	0	
Brazil	0	0	0	0	0	0	0	0	
Japan	221	0	0	0	0	0	0	0	
South Korea	0	0	0	0	0	0	0	0	
United Kingdom	305	305	0	0	0	0	0	0	
Total LNG Exports	1,819,547	220,646	190,610	177,966	160,274	138,578	156,865	141,956	
CNG									
Canada	263	25	30	28	15	15	20	20	
Total CNG Exports	263	25	30	28	15	15	20	20	
Total Exports	4,657,657	481,757	441,944	425,775	394,511	384,983	393,400	360,226	

See footnotes at end of table.

Table 5. U.S. natural gas exports, 2019-2021

(volumes in million cubic feet; prices in dollars per thousand cubic feet) – continued

	2019				
	May	April	March	February	January
Exports					
Volume (million cubic feet)					
Pipeline					
Canada	70,182	71,333	93,182	91,561	87,269
Mexico	153,452	139,750	149,514	135,514	150,544
Total Pipeline Exports	223,633	211,083	242,696	227,074	237,813
LNG					
Exports					
By Vessel					
Argentina	8,737	4,369	0	0	0
Bahamas	14	14	11	14	11
Bangladesh	0	0	0	0	0
Barbados	21	17	14	14	17
Belgium	0	0	3,390	0	0
Brazil	4,905	1,201	3,283	3,234	0
Chile	6,188	9,429	10,005	2,933	0
China	0	0	0	3,464	3,387
Colombia	0	0	2,935	0	2,934
Croatia	0	0	0	0	0
Dominican Republic	0	0	0	2,942	0
Egypt	0	0	0	0	0
France	6,621	17,092	20,853	0	7,303
Greece	3,497	0	0	3,394	0
Haiti	0	2	0	0	0
India	13,942	6,742	7,446	6,989	7,030
Israel	0	0	0	0	0
Italy	6,560	0	6,684	3,454	10,502
Jamaica	2,890	0	2,320	0	0
Japan	7,149	14,010	7,143	10,320	17,495
Jordan	7,332	3,622	0	3,695	0
Kuwait	3,502	0	0	0	0
Lithuania	0	0	0	0	0
Malaysia	0	0	0	0	0
Malta	0	413	0	0	0
Mexico	20,244	10,406	7,038	6,681	14,310
Netherlands	10,734	13,010	10,452	3,390	0
Nicaragua	0	0	0	0	0
Pakistan	0	0	3,282	3,365	0
Panama	0	0	3,191	3,269	0
Poland	0	3,414	3,701	0	9,762
Portugal	0	3,489	0	3,720	10,289
Singapore	3,397	320	6,631	7,249	0
South Korea	18,069	13,000	18,013	17,750	16,981
Spain	14,325	10,139	10,678	6,748	6,631
Taiwan	3,309	6,349	0	0	0
Thailand	3,401	0	0	0	0
Turkey	0	2,969	0	6,483	9,829
United Arab Emirates	0	6,787	0	0	0
United Kingdom	0	0	3,669	3,711	10,373
By Truck					
Canada	0	0	0	1	0
Mexico	75	87	73	48	104
Re-Exports					
By Vessel					
Argentina	0	0	0	0	0
Brazil	0	0	0	0	0
Japan	0	221	0	0	0
South Korea	0	0	0	0	0
United Kingdom	0	0	0	0	0
Total LNG Exports	144,913	127,102	130,814	102,866	126,957
CNG					
Canada	22	28	29	15	16
Total CNG Exports	22	28	29	15	16
Total Exports	368,568	338,213	373,539	329,954	364,787

See footnotes at end of table.

Table 7. Marketed production of natural gas in selected states and the Federal Gulf of Mexico, 2016-2021
(million cubic feet)

Year and Month	Alaska	Arkansas	California	Colorado	Kansas	Louisiana	Montana	New Mexico	North Dakota	Ohio
2016 Total	332,749	823,196	205,025	1,685,755	244,795	1,784,396	47,921	1,229,647	531,997	1,437,285
2017 Total	344,385	694,676	212,458	1,706,364	219,639	2,139,830	46,311	1,299,732	593,998	1,791,359
2018 Total	341,315	589,985	202,617	1,847,402	201,391	2,832,404	43,530	1,493,082	706,552	2,403,382
2019										
January	30,503	47,443	16,800	165,594	16,055	259,311	3,773	137,940	67,591	213,280
February	26,728	42,219	15,513	148,543	14,237	242,076	3,095	128,351	58,573	192,640
March	29,346	46,211	16,922	164,062	15,820	266,649	3,508	144,805	68,542	213,280
April	28,816	44,455	16,548	161,046	15,613	259,749	3,552	142,454	67,985	207,990
May	29,028	44,906	16,754	166,110	14,898	270,060	3,817	147,013	70,266	214,923
June	26,889	42,702	16,254	162,072	15,559	265,302	3,757	142,093	65,406	207,990
July	25,348	43,852	16,890	165,821	15,695	277,490	3,783	149,002	70,039	235,476
August	22,876	43,505	16,969	166,581	15,637	276,362	3,739	153,633	75,266	235,476
September	24,494	41,798	16,262	161,977	15,039	266,639	3,675	151,917	72,439	227,880
October	27,409	43,093	16,228	174,304	15,151	275,520	3,617	157,544	78,027	236,778
November	28,256	41,738	15,659	172,088	14,439	270,668	3,559	154,545	77,473	229,140
December	29,669	42,834	16,024	178,720	14,945	282,493	3,660	159,790	79,218	236,778
Total	329,361	524,757	196,823	1,986,916	183,087	3,212,318	43,534	1,769,086	850,826	2,651,631
2020										
January	30,018	42,187	15,908	178,066	14,623	274,755	3,527	162,016	78,798	203,701
February	28,537	39,093	14,649	166,620	13,636	255,885	3,340	155,323	77,940	190,559
March	29,219	43,677	15,376	175,202	14,486	276,544	3,527	169,244	83,892	203,701
April	27,513	39,748	14,906	168,438	13,595	264,869	3,148	156,722	72,059	193,050
May	27,076	40,463	15,172	163,768	14,012	281,636	2,692	147,782	52,874	199,485
June	25,545	38,742	14,837	159,601	13,321	264,072	2,667	153,276	52,626	193,050
July	26,779	39,855	15,061	167,105	13,674	264,875	3,322	165,335	64,860	201,686
August	26,846	40,295	13,344	165,091	13,504	260,226	3,248	168,311	74,940	201,686
September	26,978	38,734	12,857	162,531	13,030	255,690	3,009	165,008	78,195	195,180
October	29,080	40,172	13,059	164,462	13,461	263,120	3,204	171,376	82,649	201,097
November	29,575	38,565	12,934	159,409	12,917	267,312	3,143	167,213	80,112	194,610
December	31,161	39,452	12,475	160,168	13,097	277,178	3,135	166,561	83,498	201,097
Total	338,329	480,982	170,579	1,990,462	163,356	3,206,163	37,963	1,948,168	882,443	2,378,902
2021										
January	31,632	€39,964	€12,033	€159,820	€12,578	€271,751	€3,214	€179,574	€77,021	€206,660
February	28,365	€30,061	€10,749	€143,416	€9,965	€221,051	€2,790	€151,970	€65,685	€170,668
March	31,481	€39,947	€12,028	€156,534	€12,340	€281,406	€3,144	€187,274	€77,032	€189,405
April	29,514	€37,926	€11,685	€156,009	€12,316	€276,931	€3,096	€184,890	€76,209	€183,444
May	29,005	€38,775	€12,215	€162,200	€12,648	€284,347	€3,226	€196,174	€80,479	€187,668
June	27,715	€37,125	€11,787	€154,405	€12,276	€272,759	€2,932	€190,003	€78,111	€183,602
July	26,280	€42,594	€12,020	€160,007	€12,755	€284,802	€3,163	€201,525	€79,031	€189,223
August	27,864	€42,181	€11,929	€159,783	€12,740	€288,939	€3,198	€205,998	€82,232	€188,369
2021 8-Month YTD	231,857	€308,574	€94,447	€1,252,174	€97,617	€2,181,987	€24,764	€1,497,408	€615,799	€1,499,039
2020 8-Month YTD	221,535	324,059	119,254	1,343,891	110,851	2,142,863	25,472	1,278,009	557,989	1,586,918
2019 8-Month YTD	219,533	355,294	132,649	1,299,828	123,514	2,116,998	29,024	1,145,290	543,668	1,721,055

See footnotes at end of table.

Table 7. Marketed production of natural gas in selected states and the Federal Gulf of Mexico, 2016-2021

(million cubic feet) – continued

Year and Month	Oklahoma	Pennsylvania	Texas	Utah	West Virginia	Wyoming	Other States	Federal Gulf of Mexico	U.S. Total
2016 Total	2,468,312	5,210,209	7,225,472	365,268	1,384,458	1,662,909	559,985	1,200,669	28,400,049
2017 Total	2,513,897	5,453,638	7,223,841	315,211	1,514,278	1,590,059	517,698	1,060,452	29,237,825
2018 Total	2,875,787	6,264,832	8,041,010	295,826	1,771,698	1,637,517	485,675	974,863	33,008,867
2019									
January	255,006	576,440	737,375	23,148	169,050	125,391	39,987	90,143	2,974,830
February	229,666	519,802	678,066	21,007	154,910	117,653	35,427	76,743	2,705,249
March	250,919	578,820	758,646	23,266	171,516	125,044	39,436	92,017	3,008,808
April	250,314	560,062	727,527	22,751	167,816	123,615	38,348	87,201	2,925,844
May	266,014	571,803	781,002	23,531	171,305	128,320	38,958	87,738	3,046,445
June	243,339	556,708	766,761	22,780	174,784	124,341	37,968	81,599	2,956,304
July	254,709	583,186	804,899	22,987	180,524	116,782	38,381	66,834	3,071,698
August	257,498	585,405	837,459	23,261	181,927	120,984	38,570	91,237	3,146,384
September	256,073	568,646	798,191	22,080	181,334	126,696	37,301	84,094	3,056,535
October	261,454	589,800	828,390	22,559	201,814	130,259	37,566	86,636	3,186,150
November	251,153	597,779	815,089	21,869	196,055	123,894	36,861	83,661	3,133,926
December	259,905	608,342	845,084	22,570	204,178	125,876	37,220	87,441	3,234,746
Total	3,036,052	6,896,792	9,378,489	271,808	2,155,214	1,488,854	456,024	1,015,343	36,446,918
2020									
January	263,734	603,836	843,432	21,944	209,896	124,274	37,391	86,071	3,194,177
February	243,139	569,721	783,094	20,373	198,090	108,722	34,782	81,114	2,984,616
March	257,387	607,689	841,347	21,765	210,559	117,977	36,689	87,955	3,196,236
April	235,642	586,955	783,283	20,379	204,826	111,744	34,389	80,574	3,011,842
May	217,154	592,126	734,176	20,326	212,646	107,288	33,986	64,374	2,927,037
June	222,324	560,390	741,401	19,244	212,831	103,890	32,957	62,227	2,873,001
July	226,843	604,716	775,851	20,312	220,032	108,679	34,568	67,778	3,021,331
August	226,344	607,221	782,436	19,814	223,208	107,320	33,757	43,988	3,011,580
September	222,010	567,029	755,253	19,283	218,893	104,520	30,468	48,900	2,917,569
October	219,403	595,653	773,720	20,042	226,064	104,787	31,775	38,702	2,991,827
November	224,327	605,244	751,562	19,200	223,428	103,236	31,246	60,496	2,984,528
December	228,057	647,714	770,555	19,307	231,845	103,933	32,383	67,085	3,088,701
Total	2,786,366	7,148,295	9,336,110	241,989	2,592,319	1,306,368	404,391	789,262	36,202,446
2021									
January	E221,544	E657,704	RE774,497	E19,235	E234,432	RE106,649	RE33,651	RE68,393	RE3,110,352
February	E163,094	E585,221	RE588,035	E17,815	E208,571	RE96,543	RE30,083	RE62,325	RE2,586,408
March	E220,130	E647,681	RE771,346	E20,356	E227,218	RE107,236	RE34,338	RE72,867	RE3,091,762
April	E214,334	E618,509	RE775,796	E19,861	E229,075	RE103,470	RE33,044	RE69,696	RE3,035,804
May	E223,372	E640,431	RE798,311	E20,312	E234,118	RE105,441	RE33,844	RE67,642	RE3,130,208
June	RE213,314	RE621,905	RE781,294	RE19,587	RE227,987	RE100,983	RE32,490	RE67,779	RE3,036,055
July	RE220,940	RE649,469	RE817,371	RE20,361	RE229,376	RE104,648	RE33,626	RE70,762	RE3,157,953
August	E224,022	E674,724	E818,622	E20,331	E241,426	E101,978	E33,123	E61,488	E3,198,947
2021 8-Month YTD	E1,700,752	E5,095,642	E6,125,271	E157,858	E1,832,203	E826,947	E264,198	E540,951	E24,347,489
2020 8-Month YTD	1,892,568	4,732,656	6,285,019	164,157	1,692,089	889,893	278,519	574,080	24,219,820
2019 8-Month YTD	2,007,466	4,532,226	6,091,734	182,730	1,371,833	982,129	307,076	673,511	23,835,560

^E Estimated data.^{RE} Revised estimated data.

Notes: For 2021 forward, state monthly marketed production is estimated from gross withdrawals using historical relationships between the two. Data for Arkansas, California, Colorado, Kansas, Louisiana, Montana, New Mexico, North Dakota, Ohio, Oklahoma, Pennsylvania, Texas, Utah, West Virginia, Wyoming, and Federal Offshore Gulf of Mexico are individually collected on the EIA-914 report. The "Other States" category comprises states/areas not individually collected on the EIA-914 report (Alabama, Arizona, Federal Offshore Pacific, Florida, Idaho, Illinois, Indiana, Kentucky, Maryland, Michigan, Mississippi, Missouri, Nebraska, Nevada, New York, Oregon, South Dakota, Tennessee, and Virginia). Before 2021, Federal Offshore Pacific is included in California. All data for Alaska are obtained directly from the state. Monthly preliminary state-level data for all states not collected individually on the EIA-914 report are available after the final annual reports for these series are collected and processed. Final annual data are generally available in the third quarter of the following year. The sum of individual states may not equal total U.S. volumes due to independent rounding.

Sources: 2016-2020: U.S. Energy Information Administration (EIA), *Natural Gas Annual 2020*, Bureau of Safety and Environmental Enforcement (BSEE), IHS Markit, Enverus DrillingInfo, and BENTEK Energy. January 2021 through current month: Form EIA-914, *Monthly Crude Oil and Lease Condensate, and Natural Gas Production Report*; and EIA computations.

<https://rbnenergy.com/play-it-again-permian-natural-gas-markets-singing-a-familiar-tune-as-constraints-loom>

Play It Again - Permian Natural Gas Markets Singing A Familiar Tune As Constraints Loom

Monday, 10/25/2021

Published by: [Jason Ferguson](#)

Some things you can pretty much count on this time of year, like the end of 100-degree days in Houston, Aggies rooting against Longhorns, and the Astros in the World Series. Permian natural gas production has also been consistently higher the last few years. It's usually on its way to new highs as we approach the holidays and 2021 is another fine example. After a bang-up 2020, this year has been one of continuously solid gas production growth in the Permian, with gas volumes currently sitting near 14 Bcf/d, up around 1.5 Bcf/d versus this time last year. What's more, at today's crude oil prices, which encourage increasing production of oil and associated gas, there is no end in sight for Permian gas growth. Which means, as many gas traders already know, that the Permian's primary gas market, the Waha Hub, may soon be headed back into the familiar territory of deep basis discounts. In today's RBN blog, we look at the latest developments in Permian gas markets.

If you follow RBN's blogs — or, better yet, subscribe to our weekly [NATGAS Permian](#) report — you know we are big fans of the Permian gas markets, and all too happy to write about the topic. Lately, these markets have been relatively quiet. Sure, there was the impact of [Winter Storm Uri](#) last winter, which followed on the various [negative-price events](#) and production [shut-ins](#) that accompanied the COVID-19 pandemic, but things lately have been relatively chill. Natural gas prices in the Permian have been rising, [like those in much of the U.S.](#), and the basin has benefited from the buildout of new gas [pipeline takeaway](#) and [gas processing capacity](#). Those events, along with soaring crude oil prices, have Permian natural gas production growth surging once again.

Figure 1 below shows Permian natural gas production since the start of 2018. If you are a longtime follower of the Permian, this will be old news to you, but gas production in the basin was on a tear during 2018 and 2019. This period was the final couple of years of a phenomenon that some called "Permania" — a rush to West Texas and southeastern New Mexico that saw activity in the Permian hit frenetic levels. Though some may argue that Permania was already being reined in by Wall Street before the pandemic hit in early 2020, last year's wild ride certainly coincided with the end of unbridled spending in the Permian. Last year also saw the dramatic plunge of crude oil prices into negative territory, followed by a brief-but-painful period during which Permian producers actually shut-in crude oil and natural gas production in the basin for a few months last summer. Fortunately, that period ended relatively quickly and Permian gas production was growing again by late last year, which we detailed in our [2021 Permian Oil and Natural Gas Markets Outlook](#) blog back in January. Although Winter Storm Uri came along soon thereafter, its impact was fleeting and Permian gas production has charged higher ever since, currently sitting right at 14 Bcf/d (right end of solid purple line).

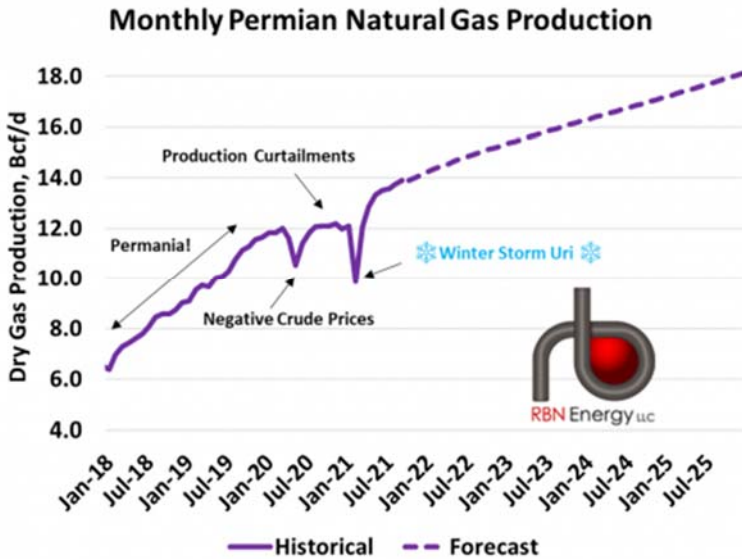


Figure 1. Permian Natural Gas Production Forecast. Source: RBN

Looking ahead, we see the recent growth continuing, as indicated by the dashed purple line in Figure 1. Though annual production growth rates going forward don't quite match the yearly ~2 Bcf/d rate of the Permania period, our current unconstrained mid-price forecast shows the basin adding about 1 Bcf/d of growth over each of the next few years and hitting 18 Bcf/d by 2025. What does that mean for pricing in the Permian gas markets? Well, let's first give some context by looking at what has happened with gas prices in the Permian over the last few years.

Figure 2 below is a graph of daily prices at the Waha Hub, the Permian's primary gas trading location. Note that the prices come from our good friends at Natural Gas Intelligence (NGI). As you can see from the graph, Waha has been on quite a ride the last two years. Going back to 2020 (blue line), you can see that Waha gas prices hovered well below \$2/MMBtu early in the year and often dropped below zero (red-shaded circles), notably during the spring of 2020's energy price meltdown at the height of the pandemic. Gas prices rallied somewhat in the summer of last year, though it wasn't due to stronger demand, but rather to lower supply thanks to [shut-in production](#) (period labeled "Production Curtailments"). However, by the fall of 2020 producers had brought most of the oil and gas production back online in the basin and Waha prices briefly dipped negative again (red-shaded circle to far right) before Kinder Morgan's Permian Highway Pipeline (PHP) continued the buildout of Permian gas infrastructure we detailed in our [Some Beach](#) series last fall.

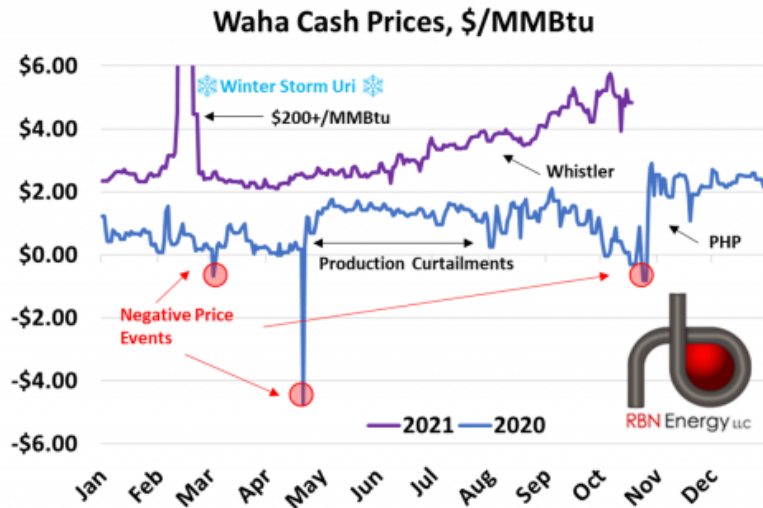


Figure 2. Waha Daily Cash Price. Source: Natural Gas Intelligence

Permian gas prices entered 2021 (left end of purple line) on stronger footing than they did last year and then the craziness of Winter Storm Uri struck and sent prices into the stratosphere for a few days. Note that while we cap the y-axis of Figure 2 at \$6.00/MMBtu, Waha set an all-time record at just over \$200/MMBtu back in mid-February, before things got back to normal later that month. However, Waha prices have been on a steady climb higher ever since, aided in part by the start of the [Whistler Pipeline](#) this summer, but also due to the overall rise in U.S. natural gas prices. In fact, recent prices have been above \$5.00/MMBtu at Waha on a somewhat sustained basis for the first time since late 2008.

If this pattern of growth seems familiar, it is. Producers in the Permian, more so than any other U.S. basin, have been responding to higher hydrocarbon prices by drilling more, and the midstream industry has been reacting predictably by gearing up to build out the necessary capacity to get those molecules to market. Certainly, the same cannot be said for all regions of the U.S. energy sector — we're looking at you, California and the Northeast. But that's not to say that building out of the Permian is not without hurdles. In addition to recent challenges to Texas's eminent domain laws, midstreamers may find it more difficult than in previous cycles to sign producers to long-term commitments for new capacity when those producers still face pressure to rein in production growth (see [Where Has All the Capex Gone?](#)). But even if Permian crude production were to flatline, which it won't, a [rising ratio of associated gas to oil](#) would ensure that gas volumes continue to grow. What does all this Permian natural gas growth mean for Waha prices going forward?

Well, that depends on a couple of factors, including how long global commodity prices hold up, how U.S. producers respond to those prices, whether planned capacity additions make it across the finish line, and how legacy infrastructure holds up. If you read [NATGAS Permian](#), you likely already know our thoughts on those subjects and we'll have plenty of time carved out at our upcoming [School of Energy](#) conference to discuss these topics specifically, including where and when production will outrun takeaway capacity. For others, you'll just have to wait for the next installment in this series. But, as today's title foreshadows, we see more pipeline takeaway constraints out of the Permian on the horizon and it may be sooner than most think before we have to once again add some red circles to Figure 2, if you know what we mean.

"Play It Again" was written by Dallas Davidson and Ashley Gorley, and appears as the ninth song on Luke Bryan's fourth studio album, *Crash My Party*. It was released as the fourth single from the album in March 2014 and went to #1 on the Billboard Hot Country Songs and #14 on the Billboard Hot 100 Singles charts. It has been certified 6x Platinum by the Recording Industry Association of America (RIAA). Personnel on the record were: Luke Bryan (lead vocals); Tom Bukovac, J.T. Corenflos, Kenny Greenberg, and Ilya Toshinsky (guitars); Mike Brignardello and Jimmie Lee Sloas (bass); Shannon Forrest and Greg Morrow (drums); Erik Darken (percussion); Mike Johnson and Russ Pahl (pedal steel guitar); Mike Rojas

(keyboards); Charlie Judge (synthesizer); Joe Spivey (fiddle, bouzouki); Jody Stevens (programming); and Perry Coleman, Tania Hancheroff, Chris Stapleton, and Jennifer Wrinkle (background vocals).

Crash My Party was recorded in 2013 in Nashville, with Jeff Stevens producing. Released in August 2013, the album went to #1 on the Billboard Top Country Albums and Billboard Top 200 Albums charts. It has been certified 4x Platinum by the RIAA. Six top-5 charting singles were released from the LP.

Luke Bryan (Thomas Luther Bryan) is an American country music singer and songwriter. He started his professional career as a songwriter in Nashville before signing his first record deal with Capitol Nashville in 2007. Bryan has had 27 #1 hits and sold over 75 million records worldwide. Since 2018, he has served as a judge on American Idol. He has released seven studio albums, six compilation albums, seven EPs, and 32 singles. He has won six Academy of Country Music Awards, two Country Music Association Awards, four American Music Awards, and four Billboard Music Awards. Bryan continues to record and tour.

<https://lngir.cheniere.com/news-events/press-releases/detail/232/cheniere-and-glencore-sign-long-term-lng-sale-and-purchase>

Cheniere and Glencore Sign Long-Term LNG Sale and Purchase Agreement

[Download as PDF](#) OCTOBER 25, 2021 8:30AM EDT

HOUSTON--(BUSINESS WIRE)-- Cheniere Energy, Inc. (“Cheniere” or the “Company”) (NYSE American: LNG) announced today that its subsidiary, Cheniere Marketing, LLC (“Cheniere Marketing”), has entered into a binding liquefied natural gas (“LNG”) sale and purchase agreement (“SPA”) with a subsidiary of Glencore plc (“Glencore”).

Under the SPA, Glencore has agreed to purchase approximately 0.8 million tonnes per annum of LNG from Cheniere Marketing on a free-on-board basis for a term of approximately 13 years beginning in April 2023. The purchase price for LNG under the SPA is indexed to the Henry Hub price, plus a fixed liquefaction fee.

“We are pleased to announce this long-term SPA with Glencore, one of the world’s largest producers and marketers of commodities and a significant player in the global LNG market,” said Jack Fusco, Cheniere’s President and Chief Executive Officer. “This agreement once again reinforces Cheniere’s position as a leading global LNG provider, and we look forward to a successful long-term relationship with Glencore. This SPA further builds upon Cheniere’s commercial momentum, marking another important milestone in contracting our LNG capacity ahead of an FID of Corpus Christi Stage 3, which we expect to occur next year.”

The Corpus Christi Stage 3 project is being developed to include up to seven midscale liquefaction trains with a total expected nominal production capacity of approximately 10 mtpa. It has received all necessary regulatory approvals.

About Cheniere

Cheniere Energy, Inc. is the leading producer and exporter of liquefied natural gas (LNG) in the United States, reliably providing a clean, secure, and affordable solution to the growing global need for natural gas. Cheniere is a full-service LNG provider, with capabilities that include gas procurement and transportation, liquefaction, vessel chartering, and LNG delivery. Cheniere has one of the largest liquefaction platforms in the world, consisting of the Sabine Pass and Corpus Christi liquefaction facilities on the U.S. Gulf Coast, with expected total production capacity of approximately 45 million tonnes per annum of LNG operating or under construction. Cheniere is also pursuing liquefaction expansion opportunities and other projects along the LNG value chain. Cheniere is headquartered in Houston, Texas, and has additional offices in London, Singapore, Beijing, Tokyo, and Washington, D.C.

For additional information, please refer to the Cheniere website at www.cheniere.com and Quarterly Report on Form 10-Q for the quarter ended June 30, 2021, filed with the Securities and Exchange Commission.

Asian LNG Buyers Abruptly Change and Lock in Long Term Supply – Validates Supply Gap, Provides Support For Brownfield LNG FIDs

Posted 11am on July 14, 2021

The last 7 days has shown there is a sea change as Asian LNG buyers have made an abrupt change in their LNG contracting and are moving to lock in long term LNG supply. This is the complete opposite of what they were doing pre-Covid when they were trying to renegotiate Qatar LNG long term deals lower and moving away from long term deals to spot/short term sales. Why? We think they did the same math we did in our April 28 blog “*Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?*” and saw a much bigger and sooner LNG supply gap driven by the delay of 5 bcf/d of Mozambique LNG that was built into most, if not all LNG supply forecasts. Asian LNG buyers are committing real dollars to long term LNG deals, which we believe is the best validation for the LNG supply gap. Another validation, Shell, Total and others are aggressively competing to invest long term capital to partner in Qatar Petroleum’s massive 4.3 bcf/d LNG expansion despite plans to reduce fossil fuels production in the 2020s. And even more importantly to LNG suppliers, the return to long term LNG contracts provides the financing capacity to commit to brownfield LNG FIDs. The abrupt change by Asian LNG buyers to long term contracts is a game changer for LNG markets and sets the stage for brownfield LNG FIDs likely as soon as before year end 2021. It has to be brownfield LNG FIDs if the gap is coming bigger and sooner. And we return to our April 28 blog point, if brownfield LNG is needed, what about Shell looking at 1.8 bcf/d brownfield LNG Canada Phase 2? LNG Canada Phase 1 at 1.8 bcf/d capacity is already a material positive for Cdn natural gas producers. A FID on LNG Canada Phase 2 would be huge, meaning 3.6 bcf/d of Cdn natural gas will be tied to Asian LNG markets and not competing in the US against Henry Hub. And with a much shorter distance to Asian LNG markets. This is why we focus on global LNG markets for our views on the future value of Canadian natural gas.

Sea change in Asian LNG buyers is also the best validation of the LNG supply gap and big to LNG supply FIDs. Has the data changed or have the market participants changed in how they react to the data? We can’t recall exactly who said that on CNBC on July 12, it’s a question we always ask ourselves. In the LNG case, the data has changed with Mozambique LNG delays and that has directly resulted in market participants changing and entering into long term contracts. We can’t stress enough how important it is to see Asian LNG buyers move to long term LNG deals. (i) Validates the sooner and bigger LNG supply gap. We believe LNG markets should look at the last two weeks of new long term deals for Asian LNG buyers as being the validation of the LNG supply gap that clearly emerged post Total declaring force majeure on its 1.7 bcf/d Mozambique LNG Phase 1 that was under construction and on track for first LNG delivery in 2024. Since then, markets have started to realize the Mozambique delays are much more than 1.7 bcf/d. They have seen major LNG suppliers change their outlook to a more bullish LNG outlook and, most importantly, are now seeing Asian LNG buyers changing from trying to renegotiate long term LNG deals lower to entering into long term LNG deals to have security of supply. Asian LNG buyers are cozying up to Qatar in a prelude to the next wave of Asian buyer long term deals. What better validation is there than companies/countries putting their money where their mouth is. (ii) Provides financial commitment to help push LNG suppliers to FID. We believe these Asian LNG buyers are doing much more than validating a LNG supply gap to markets. The big LNG suppliers can move to FID based on adding more LNG supply to their portfolio, but having more long term deals provides the financial anchor/visibility to long term capital commitment from the buyers. Long term contracts will only help LNG suppliers get to FID.

It was always clear that the Mozambique LNG supply delay was 5.0 bcf/d, not just 1.7 bcf/d from Total Phase 1. LNG markets didn’t really react to Total’s April 26 declaration of force majeure on its 1.7 bcf/d Mozambique LNG Phase 1. This was an under construction project that was on time to deliver first LNG in 2024. It was in all LNG supply forecasts. There was no timeline given but, on the Apr 29 Q1 call, Total said that it expected any restart decision would be least a year away. If so, we believe that puts any actual construction at least 18 months away. There will be work to do just to get back to where they were when they were forced to stop development work on Phase 1. Surprisingly, markets didn’t look the broader implications, which is why we posted our 7-pg Apr 28 blog “*Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?*” [\[LINK\]](#) We highlighted that Mozambique LNG delays were actually 5 bcf/d, not 1.7 bcf/d. And this 5 bcf/d of Mozambique LNG supply was built into most, if not all, LNG supply forecasts. The delay in Total Phase 1 would lead to a commensurate delay in its Mozambique LNG Phase 2 of 1.3 bcf/d. Total Phase 2 was to add 1.3 bcf/d. There was no firm in service date, but it was expected to

follow closely behind Phase 1 to maintain services. That would have put it originally in the 2026/2027 period. But if Phase 1 is pushed back at least 2 years, so will the follow on Phase 2, so more likely, it will be at least 2028/2029. The assumption for most, if not all, LNG forecasts was that Phase 2 would follow Phase 1. Exxon Rozuma Phase 1 of 2.0 bcf/d continues to be pushed back in timeline especially following Total Phase 1. Exxon's Mozambique Rozuma Phase 1 LNG will add 2.0 bcf/d and, pre-Covid, was originally expected to be in service in 2025. The project was being delayed and Total's force majeure has added to the delays. Rozuma onshore LNG facilities are right by Total. On June 20, we tweeted [\[LINK\]](#) on the Reuters report "*Exclusive: Galp says it won't invest in Rovuma until Mozambique ensures security*" [\[LINK\]](#). Galp is one of Exxon's partners in Rozuma. Reuters reported that Galp said they won't invest in Exxon's Rozuma LNG project until the government ensures security, that this may take a while, they won't be considering the project until after Total has reliably resumed work on its Phase 1, which likely puts any Rozuma decision until at least end of 2022 at the earliest. Galp has taken any Rozuma Phase 1 capex out of their new capex plans thru 2025 and will have to take out projects in their capex plan if Rozuma does come back to work. This puts Rozuma more likely 2028 at the earliest as opposed to before the original expectations of before 2025. Pre-pandemic, Exxon's March 6, 2019 Investor Day noted their operated Mozambique Rovuma LNG Phase 1 was to be 2 trains each with 1.0 bcf/d capacity for total initial capacity of 2.0 bcf/d with FID expected in 2019 and first LNG deliveries sometime before 2025. LNG forecasts had been assuming Exxon Rozuma would be onstream around 2025. The 2019 FID expectation was later pushed to be expected just before the March 2020 investor day. But the pandemic hit, and on March 21, 2020, we tweeted [\[LINK\]](#) on the Reuters story "*Exclusive: Coronavirus, gas slump put brakes on Exxon's giant Mozambique LNG plan*" [\[LINK\]](#) that noted Exxon was expected to delay the Rovuma FID. There was no timeline, but now, any FID is not expected until late 2022 at the earliest, that would push first LNG likely to at least 2028. What this means is that the Mozambique LNG delays are not 1.7 bcf/d but 5.0 bcf/d of projects that were in all, if not most, LNG supply forecasts. There is much more in our 7-pg blog. But Mozambique is what is driving a much bigger and sooner LNG supply gap starting ~2025 and stronger outlook for LNG prices

One of the reasons why it went under the radar is that major LNG suppliers played stupid on the Mozambique impact. It makes it harder for markets to see a big deal when the major LNG suppliers weren't making a big deal of Mozambique or playing stupid in the case of Cheniere in their May 4 Q1 call. In our May 9, 2021 Energy Tidbits memo, we said we had to chuckle when we saw Cheniere's response in the Q&A to its Q1 call on May 4 that they only know what we know from reading the Total releases on Mozambique and its impact on LNG markets. It's why we tweeted [\[LINK\]](#) "*Hmm! \$LNG says only know what we read on #LNG market impact from \$TOT \$XOM MZ LNG delays. Surely #TohokuElectric & other offtake buyers are reaching out to #Cheniere. MZ LNG delays is a game changer to LNG in 2020s, see SAF Group blog. Thx @olymp_e_mattei @TheTerminal #NatGas*". How could they not be talking to LNG buyers for Total and/or Exxon Mozambique LNG projects. In the Q1 Q&A, mgmt was asked about Mozambique and didn't know any more than what you or I have read. Surely, they were speaking to Asian LNG buyers who had planned to get LNG supply from Total Mozambique or Exxon Rozuma Mozambique or both. Mgmt is asked "*wanted to just kind of touch on the color use talking about for these supply curve. And are you able to kind of provide any thoughts on the Mozambique and a deferral with the project of that size on 13 and TPA being deferred by we see you have you noticed any impact to the market has is there any impact for stage 3 with that capacity? Thanks.*" Mgmt replies "*No. Look, I only know about the Mozambique delay with what I read as well as what you read that from total and an Exxon. And it's a sad situation and I hope everybody is safe and healthy that were there to experience that unrest but no I don't think it's, again it's a different business paradigm than what we offer. So, we offer a full value product, the customer doesn't have to invest in equity, customer doesn't have to worry about the E&P side of the business because, we've been able to both the by at our peak almost 7 Dec's a day of US NAT gas from almost a 100 different producers on 26 different pipelines and deliver it to our facilities. So we take care of a lot of what the customer needs*".

There are other LNG supply delays/interruptions beyond Mozambique. There have been a number of other smaller LNG delay or existing supply interruptions that add to Asian LNG buyers feeling less secure about the reliability of mid to long term LNG supply. Here are just a few examples. (i) Total Papua LNG 0.74 bcf/d. On June 8, we tweeted [\[LINK\]](#) "*Timing update Papua #LNG project. \$OSH June 8 update "2022 FEED, 2023 FID targeting 2027 first gas". \$TOT May 5 update didn't forecast 1st gas date. Papua is 2 trains w/ total capacity 0.74 bcf/d.*" We followed the tweet saying [\[LINK\]](#) "*Bigger #LNG supply gap being created >2025. Papua #LNG originally expected FID in 2020 so 1st LNG is 2 years delayed.*"

Common theme - new LNG supply is being delayed ie. [Total] Mozambique. Don't forget need capacity>demand due to normal maintenance, etc. Positive for LNG.” (ii) Chevron’s Gorgon. A big LNG story in H2/20 was the emergence of weld quality issues in the propane heat exchangers at Train 2, which required additional downtime for repair. Train 2 was shut on May 23 with an original restart of July 11, but the repairs to the weld quality issues meant it didn’t restart until late Nov. The same issue was found in Train 1 but repairs were completed. However extended downtime for the trains led to lower LNG volumes. Gorgon produced ~2.3 bcf/d in 2019 but was down to 2.0 bcf/d in 2020. (iii) Equinor’s Melkøya 0.63 bcf/d shut down for 18 months due to a fire. A massive fire led to the Sept 28, 2020 shutdown of the 0.63 bcf/d Melkøya LNG facility in Norway. On April 26, Equinor released “*Revised start-up date for Hammerfest LNG*” [\[LINK\]](#) with regard to the 0.63 bcf/d Melkøya LNG facility. The original restart date was Oct 1, 2021 (ie. a 12 month shut down), but Equinor said “*Due to the comprehensive scope of work and Covid-19 restrictions, the revised estimated start-up date is set to 31 March 2022*”. When we read the release, it seemed like Equinor was almost setting the stage for another potential delay in the restart date. Equinor had two qualifiers to this March 31, 2022 restart date. Equinor said “*there is still some uncertainty related to the scope of the work*” and “*Operational measures to handle the Covid-19 situation have affected the follow-up progress after the fire. The project for planning and carrying out repairs of the Hammerfest LNG plant must always comply with applicable guidelines for handling the infection situation in society. The project has already introduced several measures that allow us to have fewer workers on site at the same time than previously expected. There is still uncertainty related to how the Covid-19 development will impact the project progress.*”

Cheniere stopped the game playing the game on June 30. Our July 4, 2021 Energy Tidbits memo noted that it looks like Cheniere has stopped playing stupid with respect to the strengthening LNG market in 2021. We can’t believe they thought they were fooling anyone, especially their competitors. Bu that week, they came out talking about how commercial discussions have picked up in 2021 and it’s boosted their hope for a Texas (Corpus Christi) LNG expansion. On Wednesday, Platts reported “*Pickup in commercial talks boosts Cheniere's hopes on mid-scale LNG project*” [\[LINK\]](#) Platts wrote “*Cheniere Energy expects to make a "substantial dent" by the end of 2022 in building sufficient buyer support for a proposed mid-scale expansion at the site of its Texas liquefaction facility, Chief Commercial Officer Anatol Feygin said June 30 in an interview.*” “*As a result, he said, " The commercial engagement, I think it is very fair to say, has really picked up steam, and we are quite optimistic over the coming 12-18 months to make a substantial dent in that Stage 3 commercialization.*” Platts also reported that Cheniere noted this has been a tightening market all year (ie would have been known by the May 4 Q1 call). Platts wrote “*We obviously find ourselves at the beginning of this year and throughout in a very tight market where prices today into Asia and into Europe are at levels that we frankly haven't seen in a decade-plus,*” Feygin said. “*We've surpassed the economics that the industry saw post the Fukushima tragedy in March 2011, and that's happened in the shoulder period.*” It’s a public stance as to a more bullish LNG outlook

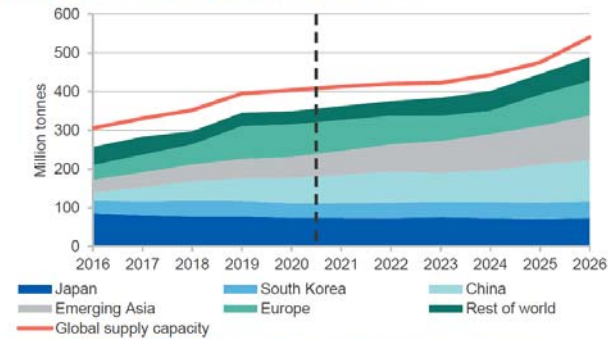
But we still see major LNG suppliers like Australia hinting but not outright saying that LNG supply gap is coming sooner. We have to believe Australia will be unveiling a sooner LNG supply gap in their September forecast. On June 28, we tweeted [\[LINK\]](#) on Australia’s Resources and Energy Quarterly released on Monday [\[LINK\]](#) because there was a major change to their LNG outlook versus their March forecast. We tweeted “*#LNGSupplyGap. AU June fcast now sees #LNG mkt tighten post 2023 vs Mar fcast excess supply thru 2026. Why? \$TOT Mozambique delays. See below SAF Apr 28 blog. Means brownfield LNG FID needed ie. like #LNGCanada Phase 2. #OOTT #NatGas*”. Australia no longer sees supply exceeding demand thru 2026. In their March forecast, Australia said “*Nonetheless, given the large scale expansion of global LNG capacity in recent years, demand is expected to remain short of total supply throughout the projection period.*” Note this is thru 2026 ie. a LNG supply surplus thru 2026. But on June 28, Australia changed that LNG outlook and now says the LNG market may tighten beyond 2023. Interestingly, the June forecast only goes to 2023 and not to 2026 as in March. Hmmm! On Monday, they said “*Given the large scale expansion of global LNG capacity in recent years, import demand is expected to remain short of export capacity throughout the outlook period. Beyond 2023, the global LNG market may tighten, due to the April 2021 decision to indefinitely suspend the Mozambique LNG project, in response to rising security issues. This project has an annual nameplate capacity of 13 million tonnes, and was previously expected to start exporting LNG in 2024.*” 13 million tonnes is 1.7 bcf/d so they are only referring to Total Mozambique LNG Phase 1. So no surprise the change is Mozambique LNG driven but we have to believe the reason why they cut their forecast off this time at 2023 is that they are looking at trying to figure out what to forecast beyond 2023 in addition to Total Phase 1. And, importantly, we believe they will be changing their LNG forecast for more than Mozambique ie. India

demand that we highlight later in the blog. They didn't say anything else specific on Mozambique but, surely they have to also be delaying the follow on Total Phase 2 of 1.3 bcf/d and Exxon Rozuma Phase 1 of 2.0 bcf/d.

Australia's LNG Outlook: March 2021 vs June 2021 Forecasts

March 2021 LNG Outlook

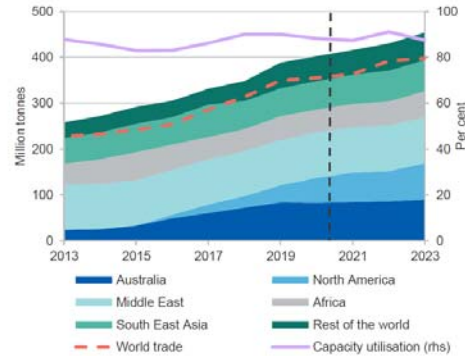
Figure 7.1: LNG demand and world supply capacity



Source: Nexant (2021) World Gas Model; Department of Industry, Science, Energy and Resources (2021)

June 2021 LNG Outlook

Figure 7.1: LNG demand and world supply capacity



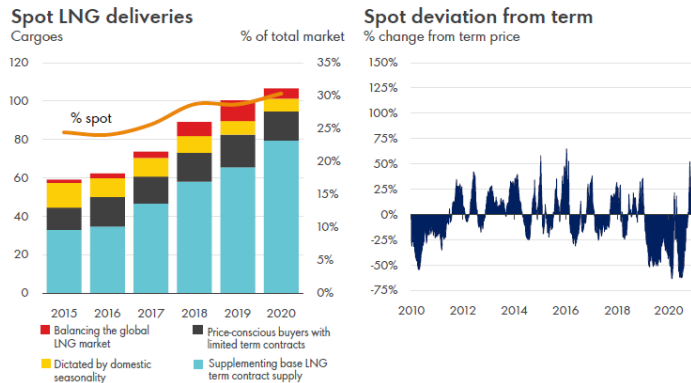
Source: Nexant (2021) World Gas Model; Department of Industry, Science, Energy and Resources (2021)

Source: Australia Resources and Energy Quarterly

Clearly Asian LNG buyers did the math, saw the new LNG supply gap and were working the phones in March/April/May trying to lock up long term supply. We wrote extensively on the Total Mozambique LNG situation before the April 26 force majeure as it was obvious that delays were coming to a project counted on for first LNG in 2024. Total had shut down Phase 1 development in December for 3 months due to the violence and security risks. It restarted development on Wed March 24, violence/attacks immediately resumed for 3 consecutive days, and then Total suspended development on Sat March 27. That's why no one should have been surprised by the April 26 force majeure. Asian LNG buyers were also seeing this and could easily do the same math we were doing and saw a bigger and sooner LNG supply gap. They were clearly working the phones with a new priority to lock up long term LNG supply. Major long term deals don't happen overnight, so it makes sense that we started to see these new Asian long term LNG deals start at the end of June.

A big pivot from trying to renegotiate down long term LNG deals or being happy to let long term contracts expire and replace with spot/short term LNG deals. This is a major pivot or abrupt turn on the Asian LNG buyers contracting strategy for the 2020s. There is the natural reduction of long term contracts as contracts reach their term. But with the weakness in LNG prices in 2019 and 2020, Asian LNG buyers weren't trying to extend long term contracts, rather, the push was to try to renegotiate down its long term LNG deals. The reason was clear, as spot prices for LNG were way less than long term contract prices. And this led to their LNG contracting strategy – move to increase the proportion of spot LNG deliveries out of total LNG deliveries. Shell's LNG Outlook 2021 was on Feb 25, 2021 and included the below graphs. The spot LNG price derivation from long term prices in 2019 and 2020 made sense for Asian LNG buyers to try to change their contract mix. Yesterday, Maeil Business News Korea reported on the new Qatar/Kogas long term LNG deal with its report "*Korea may face LNG supply cliff or pay hefty price after long-term supplies run out*" [\[LINK\]](#), which highlighted this very concept – Korea wasn't worried about trying to extend expiring long term LNG contracts. Maeil wrote "*Seoul in 2019 secured a long-term LNG supply contract with the U.S. for annual 15.8 million tons over a 15-year period. But even with the latest two LNG supply contracts, the Korean government needs extra 6 million tons or more of LNG supplies to keep up the current power pipeline. By 2024, Korea's long-term supply contracts for 9 million tons of LNG will expire - 4.92 million tons on contract with Qatar and 4.06 million tons from Oman, according to a government official who asked to be unnamed.*"

Spot LNG deliveries and Spot deviation from term price



Source: Shell LNG Outlook 2021 on Feb 25, 2021

Asian LNG buyers moving to long term LNG deals provide financing capacity for brownfield LNG FIDs. We believe this abrupt change and return to long term LNG deals is even more important to LNG suppliers who want to FID new projects. The big LNG players like Shell can FID new LNG supply without new long term contracts as they can build into their supply options to fill their portfolio of LNG contracts. But that doesn't mean the big players don't want long term LNG supply deals, as having long term LNG contracts provide better financing capacity for any LNG supplier. It takes big capex for LNG supply and long term deals make the financing easier.

Four Asian buyer long term LNG deals in the last week. It was pretty hard to miss a busy week for reports of new Asian LNG buyer long term LNG deals. There were two deals from Qatar Petroleum, one from Petronas and one from BP. The timing fits, it's about 3 months after Total Mozambique LNG problems became crystal clear. And as noted later, there are indicators that more Asian buyer LNG deals are coming.

Petronas/CNOOC is 10 yr supply deal for 0.3 bcf/d. On July 7, we tweeted [\[LINK\]](#) on the confirmation of a big positive to Cdn natural gas with the Petronas announcement [\[LINK\]](#) of a new 10 year LNG supply deal for 0.3 bcf/d with China's CNOOC. The deal also has special significance to Canada. (i) Petronas said "This long-term supply agreement also includes supply from LNG Canada when the facility commences its operations by middle of the decade". This is a reminder of the big positive to Cdn natural gas in the next 3 to 4 years – the start up of LNG Canada Phase 1 is ~1.8 bcf/d capacity. This is natural gas that will no longer be moving south to the US or east to eastern Canada, instead it will be going to Asia. This will provide a benefit for all Western Canada natural gas. (ii) First ever AECO linked LNG deal. It's a pretty significant event for a long term Asia LNG deal to now have an AECO link. Petronas wrote "The deal is for 2.2 million tonnes per annum (MTPA) for a 10-year period, indexed to a combination of the Brent and Alberta Energy Company (AECO) indices. The term deal between PETRONAS and CNOOC is valued at approximately USD 7 billion over ten years." 2.2 MTPA is 0.3 bcf/d. (iii) Reminds of LNG Canada's competitive advantage for low greenhouse gas emissions. Petronas said "Once ready for operations, the LNG Canada project paves the way for PETRONAS to supply low greenhouse gas (GHG) emission LNG to the key demand markets in Asia."

Qatar Petroleum/CPC (Taiwan) is 15 yr supply deal for 0.16 bcf/d. Pre Covid, Qatar was getting pressured to renegotiate lower its long term LNG contract prices. Now, it's signing a 15 year deal. On July 9, they entered in a new small long term LNG sales deal [\[LINK\]](#), a 15-yr LNG Sale and Purchase Agreement with CPC Corporation in Taiwan to supply it ~0.60 bcf/d of LNG. LNG deliveries are set to begin in January 2022. H.E. Minister for Energy Affairs & CEO of Qatar Petroleum Al-Kaabi said "We are pleased to enter into this long term LNG SPA, which is another milestone in our relationship with CPC, which dates back to almost three decades. We look forward to commencing deliveries under this SPA and to continuing our supplies as a trusted and reliable global LNG provider." The pricing was reported to be vs a basket of crudes.

BP/Guangzhou Gas, a 12-yr supply deal for 0.13 bcf/d. On July 9, there was a small long term LNG supply deal with BP and Guangzhou Gas (China). Argus reported [\[LINK\]](#) BP had signed a 12 year LNG supply deal with Guangzhou Gas (GG), a Chinese city's gas distributor, which starts in 2022. The contract prices are to be linked to an index of international crude prices. Although GG typically gets its LNG from the spot market, it used a tender in late April for ~0.13 bcf/d starting in 2022. BP's announcement looks to be for most of the tender, so it's a small deal. But it fit into the trend this week of seeing long term LNG supply deals to Asia. This was intended to secure deliveries to the firm's Xiaohudao import terminal which will become operational in August 2022.

Qatar/Korea Gas is a 20-yr deal to supply 0.25 bcf/d. On Monday, Reuters reported [\[LINK\]](#) "South Korea's energy ministry said on Monday it had signed a 20-year liquefied natural gas (LNG) supply agreement with Qatar for the next 20 years starting in 2025. South Korea's state-run Korea Gas Corp (036460.KS) will buy 2 million tonnes of LNG annually from Qatar Petroleum". There was no disclosure of pricing.

More Asian buyer long term LNG deals (ie. India) will be coming. There are going to be more Asian buyer long term LNG deals coming soon. Our July 11, 2021 Energy Tidbits highlighted how India's new petroleum minister Hardeep Singh Puri (appointed July 8) hit the ground running with what looks to be a priority to set the stage for more India long term LNG deals with Qatar. On July 10, we retweeted [\[LINK\]](#) "New India Petroleum Minister hits ground running. What else w/ Qatar but #LNG. Must be #Puri setting stage for long term LNG supply deal(s). Fits sea change of buyers seeing #LNGSupplyGap (see SAF Apr 28 blog <http://safgroup.ca>) & wanting to tie up LNG supply. #OOTT". It's hard to see any other conclusion after seeing what we call a sea change in LNG buyer mentality with a number of long term LNG deals this week. Puri tweeted [\[LINK\]](#) "Discussed ways of further strengthening mutual cooperation between our two countries in the hydrocarbon sector during a warm courtesy call with Qatar's Minister of State for Energy Affairs who is also the President & CEO of @qatarpetroleum HE Saad Sherida Al-Kaabi". As noted above, we believe there is a sea change in LNG markets that was driven by the delay in 5 bcf/d of LNG supply from Mozambique (Total Phase 1 & Phase 2, and Exxon Rozuma Phase 1) that was counted on all LNG supply projections for the 2020s. Puri's tweet seems to be him setting the stage for India long term LNG supply deals with Qatar.

Supermajors are aggressively competing to commit 30+ year capital to Qatar's LNG expansion despite stated goal to reduce fossil fuels production. It's not just Asian LNG buyers who are now once again committing long term capital to securing LNG supply, it's also supermajors all bidding to be able to commit big capex to part of Qatar Petroleum's 4.3 bcf/d LNG expansion. Qatar Petroleum received a lot of headlines following their June 23 announcement on its LNG expansion [\[LINK\]](#) on how they received bids for double the equity being offered. And there were multiple reports that these are on much tougher terms for Qatar's partners. Qatar Petroleum CEO Saad Sherida Al-Kaabi specifically noted that, among the bidders, were Shell, Total and Exxon. Shell and Total have two of the most ambitious plans to reduce fossil fuels production in the 2020's, yet are competing to allocate long term capital to increase fossil fuels production. And Shell and Total are also two of the global LNG supply leaders. It has to be because they are seeing a bigger and sooner LNG supply gap.

Remember Qatar's has a massive expansion but India alone needs 3x the Qatar expansion LNG capacity. In addition to the competition to be Qatar Petroleum's partners, we remind that, while this is a massive 4.3 bcf/d LNG expansion, India alone sees its LNG import growing by ~13 bcf/d to 2030. The Qatar announcement reminded they see a LNG supply gap and continued high LNG prices. We had a 3 part tweet. (i) First, we highlighted [\[LINK\]](#) "1/3. #LNGSupplyGap coming. big support for @qatarpetroleum expansion to add 4.3 bcf/d LNG. but also say "there is a lack of investments that could cause a significant shortage in gas between 2025-2030" #NatGas #LNG". This is after QPC accounts for their big LNG expansion. The QPC release said "However, His Excellency Al-Kaabi voiced concern that during the global discussion on energy transition, there is a lack of investment in oil and gas projects, which could drive energy prices higher by stating that "while gas and LNG are important for the energy transition, there is a lack of investments that could cause a significant shortage in gas between 2025-2030, which in turn could cause a spike in the gas market." (ii) Second, this is a big 4.3 bcf/d expansion, but India alone has 3x the increase in LNG import demand. We tweeted [\[LINK\]](#) "2/3. Adding 4.3 bcf/d is big, but dwarfed by items like India. #Petronet gave 1st specific forecast for what it means if #NatGas is to be 15%

of energy mix by 2030 - India will need to increase #LNG imports by ~13 bcf/d. See SAF Group June 20 Energy Tidbits memo.” (iii) Third, Qatar’s supply gap warning is driven by the lack of investments in LNG supply. We agree, but note that the lack of investment is in great part due to the delays in both projects under construction and in FIDs that were supposed to be done in 2019. We tweeted [\[LINK\]](#) “3/3. #LNGSupplyGap is delay driven. \$TOT Mozambique Phase 1 delay has chain effect, backs up 5 bcf/d. See SAF Group Apr 28 blog Multiple Brownfield LNG FIDs Now Needed To Fill New #LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2? #NatGas.”

Seems like many missed India’s first specific LNG forecast to 2030. Our June 20, 2021 Energy Tidbits memo highlighted the first India forecast that we have seen to estimate the required growth in natural gas consumption and LNG imports if India is to meet its target for natural gas to be 15% of its energy mix by 2030. India will need to increase LNG imports by ~13 bcf/d or 3 times the size of the Qatar LNG expansion. Our June 6, 2021 Energy Tidbits noted the June 4 tweet from India’s Energy Minister Dharmendra Pradhan [\[LINK\]](#) reinforcing the 15% goal “We are rapidly deploying natural gas in our energy mix with the aim to increase the share of natural gas from the current 6% to 15% by 2030.” But last week, Petronet CEO AK Singh gave a specific forecast. Reuters report “LNG’s share of Indian gas demand to rise to 70% by 2030: Petronet CEO” [\[LINK\]](#) included Petronet’s forecast if India is to hit its target for natural gas to be 15% of energy mix by 2030. Singh forecasts India’s natural gas consumption would increase from current 5.5 bcf/d to 22.6 bcf/d in 2030. And LNG shares would increase from 50% to 70% of natural gas consumption ie. an increase in LNG imports of ~13 bcf/d from just under 3 bcf/d to 15.8 bcf/d in 2030. Singh did not specifically note his assumption for India’s natural gas production, but we can back into the assumption that India natural gas production grows from just under 3 bcf/d to 6.8 bcf/d. It was good to finally see India come out with a specific forecast for 2030 natural gas consumption and LNG imports if India is to get natural gas to 15% of its energy mix in 2030. Petronet’s Singh forecasts India natural gas consumption to increase from 5.5 bcf/d to 22.6 bcf/d in 2030. This forecast is pretty close to our forecast in our Oct 23, 2019 blog “Finally, Some Visibility That India Is Moving Towards Its Target For Natural Gas To Be 15% Of Its Energy Mix By 2030”. Here part of what we wrote in Oct 2019. “It’s taken a year longer than we expected, but we are finally getting visibility that India is taking significant steps towards India’s goal to have natural gas be 15% of its energy mix by 2030. On Wednesday, we posted a SAF blog [\[LINK\]](#) “Finally, Some Visibility That India Is Moving Towards Its Target For Natural Gas To Be 15% Of Its Energy Mix By 2030”. Our 2019 blog estimate was for India natural gas demand to be 24.0 bcf/d in 2030 (vs Singh’s 22.6 bcf/d) and for LNG import growth of +18.4 bcf/d to 2030 (vs Singh’s +13 bcf/d). The difference in LNG would be due to our Oct 2019 forecast higher natural gas consumption by 1.4 bcf/d plus Singh forecasting India natural gas production +4 bcf/d to 2030. Note India production peaked at 4.6 bcf/d in 2010.

Bigger, nearer LNG supply gap + Asian buyers moving to long term LNG deals = LNG players forced to at least look at what brownfield LNG projects they could advance and move to FID. All we have seen since our April 28 blog is more validation of the bigger, nearer LNG supply gap. And now market participants (Asian LNG buyers) are reacting to the new data by locking up long term supply. Cheniere noted how the pickup in commercial engagement means they “are quite optimistic over the coming 12-18 months to make a substantial dent in that Stage 3 commercialization.” Cheniere can’t be the only LNG supplier having new commercial discussions. It’s why we believe the Mozambique delays + Asian LNG buyers moving to long term deals will effectively force major LNG players to look to see if there are brownfield LNG projects they should look to advance. Prior to March/April, no one would think Shell or other major LNG players would be considering any new LNG FIDs in 2021. Covid forced all the big companies into capital reduction mode and debt reduction mode. But Brent oil is now solidly over \$70, and LNG prices are over \$13 this summer and the world’s economic and oil and gas demand outlook are increasing with vaccinations. And we are starting to see companies move to increasing capex with the higher cash flows. The theme in Q3 reporting is going to be record or near record oil and gas cash flows, reduced debt levels and increasing returns to shareholders. And unless new mutations prevent vaccinations from returning the world to normal, we suspect that major LNG players, like other oil and gas companies, will be looking to increase capex as they approve 2022 budgets. The outlook for the future has changed dramatically in the last 8 months. The question facing major LNG players like Shell is should they look to FID new LNG brownfield projects in the face of an increasing LNG supply gap that is going to hit faster and harder and Asian LNG buyers prepared to do long term deals. We expect these decisions to be looked at before the end of 2021 for 2022 capex budget/releases. One wildcard that could force these decisions sooner is the already stressed out global supply chain. We have to believe that discussion there will be pressure for more Asian LNG buyer long term deals sooner than later.

For Canada, does the increasing LNG supply gap provide the opportunity to at least consider a LNG Canada Phase 2 FID over the next 6 months? Our view on Shell and other LNG players is unchanged since our April 28 blog. Shell is no different than any other major LNG supplier in always knowing the market and that the oil and gas outlook is much stronger than 9 months ago. Even 3 months post our April 28 blog, we haven't heard any significant talks on how major LNG players will be looking at FID for new brownfield LNG projects. We don't have any inside contacts at Shell or LNG Canada, but that is no different than when we looked at the LNG markets in September 2017 and saw the potential for Shell to FID LNG Canada in 2018. We posted a September 20, 2017 blog "*China's Plan To Increase Natural Gas To 10% Of Its Energy Mix Is A Global Game Changer Including For BC LNG*" [\[LINK\]](#). Last time, it was a demand driven supply gap, this time, it's a supply driven supply gap. We have to believe any major LNG player, including Shell, will be at least looking at their brownfield LNG project list and seeing if they should look to advance FID later in 2021. Shell has LNG Canada Phase 2, which would add 2 additional trains or approx. 1.8 bcf/d. And an advantage to an FID would be that Shell would be able to commit to its existing contractors and fabricators for a continuous construction cycle following on LNG Canada Phase 1 ie. to help keep a lid on capital costs. We believe maintaining a continuous construction cycle is even more important given the stressed global supply chain. No one is talking about the need for these new brownfield LNG projects, but, unless some major change in views happen, we believe its inevitable that these brownfield LNG FID internal discussions will be happening in H2/21. Especially since the oil and gas price outlook is much stronger than it was in the fall and companies will be looking to increase capex in 2022 budgets.

A LNG Canada Phase 2 would be a big plus to Cdn natural gas. LNG Canada Phase 1 is a material natural gas development as its 1.8 bcf/d capacity represents approx. 20 to 25% of Cdn gas export volumes to the US. The EIA data shows US pipeline imports of Cdn natural gas as 6.83 bcf/d in 2020, 7.36 bcf/d in 2019, 7.70 bcf/d in 2018, 8.89 bcf/d in 2017, 7.97 bcf/d in 2016, 7.19 bcf/d in 2015 and 7.22 bcf/d in 2014. A LNG Canada Phase 2 FID would be a huge plus for Cdn natural gas. It would allow another ~1.8 bcf/d of Cdn natural gas to be priced against pricing points other than Henry Hub. And it would provide demand offset versus Trudeau if he moves to make electricity "emissions free" and not his prior "net zero emissions". Mozambique has been a game changer to LNG outlook creating a bigger and sooner LNG supply gap. And with a stronger tone to oil and natural gas prices in 2021, the LNG supply gap will at least provide the opportunity for Shell to consider FID for its brownfield LNG Canada Phase 2 and provide big support to Cdn natural gas for the back half of the 2020s. And perhaps if LNG Canada is exporting 3.6 bcf/d from two phases, it could help flip Cdn natural gas to a premium vs US natural gas especially if Biden is successful in reducing US domestic natural gas consumption for electricity. The next six months will be very interesting to watch for LNG markets and Cdn natural gas valuations. Imagine the future value of Cdn natural gas is there was visibility for 3.6 bcf/d of Western Canada natural gas to be exported to Asia.

SAF created transcript of Exxon Q3 call Q&A

Items in "italics" are SAF group created transcript

- Scotiabank. Capex has been \$20-25b for the last few years, but low-carbon is up \$2b, incremental spending is all being absorbed how or are some legacy projects being pushed out? and update on Mozambique? Woods. re didn't change band of capex but adding low carbon. Savings is one of the items. have been some shifting as there always is, *"think of some of the LNG projects, there has been some movement on that, Mozambique and the work we have been doing there in collaboration with Total, with some of the issues that we have seen in Mozambique that has slipped some, but we are still committed to that project. We see that as a valuable opportunity, but we're going to have to do that in the time frame available to us with some of the constraints that we see today. so there is some movement in some of those projects"*. CFO Mikells *"our Coral project is clearly moving forward and you talked about the project that we paused simply because of the security situation on the ground, which we will continue to look at and revisit over time."*
- Scotiabank, followup are you still committed to Mozambique as some market rumors may revisit if you want to be in that project. Woods *"I wouldn't put a lot of faith in the rumors. As you know Paul, there is a lot of people talking, most of them don't have a good understanding of the discussions we are having. We see that as a very competitive resource, its large, we've got opportunities with Total that we've been working on. They're committed to the project. We got a really good working relationship with them as well as our other partners and our existing. But I think we will continue to develop that. we think that going to be very competitive in the long term and something that's going to be needed. So we continue to be committed to that"*
-

However, our free cash generation reflected the temporary effect related with our gas hedging strategy and a significant spike in gas prices during the period. Due to this effect, as well as the interim dividend of two hundred million euro paid to shareholders during the period meant our net debt increased to two billion euro.

02:29 This puts us slightly above our targeted net debt to EBITDA ratio of one. However, we're expecting further deleverage through Q4 and confident that the dividend variable component will be distributed and I'll cover that again later in this call.

02:47 In addition to the actual Q3 financial numbers, we also made progress towards executing our strategy to create a more sustainable company. Finally, I'm happy to see the external recognition of our strategy with Galp recurrently holding leading positions on the relevant ESG rankings, acknowledged further by the seven hundred million euro lending we have secured from EIB.

03:16 Now, let's look at the businesses in more detail. During the period, we have seen some operational improvements in upstream, namely [indiscernible] in Brazil, leading to a stronger oil output welcomed at a time of high oil prices. However, due to some maintenance activities on gas exports, overall oil and gas production was flat quarter-on-quarter.

03:40 During the quarter, the largest FPSO so far in production in Brazil was started up on the Sepia field. Petrobras' delivery of the FPSO in these difficult times is to be commended. Although, a small production contribution to Galp in the period, the production rate from the one well hooked up is prolific, boding well for the full potential of the field.

04:04 The FPSO in Atapu is also now producing at high levels, close to plateau production with only four wells connected. The Brazilian pre-salt continues to be an amazing story with new wells demonstrating high productivities and strong reservoir potential.

04:24 The improved operational conditions will allow us to resume some inspection and maintenance activities and through Q4, we hope to see progress on working through the maintenance backlog. We remain confident on the full-year production guidance updated last quarter at one hundred twenty five thousand to one hundred thirty thousand barrels oil equivalent per day.

04:48 Going forward, we expect the business to maintain its strong cash delivery, with disciplined approach to CapEx focused on key attractive low carbon developments, such as Bacalhau, a project which continues to progress well. Coral FLNG from Mozambique also progresses well and is on track for first gas during twenty twenty two with sail away from Korea expected during Q4.

wondering how should we think about maybe the exit rate in Q4 and maybe if you can give us maybe some key dates for twenty twenty two? I believe, the start-up, of course, is one of them and maybe if you can give us an update on that one as well. That's my first question.

Andy Brown

30:54 I think -- thank you, Alessandro, for your question. I think I'll hand over to Thore to talk about the upstream position.

Thore Kristiansen

31:01 Thank you, Andy. So with respect to the upstream production and the guidance for the fourth quarter, I think you can expect the production that is very similar to the ones that you have seen in the third quarter. That's our key guidance to you. With respect to twenty twenty two, that's a bit early. Let's revert to twenty twenty two at the Capital Markets Day when we have consolidated all our numbers and analyses for next year.

31:24 With respect to Coral, the project is going extremely well and it -- now it's very visible that we will have a sail away from Korea in the middle of November, then its sails to Mozambique for the offshore commissioning and in our plans, we have first gas in the second half of twenty twenty two. Thank you.

Alessandro Pozzi

31:53 Okay, thank you. The second question on renewables. I think part of your strategy is to farm down some of your positions in certain assets and given the spike in electricity prices, do you think this is potentially happening sooner rather than later? And, yeah, in general, I was wondering if you can give us an update on potential disposal opportunities there.

Andy Brown

32:23 [indiscernible] Thank you for your comment. I mean, what I'd like to just say is that what we're doing is we're building portfolio. We talked about four point seven gigawatts. We're continuing to build the portfolio to give us more options to make sure we are delivering the gross capacity of the four gigawatts.

32:46 In terms of our sell-down strategy, clearly, we haven't yet got firm plans of when we're going to kick that process off. We are diversifying the countries we are working in, with our announcement now, we're moving into Brazil. But there will be a moment when we will both look at some sell downs, particularly when we derisk the projects, but also what -- look at what timing we would take some more PPAs, because we are entirely merchants at the moment, which is obviously good with the current prices. But over

41:09 Your next question comes from the line of Jon Rigby from UBS. Please ask your question.

Jon Rigby

41:16 Hello. Thank you for taking the call -- taking the question. I think this is for Filipe, actually. I noticed the sort of step-up in contribution from renewables, obviously, with the high electricity prices. And that sort of flows through from your pro forma EBITDA into -- mainly into associates as you've noted. Can you just help and run through the sort of how both the earnings. And then also the cash flow cascade kind of works into your income statement and into your consolidated accounts?

41:51 I'm particularly interested maybe where you're doing refinancing. Does that reappear back in your cash flow statement as a dividend or is it divestment? And just wanted to sort of understand what the allocation and priority of cash flows would be to paying interest versus paying dividends back to yourselves, paying back some of the capital on the loans et cetera. So if this makes sense, some sort of map of how cash flows and earnings were back into your business, if that's possible.

Filipe Crisostomo Silva

42:35 Good morning, Jon. I don't think what we are doing and will do is different from what we've done with all the associates or what everybody else does. So you have unconsolidated entities currently generating more cash. So that cash goes to pay project finance and OpEx, of course, and whatever is left under the financing agreement, as long as you comply with debt service coverage ratio, then you distribute the cash as dividend and when you use that cash for CapEx, but we will show the numbers gross. So all the cash that comes to Galp comes from in the cash flow statement as a dividend income and CapEx will be gross. So the money goes back into projects for expansion.

43:29 On the P&L, what you see is the share of profits. It's an accounting number, share of profit, that goes on to associates in the P&L. So because we have very long-term funding and the one we've just closed has an eighteen year maturity. We do expect -- depending on power prices, of course, we do expect significant cash flow monies coming in over the next few quarters.

Jon Rigby

43:59 Yes. Okay, cool. That makes sense. **Can I just ask a follow-up question, just on Mozambique. It's really about the onshore project itself and not really about the delays or visibility around that. But just as the -- just sort of at a high level, just as the world is starting to focus very much on Scope 1, Scope 2 emissions around new projects. Is -- there is a dilemma or a paradox with LNG is that Scope 1, Scope 2 can be actually quite high or very high although Scope 3 sort of full lifecycle couldn't be relatively competitive and clearly there are some advantages in terms of clean air where you're using the gas to generate electricity et cetera. Does that present a problem for you in the context of**

your plans around going to lower emissions – to net zero in terms of being a participant in that project or is the plans ultimately to physically deal with the carbon that will be emitted as part of the process of liquefying the gas? Thank you.

Andy Brown

45:17 Thanks, Jon and I'll be asking Thore to follow through. Clearly, our net zero commission position is twenty fifty, a long way off. Clearly, gas, as you know, particularly in the Asian context replaces coal, so it's positive. But we are very focused on what the Scope 1 and Scope 2 emissions of the LNG plant being designed are. So, I mean, Thore, do you want to explain some of the things we're looking at?

Thore Kristiansen

45:42 Yeah. I will do that. Thank you, Jon. So, yes, actually one of the things that is being looked at as the product now is being revised and we're using this time in order to see how we can optimize it further. One of the things that also then is looked into is how to reduce the CO2 emissions from the plant. And with that in particular mind, what you just mentioned, Jon, so that is one of the factors that is now being put on the drawing board. Thank you.

Jon Rigby

46:18 Thank you.

Operator

46:18 Thank you. Your next question comes from the line of Giacomo Romeo from Jefferies. Please ask your question.

Giacomo Romeo

46:30 Good morning – good afternoon, actually, and thank you for taking my question. I have two left on my list. And the first one is, if you can talk a little bit more about the size of the Brazilian renewable opportunity and sort of what sort of pipeline beyond the sort of capacity that you announce you see. And the other question still on renewables is, if you can give an update on how the search for the new CEO role is going and when do you expect to sort of have an update on that?

Andy Brown

47:09 Okay, thank you for the question. Look, the Brazilian pipeline is a significant one. We've announced our participation in two projects of total six hundred megawatts, but we are looking at a much bigger funnel of opportunities there, both in solar and some in wind as well. So no deals done yet, but we continue to look at how we can expand away from that position.

look like and thirty percent of the free cash flows will be distributed out sometime during next year.

Medhi Ennebati

55:46 Thank you. And the first quarter payment to Sinopec, should we expect it to be back to normal, thirty million euro, forty million euro?

Filipe Crisostomo Silva

55:59 Again, it is not necessarily payable in the first quarter. So we paid the Galp shareholders in the second quarter and we discuss with Sinopec depending on what the cash flows or CapEx commitments, the best timing of payments. So we have quite flexibility on timing of payment. But within twenty twenty two, then it should be about thirty percent of the free cash flows.

Medhi Ennebati

56:28 Understood. Thank you.

Filipe Crisostomo Silva

56:30 Thank you.

Operator

56:31 Your next question comes from the line of Michele Della Vigna from Goldman Sachs. Please ask your question.

Michele Della Vigna

56:38 Thank you. It's Michele here. Two quick questions, if I may. The first one, I just wanted to check that Coral FLNG because it's offshore would not be in any way affected by the security concerns that are lingering in Mozambique?

56:54 And then secondly, I was wondering if you had a chance to start looking at your business through the lenses of the EU green taxonomy and if you have an early indication of what percentage of revenue and CapEx will be taxonomy compliant for you. Thank you.

Andy Brown

57:15 Thank you, Michele. So on the Coral security issues, largely, this is well offshore and therefore, we believe outside the current insecurity, clearly, shore bases exist, but in places which where I think security is better guaranteed. So at this stage, we do not have any specific concerns around that, but we need to stay alert of course.

Japan's Jera Consumes 56% More Coal Y/y for July-Sept. Quarter
2021-10-28 23:30:26.575 GMT

By Shoko Oda and Tsuyoshi Inajima

(Bloomberg) -- Jera, a joint venture between Tokyo Electric and Chubu Electric, used 5.38m tons of coal in the quarter ended Sept., up from 3.44m tons a year earlier, according to Hiroyuki Usami, a spokesman for the company.

* Japan's biggest power generator burned 6.34m tons of LNG in the July-Sept. period, down from 7.33m tons a year earlier

To contact the reporters on this story:

Shoko Oda in Tokyo at soda13@bloomberg.net;

Tsuyoshi Inajima in Tokyo at tinajima@bloomberg.net

To contact the editors responsible for this story:

David Stringer at dstringer3@bloomberg.net

Stephen Stapczynski

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Putin instructed Gazprom to increase gas injection into storage facilities in Europe

The head of the company Alexey Miller assured that Gazprom will fulfill this order

© Evgeny Paulin / Press Service of the President of the Russian Federation / TASS

NOVO-OGAREVO, October 27. / TASS /. Russian President Vladimir Putin instructed Gazprom, after the completion of gas injection into underground storage facilities in the Russian Federation, to increase supplies to the company's storage facilities in Europe.

"Alexey Borisovich, I ask you, after you finish pumping gas into underground storage facilities in Russia, by November 7 or 8, to start scheduled work to increase the volume of gas in your UGS facilities in Europe - in Austria and Germany", - the head of state addressed the head of Gazprom, Alexei Miller, at a meeting on the development and development of the resource potential of gas fields in Yamal on Wednesday.

According to Putin, "this will make it possible to reliably, stably and rhythmically fulfill (Gazprom's) contractual obligations, to supply European partners with gas in the autumn-winter period and, among other things, will undoubtedly create a more favorable situation on the European energy market as a whole." ...

Miller assured that Gazprom will fulfill this order. "Okay, okay, do it, and then report to me on how this work is going," the president instructed the head of Gazprom.

Europe Gas Monthly: Nord Stream 2 to the Rescue?

**Without Nord Stream 2, Europe's gas balance will
be increasingly tight this winter**

Stefan Ulrich, Abhishek Rohatgi,
Andrew Hill,

October 29, 2021

Executive summary

The European gas market remains marked by low inventories, high prices and thin supply. In our scenario in which Nord Stream 2 commences in January end-of-winter storage forecast now stands at 17.2 billion cubic meters (or 13.7Bcm, without Nord Stream 2). This is up from 16.1Bcm in our September forecast. This change reflects a downward revision in industrial demand forecasts outweighing lower-than-expected Russian volumes in October and lower LNG imports.

- With curtailed Russian exports to Europe, our Global Gas Winter Outlook (web | terminal) forecast October flows to Europe of 243 million cubic meters a day. Actual flows so far in October have been 17% lower, and 36% lower than October 2020. In both our scenarios we forecast Russian Gas flows to Europe will pick up in November and December, but improvement will be limited with imports averaging 265Mcm/d.
- Regulatory approval of Nord Stream 2 is more clearly the determining factor for future Russian flows. We consider two Russian flow scenarios this month - one where Nord Stream 2 flows one string early in 2022, the other where flows are delayed beyond winter. The German Ministry for Economic Affairs and Energy saying it did not consider Nord Stream 2 to be detrimental to EU energy security bolsters the case for formal approval, but regulatory hurdles remain before the pipeline can flow.
- Increased Asian LNG demand due to colder-than-normal weather, stockpiling and greater gas-fired power generation leads us to assume increased Asian LNG imports, thus decreasing assumed November European LNG imports by 53Mcm/d from the previous forecast. Various upstream issues globally also impact assumed November LNG imports. Our European LNG imports forecast for the rest of winter is now 20Mcm/d lower at 172Mcm/d, tightening the balance.
- However, we have revised our industrial demand forecast down by 10%, to reflect demand destruction associated with prevailing elevated prices. Our other forecasts remain broadly similar from the Winter Outlook.

17.2Bcm

Projected end-of-winter storage inventories in Europe in Nord Stream 2 scenario

36%

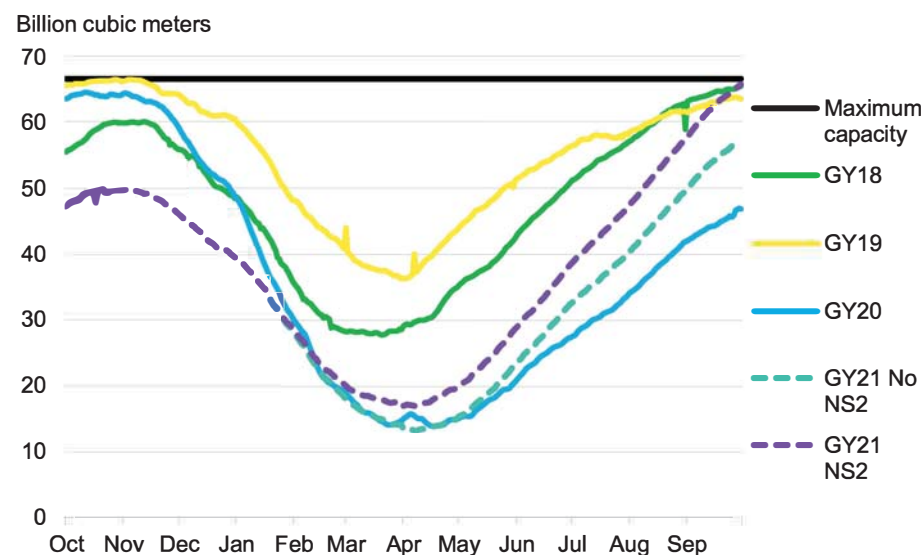
Decrease in Russian flows to BNEF's perimeter in October 2021 versus October 2020

53Mcm/d

Decrease in current November LNG imports forecast vs previous forecast

Read our Global Gas Winter Outlook ([terminal](#) | [web](#))

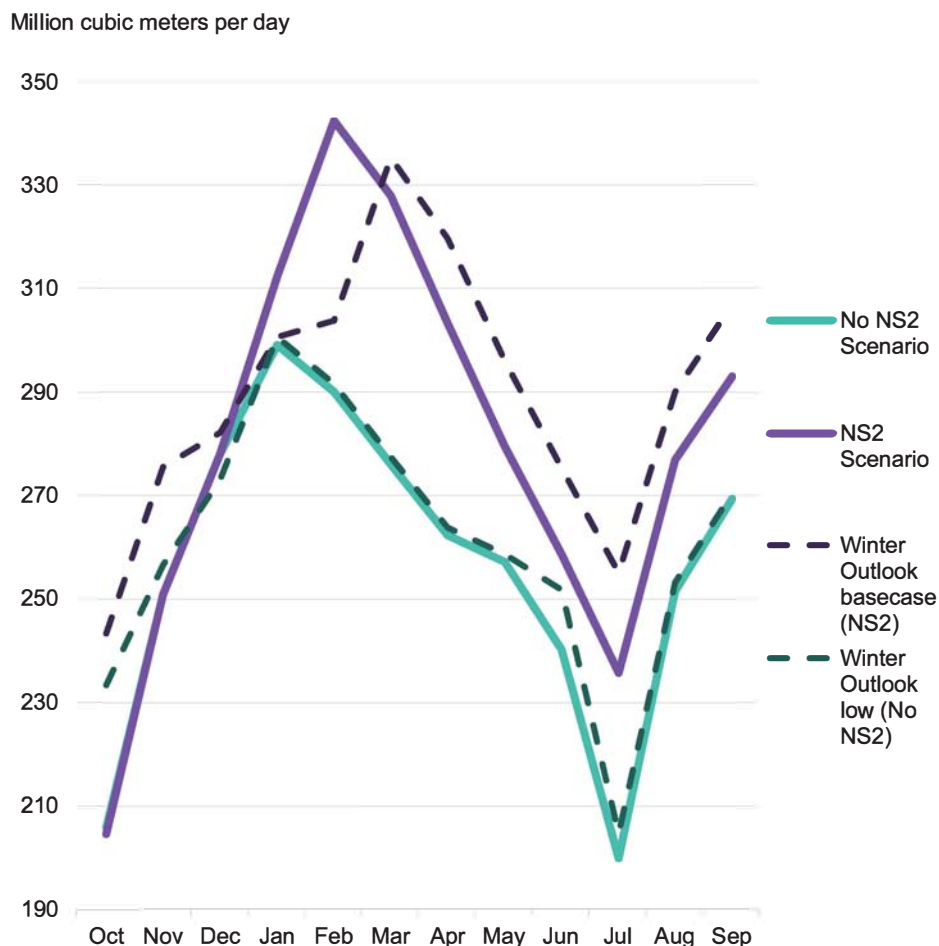
European gas underground storage inventories



Source: BloombergNEF. Note: Gas year is a 12-month period starting from October, for example, gas year 2020 starts from October 1, 2020.

NS2 scenarios: setting up for a showdown

BNEF Perimeter Russian imports for different Nord Stream 2 scenarios

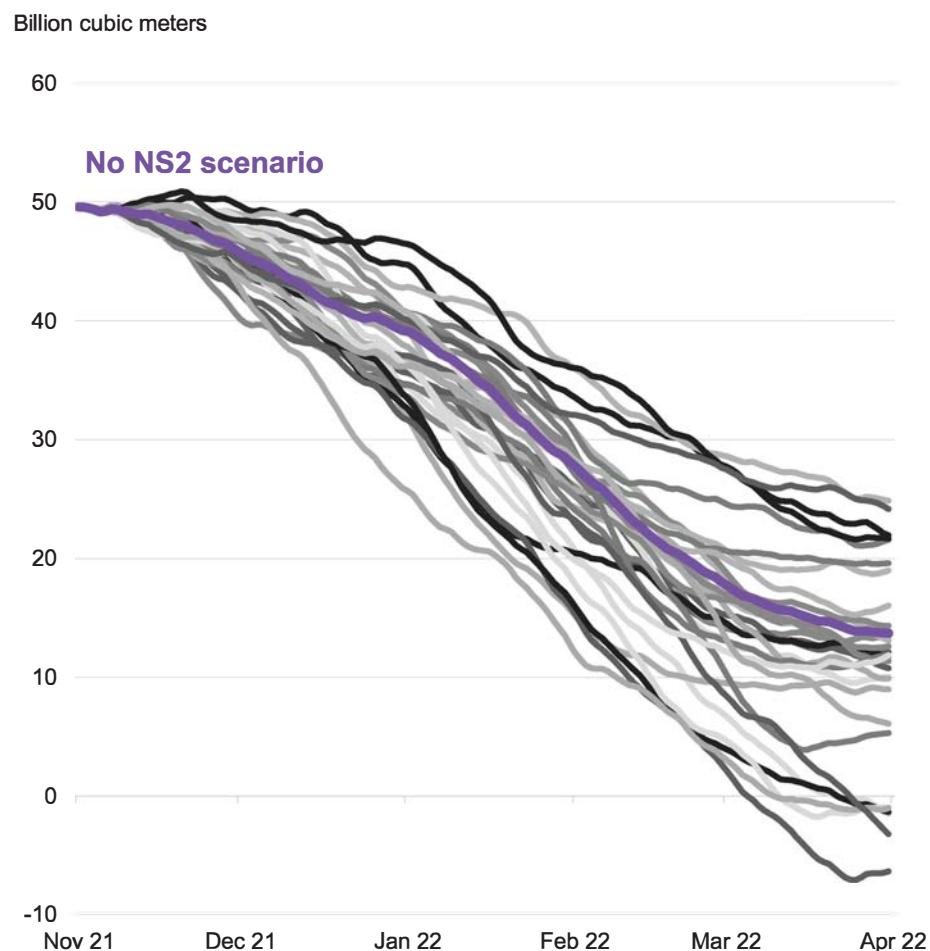


Source: BloombergNEF. Note: *Gas year is a 12-month period starting every October 1. The BNEF perimeter includes Northwest Europe, Italy and Austria.

- As in the Global Gas Winter Outlook ([web](#) | [terminal](#)) we present two scenarios based on Russian flows into the BNEF perimeter. One in which the Nord Stream 2 pipeline is not approved and flows remain low; the other in which the pipeline is approved and Russian flows to Northwest Europe increase.
- The German Ministry for Economic Affairs and Energy (BMWi) said on October 26 that in its opinion approval of Nord Stream 2 AG as transmission system operator did not endanger the energy security of the EU.
- This step was part of the German network regulator's (BNetzA) consideration of the application of Nord Stream 2 AG as an independent transmission system operator for the pipeline. The regulator still has the remainder of a four-month period, which commenced on September 8, to make its decision and consider other factors such as the unbundling requirements mandated by the EU Gas Directive.
- BNEF has previously explored some of the potential permutations around this regulatory decision and the increasingly tense showdown. As previously highlighted, the initial decision of BNetzA on certification for Nord Stream 2 AG is then referred to the European Commission.
- BNetzA has not publicly confirmed or denied whether it would allow flows of the pipeline while the EC formulated its opinion. However, in the current high price environment, particularly if it continues, it is possible that BNetzA or even the EC itself would consider allowing flows on the pipeline while the regulatory process was completed.
- Given that the pipeline was completed ahead of expectations, BNEF's Nord Stream 2 scenario now assumes that flows on one string of the pipeline could begin in January 2022, as soon as some form of regulatory approval was given.

NS2 scenarios: The “No Nord Stream” scenario leaves inventories dangerously low

Projected gas storage inventory evolution over winter in No NS2 scenario by historical weather data



Source: BloombergNEF. Note: Each line represents the evolution of inventory given historical weather data of the last thirty years. Both BNEFs scenarios utilise the average of the last ten years of model runs as input

- In our “No Nord Stream 2” scenario, Europe’s gas inventory levels look increasingly precarious as the winter develops.
- As we highlighted in our piece *Unpacking Putin’s Statements* ([web | terminal](#)), it has looked increasingly obvious that Russia was using low flows as a bargaining chip to force through approval of Nord Stream 2. We concluded that it was unlikely Europe would see increased flows from Russia unless the pipeline was approved.
- This viewpoint has been bolstered by figures close to Gazprom and the Kremlin admitting this to Bloomberg reporters. President Putin also highlighted that the pipeline would be able to deliver gas the day after approval was granted and could supply an additional 17.5Bcm of gas – without specifying a timeframe.
- Russian imports for October so far have significantly underperformed BNEF’s expectations, coming in at only 204Mcm/d, compared to the 243Mcm/d forecast in our Global Gas Winter Outlook ([web | terminal](#)) and 318Mcm/d the previous October. This highlights that the Kremlin is willing to take a hard line to achieve its aims.
- However, BNEF expects flows into our perimeter will pick up from the October lows to the end of the year in both scenarios. Partly so that the Kremlin can deflect allegations of tightening the market. Additionally, Gazprom figures themselves have highlighted that there is risk in overtightening the market, likely limiting just how low flows will go. President Putin has ordered Gazprom to begin refilling its European storages from November 9.
- Accordingly, BNEF’s lower No-NS2 scenario remains largely unchanged from the Global Gas Winter Outlook.

European gas balance: winter ahead looking increasingly tight

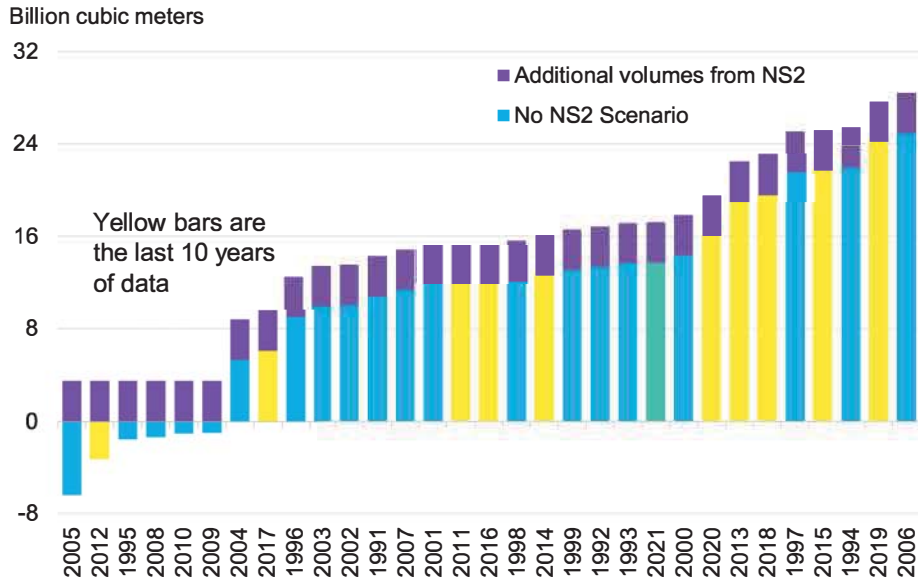
Update on European gas market supply-and-demand balance sheet for winter in gas year* 2021

Rest of Winter (November 1 to March 31)	Oct 1 – Oct 26, 2021			No NS2 Scenario (Nov 1, 2021 – Mar 31, 2022)			NS2 Scenario (Nov 1, 2021 – Mar 31, 2022)		
	Winter Outlook Forecast	Actuals	Difference	Winter Outlook Forecast	Forecast as of Oct 27	Difference	Winter Outlook Forecast	Forecast as of Oct 27	Difference
LDZ (commercial and residential demand)	436	427	-10	856	856	1	856	856	1
Gas-to-power (BE, DE, FR, GB, IT)	148	145	-3	178	175	-3	178	175	-3
Industrial	256	230	-26	302	271	-31	302	271	-31
Total demand	840	801	-39	1,335	1,303	-33	1,335	1,303	-33
Russian imports	243	204	-39	280	279	-1	300	302	2
Norwegian imports	326	329	3	334	330	-3	334	330	-3
Dutch production**	38	41	2	83	83	0	83	83	0
U.K. production	94	100	6	96	97	2	96	97	2
LNG imports	205	108	-97	192	172	-20	192	172	-20
North Africa imports	67	71	4	78	79	1	78	79	1
Other border flows (+TAP)	3	6	3	-3	-1	2	-3	-1	2
Other production	20	22	2	24	24	0	24	24	0
Total supply	996	880	-116	1,083	1,064	-19	1,103	1,087	-16
Call on storage	-156	-79	77	253	239	-14	233	216	-17
Days	26	26		151	151		151	151	
Call on storage (Bcm)	-4.0	-2.0	2.0	38.1	36.1	-2.1	35.1	32.6	-2.6
Starting inventory Nov 1 (Bcm)					49.8			49.8	
Finishing inventory Mar 31 (Bcm)					13.7			17.2	
Maximum storage capacity (Bcm)					66.5			66.5	

Source: BloombergNEF. Note: *Gas year is a 12-month period that starts on Oct 1. **In our framework, the Dutch production is a sum of gas production flowing into the Dutch network and the net withdrawal from Norg. Values may not add up due to rounding errors.

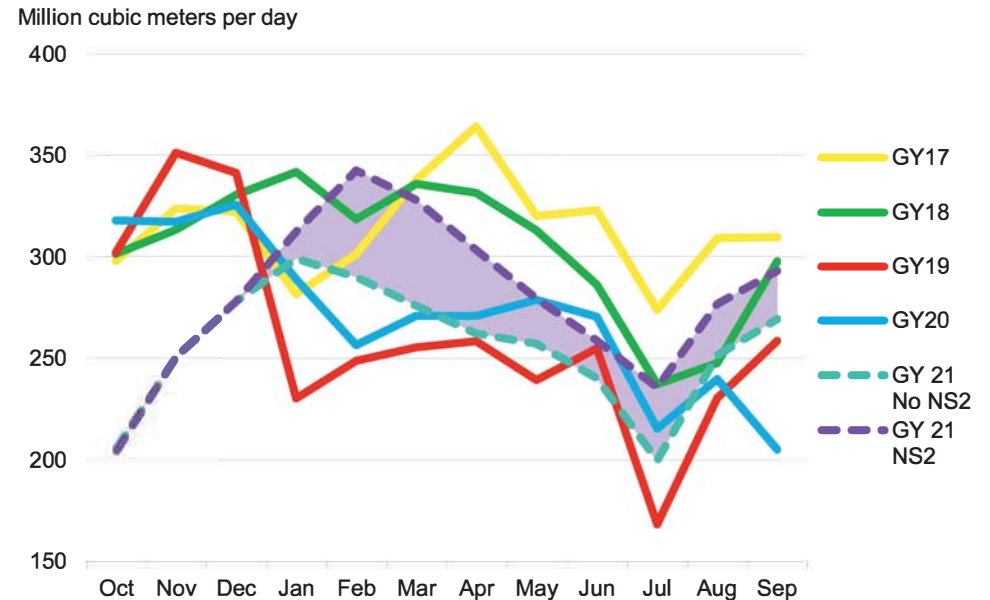
Nord Stream 2 scenarios: The chance of shortages are highly dependent on Russian flows

End-of-March storage inventory by weather year



Source: BloombergNEF. Note: Year in chart refers to year of the November in question – e.g. 2020 is using weather from November 2020 through March 2021.

BNEF perimeter Russian gas imports by gas year



Source: BloombergNEF. Note: GY refers to gas year, the period from October 1 to September 30 the following year. October in both scenarios is actual data only.

- If weather conditions for the remainder of this winter are as cold as in eight of the last 30 years, BNEF forecasts in its “No Nord Stream 2” scenario that gas in storage at the end of March would be below 10Bcm. On this trajectory, the market would see even higher prices and even greater demand destruction than we forecast currently, but this is unlikely to significantly loosen the balances.
- Accordingly, in such situations, it seems likely that the EU would have to secure extra gas supplies. Approval for Nord Stream 2 could be seen as the easiest way to achieve this. In our Nord Stream 2 scenario, featuring a month-long ramp up of one 80Mcm/d string of the pipeline from the middle of January, we assume Russia would import an extra 3.5Bcm of gas into the BNEF perimeter in 1Q 22.
- Incremental flows through Nord Stream 2 would likely be in part offset by decreases in other pipeline routes. The level of Russian flows into Europe would depend on factors including the storage situation when approval was granted, what level of approval was granted (with lower flows for provisional or partial approval), and the price reaction to an increase in flows.

Rough Gas Storage Site May Be Reopened to Bolster Strategic Reserves 2021-10-27 16:37:18.826 GMT

By Matt Oliver

(Telegraph) -- Britain's biggest energy supplier is in talks with the Government about reopening a mothballed gas storage facility in a bid to protect the industry from surging power costs.

Centrica, the owner of British Gas, is seeking to restore the defunct Rough site off the Yorkshire Coast to boost the country's energy reserves.

It comes after gas prices spiked to as much as 11 times normal levels in the wake of surging demand.

The crisis has triggered 12 bankruptcies among UK energy companies - a wave of failures which will add £100 a year to household bills, according to Chris O'Shea, the chief executive of Centrica.

Rough previously housed 70pc of the UK's natural gas stores but was shut in 2017 when the company deemed it too expensive to maintain.

Speaking to a House of Lords committee, Mr O'Shea said: "We have an asset that we have been talking to the Government about converting back into a storage asset, the Rough field in the North Sea. "I would argue for resilience."

Mr O'Shea is lobbying for the site to get a new lease of life under the UK's plan to achieve "net zero" emissions by 2050.

Rough would eventually be used to store hydrogen, which is set to replace fossil fuels in the 2030s, but Centrica is also keen to use it for natural gas before then.

Mr O'Shea said: "In 2015-17 we realised there would be substantial investment required into the asset to maintain it as a storage asset.

"The returns that we could see didn't justify that investment. What we have been talking to the Government about now is how we make sure, as we move towards a hydrogen economy, that we have the right supply chain."

He claimed the company wanted "no subsidies whatsoever" for the scheme and that it could be paid for by charging consumers through their bills.

Ministers have been accused of leaving the UK "dependent on luck" following a reduction in gas storage capacity over the past decade which means the country cannot turn to reserves when prices rise.

Britain now has space to store just one week's-worth of gas, compared to an estimated 90 days in France and Germany.

The jump in wholesale prices has proved disastrous for energy providers because the amount they are able to charge households is capped,

meaning they are unable to immediately pass costs on.

A total of 12 companies have gone bust since the crisis began, affecting hundreds of thousands of customers who will be transferred to a new supplier. The costs involved will ultimately be added to household bills, which already stand at about £1,000 a year.

Mr O'Shea said: "The current retail market failures will put £100 on the bills of every single home in the UK.

"Whether that is a house in Belgravia or a studio flat in a deprived area of Glasgow, it will be the same amount - and that is the same with the policy costs at the moment.

"If we put these costs on bills at a flat rate then that will not achieve a just transition.

"That is not to say it is easy to simply decide to fund these things from general taxation.

"The Treasury has to balance the books. But we have to have that difficult conversation."

A Government source confirmed Centrica had come forward with proposals for storing hydrogen at Rough, but downplayed the idea the site could be used again for natural gas.

Kwasi Kwarteng, the Business Secretary, has previously dismissed concerns about gas reserves as a "red herring". He said no amount of storage could have mitigated wholesale price rises on the scale reached in the past few months.

The scheme put forward by Centrica would revamp the Rough facility at a reported cost of £1.6bn.

A Government spokesman said that no final decisions have been taken about Rough or other potential hydrogen storage facilities.

He added: "We are continuing to explore the future of the clean energy storage landscape.

"The UK Hydrogen Strategy considers the role of hydrogen storage in greater detail and whether further regulation or support mechanisms are needed to maximise its potential."

-0- Oct/27/2021 16:37 GMT

To view this story in Bloomberg click here:

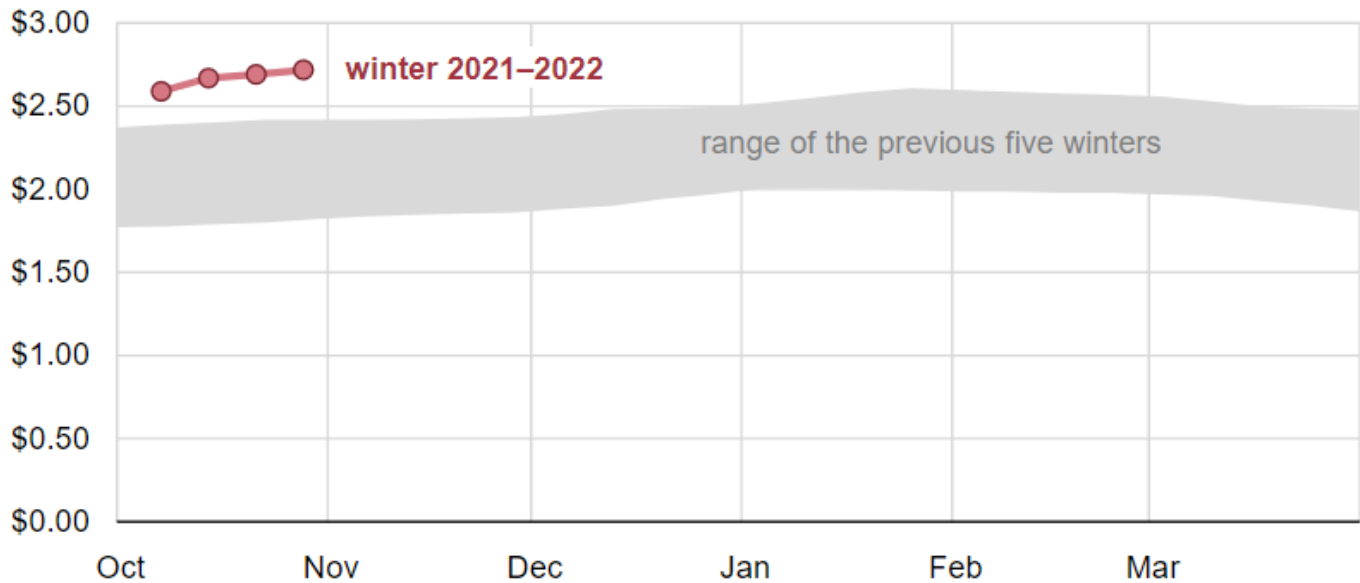
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OCTOBER 29, 2021

Residential propane prices start winter heating season at highest level since 2011

U.S. weekly residential propane prices (Oct–Mar, 2016–2021)

dollars per gallon



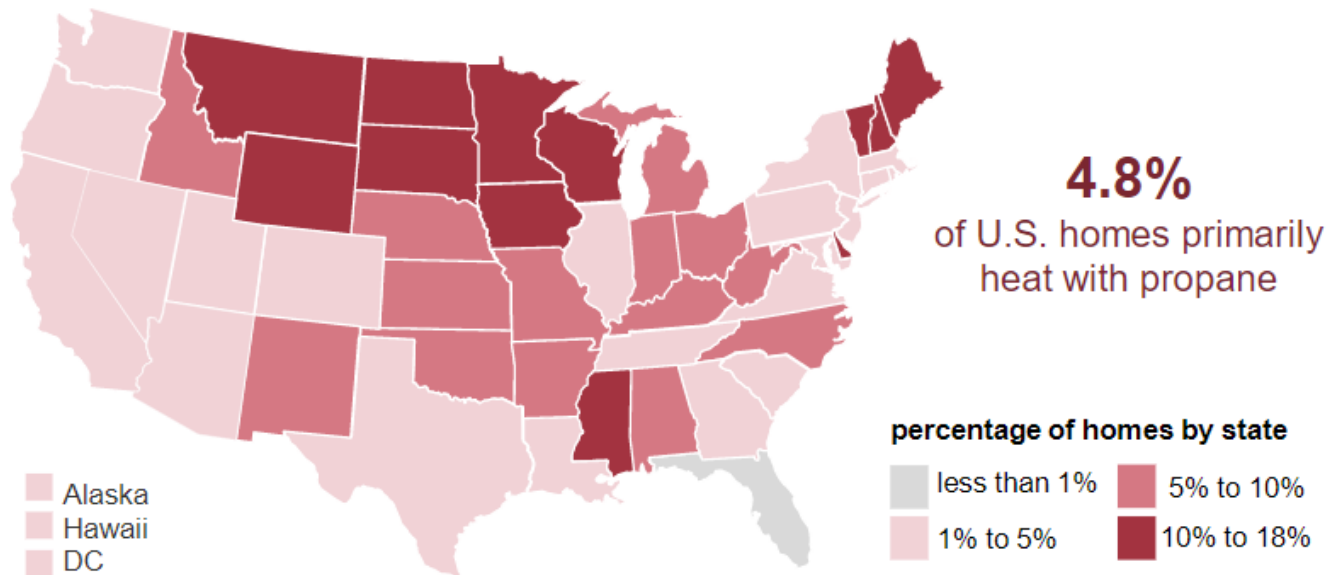
Source: U.S. Energy Information Administration, [Heating Oil and Propane Update](#)

The average U.S. residential price of propane reached \$2.59 per gallon (gal) as of October 4, 2021, the highest price reported for the first week of the winter heating season since 2011, according to our [Heating Oil and Propane Update](#) (HOPU). The winter heating season runs from October through March. Prices during the first four weeks of the current winter heating season were 49% higher than the same time last winter.

This year, retail propane prices have risen with [wholesale propane spot prices](#) that reflect greater global demand and tight global supply. That tightness is reflected in inventory levels in the United States. U.S. propane and propylene inventories are starting this winter season lower than in recent years; weekly U.S. inventories are averaging 28% lower than the same time last year and 21% lower than their recent five-year (2015–2020) average.

According to the U.S. Census Bureau's 2019 [American Community Survey](#), propane is the primary home heating fuel in 5% of U.S. homes and tends to be more common in the Northeast and Midwest. At least 14% of homes in Vermont, New Hampshire, South Dakota, North Dakota, and Montana use propane as the primary heating fuel.

Propane as primary home heating fuel by state (2019)



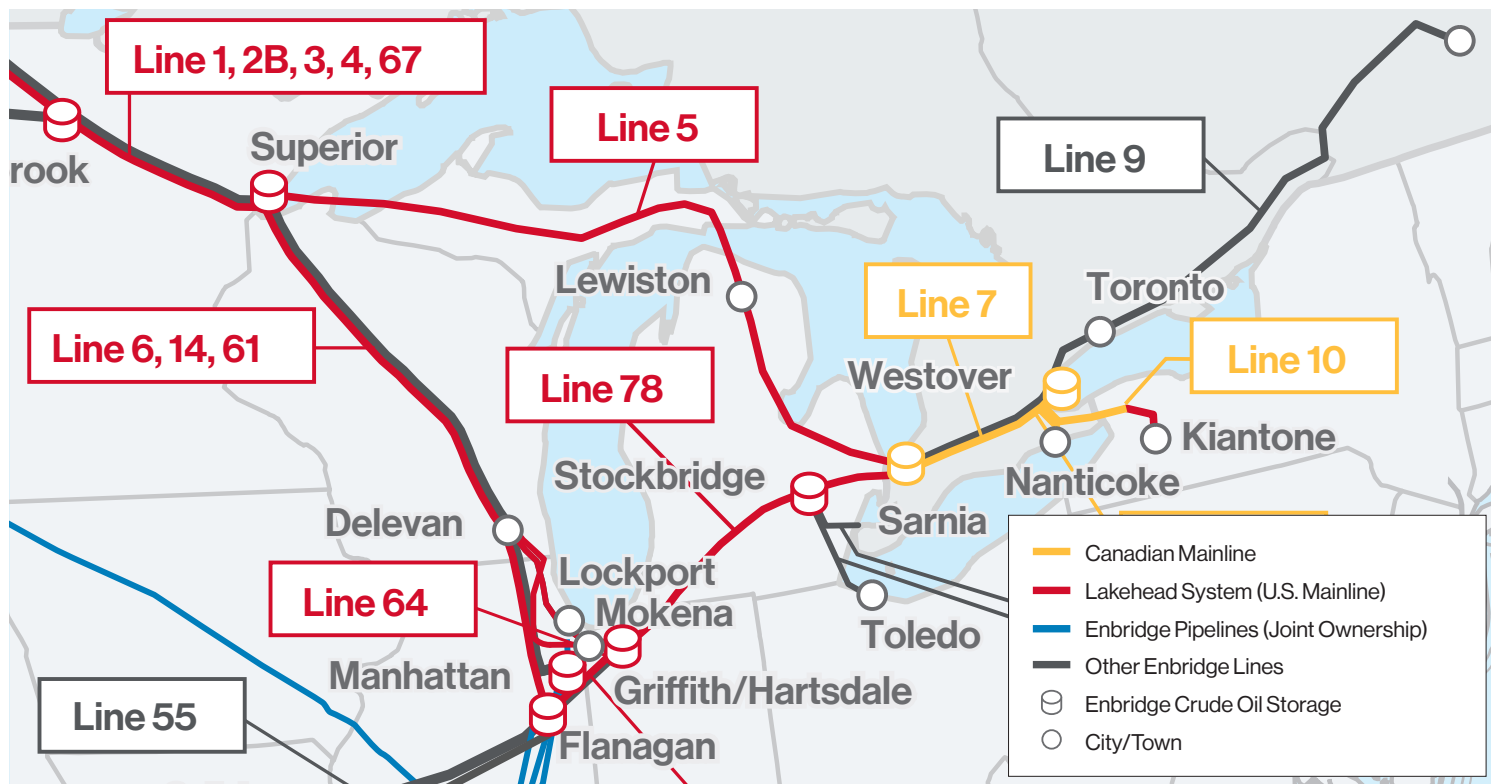
Source: Graph by U.S. Energy Information Administration, based on U.S. Census Bureau [American Community Survey 2019](#)

In our latest [Winter Fuels Outlook](#), we expect households that use propane as their primary source of heating fuel will spend 54% more on average for heating this winter compared with last winter, mainly as a result of higher propane prices. Propane prices are generally highest in New England and lowest in the Midwest. Of the states surveyed in HOPU, during the week of October 25, residential propane prices ranged from a low of \$2.01/gal in North Dakota to as high as \$4.93/gal in Florida.

The HOPU is published as part of the State Heating Oil and Propane Program (SHOPP), a joint effort between EIA and several state energy offices to collect state-level residential heating oil and propane price data from October through March in states where heating oil and propane use is common. [SHOPP collects residential heating oil and propane prices](#) for 21 states. In 18 additional states, SHOPP collects only propane prices, and in the District of Columbia, SHOPP collects only heating oil prices.

The HOPU also publishes wholesale heating oil prices for 25 states and propane prices for 23 states. We publish price data in the HOPU each Wednesday at 1:00 p.m. eastern time from the first week of October through the last week of March on the [Winter Heating Fuels](#) and [Heating Oil and Propane Update](#) web pages.

Principal contributors: Marcela Bradbury, Sean Hill



The impact of a Line 5 shutdown

Enbridge's Line 5 has been a vital piece of energy infrastructure since 1953—not just for Michigan, but for the entire U.S. Midwest and points beyond.

For more than 65 years, Line 5 has delivered the light oil and natural gas liquids (NGL) that heat homes and businesses, fuel vehicles and power industry.

Shutting down Line 5, even temporarily, would have immediate and severe consequences on the economies of Michigan, Ohio, Ontario, and elsewhere.

Enbridge's Line 5 is a 645-mile, 30-inch-diameter pipeline that travels through Michigan's Upper and Lower Peninsulas—originating in Superior, Wisconsin, and terminating in Sarnia, Ontario, Canada.

Line 5 transports up to 540,000 barrels per day (bpd), or 22.68 million US gallons per day, of light crude oil, light synthetic crude and natural gas liquids (NGLs), which are refined into propane.

Line 5 supplies 65% of propane demand in Michigan's Upper Peninsula, and 55% of Michigan's statewide propane needs. The light crude transported by Line 5 feeds refineries in the Upper Midwest and Eastern Canada.

If Line 5 were shut down*:

- Refineries served by Enbridge in Michigan, Ohio, Pennsylvania, Ontario and Quebec would receive approximately 45% less crude from Enbridge than their current demand.

- Michigan would face a **756,000-US-gallons-a-day propane supply shortage**, since there are no short-term alternatives for transporting NGL to market.
- The region (Michigan, Ohio, Pennsylvania, Ontario and Quebec) would see a **14.7-million-US-gallons-a-day supply shortage of gas, diesel and jet fuel** (about 45% of current supply).
- Michigan would need to **find an alternative supply for anywhere from 4.2 million to 7.77 million US gallons of refined products** (gas, diesel, jet fuel and propane).

Alternatives for the above shortages are limited—and that would mean massive investment in pipeline infrastructure, or significantly increasing rail or trucking capacity, to make up for the shortfall caused by a Line 5 shutdown.

*Estimates are based on current market conditions, and contingent on similar energy demands in the future (crude oil demand is not expected to see an appreciable change)

The effects of a Line 5 shutdown

Shutting down Line 5, even temporarily, would have a major and immediate impact on crude oil supply for refineries—and, as a result, refined product supply for consumers, motorists and industry.

Crude oil impacts

Regional **crude oil and NGL demand** on Enbridge's Line 5 and Line 78 totals about **40.74 million US gallons a day**.

Demand for crude is not expected to change any time soon—and with Enbridge's pipeline system already essentially full, a Line 5 shutdown would cause federally regulated apportionment, or reduction in deliveries, on our Line 78 by approximately 45%.

In other words, refineries in Michigan, Ohio, Pennsylvania, Ontario and Quebec **will receive approximately 45% less crude from Enbridge** than their current demand.

Refined products impacts

Michigan uses about **15.75 million US gallons of transportation fuel (gas, diesel and jet fuel) every day**—and with Detroit's refining capacity meeting only about 25% of that demand, Michigan relies heavily on surrounding states like Ohio, Illinois and Indiana for its refined products.

A Line 5 shutdown would cause a **shortfall of 14.7 million US gallons of transportation fuel a day** (that's 45% of the current Enbridge supply in Michigan, Ohio, Pennsylvania, Ontario and Quebec) and a **Michigan propane shortage of 756,000 US gallons a day** (or 55% of the current supply).

That means Michigan would **need to find more than 4.2 million US gallons a day of gas, diesel, jet fuel and propane** to make up for the shortfall—assuming Ohio and other regional refineries are receiving crude oil from Line 78 at an apportioned rate of approximately 55%. If those refineries are unable to meet local needs, and stop supplying Michigan, then **that number would rise to 7.77 million US gallons a day**.



The effect on regional refineries

According to PBF Energy, which operates one of two refineries in Toledo:

- A Line 5 shutdown would put Ohio refineries at risk. The closure of one of those refineries could result in the loss of **\$5.4 billion in annual economic output** to Ohio and southeast Michigan, and the **loss of thousands of direct and contracted skilled trades jobs**.
- A Line 5 shutdown would compromise crude supply to 10 refineries in the region to varying degrees, **directly affecting fuel prices**.
- Closing Line 5 would **hurt Ohio and Michigan economies**, and **threaten union jobs**.
- There are **no viable options for replacing** the volume of light crude delivered by Line 5, with **rail able to provide less than 10%** of that volume.
- A Line 5 shutdown puts **at least 15% of northwest Ohio's fuel supply at risk**, as well as more than **half of the jet fuel supplies** for the Detroit Metro Airport.

Demand on Enbridge pipelines (approximate)

Line	Kbpd	US gallons per day
Line 5 (including NGL)	500	21,000,000
Line 78	470	19,740,000
Total	970	40,740,000

Capacity of Enbridge pipelines

Line	Kbpd	US gallons per day
Line 5	540	22,680,000
Line 78	570	23,940,000
Line 78 (ex-Stockbridge)	502	21,084,000

Exxon tells locked-out Texas refinery workers non-union employees get higher pay

Erwin Seba

Thu, October 28, 2021, 7:20 PM · 2 min read

Explore the topics mentioned in this article

By Erwin Seba

HOUSTON (Reuters) - Exxon Mobil Corp on Thursday sent a message to hundreds of union workers locked out of their jobs at its Beaumont, Texas, refinery saying that pay is greater at non-union sites.

"We are not allowed to make promises, and we will not do so. We can report that non-represented employees at comparable sites are paid 5% to 7% more and have similar benefits," Exxon said in the message called a "decertification update."

The message comes about two weeks before the 585 locked-out workers begin voting on removing United Steelworkers (USW) union Local 13-243 from the 369,000 barrel-per-day (bpd) refinery and adjoining lubricant oil plant.

An official with the United Steelworkers union 13-243 had no immediate comment about the company message.

The workers are scheduled to vote by mail between Nov. 12 and Dec. 22 in a decertification election overseen by the U.S. National Labor Relations Board that, if successful, will remove the USW.

Last week, Exxon laid down two conditions for ending the lockout: Adoption of its proposed contract, or decertification of USW 13-243.

A majority of union members rejected the contract proposal in a secret-ballot vote on Oct. 19.

Exxon locked out the workers on May 1 after the union did not accept a proposal during four months of talks that eliminates job seniority, which gives employees a say over job assignments, assuring the most experienced workers operate refinery units, the USW has said.

Exxon has said ending job seniority and other changes are needed to ensure the refinery can be competitive in even low-margin environments.

Exxon continues to operate the refinery at about 60% of its capacity with managers and supervisors as well as temporary operators.

(Reporting by Erwin Seba; Editing by Kenneth Maxwell)

Mexico Projects May Halt Oil Exports in 2022: El Universal
2021-10-27 14:13:42.961 GMT

By Carolina Gonzalez

(Bloomberg) -- The government of President Andres Manuel Lopez Obrador is preparing to cancel crude oil export contracts, if necessary, once the new Dos Bocas refinery is launched, local newspaper El Universal reported.

* "There are instructions from the president to stop exporting to allocate all crude oil to the National Refining System and the new refinery that will be inaugurated on July 2, 2022," energy sector officials told El Universal

* With the Dos Bocas refinery, at least 1.5 million barrels of crude oil will be required for domestic consumption each day next year, the sources explained

* Foreign trade in crude oil has represented a large income for Mexico, but this administration's priority is to feed all the crude produced to the six refineries operated by Pemex, according to El Universal

** There is a commitment within the cabinet that the first barrels of gasoline and diesel from the new refinery will be obtained in the second half of 2022

To contact the reporter on this story:

Carolina Gonzalez in New York at cgonzalez256@bloomberg.net

To contact the editor responsible for this story:

Ney Hayashi at ncruz4@bloomberg.net

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Sudan Unrest Threatens 130k b/d of Crude Oil Exports, FGE Says
2021-10-27 01:46:52.538 GMT

By Saket Sundria

(Bloomberg) -- Unrest in Sudan following a coup has put at risk ~130k b/d of combined crude exports from the country and South Sudan, according to a note from industry consultant FGE dated Oct. 26.

* South Sudan is dependent on Sudan to export its crude via a pipeline through the nation to the sea, and also supplies Sudan's only operational oil refinery in Khartoum

** It typically sends ~30k b/d of crude to the plant

** South Sudan has only 10 days of crude storage capacity

* Continuation of operations at Sudan's Khartoum refinery, crude exports from both countries at greatest risk from unrest

* Sudan may see fuel shortages, mounting demurrage costs for tankers unable to discharge if the logistics issues are not resolved soon

** Sudan's oil product imports blocked since Sept. 30; most imports this month diverted to Egypt and trucked to Khartoum

* South Sudan's crude production forecast to drop 15k b/d y/y to 145k b/d in 2021; Sudan's output seen largely stable at 60k-65k b/d in 2021-2022

* Unrest could threaten operation of Sudan's oil infrastructure, deter new investments

* READ: Sudan Group Says Three Dead, Many Hurt in Anti-Coup Protests

* READ: U.S. Weighs More Economic Measures Against Sudan After Coup

* READ: Sudan Says Oil Exports Resume From South Sudan Oil Port: SUNA

To contact the reporter on this story:

Saket Sundria in Singapore at ssundria@bloomberg.net

To contact the editors responsible for this story:

Serene Cheong at scheong20@bloomberg.net

Ben Sharples

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JTC trims demand growth outlook ahead of Opec+ meeting

Published date: 29 October 2021

Share:

The Opec+ coalition's Joint Technical Committee (JTC) has trimmed its forecast for global oil demand growth this year ahead of next week's ministerial meeting to decide on December output policy.

The JTC, which met yesterday, considered a base case scenario in which demand grows by 5.7mn b/d in 2021. Opec's most recent *Monthly Oil Market Report* (MOMR) pegged [demand growth at 5.8mn b/d this year](#), while the JTC's base case last month was for 6mn b/d growth.

The JTC's updated base case also includes a downward revision in global oil supply growth for this year, to 1.7mn b/d from 1.9mn b/d previously. The base case for 2022 demand growth is unchanged at 4.2mn b/d, while next year's supply increase has been adjusted to 6.8mn b/d from 6.6mn b/d in the JTC's September report.

Opec+ meets at a ministerial level on 4 November. Delegates have indicated that the group is likely to press ahead with a 400,000 b/d increase in its collective production quota in December, in line with the roadmap agreed back in July. Pressure on the coalition to consider a bigger hike has mounted as oil prices climb, but concerns persist within the group about the sustainability of demand against the backdrop of an economic slowdown in China and a potential fresh wave of Covid-19 cases.

Some delegates also flag the possibility that current oil prices are being inflated by projections of gas-to-oil switching that might not materialise until the end of the first quarter, too far out to warrant a shift in December production policy. Analyst outlooks on the impact of gas price-related fuel substitution vary. Some expect just 500,000 b/d of additional oil demand over the winter, while US bank Goldman Sachs said gas-to-oil switching could yield as much as 1mn b/d of extra demand.

The US, India and Japan have all urged Opec+ to consider raising output more aggressively, and some delegates question how long these appeals can go unacknowledged.

By Ruxandra Iordache and Nader Itayim

Saudi-Kuwaiti Neutral Zone facing technical issues, maximum output still far off

HIGHLIGHTS

Source says current output less than 200,000 b/d

KPC CEO looking for 700,000 b/d by 2023

Wells, facilities need work from years of shutdown

- Oil

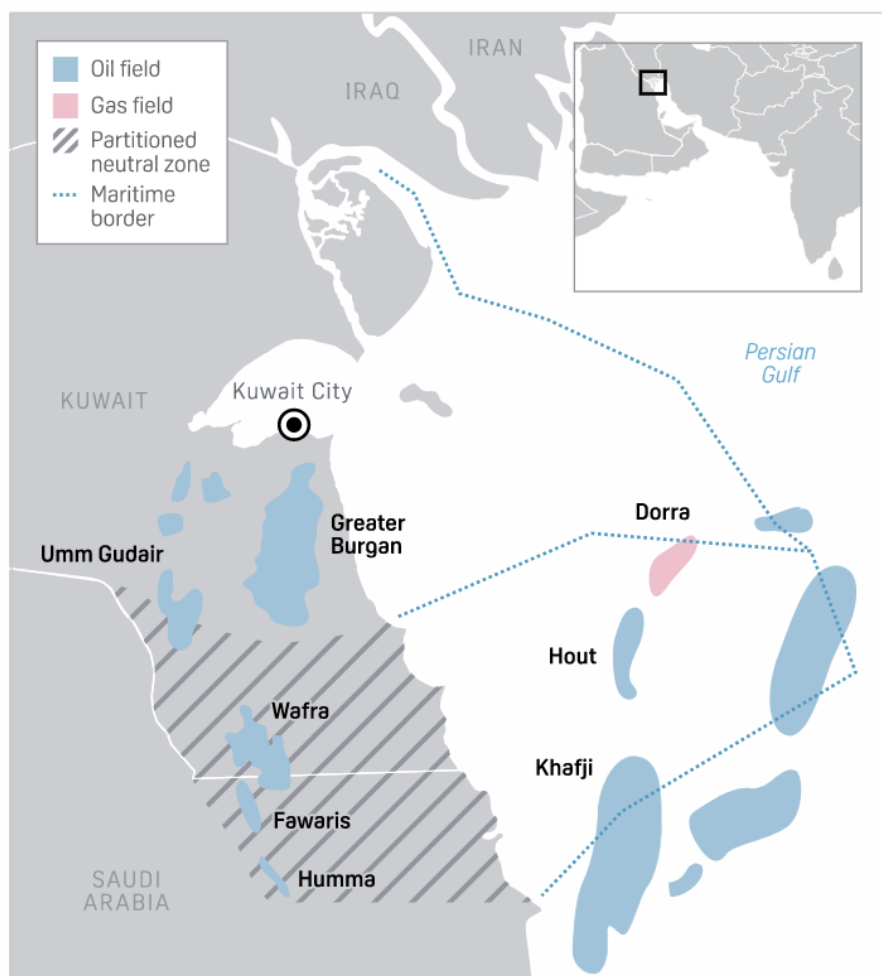
Author: Claudia Carpenter, Herman Wang

The Neutral Zone shared by Saudi Arabia and Kuwait would probably need at least five years to achieve maximum crude oil output of 500,000 b/d, with technical challenges from its lengthy shutdown still hindering a full ramp-up, a source with knowledge of the operations told S&P Global Platts.

Current production on the Saudi side is "just under" 100,000 b/d, said the source, who asked not to be identified to speak about confidential operations. The figure implies total Neutral Zone output of less than 200,000 b/d, with production shared evenly by both countries.

The source said total production would likely be capped at about 400,000 b/d to 450,000 b/d in five years due to technical challenges following its 2020 restart, and 500,000 b/d would be a "great achievement" if attained.

NEUTRAL ZONE OIL AND GAS FIELDS



Source: Kuwait oil ministry, S&P Global Platts

The assessment is far less rosy than that presented by Kuwait Petroleum Corp. CEO Hashem Hashem, who said Oct. 22 that the Neutral Zone would reach pre-shutdown levels of about 500,000 b/d in 2022, increasing to 700,000 b/d in 2023.

Hashem's comments came in response to criticism over the revelation by KPC subsidiary Kuwait Oil Co. that the country's sustainable maximum production capacity had shrunk by about 18% over three years to about 2.58 million b/d. The CEO said Kuwait was targeting a domestic capacity of 3.2 million b/d in 2025, in addition to a projected 350,000 b/d from Kuwait's share of the Neutral Zone, implying a totally Neutral Zone production rate of 700,000 b/d.

Analysts have cast doubt on the Kuwaiti production targets, and the source told Platts that the Neutral Zone figure was unlikely.

Uneven production, exports

Production in the zone has actually declined over the past few months.

Saudi energy minister Prince Abdulaziz bin Salman told reporters April 1 that the kingdom's share of Neutral Zone production was 135,000 b/d, which would make for total output of 270,000 b/d.

At the time, sources involved in work there had said lingering sovereignty and fiscal sharing issues still needed to be resolved to allow an expansion of development.

The fields contained in the Neutral Zone lie in onshore and offshore territory shared by the two nations at their border. The offshore Al-Khajfi is operated by Saudi Arabia's Aramco Gulf Operations Co. and Kuwait Gulf Oil Co., a unit of KPC, while the onshore Wafra is operated by KGOC and Saudi Arabian Chevron.

"Saudi Arabian Chevron and its partner Kuwait Gulf Oil Co. remain focused on safely ramping up production at the Wafra Joint Operations," Chevron said in a statement, declining to comment on production levels and targets.

Aramco did not respond to a request for comment.

The countries agreed in 1970 to co-manage and share crude production from the zone equally. However, they were offline for more than four years until 2020, due to a political dispute that was resolved with the signing of an agreement in December 2019.

Since then, the zone has seen on-again, off-again production and sources said the companies have had to rehabilitate fields and infrastructure from years of inactivity.

Major production cuts instituted by OPEC and its allies during the pandemic have lessened the urgency to ramp-up operations in the zone. But with the OPEC+ alliance intending to fully phase out its cuts by late 2022 and global oil demand rising in the pandemic recovery, the Neutral Zone may be counted on for incremental supply.

Crude exports from the Neutral Zone in 2021 have ranged from a low of 158,000 b/d in August to a high of 231,000 b/d in September, according to Kpler shipping data.

The exports have gone regularly to India, China, South Korea and the US, the Kpler data showed

<https://www.whitehouse.gov/briefing-room/statements-releases/2021/10/30/joint-statement-by-the-president-of-france-emmanuel-macron-chancellor-of-germany-angela-merkel-prime-minister-of-the-united-kingdom-and-northern-ireland-boris-johnson-and-president-of-the-united-st/>

Joint Statement by the President of France Emmanuel Macron, Chancellor of Germany Angela Merkel, Prime Minister of the United Kingdom and Northern Ireland Boris Johnson, and President of the United States Joseph R. Biden, Jr. on Iran

OCTOBER 30, 2021 • [STATEMENTS AND RELEASES](#)

We, the President of France, Chancellor of Germany, Prime Minister of the United Kingdom, and President of the United States, met in Rome today to discuss the risks posed to international security by Iran's escalating nuclear program. We expressed our determination to ensure that Iran can never develop or acquire a nuclear weapon and shared our grave and growing concern that, while Iran halted negotiations on a return to the Joint Comprehensive Plan of Action (JCPOA) since June, it has accelerated the pace of provocative nuclear steps, such as the production of highly enriched uranium and enriched uranium metal. Iran has no credible civilian need for either measure, but both are important to nuclear weapons programs.

These steps have only been made more alarming by Iran's simultaneously decreased cooperation and transparency with the International Atomic Energy Agency (IAEA). We agreed that continued Iranian nuclear advances and obstacles to the IAEA's work will jeopardize the possibility of a return to the JCPOA.

The current situation underscores the importance of a negotiated solution that provides for the return of Iran and the U.S. to full compliance with the JCPOA and provides the basis for continued diplomatic engagement to resolve remaining points of contention – both our concerns and Iran's. In this spirit, we welcome President Biden's clearly demonstrated commitment to return the U.S. to full compliance with the JCPOA and to stay in full compliance, so long as Iran does the same.

We are convinced that it is possible to quickly reach and implement an understanding on return to full compliance and to ensure for the long term that Iran's nuclear program is exclusively for peaceful purposes.

Return to JCPOA compliance will provide sanctions lifting with long-lasting implications for Iran's economic growth. This will only be possible if Iran changes course. We call upon President Raisi to seize this opportunity and return to a good faith effort to conclude our negotiations as a matter of urgency. That is the only sure way to avoid a dangerous escalation, which is not in any country's interest.

We welcome our Gulf partners' regional diplomatic efforts to deescalate tensions and note that return to the JCPOA would result both in sanctions lifting allowing for enhanced regional partnerships and a reduced risk of a nuclear crisis that would derail regional diplomacy. We also affirm our shared determination to address broader security concerns raised by Iran's actions in the region.

We are committed to continuing to work closely with the Russian Federation, the People's Republic of China, and the European Union High Representative, as Coordinator, in resolving this critical issue.

<https://noc.ly/index.php/en/new-4/7339-the-national-oil-corporation-condemns-acts-78of-sabotage-that-took-place-at-the-zawiya-oil-complex>

The National Oil Corporation condemns acts of sabotage that took place at the Zawiya Oil Complex



The National Oil Corporation confirms that the Zawiya Oil Complex was severely damaged as a result of skirmishes by armed groups in the vicinity of the complex for nearly three hours last night. Those involved held no regard for the lives of workers at the sites or to the damage that may have caused to the capabilities of the Libyan state and the livelihoods of citizens there.

Statistics so far indicate that these criminal operations have led to:

- 1- Damage of eight storage tanks for petroleum products and crude oil in the oil movement area.
- 2- Damage to five storage tanks for base oils and chemical additives in a mineral oil mixing and filling plant, which resulted in the leakage of large quantities from tank No. (T9) for storing base oil (SN150).
- 3- Damage to the electrical transformer which is the source of power for the main station for the oil mixing and filling factory.
- 4- Damage to the ceilings of the halls of the manufacturing lines in the oil mixing and filling plant.

Inspections on all production units of the company are ongoing to determine the extent of the damage resulting from these irresponsible actions.

In this regard, the Chairman of the National Oil Corporation, Mustafa Sanalla, was quoted as saying that "Such criminal acts cannot be accepted in or near our sites. Many of our facilities have been sabotaged during the past years as a result of clashes, but those damaged sites have been renovated and returned to work. It may take years to repair these new damages, and could cost the Libyan state an exponential amount of money, which is difficult to obtain."

Sanalla elaborated "The infrastructure of the oil sector represents the lifeblood of the Libyan state. Therefore, vandalising these facilities, destroying them, or exposing their workers to danger, is a crime that cannot be tolerated. Therefore, we ask the respective authorities to extend their security in and around these sites, protect our workers, and provide security requirements to ensure we continue our operations there".

<https://noc.ly/index.php/en/new-4/7343-the-oil-sector-is-grinding-slower-due-to-the-deterioration-of-it-s-infra-structure-facilities-and-is-losing-72-of-it-s-production-capacity-of-es-sidra-crude>

The oil sector is grinding slower due to the deterioration of it's infra structure facilities and is losing 72% of it's production capacity of Es-Sidra crude



With sadness regarding the deterioration of the oil sector infrastructure, the National Oil Corporation (NOC) announces a decrease in its production of Es-Sidra crude by approximately 72% of the daily regular available capacity.

In this regard, the Chairman of the Board of Directors of the NOC, Mustafa Sanalla, was said "Today, the risks are increasing to a great extent, and we have lost approximately 208 thousand barrels per day of Waha oil company current production, from the normal 285 thousand barrels per day, and we expect the decline to continue for ten days, which will result to a total loss to the public revenue of approximately 177 million dollars, this would bring the total loss since the beginning of the year to billion dollars.

Sanalla added, "It became clear to us years ago, during our maintenance of leaks, that we need to allocate budgets urgently to rehabilitate our deteriorated infrastructure. We explained the situation to the successive governments as well as the Ministry of Oil and Gas and stated that, to maintain a level of output of 285 thousand barrels per day or to add an estimated extra 40 thousand barrels per day, to reach 325,000 barrels per day, then proposed budgets will have to be provided on their scheduled dates, but despite the clarification of the situation in all its dimensions and its repercussions on production and revenues, we have yet to receive a single dirham".

In a related context, Sanalla said, "The leakage is large in the 30-inch pipeline from Dahra to Es-Sidra (km point: 37 km), and the control room of the Waha Oil Company announced the discovery of a sudden drop in pressure, which means that the rupture is large, and therefore instructions were given to close the pipeline. So that we conduct the appropriate assessment and carry out emergency maintenance work".

Sanalla added, "We are counting on the government to give us priority to rebuild/rehabilitate the dilapidated infrastructure and pay off our debts that have accumulated for years".

Sanalla said, "Reducing or postponing budgets has caused huge losses, and preserving the country's oil capabilities is an absolute priority. The delay in providing budgets has exacerbated the difficulties we are facing, the working teams of the operating companies are working day and night to limit the continuation of leaks, and on this occasion I cannot fail to express my thanks and gratitude to the employees of Waha Oil Company as well as all employees in onshore and offshore oil fields as well as in oil ports.

Finally, despite all these challenges, the National Oil Corporation will continue to play its technical and non-political role tirelessly. We will continue to work as a team with all policy makers in the country and ask them to support the NOC, as we also call on the Government of National Unity to stand by the oil sector, which is baring the brunt of worn out facilities.

Sechin does not rule out the end of an era of relatively low energy prices

The head of Rosneft believes that the gas crisis could further heat up oil prices

VERONA, October 28. / TASS /. Discouraging the development of traditional energy sources will cause even greater price increases; the era of relatively low energy prices, which has lasted for almost 100 years, may come to an end. This was stated by the head of Rosneft Igor Sechin, speaking at the session "Structural Changes in the Economy and the Future of Energy" in the framework of the XIV Eurasian Economic Forum.

"Discouragement of traditional energy will reduce the investment required to maintain the level of production of traditional energy resources, which will cause scarcity and even greater price increases," he said. "High energy prices will certainly slow down economic growth, and an era of relatively low energy prices, which has been going on for almost 100 years and which has become the main stimulus for the development of the world economy, may come to an end."

Approaches to changing the structure of the world energy should be balanced in order to prevent the world economy from sliding into such an energy "inflationary spiral," Sechin added.

At the same time, the head of Rosneft expressed confidence that renewable energy would not be able to completely replace traditional energy resources, even in the long term.

According to him, India will become one of the key drivers of global oil demand growth in the long term. According to the forecast of the relevant ministry of India, oil consumption in the country will double by 2050, and this type of hydrocarbons will provide 22% of the country's energy consumption, Sechin said.

"It is necessary now to make decisions that will ensure the satisfaction of future demand. Otherwise, we will face a new aggravation of the deficit and a rise in prices," the head of Rosneft stressed.

Shock prices

Record gas prices in Europe threaten the region's economic recovery, the head of Rosneft said.

According to him, limited opportunities for electricity generation using alternative sources amid growing demand have led to record gas prices. "Such a price level certainly threatens the economic recovery of Europe. Record prices have become an indicator of the shock that Europe has experienced," Sechin said.

The head of Rosneft added that long-term contracts provide a certain stability of the gas market, but they do not guarantee its full stability, since spot supplies under short-term deals are developing. "But Europe's hopes for spot supplies of LNG from the US did not materialize. Moreover, prices for such supplies were not properly hedged," he said.

At the same time, the cause of the gas crisis in Europe was a complex of factors, in particular, excessive confidence in wind generation, which led to a low occupancy of underground gas storage facilities in Europe. Sechin noted that, according to climatologists, the wind strength in September - October 2021 was 15% lower than historical levels, which negatively affected the volume of wind power generation. As a result, Europe began to understand the risks and the level of unavailability of renewable generation at the current level of technology development to ensure stable energy supplies only by the beginning of winter.

"All this led to record gas prices, which have grown 5 times since the beginning of this year and now threaten the long-term economic recovery of Europe," added the head of Rosneft, pointing out that Russia, for its part, is helping to resolve the crisis as much as possible, ensuring the stability of supplies. gas to Europe and fully fulfilling contractual obligations.

Among other reasons that caused the gas crisis in Europe, Sechin named the reorientation of American liquefied natural gas (LNG) supplies to Asian markets. While LNG supplies to Europe increased by 47% in seven months, they increased 2.6 times to the countries of the Asia-Pacific region. "As you can see, the political and economic priorities of the United States differ: promising to significantly increase gas supplies to Europe, in reality, the United States first of all increases them in a completely different direction. As a result, in oil equivalent, the price of gas in Europe reached \$ 200 per barrel, which is more than twice the price of oil," Sechin emphasized.

On the impact of gas prices on oil quotes

The head of Rosneft also said that a significant increase in gas prices could cause additional demand for oil, according to estimates by Citi and Goldman Sachs, in the amount of 1 million barrels per day, which could further heat up oil prices and serve as an additional impetus to imbalance the market ...

At the same time, according to Sechin, the pressure on oil and gas prices is caused precisely by the climate agenda, and not by the actions of OPEC +. "And almost always there are accusations that the OPEC + countries manipulate the market, as they overfulfill their obligations. At the same time, a number of OPEC + countries cannot increase production due to unilateral sanctions, and some countries do not have enough investment for this. pressure from climate activists stops the implementation of joint projects with international companies, which forces the majors to cut investments in oil and gas production, redirecting funds to renewable energy. It is the climate agenda that is now putting pressure on the global oil and gas market," he explained.

Sechin summed up that the gas crisis in Europe clearly demonstrated how a shortage of one energy resource can affect the prices and balance of the entire energy sector.

October 26, 2021 05:36:24

OIL DEMAND MONITOR: Asia Returns to the Road; China Flying Dips

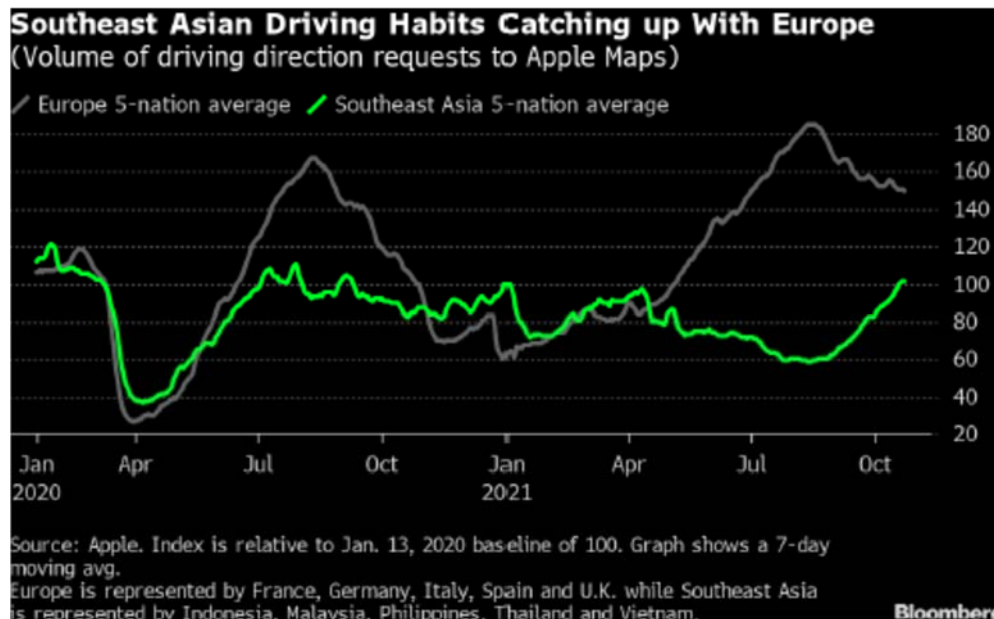
- Goldman sees global oil demand back soon to pre-Covid levels
- New York Monday morning traffic congestion up 23% from 2019

By Stephen Voss

(Bloomberg) -- Motoring has resumed in earnest across southeast Asia, following an upswing in driving that came several months earlier in Europe and India, high-frequency demand data show. China's strength in air travel continues to wobble.

Several Asian refiners, from India to Vietnam to South Korea, have ramped up processing rates to take advantage of higher prices and demand, according to company officials and people with knowledge of the matter. Asia's rebound will shortly push world oil demand to pre-Covid levels, Goldman Sachs Group Inc. analysts said in an Oct. 24 note.

Apple Inc. statistics show the number of requests for driving directions across Southeast Asia has picked up in the past couple of months.



Averaging the results for Indonesia, Malaysia, the Philippines, Thailand and Vietnam shows an upswing in the index to 101 from a low of about 59 in mid-August, the Apple data show. Those figures are relative to a baseline of 100 from early January 2020. A similar type of aggregation for west Europe shows the upward trend in driving navigation requests there started earlier in the year, reaching a peak of 185 in mid-August.

Road Traffic

High-frequency information on road volumes and fuel sales doesn't exist for all countries. Among recent available government data, the volume of all types of vehicles in the U.S. was 1%

higher than the same week of 2019 while the U.K. was 4% below. In both instances, truck traffic is heavier than the pre-pandemic year while passenger car use is less.

Another way to view road use is traffic congestion. Among 11 world cities regularly tracked in this monitor at 8 a.m. local time on Monday mornings, New York and Berlin were the only two showing busier road traffic than 2019 for the same time of the week, according to data collected by TomTom NV. Those two cities, along with Mexico City, had the largest gains over the past month, according to data. A Monday-morning commute in New York City had an extra 64% of congestion, which means that a journey lasting 60 minutes on empty roads would take 98 minutes with the congestion time included.

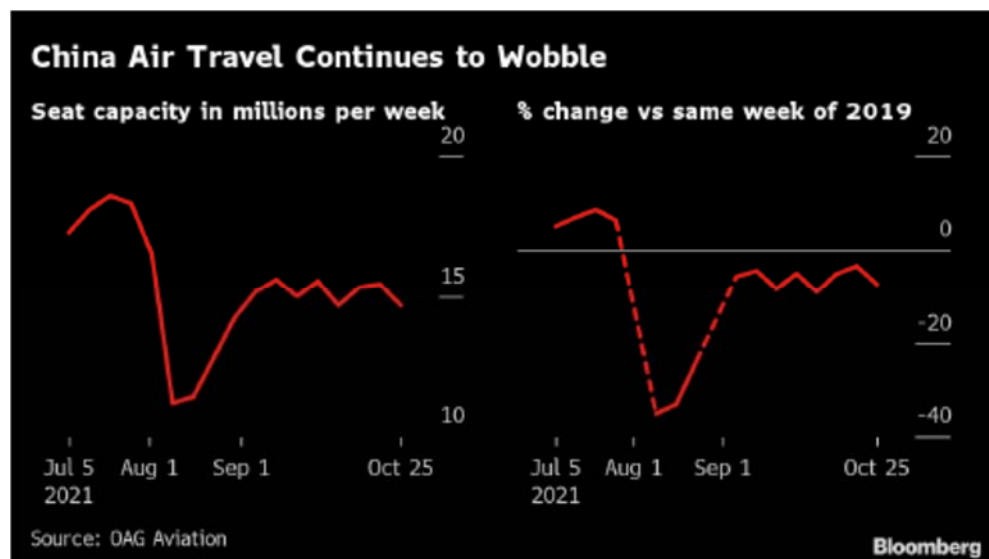
London had the biggest monthly decline in congestion, the TomTom data showed, though this may be the result of school holidays reducing rush-hour traffic. Overall U.K. road fuel sales are running 17% below the equivalent week of 2019, government statistics show, following a period of much-higher-than-normal consumption in late September when a spate of panic buying gripped the nation.

Gasoline consumption in the U.S. was about level with the pre-pandemic year and distillate fuel use was 5% higher, according to the Energy Information Administration. The EIA will provide new weekly estimates on Wednesday for the week ended Oct. 22.

Air Schedules

The global airline schedule has 78.5 million seats this week, which is 0.8% less than last week and about 27% lower than where it was for the same week in 2019, according to OAG Aviation. The main reduction was in China, where a large downward adjustment was made following new restrictions to limit the spread of coronavirus.

China's seat capacity is a key statistic for global jet fuel consumption since it is the second largest airline market after the U.S. and has been a source of stability throughout most of the pandemic, until a sudden downturn in late summer.



Nevertheless, China is still the closest to matching 2019 levels at just 7.5% below, closely followed by seat capacity in Mexico and the U.S. which trail their pre-pandemic levels by 9.1%

and 10%, respectively. Rapid gains are being made in Europe, with France, Spain and the U.K. seeing the largest week-on-week increases, the OAG data show. So far there's little sign of improvement in Singapore, with seat capacity still only about one-fifth of 2019 levels, though government plans to allow more quarantine-free travel will likely lead to many more seats being offered in coming weeks.

The Bloomberg weekly oil-demand monitor uses a range of high-frequency data to help identify trends that may become clearer later in more comprehensive monthly figures.

Following are the latest indicators. The first two tables show fuel demand and mobility, the next shows air travel globally and the fourth is refinery activity:

Demand Measure	Location	% y/y	% vs 2019	% m/m	Freq	Latest Date	Latest Value	Source
Gasoline	U.S.	+16	+0.5	+8.3	w	Oct. 9-15	9.63m b/d	EIA
Distillates	U.S.	+19	+5	-3.3	w	Oct. 9-15	4.28m b/d	EIA
Jet fuel	U.S.	+45	-32	-4.9	w	Oct. 9-15	1.41m b/d	EIA
Total oil products	U.S.	+21	+3.1	+3.2	w	Oct. 9-15	21.8m b/d	EIA
All vehicles miles traveled	U.S.		+1		w	Oct. 11-17	16.4b miles	DoT
Passenger car VMT	U.S.		-1		w	Oct. 11-17	n/a	DoT
Truck VMT	U.S.		+12		w	Oct. 11-17	n/a	DoT
All motor vehicle use index	U.K.	+7.9	-4	-5	d	Oct. 18	96	DfT
Car use	U.K.	+7.1	-9	-6.2	d	Oct. 18	91	DfT
Heavy goods vehicle use	U.K.	+1.9	+9	-0.9	d	Oct. 18	109	DfT
Gasoline (petrol) avg sales per filling station	U.K.	-3.1	-17	-13	m	Oct. 11-17	6,069 liters/d	BEIS

Diesel avg sales per station	U.K.	-6.7	-16	-10	m	Oct. 11-17	8,742 liters/d	BEIS
Total road fuels sales per station	U.K.	-5.2	-17	-11	m	Oct. 11-17	14,811 liters/d	BEIS
Gasoline	India		+8.3	+2	2/m	Oct. 1-15	1.05m tons	Bberg
Diesel	India		-0.9	+15	2/m	Oct. 1-15	2.41m tons	Bberg
LPG	India		+2.5	-3.2	2/m	Oct. 1-15	1.12m tons	Bberg
Jet fuel	India		-37	+11	2/m	Oct. 1-15	201k tons	Bberg
Total Products	India	+5.2	-1.7	+0.1	m	September	15.9m tons	PPAC
Toll roads volume	Italy	+10	-0.4		w	Oct. 11-17	n/a	Atlantia
Toll roads volume	Spain	+40	+8.2		w	Oct. 11-17	n/a	Atlantia
Toll roads volume	France	+10	-1.7		w	Oct. 11-17	n/a	Atlantia
Toll roads volume	Brazil	-6.3	-1.6		w	Oct. 11-17	n/a	Atlantia
Toll roads volume	Chile	+45	+20		w	Oct. 11-17	n/a	Atlantia
Toll roads volume	Mexico	+9.4	+5.6		w	Oct. 11-17	n/a	Atlantia
Passenger car traffic	Poland	+3	+4	-10	m	September	24,062	GDDKiA
Heavy goods traffic	Poland	+5	+9	+6	m	September	4,786	GDDKiA
All vehicles traffic	Italy	+5.7		-7.1	m	September	n/a	Anas
Heavy vehicle traffic	Italy	+5.7		+25	m	September	n/a	Anas
Gasoline	Portugal	+5.8	+9.4	-12	m	September	91k tons	ENSE
Diesel	Portugal	+1.8	+4	-2.5	m	September	411k tons	ENSE
Jet fuel	Portugal	+67	-41	-5	m	September	95k tons	ENSE
Gasoline	Spain	+17	+5.2		m	September	498k m3	Exolum
Diesel	Spain	+12	-0.4		m	September	2272k m3	Exolum
Jet fuel	Spain	+128	-41		m	September	421k m3	Exolum

Note: Click [here](#) for a PDF with more information on sources, methods. The frequency column shows d for data updated daily, w for weekly, 2/m for twice a month and m for monthly.

* In DfT U.K. data, the column showing versus 2019 is actually showing the change versus the first week of February 2020, to represent the pre-Covid era.

** In BEIS U.K. data, which is only released once per month, the column showing versus 2019 is actually showing the change versus the average of Jan. 27-March 22, 2020, to represent the pre-Covid era.

City congestion:

Measure	Location	% chg vs 2019	% chg m/m	Oct. 25	Oct. 18	Oct. 11	Oct. 4	Sep. 27	Sep. 20	Sep. 13	Sep. 6	Aug. 30
			(Oct. 25)	Congestion minutes added to 1 hr trip at 8am local time								
Congestion	Tokyo	-10	-5	34	35	12	34	35	0	32	28	28
Congestion	Mumbai	-80	-33	7	6	1	7	11	12	11	10	5
Congestion	New York	+23	+23	38	33	8	35	31	35	39	0	15
Congestion	Los Angeles	-31	-18	25	29	23	27	30	28	31	2	29
Congestion	London	-51	-65	19	34	44	43	53	44	44	37	1
Congestion	Rome	-15	-22	41	40	64	44	53	55	41	31	13
Congestion	Madrid	-10	-10	32	37	3	41	35	35	33	20	6
Congestion	Paris	-5	-20	42	47	49	52	52	53	52	49	27
Congestion	Berlin	+4	+12	35	19	20	38	31	29	32	38	32
Congestion	Mexico City	-40	+14	29	28	28	29	26	29	28	27	24
Congestion	Sao Paulo	-38	+2	27	35	10	29	26	26	27	10	30

Source: TomTom. [Click here for a PDF with more information on sources, methods.](#)

NOTE: m/m comparisons are Oct. 25 vs Sept. 27. TomTom has been unable to provide Chinese data since late April.

Air Travel:

Measure	Location	% chg y/y	% chg vs 2019	% chg m/m	Freq.	Latest as of Date	Latest Value	Source
Airline passenger throughput	U.S.	+114	+10	+0.3	d	Oct. 24	2.11m people	TSA
Commercial flights	Worldwide	+42	-19	+2.1	d	Oct. 24	96,125	FlightRadar24
Air traffic (flights)	Europe		-26	-2.8	d	Oct. 24	23,565	Eurocontrol
Seat capacity	Worldwide	+41	-27		w	Oct. 25	78.49m	OAG
Seat cap.	U.S.	+74	-10		w	Oct. 25	18.86m	OAG
Seat cap.	China	-3.7	-7.5		w	Oct. 25	14.67m	OAG
Seat cap.	India	+29	-23		w	Oct. 25	3.27m	OAG
Seat cap.	Spain	+160	-15		w	Oct. 25	2.40m	OAG
Seat cap.	Japan	-1.3	-47		w	Oct. 25	2.15m	OAG
Seat cap.	U.K.	+93	-37		w	Oct. 25	2.01m	OAG
Seat cap.	Germany	+104	-37		w	Oct. 25	1.81m	OAG
Seat cap.	Brazil	+49	-25		w	Oct. 25	1.92m	OAG
Seat cap.	Mexico	+51	-9.1		w	Oct. 25	1.67m	OAG
Seat cap.	France	+82	-25		w	Oct. 25	1.57m	OAG
Seat cap.	Australia	+25	-73		w	Oct. 25	570k	OAG
Seat cap.	S. Africa	+75	-44		w	Oct. 25	340k	OAG
Seat cap.	Singapore	+141	-81		w	Oct. 25	157k	OAG

NOTE: Comparisons versus 2019 are a better measure of a return to normal.

Refineries:

Measure	Location/area	y/y chg	vs 2019 chg	m/m chg	Latest as of Date	Latest Value	Source
Changes in ppt unless noted							
Crude intake	U.S.	+15%	-5.5%	-2.3%	Oct. 15	15m b/d	EIA
Utilization	U.S.	+12	-0.5	-2.8	Oct. 15	84.7 %	EIA
Utilization	U.S. Gulf	+13	-5.5	+0.9	Oct. 15	82.9 %	EIA
Utilization	U.S. East	+12	+17	-16	Oct. 15	77.4 %	EIA
Utilization	U.S. Midwest	+6.9	+5	-6.9	Oct. 15	89.2 %	EIA
Apparent Oil Demand	China	-2%		-2.8%	September 2021	13.23 b/d	NBS
Indep. refs run rate	Shandong, China	-1.6	+6.4	+3.3	Oct. 22	72.4 %	SCI99
State refs run rate	East China	+0.8	-3	+0.8	Oct. 15	79.6 %	SCI99
State refs run rate	South China	+1.7	+4.9	-1.4	Oct. 15	82.8 %	SCI99

NOTE: All of the refinery data is weekly, except for SCI99 state refineries, which is twice per month, and the NBS apparent demand, which is usually monthly. Changes are shown in percentage point except for the rows on crude intake and apparent oil demand, which are shown in percent change.

additional appreciation potential as Asian-domiciled and other global investors begin to fully appreciate its significant discount to its peers, excellent franchise, and growth potential.

New Position: Royal Dutch Shell

Third Point initiated a position in Royal Dutch Shell (“Shell”) during the second and third quarters. The past two years have been especially challenging for Shell shareholders due to a major dividend cut and well-publicized court case that ordered changes to Shell’s business model. Stepping back further, it has been a difficult *two decades* for shareholders, with annualized stock returns of just 3% and decreasing returns on invested capital. However, despite the current sour sentiment, we see opportunity for improvement across the board at Shell.

Shell is one of the cheapest large cap stocks in the world, trading at under 4x next year’s EBITDA and ~8x earnings at “strip” prices. It also trades at a ~35% discount on most metrics to peers ExxonMobil and Chevron despite Shell’s higher quality and more sustainable business mix. Compared to its peers, Shell generates a much larger percentage of its cash flow and earnings from stable businesses that have a major role to play in the energy transition. For example, Shell is the largest global player in liquified natural gas (“LNG”), which is a critical transition fuel to move off carbon intensive coal-fired power generation. In 2022, we expect the company’s energy transition businesses (LNG, Renewables and Marketing) to generate EBITDA of over \$25 billion with sustaining capex of only \$5 billion. These businesses account for just over 40% of Shell’s EBITDA but would likely support Shell’s entire enterprise value if they were a standalone company. At the current share price, we believe investors are getting the remaining ~60% of EBITDA (upstream, refining and chemicals) for free.

Management has been gradually divesting assets that are not aligned with a low-carbon future such as upstream and refining. This is perhaps most evident in Shell’s refining business where the company went from owning 54 refineries in 2004 to only five (by year-end.) This is a remarkable accomplishment. Shell’s massive dividend cut and other asset sales (e.g. Permian) have left it with an under-levered balance sheet with year-end 2021 net

debt to EBITDA of well below 1x. This positions Shell to return capital earlier and more aggressively than peers.

Given all these positive attributes, why can't Shell attract investor interest? In our view, Shell has too many competing stakeholders pushing it in too many different directions, resulting in an incoherent, conflicting set of strategies attempting to appease multiple interests but satisfying none. Some shareholders want Shell to invest aggressively in renewable energy. Other shareholders want it to prioritize return of capital and enjoy the exposure to legacy oil and gas. Some investors think Shell should shrink to grow, while we suspect some within Shell seem sentimentally attached to its "super major" legacy. Some governments want Shell to decarbonize as rapidly as possible. Other governments want it to continue to invest in oil and gas to keep energy prices affordable for consumers. Europe paradoxically wants both!

Shell's board and management have responded to this with incrementalism and attempts to "do it all." As the saying goes, you can't be all things to all people. In trying to do so, Shell has ended up with unhappy shareholders who have been starved of returns and an unhappy society that wants to see Shell do more to decarbonize.

Shell's board can and must move faster. We believe all stakeholders would benefit from a plan to:

1. Optimize Shell's corporate structure to reduce cost of capital and allow it to more aggressively invest in decarbonization;
2. Match its business units with unique shareholder constituencies who may be interested in different things (return of capital vs. growth; legacy energy vs. energy transition);
3. Allow each of its business units to more nimbly and effectively react to market and environmental policy developments.

This should involve the creation of multiple standalone companies. For example, a standalone legacy energy business (upstream, refining and chemicals) could slow capex beyond what it has already promised, sell assets, and prioritize return of cash to

shareholders (which can be reallocated by the market into low-carbon areas of the economy). A standalone LNG/Renewables/Marketing business could combine modest cash returns with *aggressive* investment in renewables and other carbon reduction technologies (and this business would benefit from a much lower cost of capital). Pursuing a bold strategy like this would likely lead to an acceleration of CO₂ reduction as well as significantly increased returns for shareholders, a win for all stakeholders.

Many ESG investors employ a strategy of buying companies that already have a clean bill of health. A lesson from our prior engagements is that it is often most impactful to invest in companies where the opportunity for positive change is the greatest. While daunting, there is perhaps no bigger ESG opportunity than in “Big Oil”, and specifically, at Royal Dutch Shell. We are early in our engagement with the company but are confident that Shell’s board and management can formulate a plan to accelerate decarbonization while simultaneously improving returns for its long-suffering shareholders.

UnitedHealth

UnitedHealth is one of the largest healthcare companies in the world and a market leader in both its insurance and healthcare services (Optum) businesses. We initiated our position during the 2020 Presidential election at a time of heightened political and regulatory uncertainty.

We believe under its new CEO, Andrew Witty, UnitedHealth can not only preserve its market dominance and sustain industry-leading growth rates across most of its key segments but also enter new healthcare services markets. Witty is known as a mission-driven CEO who clearly articulates his view that providing high-quality, affordable health care services is a social good. He receives consistently high marks from former colleagues, and we believe that his leadership approach will ballast and even strengthen UNH’s already impressive management and employee ranks. The insurance and services businesses are synergistic and complementary, which entrenches United’s critical role in care financing, access, and management. This dynamic gives us confidence in the durability of United’s market leadership.

In digital production operations, we announced a partnership with AVEVA to expand powerful edge and IoT solutions to the field, complementing our Agora platform and Sensia solutions.

And in digital drilling, we successfully completed the first fully automated section drilled offshore at the Hebron platform for ExxonMobil in Canada, as you have seen in this morning's earnings release. This achievement is a significant step for our industry, particularly offshore, and signals a momentous opportunity to apply digital technology to create a step change in well construction safety, performance and carbon footprint.

As shared recently, we are seeing the adoption of digital solutions accelerate in our industry. And while we are in the early innings, we are excited about the prospect of transitioning the majority of our software customer base, of over 1,700 companies, to our digital platform during the next few years. This growing adoption will generate an expanding set of digital revenue streams over a long horizon, as we transition every customer to new digital solutions for their data, workflows and operations.

Moving to New Energy: We advanced our portfolio by taking a position in stationary energy storage through our strategic investment in EnerVenue, a company with differentiated metal-hydrogen battery technology. This represents a new opportunity set and an expansion of total addressable market in a sector with significant growth opportunities.

In geenergy, following the success of the pilot in our technology facility in France, Celsius Energy has secured five commercial contracts in Europe. This is a significant achievement in the commercialization roadmap for Celsius as a low-carbon solution for heating and cooling buildings, contributing to global efforts in reducing emissions.

To conclude on this quarter's performance, we once again demonstrated excellent progress in our strategic execution across our portfolio, supporting outstanding results and I want to thank the entire Schlumberger team, not only for delivering another strong quarter, but for their unwavering efforts to create enduring value for our customers and our shareholders.

Now, I would like to turn to the near-term macro and the growth opportunity ahead of us.

The market fundamentals have improved steadily throughout 2021, especially over the last few weeks, with oil and gas prices attaining recent highs, inventories at their lowest levels in recent history, a rebound in demand and encouraging trends in the pandemic containment efforts. These strengthening industry fundamentals, combined with the actions of OPEC plus and continued capital discipline in North America, have firmly established a prospect of an exceptional multi-year growth cycle ahead.

In the international markets, all regions are set to benefit from this highly favorable environment, something not seen internationally since the last super cycle. This expansion will occur at different paces, across different basins, operating environments and customer groups, resulting in a sustained, multipronged growth cycle. Our broad exposure across these different dimensions puts us in an advantaged position to fully seize this growth opportunity.

For example, this growth inflection is already visibly underway in Latin America, sparked by the resumption of exploration and the initiation of long-cycle development campaigns. Activity has strengthened throughout 2021, and revenue in this market is already at 2019 pre-pandemic levels. Year-to-date revenue growth in Latin America is at 30%, with broad activity growth across multiple countries, including Argentina, Brazil, Ecuador and Guyana. This growth is expected to strengthen further in the coming years due to ongoing long-cycle development campaigns.

By contrast, in the Middle East, where activity has been more subdued in 2021, the market conditions are set for a material uptick of activity in the coming quarters. The combination of short-cycle activity to meet supply commitments, strategic oil capacity expansion and the acceleration of gas development projects will result in a significant increase in investment throughout 2022 and beyond. Our recent success in tender awards, as detailed in our earnings release, strengthens our market position, and with our strong presence and commitment, we will benefit the most from this exciting outlook in the region.

In the offshore markets, we are also set for a strong resurgence this cycle. Rig activity grew for the third sequential quarter internationally and is expected to build on the notable increase in development FIDs in the coming years. Advances in new technology, digital and integration are driving performance impact offshore, from discovery to well construction, production and recovery, and are creating the conditions for offshore operators to reinvest with confidence in this cycle.

In North America, the imminent resumption of lease sales in the Gulf of Mexico, where we have significant market presence, will drive additional offshore growth, as operators capitalize on the advantages of this prolific basin and its existing takeaway infrastructure and extract more value from their core upstream positions through exploration and tiebacks.

Taking these factors together, a broad offshore resurgence will result from IOCs building on their advantaged hubs, independents fast-tracking development of their recently acquired assets and NOCs unlocking their gas and oil reserve recovery potential. Our technology, digital enablement and integration capabilities are critical advantages in this market environment and are resulting in significant new contract awards, both internationally and in North America.

Finally, we are extremely pleased with customer reception of our Transition Technologies portfolio, and the accelerated adoption of these technologies that reduce the carbon impact of oil and gas operations. This portfolio is focused on fugitive emissions, flaring and electrification, and is already helping customers decarbonize operations, advancing our net-zero ambition and strengthening our sustainability leadership in the industry. Some examples of this impact are cited in our highlights.

Turning to the fourth quarter outlook:

Directionally, we anticipate another quarter of growth, with an ambition for growth across all divisions. Growth will be led by Production Systems and Digital & Integration, benefiting from a year-end sales uplift, tempered by typical seasonality in Reservoir

Performance and Well Construction. This should result in an overall sequential growth rate similar to the prior quarter.

With this fourth quarter outlook, we expect to reach our double-digit international growth ambition for the second half of 2021, when compared to the second half of 2020. It will also translate into full year revenue growth, both internationally and in North America, after adjusting for the effect of divestitures.

Building on third quarter operating margins at recent highs, our ambition is to sustain this level of margin performance in the fourth quarter. Consequently, on a full year basis, we remain confident in attaining the high end of our guidance of 250 bps to 300 bps EBITDA margin expansion, an excellent foundation for expansion in the year ahead.

Now, I would like to close my prepared remarks with our earliest views on 2022.

Against the backdrop of the constructive environment I described earlier, our confidence in the onset of an exceptional growth cycle is reinforced. At this early point in the planning cycle, and absent of setback in economic and pandemic recoveries, we anticipate very strong global upstream capital spending growth. This growth will impact all basins, every operating environment, short- and long-cycle activity and all customer groups.

In North America, we anticipate capital spending growth to increase around 20%, impacting both the onshore and offshore markets. Internationally, growth momentum will strengthen, and early indications point to strong capital spending growth in the low- to mid-teens, driven by both short-cycle activity and the onset of multiyear capacity expansion plans.

Through our performance strategy, we have strengthened our position across multiple dimensions. In North America, we have enhanced our market positioning and are now biased to accretive growth onshore and will benefit from strong growth offshore in the Gulf of Mexico. And in the international markets, we have built a multiyear pipeline of strong activity in the most prolific basins that will lead the supply response, both in oil and gas.

More importantly, we have enhanced our earnings growth potential significantly, as demonstrated by multiple quarters of margin expansion. In North America, our operating margins are primed to exit the year at the highest levels since 2015, which, combined with the favorable market position I've just described, is an excellent platform for margin expansion. Internationally, we are also set for peer-leading margin expansion, as we exit 2021 with margins above pre-pandemic levels. The combination of strong activity growth and operating leverage will support durable margin expansion.

Additionally, through our Fit-for-Basin and Transition Technologies, and capacity tightening, we see favorable conditions for broader net pricing net gains in the coming year, in both North America and the international markets.

James West -- *Evercore ISI -- Analyst*

Right. Okay. Great, that's very helpful, Olivier. And then, Olivier, a follow-up on that, on the digital side. This will be the first cycle where we really see digital as a big part of the business. There has been, as you allude to, widespread adoption, but we haven't yet seen the growth cycle with that adoption. So, how do you think that plays out? Is it going to allow you -- I mean, obviously, margins will be part of it. Does this allow you to grab market share? I mean, what are the -- what does digital do in an upcycle in such a strong one like we're projecting?

Olivier Le Peuch -- *Chief Executive Officer*

I think, I would highlight three things that will -- were result of our success and our investment and leadership. First, if you see the acceleration of digital adoption by customer through workflows, data and digital portion offering and you are seeing element of this being announced every quarter and you will continue to see this unfolding across the different customer groups, across different geographies, so this will mean accretive growth in 2022 to our top line by the digital offering we have.

The second aspect is the long-tail effect beyond the cycle. I believe that the effect is certainly will last, considering the very significant size of our customer portfolio, the fact that customer are going into it over the long run. We are seeing multiple effect of revenue stream being deployed across multiple quarters and multiple year across the different customer group we are addressing.

And finally, this is generating margins flow through that are accretive to earning and will be and continue to help us operate D&I at above 30% or mid 30%*s*. And also will result into our ability to extract from digital operation on our own operation, particularly integrated performance, and Well Construction, Reservoir Performance, the ability to extract more efficiency and hence to expand and support margin expansion on those divisions.

James West -- *Evercore ISI -- Analyst*

Very good. Thank, Olivier.

Olivier Le Peuch -- *Chief Executive Officer*

Thank you.

Operator

Our next question is from David Anderson with Barclays. Please go ahead.

David Anderson -- *Barclays -- Analyst*

Hi, good morning. I want to ask a couple of questions about the unconventional contracts that you announced in Saudi and Oman. So, could you just help us understand the pricing mechanisms there? Are this lump sum? Is there a baseline of stages per day? And also just curious where you're sourcing all these equipment. Do

But now looking ahead and looking at the activity, we see a lot of leading indicator. First, the FIDs, if you look at the actual FID of this year or if you look at the projection of some of the Wood Mack projection recently published showing that there will be an excess of \$100 million of offshore FID, most likely assumption, by the end of this year, and that will almost double next year. And out of this, 50% of that will be deepwater. So there is an acceleration of FID back to 2019 level that is on the horizon, and that is a result of IOCs going to exploit that on the advantaged basin and focusing on the hubs, the national oil company exploiting and unlocking the oil and gas reserve to participate to the supply.

And finally, there has been a lot of assets changing -- trading hands in the last few quarters. And this internationally independent also pursuing accelerated FID in different basins we are exposed. And the result of that, these subsea backlog is growing. We are [Indecipherable] book-to-bill ratio and we certainly be growing year-on-year in excess of 30% or 40% our booking from 2021 -- 2020 to 2021. So, we are, indeed, quite positive and constructive, and this plays very well to our portfolio, because this is where Well Construction, Reservoir Performance in exploration appraisal in large offshore contract are getting the benefit and it was very visible during the third quarter. So, you could take this as a proxy of the future.

David Anderson -- *Barclays* -- *Analyst*

Thank you, Olivier.

Olivier Le Peuch -- *Chief Executive Officer*

You're welcome.

Operator

And our next question is from Chase Mulvehill with Bank of America. Please go ahead.

Chase Mulvehill -- *Bank of America* -- *Analyst*

Hey, good morning, everybody.

Olivier Le Peuch -- *Chief Executive Officer*

Good morning, Chase.

Chase Mulvehill -- *Bank of America* -- *Analyst*

Good morning. I guess, first thing, kind of a macro kind of higher level question about kind of this investment cycle. There seems to be this growing narrative out there that the oil and gas industry is going to continue to under invest this cycle given the discipline narrative of the E&P industry and also kind of this energy transition focus. I mean, obviously you've talked to more E&P in oil and gas producers than probably anybody worldwide. And so, given the commentary that you expect exceptional growth in a multiyear cycle in the oil and gas industry, this obviously leads you to believe that there is not going to be this under investment going forward. So, maybe if you can kind of

provide some color around this and thoughts around the disconnect between some investor perception that you're not going to see a reinvestment cycle going forward?

Olivier Le Peuch -- *Chief Executive Officer*

I think the conditions are set -- it's a unique combination that we are living with. We are living with the result of under investment in the last five to seven years, combined with a reset that we have experienced in industry during 2020, and also -- and the limited capital discipline, particularly in North America. When you combine these and look at the demand outlook that we surpass through the GDP growth expected for the next two or three years that we surpassed the 2019 level sometime next year. I think the result of which will catapult international supply and will create a necessity for reinvestments in our industry.

So, the questions are very simple. There is an anticipated deficit of supply if there is no reinvestment to be done into our industry. We have seen that many NOCs have signaled that they are set to reinvest into their capacity going forward. The IOCs are concentrating on their advantaged basins. They will not be the one leading the growth in this cycle, but they would be the one pursuing still the advantaged basin to generate the cash they need to transition to new energy. The independents taking benefit of this position, inherited some prolific assets and redeveloping those assets with some support and the support of the entire industry to participate to the supply.

So, I think the conditions are set undoubtedly that this demand will have to be met with supply and this supply cannot come with inventory, cannot come with only raising the OpEx spare capacity, more will have to be built, hence it will create activity growth in the coming years. And it's not only a shock in 2022. This FID I talked about, this capacity expansion in Middle East, long-term project that will have a long-tail effect beyond the 2022-2023 horizon.

Chase Mulvehill -- *Bank of America -- Analyst*

Okay. All right. That's perfect. Just one quick follow-up. Just some clarification on your guidance. I mean, fourth quarter, I think you said flat margins. Was that flat consolidated margins or was that flat for each segment? In other words, if you run the mix, could actual margins -- because of favorable mix, can margins be up?

Olivier Le Peuch -- *Chief Executive Officer*

No, Chase, we don't disclose and we don't guide on that kind of division. I think we are talking about flattish margin -- global margin, and in a sense maintaining very, very high margin and exiting in the mid-teens globally for the company as operating margins and the same level of EBITDA margin. So that's -- what matters for us is the exit rate and the implication of this exit rate as we enter 2022 as a platform, as a foundation for margin expansion going forward. So, the mix is giving us this result of flat or about mid-teens margin, and that's what's our ambition, and we are very proud of this -- maintaining this level of margins.

Chase Mulvehill -- *Bank of America -- Analyst*

Okay, perfect. I'll turn it back over. Thanks, Olivier.

Olivier Le Peuch -- *Chief Executive Officer*

Thank you.

Operator

Our next question is from Arun Jayaram with JPMorgan Chase. Please go ahead.

Arun Jayaram -- *JPMorgan Chase -- Analyst*

Yeah. My first question is, Olivier, there's 3 million to 4 million barrels of productive capacity offline from OPEC and as the cartel methodically brings back this output called in for KBD [Phonetic] increments, I wanted to get your thoughts, is this creating any near-term service opportunities for you? And I was wondering if you can maybe elaborate on any shifts globally in spending from maintenance capex type spending to growth in productive capacity, oil and gas, and what this means for Schlumberger?

Olivier Le Peuch -- *Chief Executive Officer*

Yeah. I think the OPEC plus will continue to release this increment of oil to the market to be behind the supply curve, behind the demand curve, but we are continuing to see an increase of intervention activity, short-cycle activity that is starting to materialize in the OPEC plus countries where we have seen mobilization of intervention, stimulation, as you have seen lifting and production maintenance activity. So, that's the effect on short cycle. This will also include rig mobilization to do some infill drilling, to start to support this increment of barrels for the country that have the capacity to expand fast. And this returning to more long cycle as both the gas development is accelerating and you have seen the -- as the [Indecipherable] announcement from Saudi, and the continuation of large gas in the Middle East and elsewhere, as well as the commitment that two or three country have taken in the Middle East, particularly, around the expansion of production capacity, permanent capacity toward the horizon of '24, '27 depending on the country. So, what you talked about as an impact on short cycle, but this is an underlying activity growth coming from long cycle as well

Operator

And our next question is...

Olivier Le Peuch -- *Chief Executive Officer*

Arun?

Operator

Arun, do you have any follow-up? We'll move on. And we go to the line of Connor Lynagh with Morgan Stanley. Please go ahead.

Connor Lynagh -- *Morgan Stanley -- Analyst*

Roger Read -- *Wells Fargo -- Analyst*

Okay. Great. Thanks. And then just an unrelated follow-up. I was curious, you talked about a lot of major projects and so forth globally. We've seen obviously some pretty extreme pricing in LNG and natural gas overall. So if you just kind of look at natural gas as a driver on the project side or the activity side, anything globally you could say, looks like it's improved over recent months or recent quarters or anything on the sort of larger project side there looks [Speech Overlap]

Olivier Le Peuch -- *Chief Executive Officer*

Gas is there for a long time as a critical supply, as a transition fuel as well. So I think, you see that the existing reserve beat on commercial or conventional offshore and onshore will be commercialized by our customers as long as they have a pass to markets through LNG or they have pass to market through pipelines, so we see this accelerating. You have seen some of the critical announcement we made this morning, highlighting to onshore-offshore unconventional and conventional gas developments, and we see it as a trend that is not about to stop now.

We need to accelerate. I think the gas supply demand is miss balanced this year, will recover a little bit next year, but we'll continue with the strong trajectory going forward. There are few country that are committed to accelerate the gas transition, India is the most visible one, that will step changed their consumption of gas and we then participate to fuel, the gas demand, and would itself expand industrial as well domestically. So whether it's domestic gas, India as an engine of growth for gas beyond the current mix. And some specific security supply -- of supply that will trigger some gas development from existing gas, the redevelopment or short cycle activity. So I'm optimistic, hence very, very pleased with the gas contract we have been winning this quarter.

Roger Read -- *Wells Fargo -- Analyst*

Thank you.

Operator

Thank you. And our next question is from Waqar Syed with ATB Capital Markets. Please go ahead.

Waqar Syed -- *ATB Capital Markets -- Analyst*

Good morning. Thanks for taking my question. Olivier, just one broader question. You've given us some good guidance on upstream capital spending for international markets and North American markets for next year. Now with respect to exploration budgets in particular, do you see the growth rate of exploration spending in line with the otherwise global spending are higher or lower?

Olivier Le Peuch -- *Chief Executive Officer*

It's too early to give a specific guidance for exploration. What we said for exploration is that we are seeing two things coming back. We are seeing some seismic activity

coming back, including there's some proof that the seismic book utilization is going. But what is more critical is the near-field exploration is triggering a more activity in exploration going forward, as everybody wants to get better return on the existing infrastructure to tieback, and hence we have seen some licensing round as well. So licensing rounds, some seismic survey coming back and exploration -- near-field exploration for future infill or tieback is what we see. So, to give you the magnitude directionally, it will improve -- it will increase, but to give [Indecipherable], it's too early.

Waqar Syed -- *ATB Capital Markets -- Analyst*

Okay. And then with respect to the APS business, previously, there were some plans for asset divestitures. Are those plans on hold or you still pursuing those?

Stephane Biguet -- *Executive Vice President and Chief Financial Officer*

Look for -- Waqar, for APS asset in Canada, which is what we discussed previously, we have received offers with values commercial constructs, and now we are addressing the process of evaluating the potential merits and risk associated reverse proposals. So, this is what we're doing now. In the meantime, we are, of course, managing these assets as to optimize cash flows in the current commodity, pricing environment and it generates quite a lot of cash flow.

Waqar Syed -- *ATB Capital Markets -- Analyst*

Okay. Thank you very much. Appreciate the answers.

Olivier Le Peuch -- *Chief Executive Officer*

You're welcome.

Operator

And next, we go to the line of Neil Mehta with Goldman Sachs. Please go ahead.

Neil Mehta -- *Goldman Sachs -- Analyst*

Thanks so much, team. I just want to go back to Arun's question on deleveraging. As you think about the rate -- the optimal capital structure, is two times net debt to EBITDA still the normalized way you would think about that business? And based on the visibility you have on the cash flow, when do you think you'll be in a position to hit that target?

Stephane Biguet -- *Executive Vice President and Chief Financial Officer*

It's a good question, Neil. Is two times the right level? You could argue, it's a good level throughout the cycle. Now in an upcycle, with the cash you generate, the excess cash, we would probably be happy to go below two times and it will give us the required flexibility as I said to look at growth, additional growth opportunities and potential incremental shareholder returns. So, we may know it's still about [Phonetic] two times, we can take this as an intermediary step and we -- two times will just be an average throughout the cycle, I think is the right level.

Neil Mehta -- *Goldman Sachs -- Analyst*

Macron warns of threat to global economy from energy crisis

French president urges world leaders to act on climate change with more financial pledges ahead of COP26 summit

Leila Abboud in Paris and Leslie Hook in London YESTERDAY

President Emmanuel Macron has warned that an energy crisis threatens the world's post-pandemic recovery, calling for leaders at a G20 summit in Rome this weekend to work together to stabilise supplies.

In an interview, the French president also urged bigger financial commitments towards the fight against global warming on the eve of the COP26 climate summit in Scotland, and for particular attention to be paid to a deal to phase out coal power.

The G20 needed to co-ordinate between energy producers and consuming countries to prevent a supply breakdown this winter, which risked "extreme tensions both economically and socially", Macron said.

"In the coming weeks and months, we need to get better visibility and stability on prices so tension on the energy prices doesn't generate uncertainties, and undermine the global economic recovery," he told the Financial Times in the Elysée Palace. "What we expect is to have co-ordination to avoid soaring prices."

Global energy costs have surged this year, disrupting industry and hitting consumers with higher prices. Eurozone inflation surged in October to a 13-year-high of 4.1 per cent, according to a flash estimate published by the EU's statistics arm on Friday.

"I don't think we're going to be able to lower prices given tensions on the demand side," Macron said. "But what we need to avoid is to have a break in supply [and further] increases in prices, particularly as we're moving into the winter period for the northern hemisphere."

Emmanuel Macron: 'I don't think we're going to be able to lower [gas] prices given tensions on the demand side' © Magali Delporte/FT

Rapid economic recovery from the pandemic has pushed up energy prices "almost too rapidly" which risked "weighing on economic growth and putting a burden on households", Macron said.

France and a number of other EU governments have sought to protect consumers and businesses with billions in aid and price freezes.

Concerns have mounted that Russia's state-backed gas producer Gazprom has kept storage levels unusually low in western Europe, exacerbating fears over supplies and driving up prices.

Asked whether he blamed high European energy prices on Russia, Macron said: "I have no evidence that there's been manipulation of prices and I'm not accusing anybody. These are trading relations. They shouldn't be used for geopolitical reasons."

Asked about Gazprom's power over Europe, Macron said: "It's not a matter of whether we're too dependent on a company or not, it's how do we create alternatives. And the only alternatives are to have European renewables and of course, European nuclear."

France is the EU's biggest user of nuclear power, contrasting with a move away from atomic power by Germany and some other countries.

Macron called for Europe to develop a more diverse gas supply but also to speed up a transition away from fossil fuels, which will be necessary to slow rising temperatures and tame the climate disruptions caused by global warming.

“What is happening now is ironic, because we are building a system where in the medium and long term fossil energy will cost more and more, that’s what we want [to fight climate change],” he said. “The problem is that industries and households will need to be accompanied in this transition . . . or it won’t be sustainable.”

The French president, who is facing national elections in April, has been a vocal advocate of multilateralism. He has pushed for more co-operation globally and at EU level to reach deals on issues including international taxation and global warming.

“The first subject for the G20 is to accelerate the exit from coal power” Emmanuel Macron

Against a backdrop of global tensions, a supply chain crisis and the Covid-19 pandemic, Macron said the G20 had a responsibility to work together, especially to help low-income countries. He urged leaders at the Rome summit to agree a plan for faster vaccine delivery to developing countries.

“France has always stressed the importance of maintaining multilateralism, but we have to get concrete results from it,” he said.

The leaders of China, Russia and Japan will not attend the summit in Rome in person this weekend because of Covid-19 concerns and an election in Japan.

Macron said the G20 meeting, which is being hosted by Italian leader Mario Draghi on the eve of COP26, would also give countries a chance to hammer out more ambitious plans to fight climate change.

“When we’ll be meeting in Rome, the major challenge is to ensure that members of G20 can usefully contribute in Glasgow, to making this COP26 a success,” he said. “Nothing can be taken for granted before a COP,” he added.

“The first subject for the G20 is to accelerate the exit from coal power,” he said. G20 leaders expect a heated debate this weekend over including a pledge to end international coal financing.

“We need the G20 to go right through to the eradication of all international financing of coal-fired power plants,” Macron said.

Macron also called for rich countries, particularly the US, to commit more financially to help developing countries meet their climate goals. And he called on China to bring forward the date at which it will peak emissions, from 2030, to 2025.

“So as not to lose more time, we have to do as much as is absolutely possible in terms of financing, and encourage the US administration so that they can convince Congress to front-load its financing.”

Another issue will be to hold countries to their emissions targets for 2030 and 2050. “Our objective is to get maximum results from all countries,” he said. “This pathway is possible, even if it’s a challenge, especially for emerging countries which at the same time are trying to recover from the Covid crisis.”

Macron also urged the G20 leaders to do more to help vaccinate the world against Covid-19. The group should end vaccine export bans, increase its donations of vaccine doses, and support vaccine production in Africa, he said.

“Every French person has given one vaccine to somebody else in the world,” he said, referring to the roughly 60m doses that were on the way to Covax, the World Health Organisation’s procurement scheme for low-income countries. “If everybody in the G20 could do that we would get to the 20 per cent of the population vaccinated. This is vital,” he said.

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<https://www.wsj.com/articles/the-u-s-is-turning-green-what-will-this-climate-plan-cost-and-who-will-pay-11634997601>

The U.S. Is Turning Green. What Will This Climate Plan Cost and Who Will Pay?

Washington and the private sector are expected to pledge to spend trillions of dollars to reduce carbon emissions

A shift to renewable energy would spur a construction boom. New solar and wind facilities would need to be built at unprecedented rates to make up for lost generating capacity of retired fossil-fuel sources. AUDRA MELTON FOR THE WALL STREET JOURNAL

By Shane Shifflett
Oct. 23, 2021 10:00 am ET

The bill for [climate change](#) is coming due, and it will be big. Businesses, investors and the U.S. government are planning to turn the country carbon neutral in the coming 30 years. They are also trying to limit and pay the cost of the climate change that has already occurred.

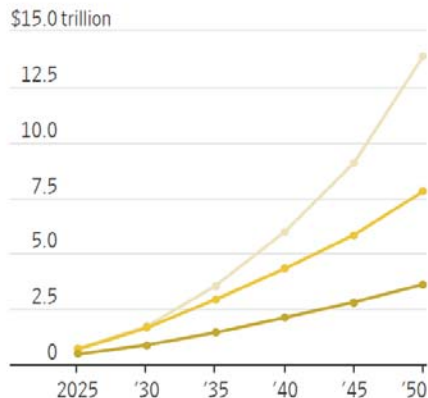
The U.S. is joining nearly 200 countries [at the United Nations climate conference in Glasgow, Scotland](#). Washington and the private sector [are expected to pledge to spend trillions of dollars](#) to reduce carbon emissions.

The bill would be shared among the federal and state governments, businesses and consumers. Banks and investors are committing to shift funding away from fossil-fuel producers and to businesses that will help reduce carbon emissions. There would be job losses and new jobs created.

The total bill could require tens of trillions in investments, though estimates like these are inherently speculative. The biggest and most measurable cost would be to generate and deliver all of the country's electricity using renewable resources. **The bill would range from \$7.8 trillion to \$13.9 trillion over the next 30 years, according to a team of energy researchers at Princeton University.**

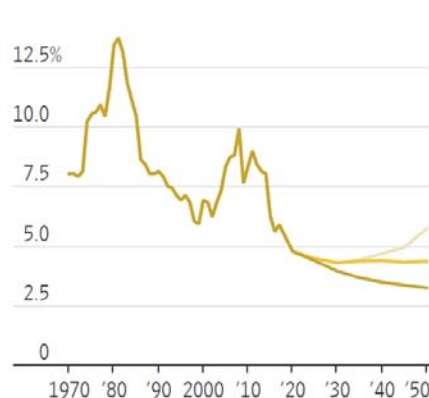
Estimated U.S. energy supply system investments

- Current trajectory
- Partially renewable net-zero pathway
- Fully renewable net-zero pathway



Spending on the U.S. energy system as a percentage of GDP

- Current trajectory
- Partially renewable net-zero pathway
- Fully renewable net-zero pathway



Sources: Chris Greig, senior research scientist at Princeton; Net-Zero America: Potential Pathways, Infrastructure, and Impacts, interim report

As a portion of the U.S. economy, the estimated costs to transform the electrical power system top out at just above 5% of the country's annual economic output. That is well below the 10% of GDP that was spent on the power system as recently as 2008. Job losses will be offset by gains, though the

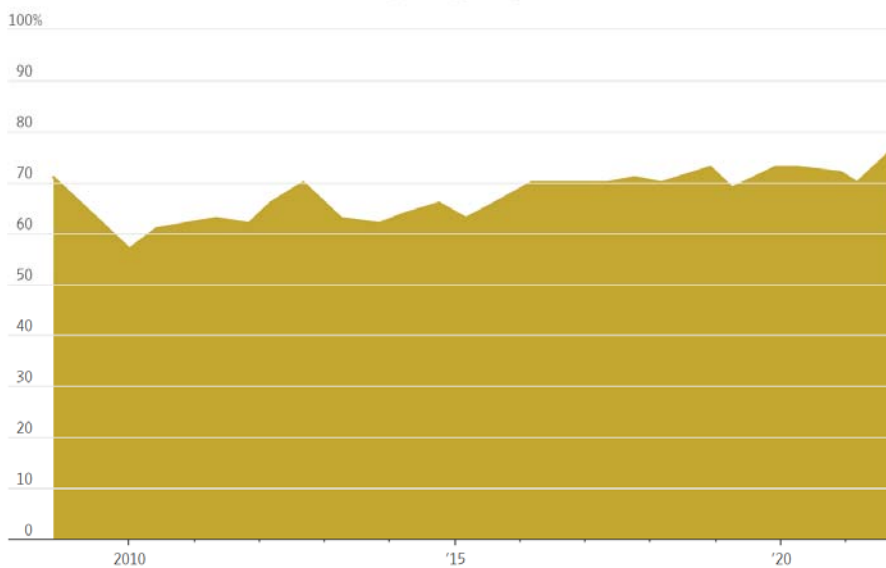
new jobs would mostly be in different places and require different skills. The Princeton researchers calculated the cost of a complete and partial shift to renewable energy by 2050.

The other big cost would be to replace fossil-fuel-powered cars and trucks with electric vehicles, to make buildings more efficient and to heat and cool them with electricity rather than gas or oil. That price is harder to estimate and trickier to pay for. **Cars and trucks wear out, so replacing them with electric vehicles over time could be effectively free, if the prices for the vehicles are comparable.** Replacing gas and oil heating and cooling systems with electricity would likely saddle owners with real costs. Billions are being invested in research on technologies such as [battery storage](#), green hydrogen and carbon capture that could change the overall cost of the transition away from fossil fuels.

Public Opinion and Investor Cash Back Shift

Businesses and governments are increasing their pledges to cut carbon emissions because of risks associated with climate change. Polls show more Americans are concerned about climate change than ever before. In the past, interest in environmental issues rose when the economy was strong and fell during tough times. Since the Covid-19 pandemic began, environmental concerns have risen.

Share of Americans who believe climate change is happening

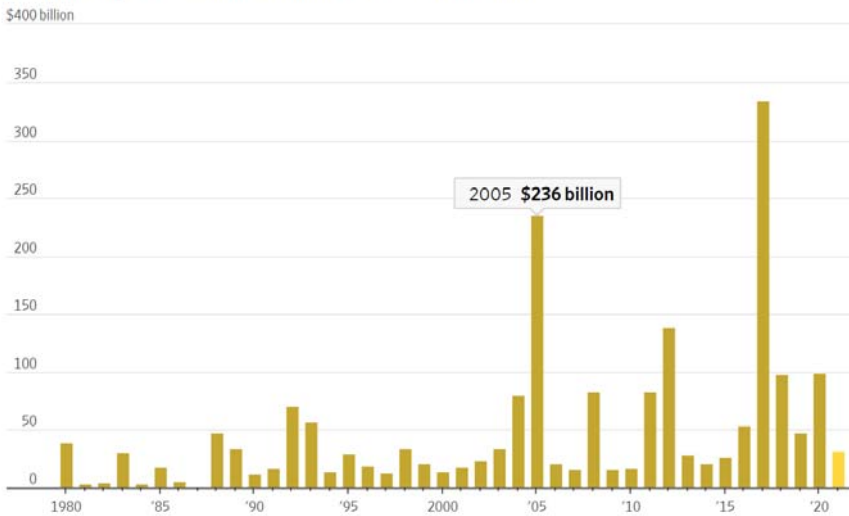


Source: Yale University and George Mason University

The cost of extreme weather, often made worse by climate change, like [the wildfires](#), [drought](#), heat waves, [storms](#) and floods of this summer, is growing. Weather and climate disasters have caused an average of \$84 billion in damage a year over the past decade in the U.S., adjusted for inflation, compared with \$54 billion in the previous decade.

For instance, there have been more bad storms, those that cause \$1 billion or more in damage, recently. The U.S. has only had 11 years in which it has had 10 or more of these storms. All but one of those years have occurred since 2008. The surge in damage was caused by the bad storms and by homes and infrastructure expanding into higher-risk areas, according to the National Oceanic and Atmospheric Administration.

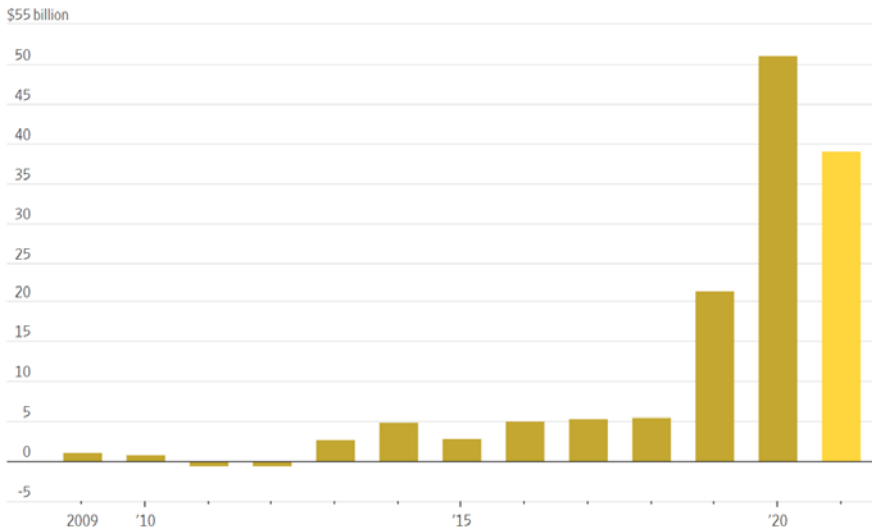
Annual damages caused by billion-dollar weather and climate disasters



Note: Values adjusted to 2020 dollars. Total 2021 damages based on data from first six months of the year.
Source: National Oceanic and Atmospheric Administration

Investors are responding to climate risks by pouring money into funds that use criteria on the environment, society and corporate governance to make investment decisions. More than \$51 billion flowed in sustainable funds in 2020, about a quarter of overall asset flows into U.S. funds and more than double the 2019 record, according to data from Morningstar Direct. The market is on pace to grow further this year.

Annual asset flows into U.S.-based sustainable funds

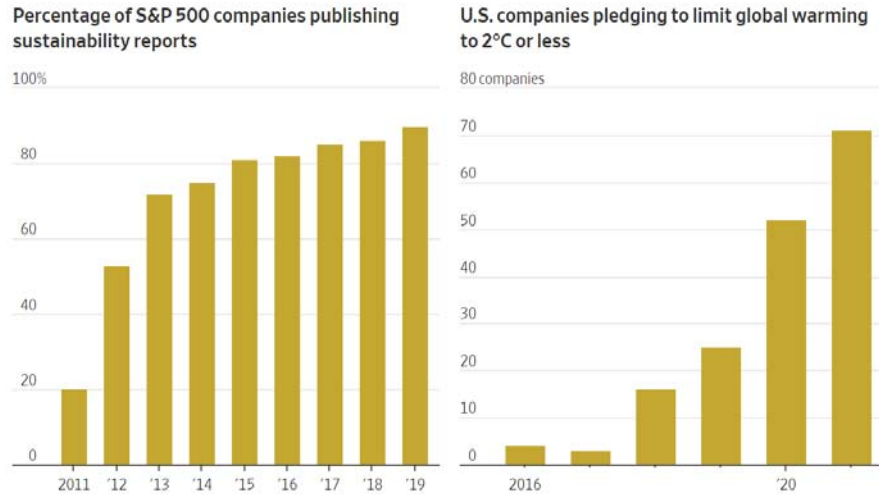


Note: 2021 based on data as of June 30
Source: Morningstar Direct

U.S. companies are chasing those investors by setting targets to reduce emissions to limit climate change. More than 170 U.S. companies have pledged to cut their greenhouse-gas emissions by enough to help limit global warming to 2 degrees Celsius or lower, according to the Science Based Targets initiative. Some 90% of companies in the S&P 500 published a sustainability report in 2019 describing their impact on the climate, up from 20% in 2011, according to S&P Global Sustainable1.

The Biden administration will promote the same goals as consumers, investors and businesses at the coming U.N. climate-change conference in Glasgow next month, the most important global gathering on the environment since [the Paris accords in 2015](#).

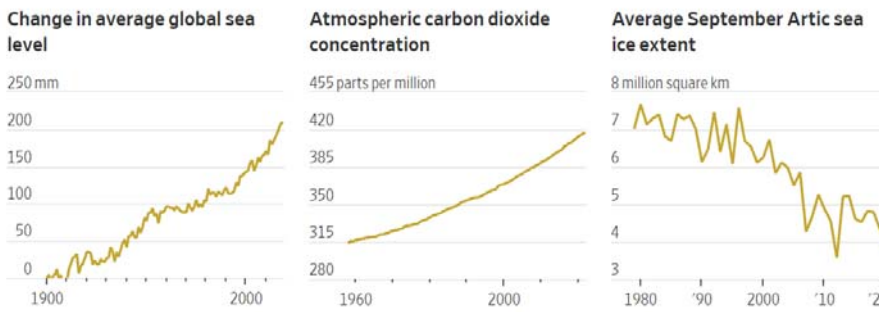
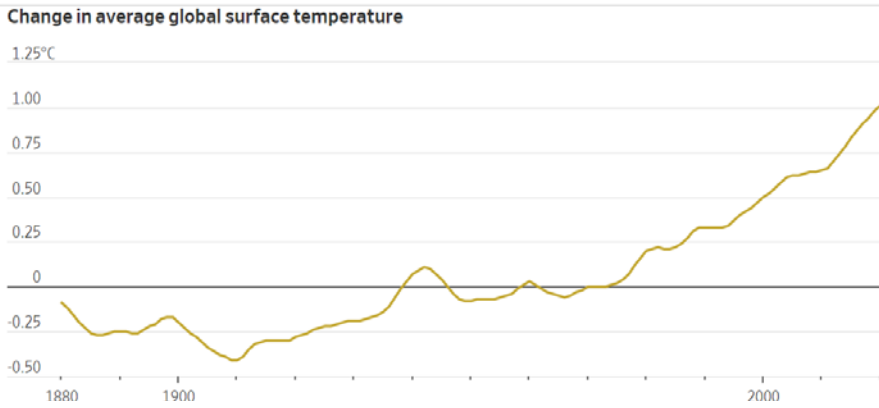
Representatives of nearly 200 countries will try to strike deals to cut carbon emissions and to pay for the transition away from fossil fuels.



Sources: S&P Global Sustainable; The Science Based Targets initiative

Goal Is to Limit Climate Change

At the current rate of greenhouse-gas emissions, scientific models that estimate the amount of carbon in the atmosphere and other factors that affect the climate, predict that [the Earth will warm by 2.7 degrees Celsius](#) by the end of the century compared with preindustrial levels. The Earth would warm by less if most nations take action now to reduce greenhouse-gas emissions, according to a report published in September by the U.N. The latest projections are well above the 1.5 degrees Celsius target world leaders agreed to in the Paris climate accords.

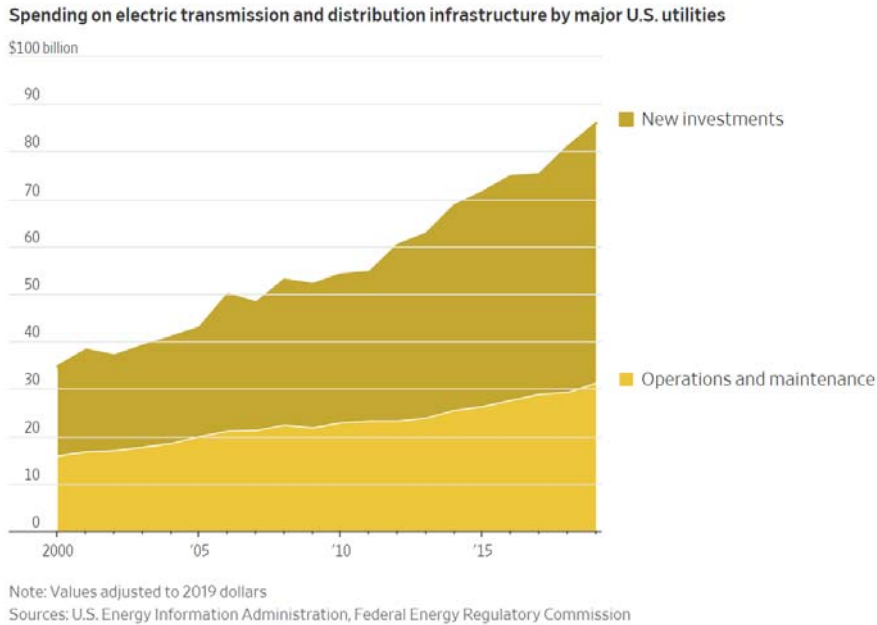


Sources: NASA's Goddard Institute for Space Studies; Frederikse, T., Landerer, F., Caron, L. et al.; National Snow & Ice Data Center; National Oceanic and Atmospheric Administration

Costs to Limit and Adapt to Climate Change

Businesses are already spending billions of dollars to protect their assets and shift to renewable energy sources, and they expect to spend more. According to data from analysis firm Four Twenty Seven, which is owned by Moody's Investors Service, extreme weather over the next 20 years could threaten \$138 billion in utility company assets. The shift to renewable energy such as wind or solar power will cost billions more.

New investments in electricity, transmission and distribution by U.S. utilities hit \$55 billion in 2019, accounting for the largest and a growing share of spending.



North Carolina-based utility giant [Duke Energy](#) Corp. has spent or is planning to invest \$16.2 billion this decade on climate-related projects including grid modernization and new energy sources to reduce net carbon emissions to zero by 2050, according to the company's environmental reports to the nonprofit CDP, which runs a global carbon disclosure system.

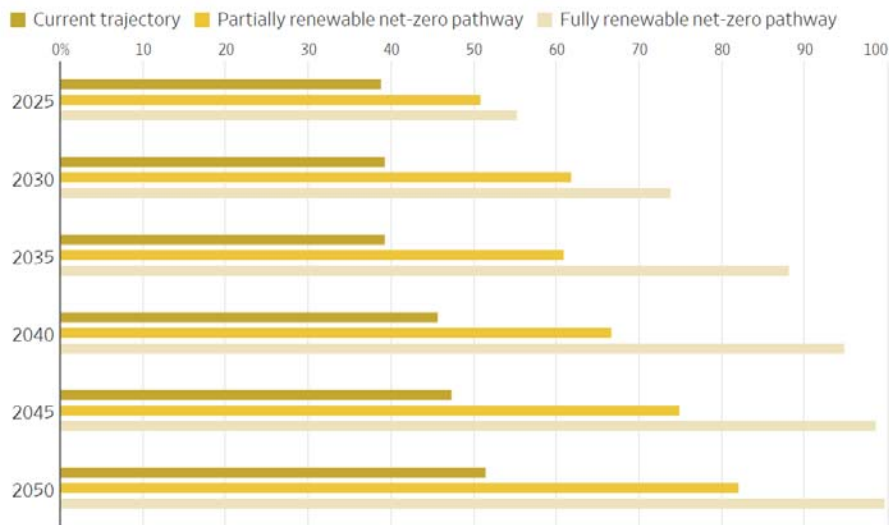
Duke ranks third among U.S. utility providers for severe hurricane risk as a result of climate change, behind [NextEra Energy](#) Inc. and [Dominion Energy](#) Inc., according to Moody's. Since 2016, Duke has spent hundreds of millions of dollars repairing and hardening infrastructure in Florida and North Carolina from increasingly damaging storms, according to annual reports.

The company is committed to addressing risks from climate change, said Neil Nissan, a Duke spokesman.

Power generators such as Duke will need to spend even more for the U.S. to reach its goal of net-zero carbon emissions by 2050. The Princeton researchers charted two pathways, one where all U.S. electricity is generated by alternative energy sources and a less costly trajectory where sun, wind, water and other renewables account for at least 80% of electricity generation.

The Shift to Renewable Energy

Share of electricity generated by low-carbon sources

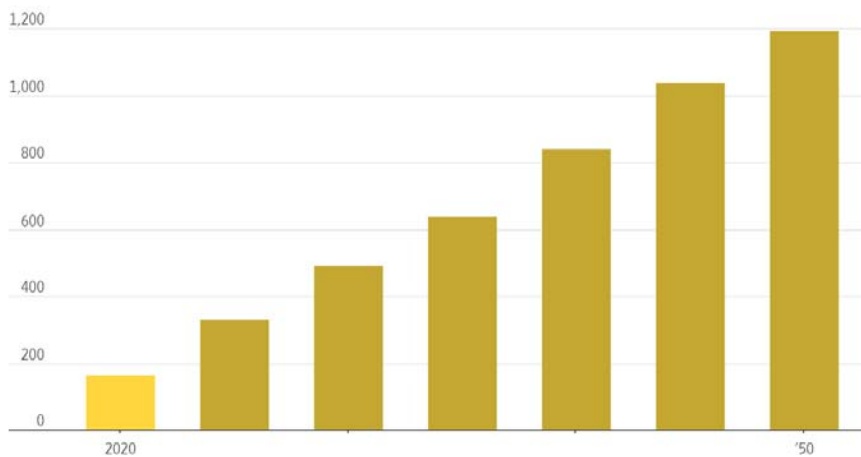


Source: Net-Zero America: Potential Pathways, Infrastructure, and Impacts, interim report

In a partial renewable net-zero pathway, more than 1,000 gigawatts of solar and wind generation capacity need to be added to the grid by 2050 to meet the country's power demands. That is more than six times the 2020 net summer capacity of utility-scale generators, according to data from the Energy Information Administration.

Projected installed solar and wind capacity under a partial renewable net-zero pathway

1,400 gigawatts



Sources: U.S. Energy Information Administration (2020); Net-Zero America: Potential Pathways, Infrastructure, and Impacts, interim report; U.S. Energy Information Administration

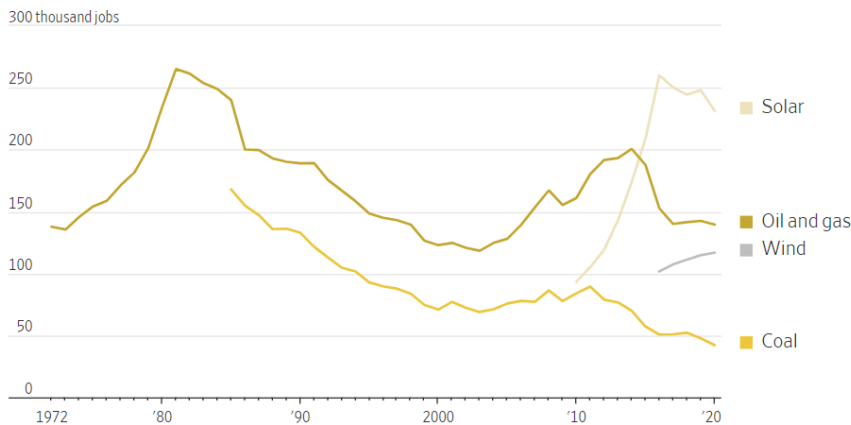
What Happens to Jobs

A shift to renewable energy would spur a construction boom. New solar and wind facilities would need to be built at unprecedented rates to make up for lost generating capacity of retired fossil-fuel sources.

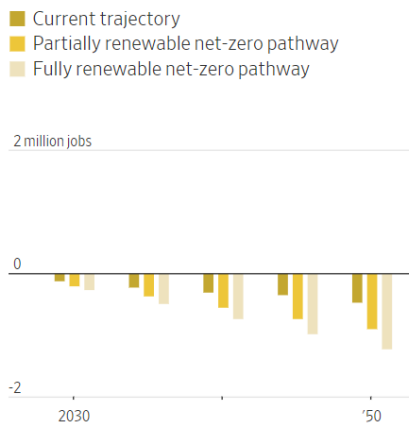
Princeton's net-zero study says job losses will be concentrated in rural communities where 700 coal mines would be closed and more than 500 coal-fired power plants retired in its model. Oil and natural-gas production and consumption would also decline, leading to job losses in energy-rich regions.

Two energy-producing states, Wyoming and North Dakota, are expected to experience net job losses.

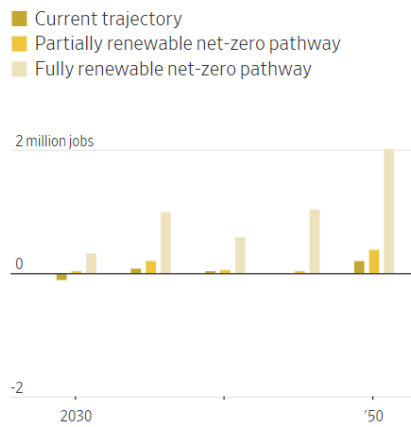
Employment by energy sector



Cumulative net job losses in fossil fuel sectors



Cumulative net job changes in all energy sectors



Sources: U.S. Bureau of Labor Statistics (Oil, gas and coal); National Solar Jobs Census 2020 (solar); 2020 U.S. Energy & Employment Report (wind); Net-Zero America: Potential Pathways, Infrastructure, and Impacts, interim report

Transforming the nation's power grid might expand the workforce in energy sectors by 30% in the next decade, providing opportunities to offset job losses in fossil fuels through policy and training programs.

Excerpt

SENATE APPROPRIATIONS COMMITTEE, ENERGY AND WATER DEVELOPMENT
SUBCOMMITTEE HEARING REVIEW OF THE FY2022 BUDGET SUBMISSION FOR
THE DEPARTMENT OF ENERGY

JUNE 23, 2021

SEN. JOHN KENNEDY, R-LA., RANKING MEMBER

WITNESSES:

JENNIFER GRANHOLM, SECRETARY OF ENERGY

KENNEDY: Thank you, Madam Chair. You can probably guess from my opening comments, Madam Secretary, I see the climate as a discrete scientific issue. I think it's a mistake to approach it with too much emotion. Passion is good, but not when it interferes with your judgment.

I've got a couple of - of 30,000 foot question, feet questions. How much money in public and private dollars does the department think it would make - it would take to make the world carbon neutral?

GRANHOLM: I don't have a number for that, but probably a lot.

KENNEDY: Hundreds of trillions of dollars, do you think?

GRANHOLM: It would be a lot, for sure.

KENNEDY: Okay. How much money, in public and private dollars - dollars, does the department think it would take to make the United States carbon neutral?

GRANHOLM: Again, it would be a lot.

KENNEDY: Hundreds of trillions?

GRANHOLM: I don't know about hundreds of trillions, but it would be a lot of money.

KENNEDY: It'd be in the trillions.

GRANHOLM: Yes.

KENNEDY: Mid trillions.

GRANHOLM: I don't know.

KENNEDY: I understand. Here's my question, to make the United States carbon neutral based on the administration's plans, I think

it would be fair to say it's going to cause displacement, major displacement. Now I don't use that in a - in a - in a pejorative sense, I think that's just an accurate description. It's going to change our economy dramatically.

Many people are going to gain - many people are going to lose, and that's what I mean by displacement. If we, today, spent these, to be fair, tens of trillions of dollars that I think many members of the administration would like to spend and make the United States of American carbon neutral and nobody else has our - our aggressive - ups our aggressive approach, and they only make modest gains in CO2 emissions, how much is it going to lower the world temperature and how much is - of it - how much - how much are we going to reduce carbon emissions?

GRANHOLM: I want to say that the administration has a really firm commitment to communities to be able to take advantage of the economic opportunity (inaudible)...

KENNEDY: I know, Madam Secretary. Forgive me for interrupting, but we both know now, I'm - I'm - I'm really - want to try to probe your mind here. We both know this is going to cause major displacement. Let's don't kid each other. You're not going to turn coal miners into coders overnight, and you're not going to turn fossil fuel workers into solar experts overnight, and there not as many solar jobs as there are oil and gas, so I don't want to get off into that.

And I'm not trying to be critical of the administration, but I - these are important questions. If we - if we become carbon neutral and we don't get cooperation from China and India, what have we - what have we accomplished?

GRANHOLM: The goal is to get cooperation from China and India.

KENNEDY: I know, but what if they don't?

GRANHOLM: Well...

KENNEDY: What if we go spend these tens of trillions of dollars in President Xi Jinping, the people of China are wonderful people, by the way. President Xi (inaudible), we know that. The Communist Party, they're gangsters. What - what if they - what - I mean, they probably built a coal power - a coal powered power plant while we - you and I have been talking. What have we achieved?

GRANHOLM: The administration has a strategy to make sure that all of our - all of the people who have signed onto this Paris agreement meet the goals that they have articulated, and that means working with allies, and that means...

KENNEDY: I - I get it, I get it.

GRANHOLM: ... (inaudible) strategy...

KENNEDY: And that's fair, but I'm asking a very practical question. My son, who I love dearly, has a strategy to have his dad buy him a 9/11 Targa Porsche, it's not going to happen. And I'm raising a very legitimate question, I think. If we spend these trillions of dollars and we go through all this displacement and we don't get cooperation from China and India, what - what - what - is the pain worth the gain, and how do we know?

GRANHOLM: I would say we have a strategy to get those countries on board. And if we don't pursue this strategy, what then? Then you have climate disasters that are upon us. California is now - could be on fire again this summer. And if we don't take action, then where are - where is - where are we with respect to the other disasters. So we have to approach our allies --

(CROSSTALK)

KENNEDY: Let me ask you one last question. I get it. I get it. If I -- if you can indulge me, Madam Chair, if we spent all the money that the Biden administration wants to spend, let's take in its current infrastructure bill to reduce CO2 admissions. What percentage of the increase in carbon admissions worldwide, not the United States, is going to be reduced?

GRANHOLM: The -- all of these countries have signed on. All of them have.

KENNEDY: No, I'm talking about -- I know and you're trusting them.

GRANHOLM: Well, no, verified.

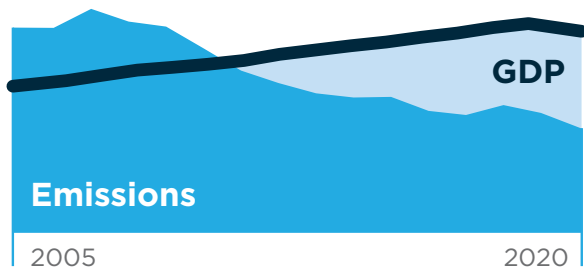
KENNEDY: But I believe -- I believe in metrics.

GRANHOLM: Yes.

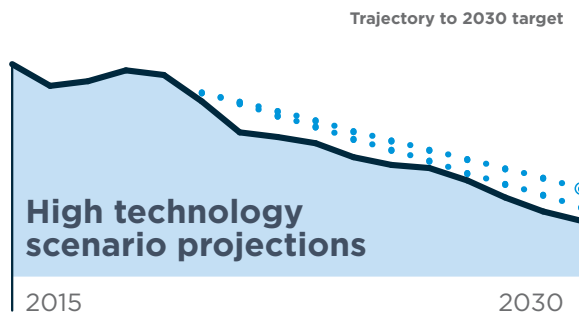
At a glance - Australia's achievements

Australia has reduced emissions and met its 2020 target while keeping the economy strong, and this will continue.

We have reduced emissions by over 20% since 2005, while our economy grew by 45%. Our emissions have fallen 1.6% per year on average since 2010, even as global emissions have increased by 1.4% per year.



Through technology we are on track to beat our 2030 target



And we have become a leader in low emissions technology.

\$35 billion
Investment in renewable energy since 2017

We adopt low emissions tech **8 times faster** than the global average for new renewable energy installations in 2020

Over 1 in 4 Australian homes have solar panels; the world's highest uptake

We are building **three of the world's largest hydrogen electrolysers**

90% of commercial solar cells globally use Australian technology

Snowy 2.0 is the largest energy storage project in the southern hemisphere

At a glance – Australia’s Plan



Driving down technology costs

Unlocking growth of priority technologies by driving down costs:

- Clean hydrogen
- Ultra low-cost solar
- Energy storage
- Low emissions steel and aluminium
- Carbon capture and storage
- Soil carbon

Emerging technologies, such as livestock feed to reduce methane emissions



Enabling deployment at scale

Incentivising businesses to adopt low emissions technologies

Building voluntary carbon markets

Helping consumers with information, knowledge sharing and certification

Building essential infrastructure such as Snowy 2.0, EV charging networks and expanded electricity transmission networks

Planning to ensure the right infrastructure is in place as sectors decarbonise

Aligning efforts with the states and territories through bilateral support agreements and energy market reforms



Seizing opportunities in new and traditional markets

Expanding markets for minerals & metals that will be needed in low emissions economies, such as copper, nickel and lithium

Building a clean hydrogen export industry and shaping global certification standards

Exporting low emissions fuels, including LNG and uranium

Realising opportunities for low emissions manufacturing and clean energy equipment and services

Growing our agricultural sector and communities

Building our workforce by investing in skills and training

Continuing to invest in our regional communities



Fostering global collaboration

Building International partnerships to accelerate innovation and drive investment

Engaging through multilateral technology initiatives

Establishing a high integrity Indo-Pacific Carbon Offset Scheme

At a glance – Australia’s investments and institutions

AUSTRALIA’S TECHNOLOGY-LED APPROACH



Over \$1.4 billion committed to the **Australian Renewable Energy Agency (ARENA)** over the next 10 years, with an additional \$75 million allocated to low emissions technologies like EV charging



\$2.5 billion for projects through the **Emissions Reduction Fund** - Australia's carbon offset scheme - and \$2 billion for further abatement through the **Climate Solutions Fund**



The **Clean Energy Finance Corporation (CEFC)** is investing \$10 billion to catalyse private sector investment in low emissions technology



Over **\$1.2 billion** committed to supporting clean hydrogen so far, including up to **7 Clean Hydrogen Industrial Hubs**



Over \$300 million for **Carbon Capture Use and Storage (CCUS)** hubs and technologies



Investing with our partners overseas, including \$565 million for **international low emissions technology partnerships**



\$280 million to support industrial facilities to further reduce emissions using the new **Safeguard Crediting Mechanism**

The **Technology Investment Roadmap** will guide more than **\$20 billion** of government investment in low emissions technology to 2030

More than **\$80 billion** leveraged from government and private sector by 2030 | **160,000 jobs** in low emissions technology by 2030

EXECUTIVE SUMMARY

Australia's whole-of-economy Long-Term Emissions Reduction Plan (the Plan) sets out how Australia will achieve net zero emissions by 2050. The Plan is focused on 'the how', on practical action to convert ambition into achievement, because a target without a plan is meaningless.

We will achieve net zero emissions by 2050 in a practical, responsible way that will take advantage of new economic opportunities while continuing to serve our traditional export markets. This Plan does not rely on taxes and it will not put industries, regions or jobs at risk. No Australian jobs will be lost as a result of the Commonwealth Government's actions or policies under the Plan.

Our Plan is the right one for Australia. It does not impose new costs on households or businesses. At its core, it recognises that reducing the cost of low emissions technologies is key to unlocking widespread deployment, and that global technology trends will drive demand shifts at home and abroad. It will not raise the price of our energy or reduce the competitiveness of our export industries.

Our Plan will create the enabling environment for investment in Australia, which will ensure regional communities can capture the opportunities of the new energy economy and unlock new sources of growth. It will not shut down coal or gas production or require displacement of productive agricultural land. Australia will remain a trusted commodity producer and a leading energy exporter. We will continue to meet the needs of our customer countries overseas, particularly in our Indo-Pacific region.

Our Plan is the best economic choice for Australia. Our modelling shows it will increase our national income per person by almost \$2,000¹ in 2050 compared to a 'no policy change' scenario. By regularly reviewing our Plan, we will allow for future advancements in technology and avoid locking in high costs now. The Plan and its technology investments build on our long commitment to global action on climate change and working with our allies to reduce global emissions.

Our Plan recognises that acting to reduce emissions is in our national interest. If we don't act, decisions by customer countries will impact our traditional exports, costing jobs and exports. Failing to act increases the risk Australian businesses will face a higher cost of capital. By setting out a Plan to achieve net zero emissions by 2050, Australia can build on our existing industries and supply chains and capitalise on new export opportunities, protecting regional industries and the jobs and livelihoods they support.

Australia has a track record we can be proud of. Australia has reduced emissions by 20% between 2005 and 2020, with our emissions per capita falling by 36%.^{2,3} However, our economy (real GDP, chain volume measures) has grown by 45% over the same period, with GDP per capita increasing by 14%. Our latest projections show that under a Technology Investment Roadmap-aligned scenario, Australia will reduce emissions by up to 35% by 2030. Our Plan builds upon this record of success.

Our Plan is based on five key principles, with an enabling role for government. These principles are:

1. **Technology not taxes** – no new costs for households or businesses,
2. **Expand choices, not mandates** – we will work to expand consumer choice, both domestically and with our trading partners,
3. **Drive down the cost of a range of new energy technologies** – bringing a portfolio of technologies to parity is the objective of Australia's Technology Investment Roadmap,
4. **Keep energy prices down with affordable and reliable power** – our Plan will consolidate our advantage in affordable and reliable energy, protecting the competitiveness of our industries and the jobs they support, and
5. **Be accountable for progress** – transparency is essential to converting ambition into achievement. Australia will continue to set ambitious yet achievable whole-of-economy goals, then beat them, consistent with our approach to our Kyoto-era and Paris Agreement targets.

The Government's technology based approach provides Australia with a pathway to net zero by 2050 that protects and strengthens our economy. Achieving the Technology Investment Roadmap economic stretch goals, coupled with global trends like electrifying transport, will put us within range of net zero emissions by 2050, while supporting existing industries, creating new jobs and export opportunities from low emissions technologies, and ensuring the ongoing prosperity of our regions.

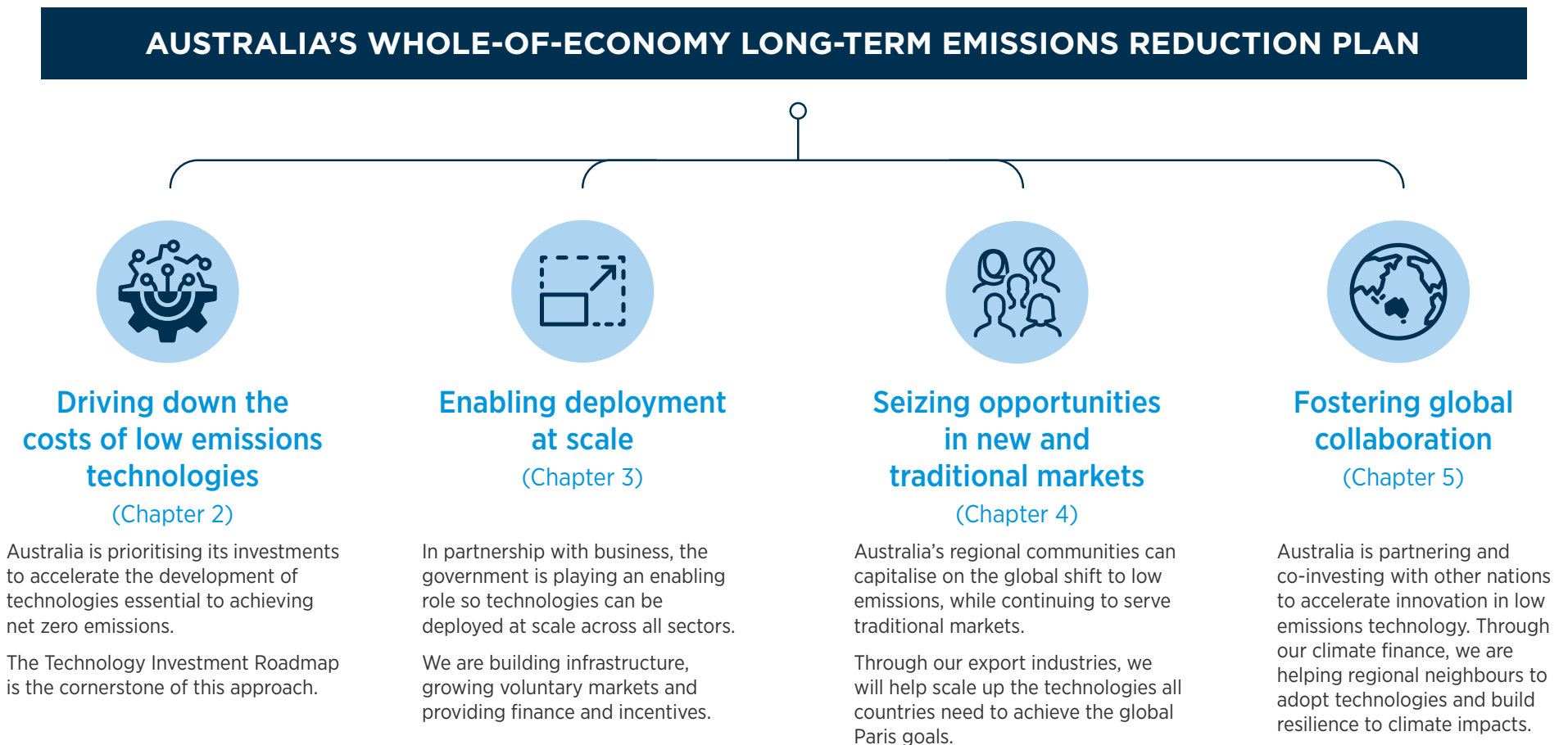
Modelling undertaken for our Plan confirms it is the right plan for Australia. We estimate that more than 100,000 new jobs could be created in industries including critical minerals, clean hydrogen, renewable energy, green steel and alumina, many in Australia's regions. Australia's export-oriented sectors are projected to grow significantly in aggregate, with the value of Australian exports more than tripling between 2020 and 2050.

Our Plan is structured in six chapters:

1. Australia's approach and principles

Our Plan has the wellbeing and prosperity of Australia's regional communities at its core. It will not impose new costs on households, businesses or the broader economy. Our actions under the Plan will not lead to job losses or place burdens onto regional communities (Figure ES.1).

Figure ES.1 Australia's Whole-of-Economy Long-Term Emissions Reduction Plan



Analysis to inform our Plan was commissioned from the Department of Industry, Science, Energy and Resources (DISER) and McKinsey & Company (McKinsey). This analysis shows that achieving the Technology Investment Roadmap stretch goals, coupled with other emerging global trends like electrification of transport, can reduce Australia's emissions by as much as 85% by 2050. Our Plan, with additional priority technologies over time, will close the gap.

We are already making the investments now to achieve this. The Government will invest more than \$20 billion in low emissions technologies by 2030, helping to secure over \$80 billion in total investment from the private sector and state governments.

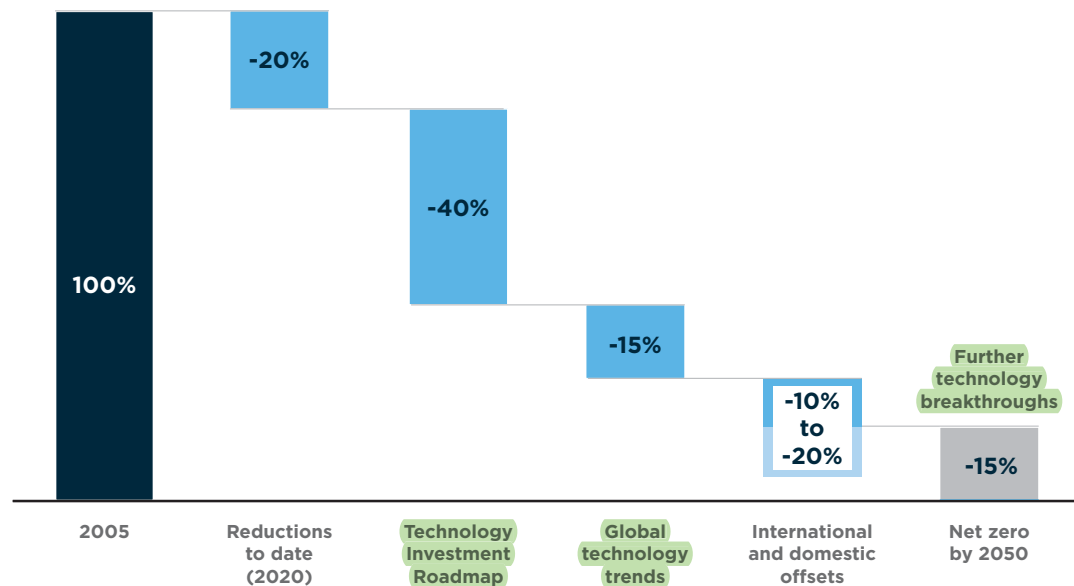
Technology will evolve over the next three decades in ways that we can't yet imagine. This has been the lived experience with technologies like solar and batteries, where cost reductions have consistently exceeded forecasts. Trying to solve for every tonne of abatement now is not the right approach. Instead, our Plan sets our economy on a path to deliver a high percentage of the abatement needed without locking in high costs, and puts in place the right settings to adapt and refine our Plan as new technology options open up.

2. Driving down the costs of essential low emissions technologies

Affordable low emissions technologies are key to Australia achieving net zero emissions by 2050. The technologies prioritised through Australia's Technology Investment Roadmap can deliver approximately half the emissions reductions needed to achieve net zero emissions (Figure ES.2).

- Our priorities are:
- energy storage for firming
 - carbon capture and storage
 - clean hydrogen
 - low emissions steel
 - soil carbon.
 - ultra low-cost solar
 - low emissions aluminium

Figure ES.2 Priority technology contribution to meeting Australia's net zero by 2050 goal



*Source: Based on McKinsey and DISER analysis. *Sources of offsets include voluntary soil carbon of up to 20%, depending on cost reductions in technology and voluntary demand.*

The Technology Investment Roadmap is expected to guide at least \$20 billion of Australian Government investment in low emissions technologies over the decade to 2030. The forthcoming LETS 2021 will examine deployment pathways for these priority technologies to ensure we meet our ambitious economic stretch goals.

2.3 Priority low emissions technologies

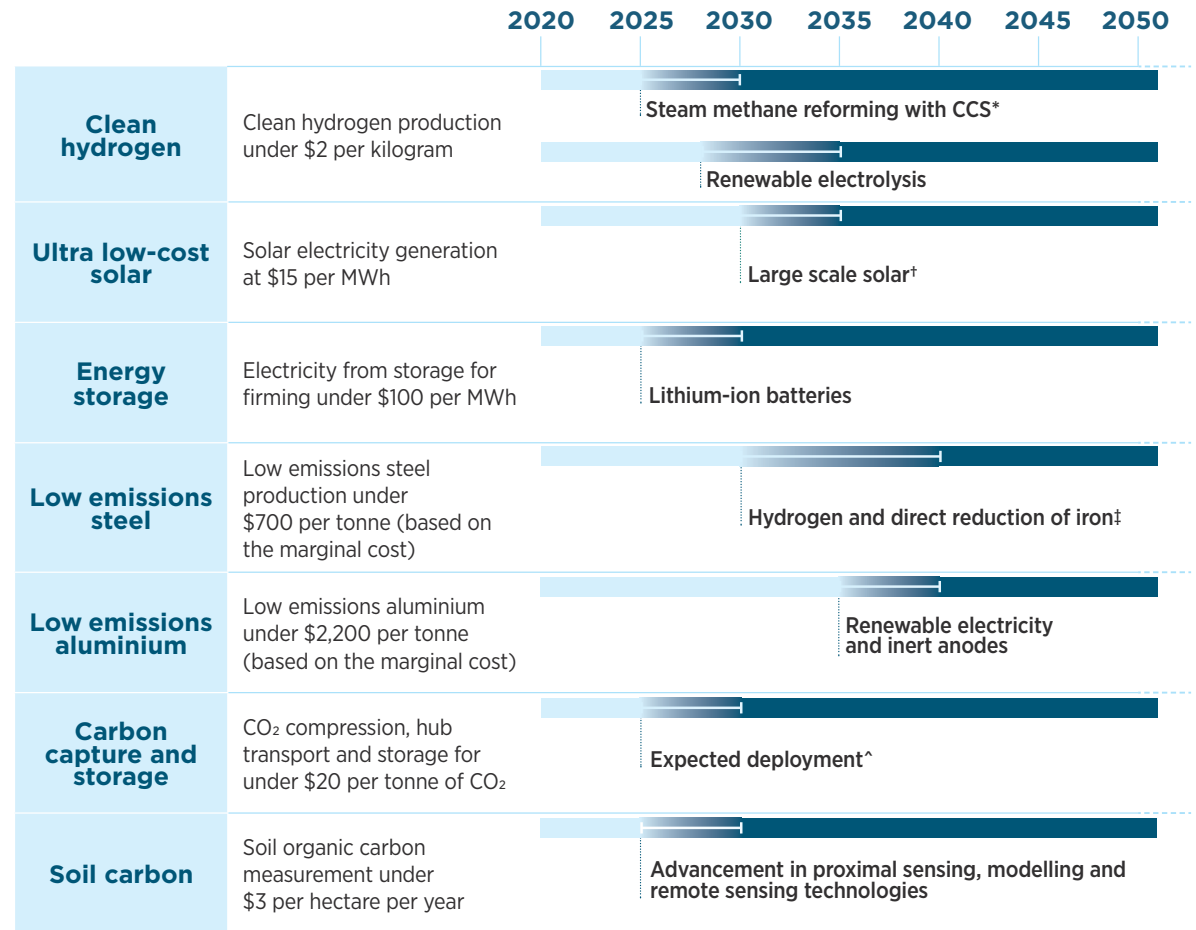
LETS 2020 and the forthcoming LETS 2021 have identified six priority low emissions technologies:

- clean hydrogen
- ultra low-cost solar
- energy storage for firming
- low emissions materials (steel and aluminium)
- carbon capture and storage
- soil carbon.

The statements have set ambitious but realistic economic stretch goals for each priority technology (Figure 2.4). The stretch goals aim to bring the priority technologies to cost parity with existing high emissions technologies.

The forthcoming LETS 2021 will examine deployment pathways for these priority technologies, with a focus on identifying cost reduction opportunities that would help achieve the economic stretch goals.

Figure 2.4 Priority technologies and economic stretch goals



* economically feasible now, but subject to offtake agreements, development approvals and the adoption of a hydrogen Guarantee of Origin scheme.

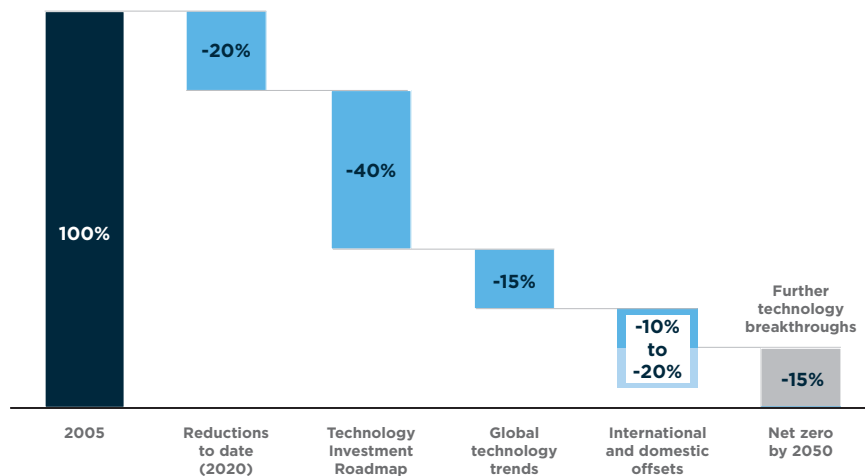
† the timeframe for achieving the ultra low-cost solar stretch goal does not yet underpin the electricity price assumptions used for achieving clean hydrogen, energy storage, and low emissions steel and aluminium stretch goals

‡ economically viable in the late 2020s, but subject to capital development cycles

^ subject to offtake agreements and development approvals

Analysis for this Plan shows that, if Australia is successful in realising its technology agenda, these technologies could unlock almost half of the abatement needed to achieve net zero emissions by 2050 (Figure 2-5). These technologies will also underpin further emissions reductions from global technology trends like EVs powered by zero emissions electricity or fuels.

Figure 2.5 Priority technology contribution to Australia achieving net zero emissions



Source: Based on McKinsey and DISER analysis. *Sources of offsets include voluntary soil carbon of up to 20%, depending on cost reductions in technology and voluntary demand.

2.3.1 Clean hydrogen

Stretch goal: Clean hydrogen production under \$2 per kg

Potential for clean hydrogen

Australia is set to become a world-leading clean hydrogen producer and exporter.

Clean hydrogen will help decarbonise Australia's industry, transport and mining sectors. It can be used across a range of applications including:

- to power vehicles
- to generate heat and electricity
- as an industrial chemical feedstock for products such as ammonia and steel
- to globally trade clean energy.

In the future, clean hydrogen could also help firm the electricity grid as renewables reach very high levels, and provide an important source of controllable energy demand to increase power system resilience.

McKinsey found fuel switching to hydrogen use, particularly across industry and heavy transport, could reduce Australia's emissions by around 50 Mt CO₂-e in 2050.

A future Australian clean hydrogen export industry can also make significant contributions to global emissions reductions, while creating jobs and income for regional communities (Chapter 4). Analysis by McKinsey found that an Australian clean hydrogen export industry providing a low emissions energy source and chemical feedstock for other countries, could drive international emissions reductions growing to almost 100 Mt CO₂-e per year by 2050.

Australian businesses are already mobilising to capture these opportunities. For example, Fortescue Future Industries is targeting 15 Mt year in Australian hydrogen production by 2030, building to 50 per year thereafter.²⁶ It is also exploring how applications like steel and shipping can utilise hydrogen and its derivatives (like ammonia). The Australian Gas Infrastructure Group (AGIG) is investing in hydrogen and other renewable gas technologies with the aim to decarbonise its gas distribution networks as early as 2040, and will offer 100% renewable gas to new home estates by 2025.²⁷

Government actions to unlock clean hydrogen

The Australian Government is working with the states and territories to deliver the National Hydrogen Strategy. The strategy envisions a clean, innovative and safe hydrogen industry that benefits all Australians and where Australia is a major global player by 2030.

The National Hydrogen Strategy has 57 actions that are the first steps to build Australia's hydrogen industry. These actions initially set the foundations for industry growth, ahead of supporting industry scale-up to service international and domestic markets as they emerge. Australia will track our progress and successes under the strategy, and adapt our approach as markets and technologies develop.

All levels of government are acting to deliver the strategy and are taking early actions to overcome the barriers facing the industry. So far, the Australian Government has:

- built international relationships, including major announcements on hydrogen cooperation with Germany, Japan, Singapore and the UK to build supply chains and advance technology research
- developed a domestic Hydrogen Guarantee of Origin scheme and helped shape the design of international methodologies for measuring hydrogen production emissions
- announced hydrogen funding programs, such as \$464 million for the 'Activating a Regional Hydrogen Industry: Clean Hydrogen Industrial Hubs' program (Box 2.2)
- invested over \$300 million to support development of CCS and CCUS projects
- awarded over \$100 million to three 10 MW hydrogen electrolyser projects through ARENA
- fostered industry innovation, collaboration and knowledge sharing
- provided more than \$300 million in funding for research, development and demonstration activities.

The Government has already committed more than \$1.2 billion to building an Australian hydrogen industry.

State and territory governments are also helping to develop the hydrogen industry by implementing the National Hydrogen Strategy and their own hydrogen strategies. Together, the federal, state and territory governments have:

- started a review of legal and regulatory frameworks
- started an accelerated review of arrangements supporting blending of hydrogen into gas networks
- started the National Hydrogen Infrastructure Assessment
- commenced work on industry development, including skills and training
- supported analysis to help understand community attitudes towards hydrogen.

In addition, state and territory governments are undertaking activities in their jurisdictions to support the hydrogen industry, including:

- announcing funding for pilots, trials and demonstrations
- engaging with communities
- committing funding for hydrogen hubs
- supporting industry development
- participating in regional hydrogen technology clusters in partnership with National Energy Resources Australia (NERA)
- supporting trials for hydrogen vehicles and blending hydrogen into gas networks.

Through the forthcoming LETS 2021, the Australian Government will commit to develop a voluntary zero emissions gas market in Australia. This will increase early demand for clean hydrogen and other zero emissions gases and recognise consumers' voluntary purchase of zero emissions gas. Certification and standards (such as the Hydrogen Guarantee of Origin scheme) will provide the necessary transparency and traceability for this market.

Box 2.2 Clean Hydrogen Industrial Hubs

The Australian Government has announced \$464 million over five years from 2021–22 for the Activating a Regional Hydrogen Industry: Clean Hydrogen Industrial Hubs program. This includes funding to support the early design works of hydrogen hubs, of which an estimated \$30 million is available for Hydrogen Hub Development and Design Grants.

Hydrogen hubs will create economies of scale to drive down costs of production, unlocking further demand for hydrogen as costs fall. Hubs will also create efficiencies by leveraging and supporting the existing industrial capabilities and workforces in relevant regions. Hubs will stimulate innovation and increase workforce skills development, as well as support other existing industrial sectors in these regions to lower both emissions and costs in doing business.

The hubs will support direct and indirect employment in Australia's regions. This includes technicians, tradespeople, engineers and professionals associated with hydrogen production and export. Hubs could also create local manufacturing jobs associated with low-carbon products such as ammonia, fertiliser, steel and aluminium.

Australia's hubs program will build our potential to supply domestic users and international trading partners with low-cost clean energy, and will help to capitalise on global interest in investing in Australian hydrogen opportunities.

2.3.2 Ultra low-cost solar

Stretch goal: solar electricity generation at \$15 per megawatt hour (MWh)

Potential for solar

Cheap, clean electricity is integral to lowering emissions in the electricity sector and other industries in Australia. Australia has some of the best solar resources in the world, giving it a comparative advantage in utilising solar to supply clean electricity.

Australia is already experiencing high levels of investment in both grid-scale and rooftop solar. Australia has the highest solar capacity per person in the world,²⁸ and over 1 in 4 Australian homes now have rooftop solar. Solar contributed almost 10% of Australia's electricity generation in 2020 and is projected to contribute 27% in 2030.²⁹

Lived experience shows there is an exponential relationship between falling technology costs and deployment. Despite significant research and deployment efforts since the early 1970s, it took until 2002 to deploy the first gigawatt (GW) of solar globally. Over the following decade 100 GW were deployed. By the end of 2022, more than 1000 GW of solar will have been deployed globally.

There is the potential for continued technology advances and breakthroughs to unlock ultra low cost solar. This would further reduce costs and emissions from Australia's electricity and help deliver the world's lowest cost clean electricity.

Reducing the costs of solar generation will also unlock the economic, employment and abatement potential of other priority low emissions technologies. Clean electricity at \$15 per MWh would enable low-cost clean hydrogen production and increase our competitiveness in hydrogen export markets. It would also support cost-competitive production of low emissions steel and aluminium and emerging technologies like direct air capture of CO₂.

Modelling for the Plan shows that, if we can realise these cost reductions, solar could become the single largest source of Australia's electricity generation by 2050 (over 50% of total generation). Unlocking ultra low-cost solar is therefore crucial for Australia's electricity system to achieve near zero emissions.

Government actions for solar

ARENA, the CEFC and other Australian institutions will remain at the front line in developing solar technologies. They will build on their strong success in leading solar breakthroughs and deployment. To date, ARENA has provided \$252 million since 2015 towards solar research, design and development (RD&D) to projects with a total value of \$1.7 billion. The CEFC has committed over \$1.1 billion towards large-scale solar projects with a total generating capacity of over 1.6 gigawatts (GW).

To support innovations in this area, the Australian Government has set an objective to achieve 30% module efficiency at 30 cents per installed watt by 2030 – the ‘Solar 30 30 30’ Initiative. Led by ARENA, the initiative will help drive down costs to meet the stretch goal for the newly prioritised technology.

ARENA, alongside other research institutions like the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the Australian Research Council, are also investing across a range of early-stage solar projects. These agencies have supported the world-leading Australian Centre for Advanced Photovoltaics headquartered at the University of New South Wales, where researchers have led solar breakthroughs and developed the passivated emitter rear cell (PERC) technology used in 90% of global solar production. ARENA is also supporting the commercialisation of an Australian National University patented technology enabling simpler, safer and cheaper fabrication of next-generation silicon solar cells.

ARENA and the CEFC have worked together to support early movers in large scale solar, helping de-risk the technology and generating lessons for industry growth. ARENA’s \$90 million Large-Scale Solar Round funded 12 projects, with 2 further projects signing up to ARENA’s knowledge-sharing obligations. To provide financial certainty, the CEFC offered long-term debt finance to 8 of these projects, alongside ARENA’s grant funding. These investments unlocked almost \$1 billion of investment in the projects and laid the foundations for further large-scale solar deployment.

The Australian Government has also committed \$68.5 million to the Reliable Affordable Clean Energy (‘RACE for 2030’) Cooperative Research Centre (CRC), which is focused on opportunities arising from low-cost renewable energy, network integration and smart energy management. Its research is aiming to:

- reduce energy costs
- cut carbon emissions
- increase customer load flexibility to allow increased penetration of renewables in the grid and increased reliability.

2.3.3 Energy storage

Stretch goal: electricity from storage for firming under \$100 per MWh

Potential for energy storage

Energy storage technologies are essential for Australia to shift to lower emissions electricity systems.

Capturing the full potential of Australia’s renewable energy resources requires storage that can dispatch clean electricity on demand and provide critical system security services. Analysis for the Plan found that low-cost storage could enable a step change in the share of variable renewable generation, unlocking new opportunities for energy intensive exports.

The most pressing need for storage is for durations of several hours to manage daily variations in solar and wind output. But longer duration ‘deep storage’ technologies, along with expanded transmission networks, will also be needed as very high shares of renewables enter Australia’s electricity grid. These will be required for seasonal storage and to mitigate the risk of weather events that last for days or weeks

Government actions for energy storage technologies

The Government is supporting emerging battery technologies through ARENA, the CEFC and other programs by:

- increasing access to capital to deploy early-stage, innovative technologies in Australia
- funding feasibility studies and demonstration projects
- supporting research to identify development opportunities in the battery supply chain.

For example, ARENA, the CEFC and the South Australian Government have co-invested up to \$73 million towards expanding the Neoen Hornsdale Power Reserve. The Hornsdale Power Reserve is already the largest battery in the southern hemisphere, and this investment has increased its capacity by 50%. This will enhance the battery’s ability to stabilise the grid, reduce the risk of blackouts and limit price volatility. The CEFC is also investing \$160 million in a 300 MW Victorian Big Battery (VBB), providing a critical boost to the state’s grid security while driving down power prices and supporting more renewable energy.

ARENA supports innovative battery projects such as a 30 MW grid-connected battery in Ballarat, Victoria. Capable of powering 20,000 homes for an hour, the battery will store energy when demand is low and use it during peak times. It will also examine other grid services like frequency control ancillary services. This project will demonstrate how batteries can provide grid stability and support on a congested transmission terminal, reducing the need to expand the substation.

ARENA, the CEFC and the Northern Australia Infrastructure Facility have also invested in the 250 MW Kidston Pumped Hydro Project in Queensland, an innovative project that will repurpose an abandoned gold mine site as a storage reservoir. These projects complement other pumped hydro investments, including the Snowy 2.0 and Battery of the Nation projects (Section 3.2).

The Australian Government has contributed around \$300 million in battery-related research and development since 2015, including providing \$25 million in funding for the Future Battery Industries Cooperative Research Centre (FBICRC). Established in 2019, the FBICRC is driving collaboration across industry and research organisations through an ambitious six year R&D program targeting all segments of the battery value chain.

2.3.4 Low emissions materials – steel and aluminium

Stretch goal: low emissions steel production under \$700 per tonne and low emissions aluminium production under \$2,200 per tonne

Potential for low emissions materials

Low emissions technologies for steel and aluminium will provide a decarbonisation pathway for these globally significant but hard-to-abate sectors.

Decarbonising metal production has two parts:

- decarbonisation of the energy used in smelting
- reducing emissions from the chemical process of converting ore to metal.

Unlocking these technologies will help reduce Australian emissions. Modelling for the Plan projects that, by adopting new technologies, emissions from Australian steel production could fall by over a third by 2050, even as production volumes increase by about two-thirds. McKinsey's analysis suggests that even deeper reductions are possible if we can achieve substantial cost reductions for clean hydrogen and other technologies, with the potential to eliminate nearly all emissions from Australian steel production by 2050.

For aluminium, our modelling projects that emissions per unit of output could fall by around 60% while production and export volumes more than double. McKinsey's analysis shows with technology improvements could enable a 30% reduction in non-electricity emissions associated with aluminium and upstream alumina processing by 2050. Coupled with a deep reduction in Australia's electricity emissions, this has the potential to dramatically reduce emissions from production of these materials.

Unlocking these technologies would also reduce global emissions, as production of steel and aluminium together account for between 4 and 5 Gt CO₂-e worldwide.³⁰ Australia is well placed to help reduce these emissions by meeting growing future export demand for low emissions steel and aluminium, given our potential to draw on affordable firm renewable electricity and clean hydrogen.

Government actions to support low emissions materials

Low emissions steel and aluminium production will become attractive in Australia as the costs of firm renewable electricity and clean hydrogen fall. By driving down costs of clean hydrogen (Section 2.3.1), solar (Section 2.3.2) and energy storage (Section 2.3.3), the Government is laying the foundations for low emissions material manufacturing.

Funding and financing for low emissions materials are available through Australia's Cooperative Research Centres Program, ARENA and the CEFC. The Government, industry and universities are investing more than \$200 million towards the Heavy Industry Low-carbon Transition Cooperative Research Centre.³¹ The CSIRO is also investing in low emissions materials. It has developed an innovative self-sustaining pyrolysis process to produce 'designer biochar', which could be used to make high-end 'carbon lite' steel.³²

As the largest producer of both iron ore and bauxite (most of which is exported in the form of alumina³³), Australia is also focused on technologies that can reduce upstream supply chain emissions. CSIRO is investigating processes that improve iron ore quality and reduce energy consumption and emissions in ironmaking processes. ARENA is investigating if hydrogen and concentrated solar thermal energy can be used in alumina production, a process responsible for 14 Mt CO₂-e in 2020.

2.3.5 Carbon capture and storage (CCS) and carbon capture, use and storage (CCUS)

Stretch goal: CO₂ compression, hub transport and storage for under \$20 per tonne of CO₂

Potential for CCS and CCUS

Large-scale CCUS projects can underpin new low emissions industries (including clean hydrogen) and provide a potential decarbonisation pathway for hard-to-abate industries. CCUS is among the most prospective options for mitigating process emissions from many industrial processes including:

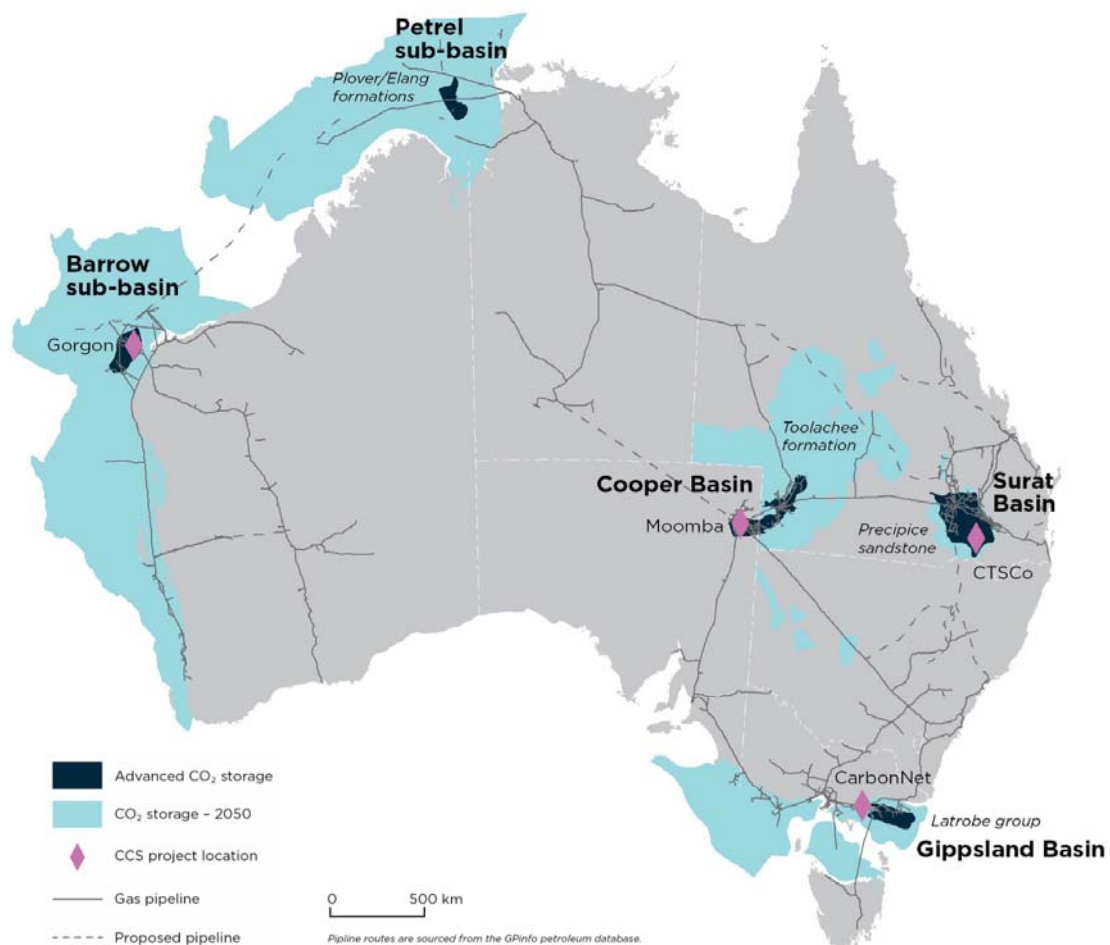
- natural gas processing
- cement production
- steel production
- fertiliser production
- power generation
- hydrogen production from fossil feedstocks.

Australian CCUS projects could also play an important long-term role in negative emissions projects that store CO₂ drawn down from the atmosphere. The Intergovernmental Panel on Climate Change (IPCC) has said negative emissions will be crucial in global efforts to meet the Paris Agreement’s temperature goals.³⁴

Australia’s competitive advantage in CCUS comes from our abundant, world-class geological storage basins. Many of these basins are close to industries producing highly concentrated streams of CO₂ emissions.

The Gippsland, Surat, and Cooper Basins, together with the Petrel and Barrow sub-basins host carbon storage sites at an advanced stage of development, and each have genuine industry interest and support (Figure 2.6). The combined storage capacity at four of these key locations (Gippsland, Surat, and Cooper Basins, and the Petrel sub-basin) is over 20 billion tonnes.³⁵

Figure 2.6 Prospective CO₂ storage sites in Australia



The Australian Government is undertaking further analysis to inform Australia's potential to store CO₂ in our basins as this varies widely depending on basin characteristics and injection rates.

Government actions to support CCUS

Australia is developing a National CCUS Technology Emissions Abatement Strategy to improve policy frameworks and coordinate the deployment of CCUS hubs and technologies. It is also investing an additional \$250 million under the CCUS Hubs and Technologies Program over 10 years from 2021 to support research, development and commercialisation of CCUS technologies.

This builds on the \$50 million CCUS Development Fund announced in 2020, which is supporting technologies including:

- direct air capture and removal
- capture and geological storage from power stations
- capture and use of CO₂ in the production of construction materials.

The Government has invested \$790 million in CCUS and related low emissions technologies since 2008.

The Government has introduced reforms to ARENA and the CEFC to enable funding and investment in CCS. The Government has also introduced a new ERF method to incentivise CCS and has committed to develop a method for CCUS in 2022.

These opportunities are complemented by bilateral partnerships with key trading countries, including Japan and Singapore.

2.3.6 Soil carbon

Stretch goal: soil carbon measurement under \$3 per hectare per year.

Potential for soil carbon

Enriching soil carbon draws CO₂ out of the atmosphere, providing an additional way to offset emissions from hard-to-abate sectors such as agriculture, industry and heavy transport. In the modelling for this Plan, Australian soil carbon projects were estimated as having the potential to provide at least 17 Mt CO₂-e of accredited offsets in 2050, in addition to CO₂ drawn from the atmosphere without accreditation.

Offsets from soil carbon projects provide an additional revenue stream for farmers while improving agricultural productivity and soil resilience. Our modelling found landholders could earn around \$400 million in additional revenue through the sale of accredited soil carbon sequestration in 2050. Some industry estimates suggest a greater soil carbon potential across Australian pasture and cropping lands, which if realised could offer substantially higher revenue for farmers (Box 2.4).

Government actions to unlock soil carbon's potential

The Government is accelerating the deployment of soil carbon measurement technologies through several research and development (R&D) funding mechanisms:

- The \$36 million National Soil Carbon Innovation Challenge will identify and fast-track low-cost, accurate technological solutions for measuring soil organic carbon.
- The \$8 million Soil Carbon Data Program is partnering with scientists, industry, landholders and other stakeholders to provide data that helps develop and validate measurement approaches, and can be used to improve models of soil carbon change.
- The \$20 million National Soil Science Challenge grants program will help identify the best management practices to increase soil carbon and productivity.
- The CSIRO, rural research and development corporations, and the CRC for High Performance Soils are investing in agricultural innovations, including soil measurement.

The Government also provides incentives for soil carbon sequestration through the ERF. Advance payments of up to \$5,000 are available to help with upfront costs of soil sampling. The CER is developing a new soil carbon ERF method that lets projects combine direct sampling with model-based approaches.

The CEFC is also investing in the agricultural technology sector to build the industry's capabilities. This includes a \$1.7 million investment in the Soil Carbon Company, which is developing a microbial treatment for seeds that could increase soil carbon levels, enabling improved water retention and increasing the ability of crops to withstand extreme weather.

The National Soil Strategy is helping farmers and land managers monitor, understand and make better decisions about their soil health, productivity and sequestration potential.

This includes the \$54.4 million National Soil Monitoring and Incentives Pilot to trial new measures to incentivise soil testing and data sharing. This will improve our understanding of Australia's soil condition and how our soil can be better managed. Soil data from land managers will also be used to validate soil carbon modelling and reporting.

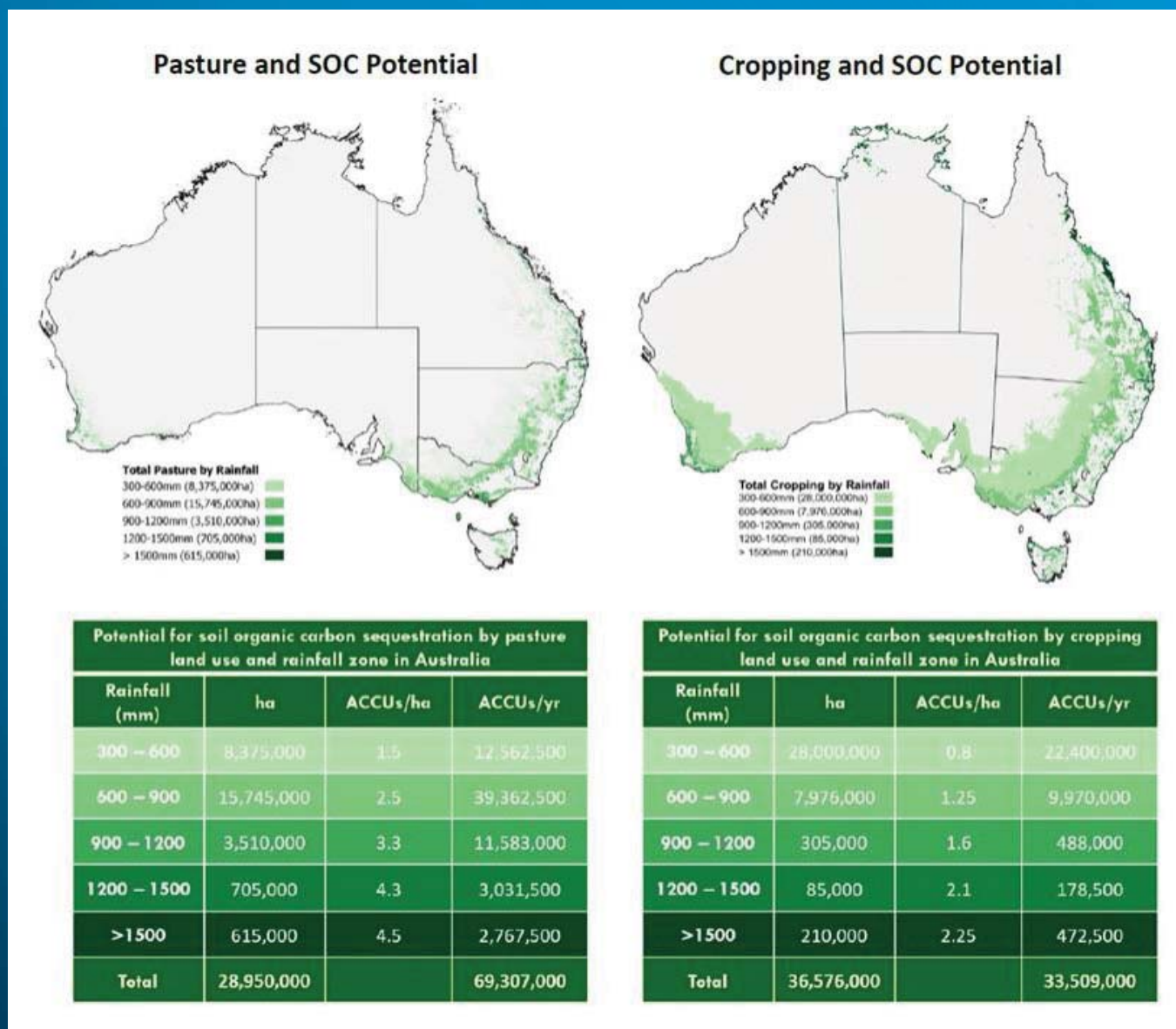
Box 2.4 Potential revenue opportunities for farmers from soil carbon

There is growing interest in increasing soil carbon levels on Australia's agricultural land, and the ERF has recently seen a rapid rise in adoption of soil carbon projects. Many new projects are still at an early stage, so there is limited data available on how much carbon these projects can store across Australia over time.

However, a range of estimates provide indications of the contribution soil carbon projects could make to reducing emissions. The 2020 Low Emissions Technology Statement drew on CSIRO analysis in noting the potential for improved management of one quarter of Australia's crop and grazing lands (including the extensive low-rainfall rangelands) to secure as much as 35-90 million tonnes per annum through soil carbon.

Other estimates indicate the potential could be higher. For example, leading soil carbon project developer Agriprove has conducted detailed analysis of soil carbon sequestration potential on cropping and grazing land across different rainfall zones. Agriprove's analysis indicated the national potential across cropping and grazing land (not including lower rainfall rangelands) could be at least 103 million Australian Carbon Credits Units annually.

Source: Agriprove analysis, www.agriprove.io



First look: American Airlines' new plan for net-zero emissions

[Andrew Freedman](#)

American Airlines is more aggressively leaning into sustainable aviation fuels and [research into new propulsion technologies](#) to reach its goal of net-zero emissions in 2050, the company tells Axios.

What's new: The Fort Worth-based airline gave Axios a first look at new details on how it plans to get to net zero.

Why it matters: Aviation is a growing source of greenhouse gas emissions, and one of the hardest to decarbonize because of the need to develop high-performing engines to run on something other than Jet-A fuel.

Details: The airline's planned reliance on sustainable aviation fuels, which are made from sustainable feedstocks like household solid waste or algae, has increased compared to last year's agenda.

By the numbers: Here's how the airline plans to get to net zero:

- 39% from sustainable aviation fuels (SAFs).
- 17% from next-generation planes.
- 17% from carbon offsets.
- 15% of emissions cuts would come from buying new, more efficient planes to replace older aircraft.
- 9% from air traffic control modernization to enable more efficient flight paths.
- 3% would come from operational efficiency gains.

The bottom line: "The engine makers have really been pushing the barriers and trying to figure out how we can get to 100%" of SAFs in aviation fuel, rather than a 50% blend with traditional aviation fuel, an American Airlines official told Axios.

Go deeper: [The Prius of airplanes](#)

Editor's note: This story has been corrected to note that American Airlines is based in Fort Worth (not Dallas).

<https://www.dec.ny.gov/press/124070.html>

For Release: Wednesday, October 27, 2021

Statement from DEC Commissioner Basil Seggos on Denial of the Title V Permit for Astoria Gas Turbine Power, LLC.

The New York State Department of Environmental Conservation (DEC) today announced the agency's denial of the required Title V air permit for Astoria Gas Turbine Power, LLC., a wholly owned subsidiary of NRG Energy. DEC conducted a comprehensive review of Astoria NRG's application and supporting materials, as well as the more than 6,600 public comments received on the project, before reaching this decision. DEC subjects all applications for environmental permits to an extensive and transparent review process that encourages public input at every step.

Our review determined the proposed project does not demonstrate compliance with the requirements of the Climate Leadership and Community Protection Act. **The proposed project would be inconsistent with or would interfere with the statewide greenhouse gas emissions limits established in the Climate Act.**

Astoria NRG failed to demonstrate the need or justification for the proposed project notwithstanding this inconsistency.

The [full decision is outlined in a letter \(PDF\)](#) by Daniel Whitehead, Director, Division of Environmental Permits, DE

<https://www.dec.ny.gov/press/124069.html>

For Release: Wednesday, October 27, 2021

Statement from DEC Commissioner Basil Seggos on Denial of the Title V Permit for the Danskammer Energy Center

The New York State Department of Environmental Conservation (DEC) today announced the agency's denial of the required Title V air permit for the Danskammer Energy Center located in the town of Newburgh, Orange County. DEC conducted a comprehensive review of Danskammer's application and supporting materials, as well as the more than 4,500 public comments received on the project, before reaching this decision. DEC subjects all applications for environmental permits to an extensive and transparent review process that encourages public input at every step.

Our review determined the proposed project does not demonstrate compliance with the requirements of the Climate Leadership and Community Protection Act. **The proposed project would be inconsistent with or would interfere with the statewide greenhouse gas emissions limits established in the Climate Act.**

Danskammer failed to demonstrate the need or justification for the proposed project notwithstanding this inconsistency.

The [full decision is outlined in a letter \(PDF\)](#) by Daniel Whitehead, Director, Division of Environmental Permits, DEC.

<https://www.governor.ny.gov/news/statement-governor-kathy-hochul-dec-permit-denials>
OCTOBER 27, 2021 Albany, NY

Statement from Governor Kathy Hochul on DEC Permit Denials

"I applaud the Department of Environmental Conservation's **decisions to deny the Title V Permits for the Danskammer Energy Center and Astoria Gas Turbine Power, LLC in the context of our state's clean energy transition.** Climate change is the greatest challenge of our time, and we owe it to future generations to meet our nation-leading climate and emissions reduction goals."

Hertz Invests in Largest Electric Vehicle Rental Fleet and Partners with Seven-Time Super Bowl Champion Tom Brady to Headline New Campaign

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ESTERO, Fla., Oct. 25, 2021 /PRNewswire/ -- As consumer interest in electric vehicles (EV) skyrockets, Hertz today is announcing a significant investment to offer the largest EV rental fleet in North America and one of the largest in the world. This includes an initial order of 100,000 Teslas by the end of 2022 and new EV charging infrastructure across the company's global operations.

In addition, Hertz is teaming up with seven-time Super Bowl champion and entrepreneur Tom Brady to showcase how it is making EV rentals fast, seamless and more accessible, as the company accelerates its commitment to lead the future of mobility and travel.

"Electric vehicles are now mainstream, and we've only just begun to see rising global demand and interest," said Hertz interim CEO Mark Fields. "The new Hertz is going to lead the way as a mobility company, starting with the largest EV rental fleet in North America and a commitment to grow our EV fleet and provide the best rental and recharging experience for leisure and business customers around the world."

Today, 40 percent of U.S. consumers say they are likely to consider an electric vehicle the next time they are in the market for a new vehicle, according to Pew. Global EV sales skyrocketed 200 percent in the last year and will likely continue to grow with commitments from global automakers to increase EV sales. For example, in August, three U.S. automakers pledged to boost EV sales to 40-50 percent by 2030.

The growth is powered by electric vehicles' high efficiency, positive user experience and climate change benefits – coupled with battery breakthroughs and rapidly expanding charging networks. EV drivers also benefit from lower maintenance and fuel costs.

Beginning in early November and expanding through year end, customers will be able to rent a Tesla Model 3 at Hertz airport and neighborhood locations in U.S. major markets and select cities in Europe. To learn more, visit hertz.com/ev.

Hertz also is installing thousands of chargers throughout its location network. Customers who rent a Tesla Model 3 will have access to 3,000 Tesla supercharging stations throughout the U.S. and Europe.

Hertz will offer a premium and differentiated rental experience for the Tesla EVs. This includes digitized guidance to educate customers about the electric vehicle to get them on their way quickly, and coming soon, an expedited EV rental booking process through the Hertz mobile app.

With the current order, EVs will comprise more than 20 percent of Hertz global fleet and is expected to be supported by a combination of Level 2 and DC fast charging in approximately 65 markets by the end of 2022 and more than 100 markets by the end of 2023. Hertz said these ambitions could be affected by factors outside of Hertz's control, such as semiconductor chip shortages or other constraints.

"Hertz, Let's Go!" with Tom Brady

To spread the word about its leadership on EV rentals, Hertz is partnering with seven-time Super Bowl champion Tom Brady for a new "Hertz, Let's Go!" campaign.

Two new ads – "Plugged In" and "Speed" – beginning today show Brady renting, recharging and using an EV at a Hertz airport location. The spots use humor and Brady's signature "Let's Go" game-day rallying cry to underscore Hertz's reputation for excellence, speed and ease throughout the travel experience.

"Hertz is changing the game when it comes to the future of mobility and has come through for me time and time again," said Tom Brady. "Although the company has been around for over 100 years, their constant evolution, especially now, is something that is amazing to be a part of. I've been driving an EV for years and knowing Hertz is leading the way with their electric fleet speaks to how the world is changing and the way companies are approaching being environmentally and socially conscious. I've always loved how easy and convenient Hertz makes it for me when I'm traveling to my favorite places like New York, LA and Tampa and can't wait to see what they continue to have in store."

The New Hertz

Hertz is combining its brand strength and global fleet management expertise with new technology and innovations to chart a dynamic, new course for travel, mobility and the auto industry. The company's commitment to becoming an essential component of the modern mobility ecosystem includes Hertz leading in electrification, shared mobility and a digital-first customer experience.

Today's investment in electric vehicles builds on Hertz's pioneering work in its rental operations during the past decade. Hertz was the first U.S. car rental company to introduce EVs to its rental fleet in 2011 and the first to implement a wireless charging system for electric vehicles. The company also is the exclusive rental car member of the Corporate Electric Vehicle Alliance, a consortium of companies focused on accelerating the transition to electric vehicles.

About Hertz

The Hertz Corporation, a subsidiary of Hertz Global Holdings, Inc., operates the Hertz, Dollar and Thrifty vehicle rental brands throughout North America, Europe, the Caribbean, Latin America, Africa, the Middle East, Asia, Australia and New Zealand. The Hertz Corporation is one of the largest worldwide vehicle rental companies, and the Hertz brand is one of the most recognized globally. Additionally, The Hertz Corporation operates the Firefly vehicle rental brand and Hertz 24/7 car sharing business in international markets and sells vehicles through Hertz Car Sales. For more information about The Hertz Corporation, visit www.hertz.com.

Japanese Shipping Industry Announces “Challenge of 2050 Net Zero GHG.”

1. The Japanese Shipowners' Association has announced that the Japanese shipping industry will take on the challenge of 2050 net zero GHG at its press conference held on 26 October, with COP26 and IMO MEPC 77 in sight. Following are key comments by Junichiro Ikeda, President of the JSA, at the press conference.

- The world is pressing ahead with initiatives to realise a sustainable society. For the shipping industry, whose field of operations is the world's oceans, the reduction of GHG as a measure to grapple with climate change is an issue of the most vital importance.
- With COP26 in sight, the whole world, including Japan, is moving GHG reduction measures forward aggressively. In the circumstances, the Japanese shipping industry has committed itself to the challenge of 2050 Net Zero GHG as a current and future leader in the global shipping field.
- Through this challenge, Japanese shipping will actively continue to contribute to the preservation of the global environment and believes that active efforts towards GHG reduction will create a new source of competitiveness for the industry.
- Making efforts throughout the whole supply chain, such as research and the development of new ships and new fuels and the establishment of fuel supply facilities, will be needed for 2050 net zero GHG.
- The transition to zero-emission vessels, which will be powered by new fuels such as carbon-recycled methane, hydrogen and ammonia, is essential. For the Japanese merchant fleet, composed of about 2,200 vessels alone, it is thought that an average of 100 ships per year will need to be built, requiring investment in shipbuilding of about US\$10 billion annually for 25 years to 2050.
- In addition, not only efforts by the industry itself but also cooperative actions with relevant industries will be required to take on the challenge of 2050 net zero GHG. Cooperation with a wide range of stakeholders, including the energy industries, the port industry, cargo owners and trading companies as well as the shipbuilding industry, will be indispensable.
- The industry expects the Japanese government to continue to lead discussions at the IMO about the revision of its Initial GHG strategy, set to begin next month, and reduction measures, pledging full support for the government.
- Today, Mr Tetsuo Saito, Minister of MLIT, said that the Japanese government proposed 2050 carbon-neutral target to the IMO and welcomed this JSA's challenge. The JSA feels very

encouraged by the Minister's statement and welcomes it.

- The Japanese shipping industry strives to play an infrastructural role in people's lives and industry in not just Japan but the world as well as a leading role in the activities of the IMO and is working with a wide range of stakeholders in society to achieve overall carbon neutrality. The industry is rising to the challenge of net zero GHG, on the way to attaining a sustainable society. The JSA thanks all stakeholders for their ongoing support, understanding and encouragement.

2. At the press conference, the JSA also published the PR material "Japanese Shipping Industry: The Challenge of 2050 Net Zero GHG." This material explains the industry's efforts and stance towards GHG reduction clearly and is available via the following link.

<https://www.jsanet.or.jp/GHG/pdf/en.pdf>

3. The JSA plans to carry out PR activities in order to foster a better understanding of the Japanese shipping industry's efforts among a wide range of stakeholders and ordinary people.

The video of the press conference and the following lecture about the PR material will be available on the website (only in Japanese).

<https://www.jsanet.or.jp/GHG/index.html>

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https://www.wsj.com/articles/solar-wind-force-poverty-on-africa-climate-change-uganda-11635092219?reflink=share_mobilewebshare

• [OPINION COMMENTARY](#)

Solar and Wind Force Poverty on Africa

Letting us use reliable energy doesn't mean a climate disaster.

By Yoweri K. Museveni

Oct. 24, 2021 2:13 pm ET

Africa can't sacrifice its future prosperity for Western climate goals. The continent should balance its energy mix, not rush straight toward renewables—even though that will likely frustrate some of those gathering at next week's global climate conference in Glasgow.

My continent's energy choices will dictate much of the climate's future. Conservative estimates project that Africa's population of 1.3 billion will double by 2050. **Africans' energy consumption will likely surpass that of the European Union around the same time.**

Knowing this, many developed nations are pushing an accelerated transition to renewables on Africa. The Western aid-industrial complex, composed of nongovernmental organizations and state development agencies, has poured money into wind and solar projects across the continent. This earns them praise in the U.S. and Europe but leaves many Africans with unreliable and expensive electricity that depends on diesel generators or batteries on overcast or still days. Generators and the mining of lithium for batteries are both highly polluting.

This stands to forestall Africa's attempts to rise out of poverty, which require reliable energy. African manufacturing will struggle to attract investment and therefore to create jobs without consistent energy sources. Agriculture will suffer if the continent can't use natural gas to create synthetic fertilizer or to power efficient freight transportation.

A better solution is for Africa to move slowly toward a variety of reliable green energy sources. Wildlife-friendly [minihydro technologies](#) should be a part of the continent's energy mix. They allow for 24-hour-a-day energy production and can be installed along minor rivers without the need for backup energy. Coal-fired power stations can be converted to burning biomass, and carbon capture can help in the meantime. Nuclear power is also already being put to good use in South Africa, while Algeria, Ghana and Nigeria operate research reactors with the intent of building full-scale nuclear facilities.

All this will take time, meaning Africa will have to use fossil fuels as it makes the transition. Natural gas is a greener option that will help the continent reduce emissions even as it grows, as developed nations have done themselves.

Saying any of this meets with backlash from developed nations. Instead of reliable renewables or greener fossil fuels, aid money and development investments go to pushing solar and wind, with all their accompanying drawbacks. And many Western nations have put a [blanket ban on public funding](#) for a range of fossil-fuel projects abroad, making it difficult for Africa to make the transition to cleaner nonrenewables.

In the coming decades my continent will have a strong influence on global warming. But it doesn't now. Were sub-Saharan Africa (minus South Africa) to triple its electricity consumption overnight, powering the new usage entirely by gas, it would add [only 0.6% to global carbon emissions](#).

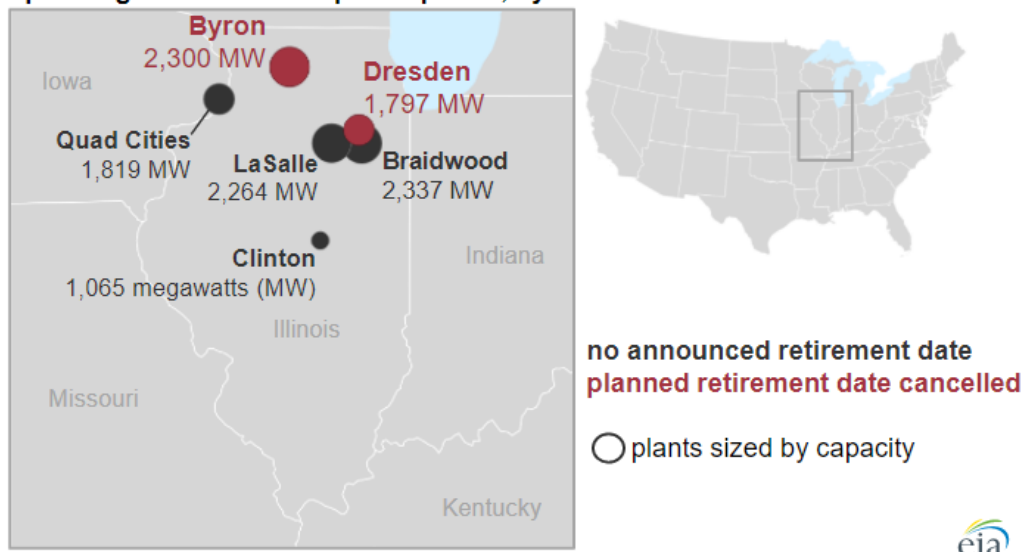
Africans have a right to use reliable, cheap energy, and doing so doesn't prevent the development of the continent's renewables. Forcing Africa down one route will hinder our fight against poverty.

Mr. Museveni is president of Uganda

OCTOBER 28, 2021

[Two nuclear power plants in northern Illinois reversed plans to retire early](#)

Operating Illinois nuclear power plants, by retirement status



Source: U.S. Energy Information Administration, [Preliminary Monthly Electric Generator Inventory](#)

Exelon, the owner-operator of Illinois's six nuclear power plants, recently [announced](#) that the Byron and Dresden nuclear plants will continue operating rather than retire this fall as previously planned. The announcement came after the Illinois state legislature and governor approved a clean energy bill supporting carbon-free energy resources.

[Illinois Senate Bill 2408](#) (S.B. 2408), signed into law on September 15, 2021, aims to transition the state to 50% clean energy by 2040 and 100% clean energy by 2050. The legislation defines clean energy as energy generation that is at least 90% free of carbon dioxide emissions, which includes nuclear generation.

Illinois has more nuclear generating capacity than any other state. In 2020, nuclear power plants accounted for 58% of Illinois's in-state electricity generation. Byron and Dresden combined supplied 20% of Illinois's in-state electricity generation last year.

The bill also supports nuclear power plants in the state through a [carbon credit plan](#), where utilities that serve more than 300,000 residential customers are required to purchase electricity credits generated from certain nuclear plants. S.B. 2408 comes in addition to an existing Zero Emission Credits (ZEC) [program](#) that began in 2017 and provides revenue to participating nuclear power plants in Illinois.

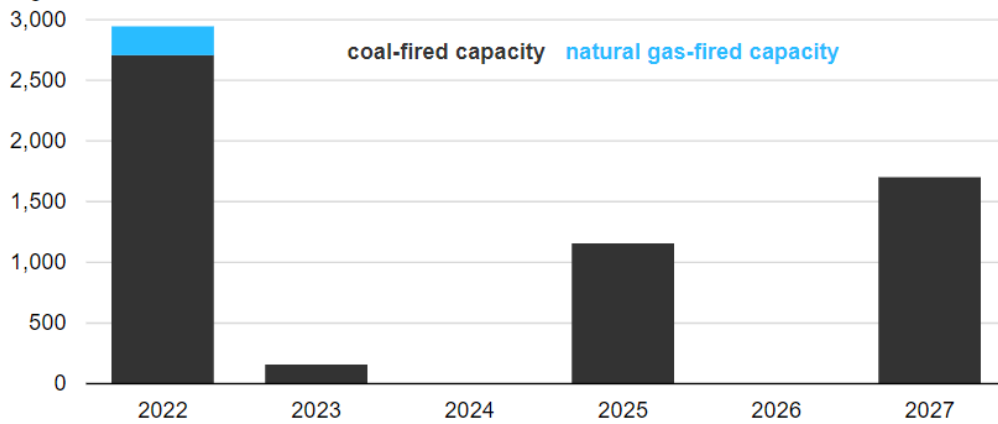
Prior to S.B. 2408, the Byron and Dresden plant operators reported to EIA that they had planned to retire the plants in September and November 2021, respectively. For power plants with one megawatt (MW) of capacity or more, plant owners and developers report planned capacity retirements and additions to EIA, which we compile and publish in our [annual](#) and [monthly](#) electric generator inventory data.

In addition to providing revenue to nuclear power plants, S.B. 2408 requires the state's remaining fossil-fueled generation plants to reduce carbon emissions in stages, beginning in 2030 and to be completed by 2045. In 2020, 18% of in-state generation in Illinois came from coal; natural gas-fired plants generated another 14%.

As of August 2021, close to 6,000 MW of electric generating capacity in Illinois have reported plans to retire by 2027. Almost all of those planned retirements are coal-powered generating facilities. After 2027, about 4,000 MW of coal-fired capacity will remain operating in the state. Most of this coal-fired capacity, along with more than 15,000 MW of natural-gas fired capacity, will face deadlines to reduce emissions, switch to a nonfossil fuel, or retire no later than 2045. Illinois may grant exceptions for units needed to support grid reliability.

Planned Illinois electric generating capacity retirements (2022–2027)

megawatts



Source: U.S. Energy Information Administration, [Preliminary Monthly Electric Generator Inventory](#)

Source: U.S. Energy Information

Administration, [Preliminary Monthly Electric Generator Inventory](#)

Principal contributors: Tyson Brown, Slade Johnson

Tags: [generation](#), [electricity](#), [nuclear](#), [retirements](#), [power plants](#), [Illinois](#), [states](#), [map](#)

Most of 2022's solar PV projects risk delay or cancelation due to soaring material and shipping costs

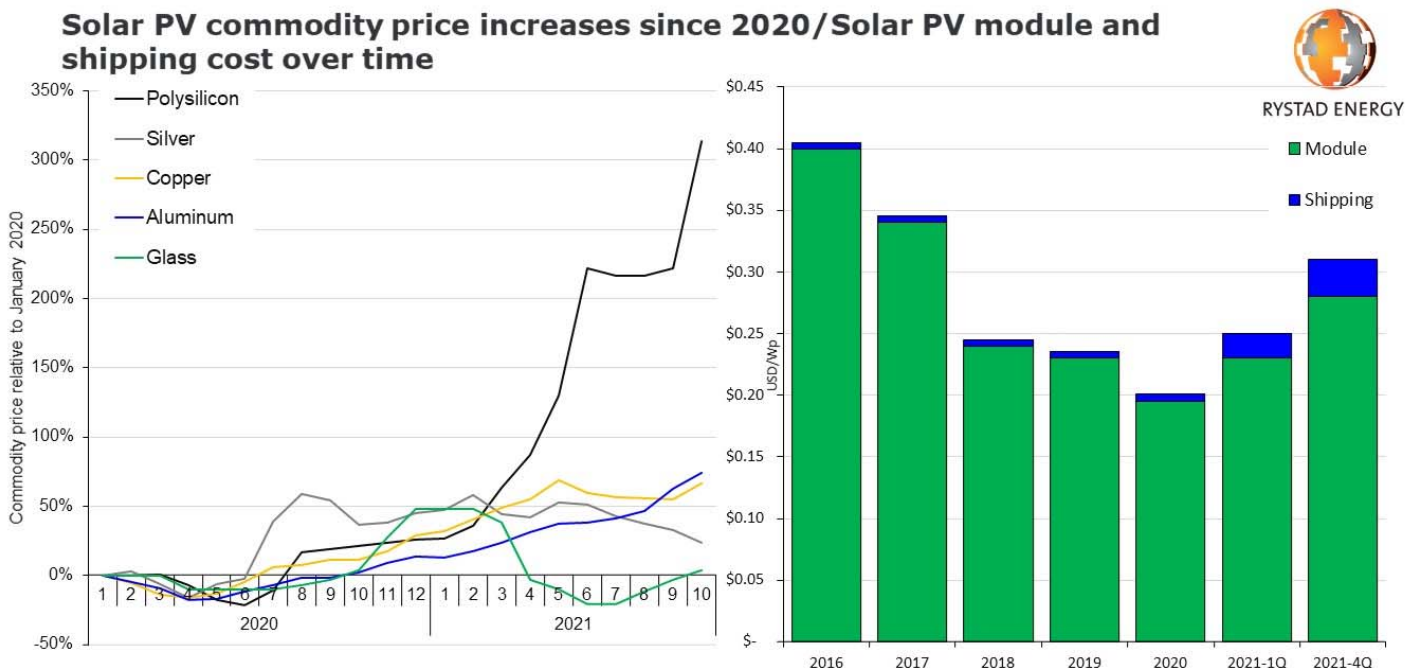
October 26, 2021

The surging cost of manufacturing materials and shipping could threaten 50 gigawatts (GW) – a staggering 56% – of the 90 GW of global utility PV developments planned for 2022, a Rystad Energy analysis shows. Commodity price inflation and supply chain bottlenecks could lead to the postponement or even cancelation of some of these projects, impacting demand and consumer pricing for solar-generated power.

Driven by core component price inflation, manufacturing costs for PV modules have surged from below \$0.20 per watt peak (Wp) in 2020 to between \$0.26 and \$0.28 per Wp in the second half of 2021 – a near 50% increase in a year.

A significant driver of this surge is a more than 300% hike in the cost of polysilicon, a core component in PV manufacturing. In addition, other raw materials – silver, copper, aluminum and glass – have also climbed steadily since January 2020, increasing the pressure on module prices.

"The utility solar industry is facing one of its toughest challenges just days ahead of COP26. The current bottlenecks are not expected to be relieved within the next 12 months, meaning developers and offtakers will have to decide whether to reduce their margins, delay projects or increase offtake prices to get projects to financial close," says David Dixon, senior renewables analyst at Rystad Energy.



Source: Rystad Energy RenewableCube; Rystad Energy research and analysis

Learn more about Rystad Energy's [RenewableCube](#).

In addition to materials cost inflation, shipping is another element in the supply chain causing considerable challenges for developers and module suppliers. The cost of shipping continues to rise, playing more of a role in overall production capital expenditure. Before 2021, the cost of PV shipping had a minimal impact on the overall production cost. However, pandemic-era shipping delays and bottlenecks have resulted in a near 500% increase in prices, from \$0.005 per Wp in September 2019 to \$0.03 per Wp in October 2021.

Modules and their associated shipping costs typically comprise between a quarter and a third of the total project capex and together represent the single-largest item of a project's cost. When the cost of modules – and shipping – increases, it can significantly impact project economics.

Rystad Energy performed a sensitivity analysis to determine the levelized cost of electricity (LCOE) for different plant sizes comparing last year's module and shipping costs with current costs. The results show that the LCOE of new projects has increased by between 10% and 15%, a major cost bump for most of the projects planned for 2022. Seeing their projects at risk, developers may have to resort to negotiating higher power purchase agreements (PPA) or absorbing some of the cost inflation, accepting higher project costs and lower margins.

For more analysis, insights and reports, clients and non-clients can apply for access to Rystad Energy's [Free Solutions](#) and get a taste of our data and analytics universe.

Contacts

David Dixon
Senior Analyst
Phone: +47 24 00 42 00
david.dixon@rystadenergy.com

Elliot Busby
Media Relations Manager
Phone: +1 708 513 4214
elliot.busby@rystadenergy.com

About Rystad Energy

Rystad Energy is an independent energy research and business intelligence company providing data, tools, analytics and consultancy services to the global energy industry. Our products and services cover energy fundamentals and the global and regional upstream, oilfield services and renewable energy industries, tailored to analysts, managers and executives alike. Rystad Energy's headquarters are located in Oslo, Norway with offices in London, New York, Houston, Aberdeen, Stavanger, Moscow, Rio de Janeiro, Singapore, Bangalore, Tokyo, Sydney and Dubai.

Press release

ABP stops investing in fossil fuel producers

Heerlen/Amsterdam, October 26, 2021 – **Pension fund ABP will stop investing in producers of fossil fuels (oil, gas and coal). Reasons for this decision are recently published reports by the International Energy Agency (IEA) and the UN Climate Panel (IPCC). Groups of ABP pension participants and employers have shown broad support for this decision. ABP will divest from the fossil fuel producers in phases; the majority of which is expected to be sold by the first quarter of 2023. This concerns more than 15 billion euros in assets, almost 3% of ABP's total assets . The fund does not expect this decision to have a negative impact on long-term returns.**

Since 2015, ABP has based its climate policy on the insights of the UN Climate Panel (IPCC). The recent IPCC report shows that all over the world people are already experiencing the physical effects of climate change, and that without stronger action global warming will reach an unacceptable level. To combat global warming, CO2 emissions must be reduced quickly and drastically.

ABP Chairman of the Board Corien Wortmann: “We want to contribute to minimizing global warming to 1.5 degrees Celsius. Large groups of pension participants and employers indicate how important this is to them. The ABP Board sees the need and urgency for a change of course. We part with our investments in fossil fuel producers because we see insufficient opportunity for us as a shareholder to push for the necessary, significant acceleration of the energy transition at these companies. From now on we will focus on bulk users of fossil energy such as electricity companies, the car industry and aviation. Using our influence as a shareholder, ABP will encourage companies that use fossil fuels to become more sustainable. We will further tighten the criteria for these investments in 2022. We will also continue to advocate for governments to move towards further CO2 pricing in the industry. And we will continue to push for an end to subsidizing fossil fuels.”

Before the summer of this year, ABP announced that it intended to tighten its sustainable and responsible investment policy. Today's announcement is an important and concrete step in that process. Corien Wortmann: “As soon as we have completed the sale of these fossil investments, we will make this known. Where possible, we intend to increase our investments in renewable energy, already more than 4 billion euros, and our involvement in smart solutions for the energy transition. Naturally, our criteria for return, risk, costs and sustainability also apply here. Our goal is and always will be to realize a good pension for our participants in a livable world.”

In 2022, ABP will set a new CO2 reduction target. ABP will also draw up a plan for investments in fossil fuel producers that are less easy to trade. The pension fund will also tighten its sustainable and responsible investment policy in other areas, such as conservation of natural resources, digitalization and human rights. ABP will disclose more information about this in 2022.

October 20, 2021 05:31 PM

New York City's 2 largest pension funds agree to net-zero goal

ROBERT STEYER

The two largest pension funds in the New York City Retirement Systems agreed to achieve net-zero greenhouse gas emissions in their investment portfolios by 2040, said city Comptroller Scott M. Stringer and Mayor Bill de Blasio announced Wednesday.

Trustees of the New York City Teachers' Retirement System and the New York City Employees' Retirement System have voted to approve the policy, said a joint news release issued by the comptroller and the mayor. The former has assets of \$102.2 billion and the latter has assets of \$87 billion.

The \$269.3 billion New York City Retirement Systems contains five pension funds, each with an independent board.

Trustees of the New York City Board of Education Retirement System are "expected to move forward on a vote imminently," the news release said. This pension fund has \$8.8 billion in assets.

The \$53 billion New York City Police Pension Fund and the \$19.3 billion New York City Fire Pension Fund are not participating. Representatives of Mr. Stringer, who is the fiduciary for all five pension funds, did not return a request for comment.

The net-zero greenhouse gas pledge "includes a goal to double investments in climate-change solutions such as renewable energy, energy efficiency and green real estate, to over \$8 billion by 2025," the news release said. The goal also is "to achieve a total of over \$37 billion in climate solutions investments by 2035 across the three funds."

The goal and plan to achieve net-zero emissions by 2040 was proposed jointly by Messrs. Stringer and de Blasio.

"Achieving net-zero emissions is an imperative for investors, businesses and government to maintain economic viability as well as livable conditions on the planet," Mr. Stringer said in the release. "As fiduciaries, we must mitigate the tremendous systemic risk that climate change poses to our pension funds."

The votes by the pension funds' trustees "will help the pension system meet these goals and ensure we have a livable planet for future generations to come," Mr. de Blasio said in the release.



IFIC Monthly Investment Fund Statistics – September 2021

Mutual Fund and Exchange-Traded Fund Assets and Sales

October 25, 2021 (Toronto) – The Investment Funds Institute of Canada (IFIC) today announced investment fund net sales and net assets for September 2021.

Mutual fund assets totalled \$1.986 trillion at the end of September 2021. Assets decreased by \$42.3 billion or 2.1% compared to August 2021. Mutual funds recorded net sales of \$8.0 billion in September 2021.

ETF assets totalled \$318.3 billion at the end of September 2021. Assets decreased by \$6.4 billion or 2.0% compared to August 2021. ETFs recorded net sales of \$2.8 billion in September 2021.

Mutual Fund Net Sales/Net Redemptions (\$ Millions)*

Asset Class	Sep. 2021	Aug. 2021	Sep. 2020	YTD 2021	YTD 2020
Long-term Funds					
Balanced	4,280	4,928	(232)	53,795	(6,065)
Equity	1,952	2,524	(1,641)	32,300	(472)
Bond	1,591	1,707	1,537	14,729	11,662
Specialty	424	337	500	4,746	4,419
Total Long-term Funds	8,247	9,496	165	105,570	9,544
Total Money Market Funds	(205)	63	(198)	(6,687)	4,488
Total	8,042	9,558	(33)	98,883	14,032

Mutual Fund Net Assets (\$ Billions)*

Asset Class	Sep. 2021	Aug. 2021	Sep. 2020	Dec. 2020
Long-term Funds				
Balanced	978.0	996.9	825.2	874.4
Equity	699.5	722.8	534.7	593.4
Bond	260.8	261.1	237.6	246.4
Specialty	20.2	20.0	31.7	34.9
Total Long-term Funds	1,958.6	2,000.8	1,629.2	1,749.1
Total Money Market Funds	27.1	27.3	37.0	34.4
Total	1,985.7	2,028.0	1,666.2	1,783.5

* Please see below for important information regarding this data.

ETF Net Sales/Net Redemptions (\$ Millions)*

Asset Class	Sep. 2021	Aug. 2021	Sep. 2020	YTD 2021	YTD 2020
Long-term Funds					
Balanced	318	273	163	3,211	1,329
Equity	221	3,379	(343)	24,135	18,542
Bond	1,739	1,137	804	10,537	8,763
Specialty	286	300	52	6,645	1,555
Total Long-term Funds	2,565	5,088	675	44,528	30,190
Total Money Market Funds	282	(62)	24	(996)	2,231
Total	2,847	5,026	699	43,532	32,420

ETF Net Assets (\$ Billions)*

Asset Class	Sep. 2021	Aug. 2021	Sep. 2020	Dec. 2020
Long-term Funds				
Balanced	11.0	11.0	6.1	7.2
Equity	201.8	209.0	140.7	158.4
Bond	87.8	87.0	76.1	79.3
Specialty	11.5	11.8	4.9	5.2
Total Long-term Funds	312.1	318.8	227.9	250.0
Total Money Market Funds	6.3	6.0	6.7	7.3
Total	318.3	324.7	234.6	257.3

* Please see below for important information regarding this data.

IFIC direct survey data (which accounts for approximately 91% of total mutual fund industry assets) is complemented by data from Investor Economics to provide comprehensive industry totals.

IFIC makes every effort to verify the accuracy, currency and completeness of the information; however, IFIC does not guarantee, warrant, represent or undertake that the information provided is correct, accurate or current.

*** Important Information Regarding Investment Fund Data:**

1. Mutual fund data is adjusted to remove double counting arising from mutual funds that invest in other mutual funds.
2. ETF data is not adjusted to remove double counting arising from ETFs that invest in other ETFs.
3. The Balanced Funds category includes funds that invest directly in a mix of stocks and bonds or obtain exposure through investing in other funds.
4. Mutual fund data reflects the investment activity of Canadian retail investors.
5. ETF data reflects the investment activity of Canadian retail and institutional investors.

About IFIC

The Investment Funds Institute of Canada is the voice of Canada's investment funds industry. IFIC brings together 150 organizations, including fund managers, distributors and industry service organizations, to foster a strong, stable investment sector where investors can realize their financial goals. By connecting Canada's savers to Canada's economy, our industry contributes significantly to Canadian economic growth and job creation. To learn more about IFIC, please visit www.ific.ca.

For more information please contact:

Pira Kumarasamy
Senior Manager, Communications and Public Affairs

Boomerang boomers: the over-50s moving back in with their parents



The Jackson family, from left: Corinne, Jim and Diane. ‘It turned out to be a great experience,’ says Jim

Financial and relationship woes caused by Covid in the UK are driving a rise in older people returning to live with family

Amelia Hill

@byameliahill

Mon 25 Oct 2021 11.25 BST

The Covid pandemic has led to growing numbers of baby boomers in Britain moving back in with their elderly parents, experts have said.

The reasons are varied, from the positive – grown-up children ensuring their parents had care and company during lockdowns – to the negative, including financial and relationship breakdowns.

“The pandemic has dramatically changed the way many of us are living,” said Stuart Lewis, the founder of **Rest Less**, a digital community for people aged 50 and older. “A number of our members have moved back in with their parents during the pandemic.”

For many, the return home has been a positive experience. Emma Egan, a 56-year-old teacher from New Malden, said moving in with her parents after her marriage broke up was a “blessing”.



‘Great times’: Emma Egan with her parents

“We spent many great times together during lockdown,” she said. “I now live at home purely because I really enjoy living with them. When I do move out, I will miss them terribly. They are my friends as well as my parents, and they are the coolest people I know.”

Jim Jackson says moving back home turned out to be a positive experience. The creative director, 61, and his wife moved back into his parents’ house after their children left home and he lost his job.

“Knowing that finding a new job at the age of 60 was not going to be easy, we decided that the best plan was to sell our home to be free of our mortgage and **move into my parents’ basement,**” he said.

“It turned out to be a great experience. I was proud to say that I had made it full circle and enjoyed living in my parents’ basement,” he said. “The time without the pressure of homeownership allowed me to work full-time on finding a new job. That new job allowed us to buy a new home of our own, only 10 minutes from my newly widowed mother.”

Financial concerns are a key reason for older people moving back home: more than 355,000 people aged 50 and older are unemployed, with 31,000 having been made redundant between May and July alone, according to the Office for National Statistics.

With rising inflation and increasing energy bills on the horizon, the idea of sharing the costs of living could also be attractive to many of the 360,000 people aged 55 and over still on furlough at the end of July, who risk being locked out of employment because of ageism if they are made redundant now the scheme has ended.

Lance Rumbolt, a 54-year-old IT consultant, moved into his mother’s house after his relationship broke down during the pandemic and he fell into debt.

The arrangement suits them both. “My mum loves it because my kids come over all the time, and she loves seeing them so regularly. I do long for my own space, though, and now living at home has enabled me to clear my debts, I plan to move out next year,” he said.

Polly Neate, the chief executive of Shelter, the homelessness and housing charity, said falling incomes – whether through furlough, job losses or relationship breakdowns – had left some older people “barely hanging on to their homes during the pandemic”.

“Older people find it especially difficult to escape homelessness because they can face long-term unemployment,” she said. “The rising cost of living and cuts to universal credit are only making this harder.”



Ian O’Sullivan and his father, 91, and mother, 88

Advertisement

For Ian O’Sullivan, 56, a librarian who moved back with his parents after the breakup of his marriage, the experience has been bittersweet.

“Renting a flat on my salary was not an option, so I was very fortunate that my parents had space for me. When the pandemic hit, I was put on full furlough. This turned out to be advantageous as it meant I could look after my parents and ensure they could remain fully isolated,” he said.

“But things changed dramatically as the lockdown progressed. The lack of exercise had an adverse effect on them and by the end of the final lockdown, it was apparent they needed so much help that I can’t leave here now.

“What started out as a temporary arrangement has become a permanent one. The only comfort I have is that at least I have been able to help my parents by living with them.”



Dan Tsubouchi @Energy_Tidbits · 1h

Blueprint for #Trudeau to reject #NatGas #Oil projects. NY rejects #NatGas power as inconsistent/interefere with GHG emissions in Climate Act. #Liberals received royal assent in July, it's now the law to ensure 🇨🇦 is on track to #NetZero. See SAF Group July 4 Energy Tidbits #OOTT

Excerpt SAF Group July 4, 2023 Energy Tidbits Memo <https://safgroup.ca/memo/2023/07/04/>

- **Energy Transition - Negative CO2 of oil & gas. It's now the law to hit climate targets** as defined, which is now the binding rule from a major climate negotiator to the G20, and just under its nose the law for the G20 government to be on track to meet 2030 emissions reductions. The law requires that the Government must meet its obligations. The Government, including the Minister, must ensure that the Canadian Net-Zero Emissions Accountability Act receives Royal Assent, which means the Bill is now law. We have entered on this bill since last year because it is now the law for the government. It is now the law to hit the specific plans to meet emissions reduction targets by 2035 so they can meet Canada's net-zero target for 2050. Our concern is that the measure the Liberals hope to take big emissions reduction before right now. And the Bill obligates them to have 2023, 2025 and 2027 progress reports so they can see where they are and adjust the emissions reduction plan. As we have been warning, it means the Liberals will be taking more aggressive action and that's better in "the heat" has been to do it. We are following the law, we have to do it on track as per the law. We have been warning that the oil and gas sector (and to be prepared for more aggressive emissions reduction) falling through as part of the Canada's underlying structure problem. Our Supplemental Documents package includes the Blueprint report.

Statement from DEC Commissioner Basil Scoggins on Denial of the Title V Permit for the Oxbow Energy Center

The New York State Department of Environmental Conservation (DEC) today announced the agency's denial of the required Title V air permit for the Oxbow Energy Center located in the town of Westerlo, Orange County. DEC conducted a comprehensive review of the application and supporting materials, as well as the more than 4,000 public comments received on the project before reaching this decision. DEC subjects all applications for environmental permits to an extensive and transparent review process and encourages public input at every step. Our review determined the proposed project does not demonstrate compliance with the requirements of the Climate Leadership and Community Protection Act. **DEC's decision is based on the fact that the project does not demonstrate the necessary**

The full decision is published in a notice (PDF) by Daniel Whitehead, Director of Environmental Permits, DEC.

Statement from Governor Kathy Hochul on DEC Permit Denial

"I applaud the Department of Environmental Conservation's decision to deny the Title V permit for the Oxbow Energy Center and to take this step to protect our air quality and public health. Climate change is the greatest challenge of our time, and we owe it to future generations to meet our nation-leading climate and emissions reduction goals."

1 2



Dan Tsubouchi @Energy_Tidbits · 10h

US tries to break #JCPOA impasse. #Biden says US will stay in full compliance as long as Iran does the same. He can't obligate future presidents to stay in a JCPOA, so this is the best he can offer. #OOTT

Iran's escalating nuclear program. We expressed our determination to ensure that Iran can never develop or acquire a nuclear weapon and shared our grave and growing concern that, while Iran halted negotiations on a return to the Joint Comprehensive Plan of Action (JCPOA) since June, it has accelerated the pace of provocative nuclear steps, such as the production of highly enriched uranium and enriched uranium metal. Iran has no credible civilian need for either measure, but both are important to nuclear weapons programs.

These steps have only been made more alarming by Iran's simultaneously decreased cooperation and transparency with the International Atomic Energy Agency (IAEA). We agreed that continued Iranian nuclear advances and obstacles to the IAEA's work will jeopardize the possibility of a return to the JCPOA.

The current situation underscores the importance of a negotiated solution that provides for the return of Iran and the U.S. to full compliance with the JCPOA and provides the basis for continued diplomatic engagement to resolve remaining points of contention – both our concerns and Iran's. In this spirit, we welcome President Biden's clearly demonstrated commitment to return the U.S. to full compliance with the JCPOA and to stay in full compliance, as long as Iran does the same.

We are convinced that it is possible to quickly reach and implement an understanding on return to full compliance and to ensure for the long term that Iran's nuclear program is exclusively for peaceful purposes.

Return to JCPOA compliance will provide sanctions lifting with long-lasting implications for Iran's economic growth. This will only be possible if Iran chooses to return. We will remain President Biden to ensure this commitment.

4 3



Dan Tsubouchi @Energy_Tidbits · 15h

#Vortexa crude oil floating storage for 10/29 est 84.07 mmb. Big revisions to 10/22, now est 113.88 mmb vs 86.24 mm est as of 10/23. 10/29 is +7.27 mmb vs recent 06/25 trough of 76.80 mmb. But -136.2 mmb vs 06/26/2020 peak 220.79 mmb. Thx @Vortexa @TheTerminal #OOTT

Figure 34: Vortexa Floating Storage Oct 29, Posted on Bloomberg 4pm MT Sat



Source: Bloomberg, Vortexa

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Dan Tsubouchi @Energy_Tidbits · Oct 30

Oops, #Macron on #EnergyTransition "Ironic, because we are building a system where in the medium & long term fossil energy will cost more & more, that's what we want to [to fight climate change]". 2020s will be very good for #Oil #NatGas prices. Great report @laboudies #OOTT



Leila Abboud @laboudies · Oct 30

As world leaders meet in Rome for the G20 today, Emmanuel Macron has a message: soaring energy prices must be addressed or risk "extreme tensions socially and economically". Our interview with @lesliehook via @FT

Show this thread

1

3

11





Dan Tsubouchi @Energy_Tidbits · Oct 29



But still no indication of timing for @exxonmobil to proceed on Mozambique #LNG. #Exxon CFO Mikells "paused simply because of the security situation on the ground, which we will continue to look at and revisit over time". see added SAF Group created transcript. #OOTT

SAF Group created transcript of excerpt from Exxon Q3 call Q&A

Items in "italics" are SAF Group created transcript

2nd last question of Q&A. Woods on how capex shifts within a total capex program. CEO Woods "think of some of the LNG projects, there has been some movement on that, Mozambique and the work we have been doing there in collaboration with Total, with some of the issues that we have seen in Mozambique that has slipped some, but we are still committed to that project. We see that as a valuable opportunity, but we're going to have to do that in the time frame available to us with some of the constraints that we see today, so there is some movement in some of those projects". CFO Mikells "our Coral project is clearly moving forward and you talked about the project that we paused simply because of the security situation on the ground, which we will continue to look at and revisit over time."

Last question of Q&A, are you still committed to Mozambique as some market rumors may revisit if you want to be in that project. Woods "I wouldn't put a lot of faith in the rumors. As you know Paul, there is a lot of people talking, most of them don't have a good understanding of the discussions we are having. We see that as a very competitive resource, its large, we've got opportunities with Total that we've been working on. They're committed to the project. We got a really good working relationship with them as well as our other partners and our existing. But I think we will continue to develop that, we think that going to be very competitive in the long term and something that's going to be needed. So we continue to be committed to that"

Prepared by SAF Group <https://safgroup.ca/energy-insights/>



Dan Tsubouchi @Energy_Tidbits · Oct 29



#Exxon CEO Woods just shot down any rumors that @exxonmobil would walk away from Mozambique #LNG. He gave clear answer when asked on these market rumors. Exxon continues to be committed to Mozambique LNG, as is @TotalEnergies. See SAF ...



Dan Tsubouchi @Energy_Tidbits · Oct 29



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Prepared by SAF Group <https://safgroup.ca/energy-insights/>



Dan Tsubouchi @Energy_Tidbits · Oct 20



Must read @EmilyGlazer report. Bullish to an already bullish #LNG in 2020s if #Exxon abandons Rozuma Mozambique LNG. Pre-Covid, was 1st LNG in 2024. See SAF Group 7-pg Apr 28/21 Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap ...



6



5



SAF Dan Tsubouchi @Energy_Tidbits · Oct 29
forgot to include these graphs yesterday. #OOTT



SAF Dan Tsubouchi @Energy_Tidbits · Oct 28
Positive for 🇲🇽 heavy/med oil. New #Pemex slide deck, continues to lower #Oil production forecasts. no change to 2022, but 2023 now 1.971 mmb/d (was 2.121) & 2024 now 2.063 mmb/d (was 2.186). Will help AMLO reach his no exports goal. #OOTT
twitter.com/Energy_Tidbits...

3 5

SAF Dan Tsubouchi @Energy_Tidbits · Oct 28
World's biggest #LNG importer, JERA, has big #LNG #NatGas to #Coal switching for #Electricity in Q3/21. JERA coal use +54% YoY vs LNG use -14% YoY. Thx @ @shoko_oda @Inajima17 #OOTT

by Shoko Oda and Tsuyoshi Inajima
(Bloomberg) -- Jera, a joint venture between Tokyo Electric and Chubu Electric, used 5.38m tons of coal in the quarter ended Sept., up from 3.44m tons a year earlier, according to Hiroyuki Usami, a spokesman for the company.
* Japan's biggest power generator burned 6.34m tons of LNG in the July-Sept. period, down from 7.33m tons a year earlier

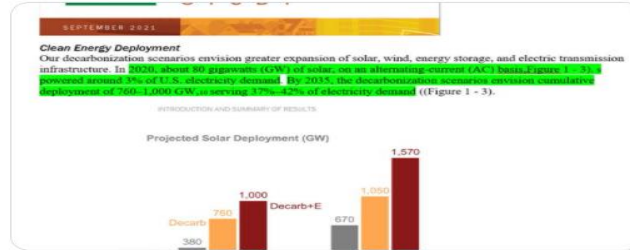
To contact the reporters on this story:
Shoko Oda in Tokyo at soda13@bloomberg.net;
Tsuyoshi Inajima in Tokyo at tinajima@bloomberg.net
To contact the editors responsible for this story:
David Stringer at dstringer3@bloomberg.net

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Dan Tsubouchi @Energy_Tidbits · Oct 28

#RenewableEnergy reality check from Marshall.Adkins@RaymondJames.com John.Freeman@RaymondJames.com. #Solar from 1% to 3% of #Electricity over 5 yrs when costs decreasing. #DOE fcasts from 3% to >37% to 2035 when costs no longer going lower. Hmm! #NatGas is needed for longer #OOTT



Dan Tsubouchi @Energy_Tidbits · Sep 14

No surprise, US #solar costs up across all segments in 2021 & expected up again in 2022. Is this reflected in #EnergyTransition plans like DOE Solar Futures Study that say electricity costs aren't going up? Hmmm! #NatGas will be needed for longer. Thx @danmurtaugh

1 5



Dan Tsubouchi @Energy_Tidbits · Oct 28

Even if you are a Dem, got to give best line to other side. @RoKhanna tried to get \$CVX \$XOM to commit to reduce #Oil production like \$RDSA \$BP. @Jim_Jordan follows you're telling them to reduce oil prod at same time as #POTUS is begging #OPEC to increase prod. #OOTT

Dan Tsubouchi @Energy_Tidbits · Oct 28

Today's #BigOil CEOs must be so envious of their predecessors when #Oil was understood/accepted to be critical to economic growth. In 1 hr, the grilling starts. Wonder if only grandstanding or some insight, maybe material for @JimmyKimmelLive @LateNightSeth @TheDailyShow #OOTT

WATCH LIVE

FUELING THE CLIMATE CRISIS: EXPOSING BIG OIL'S INFORMATION CAMPAIGN TO PREVENT CLIMATE ACTION

Watch on YouTube

Thursday, October 28, 2021 10:30 AM E.T.

2 2



Dan Tsubouchi @Energy_Tidbits · Oct 28

Positive for 🇨🇦 heavy/med oil. New #Pemex slide deck, continues to lower #Oil production forecasts. no change to 2022, but 2023 now 1.971 mmb/d (was 2.121) & 2024 now 2.063 mmb/d (was 2.186). Will help AMLO reach his no exports goal. #OOTT

Retweeted by Dan Tsubouchi @Energy_Tidbits · Oct 27

H2/22 #Oil supply gap >0.5 mmbd heavy/med to PADD 3. #Pemex Dos Bocas refinery start up 07/01/22, AMLO says MX oil prod needed for refineries & to stop exports. Should be upside to 🇨🇦 heavy/med. Thx @CarolinaBGP. See SAF Group 12/27/20 Energy Tidbits safgroup.ca/news-insights/ #OOTT



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Dan Tsubouchi @Energy_Tidbits · Oct 28

felt someone was staring at me while watching chevron ceo testimony. was just a local #Canmore elk. note the big buck down below h is watching his gang



0:03 323 views

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8





Dan Tsubouchi @Energy_Tidbits · Oct 28



sunrise is late in the Cdn Rockies but it's spectacular this morning. two of the famous three sisters are in the grey but then brilliant looking over the Bow River by the old coal mine in #Canmore. a few elk are just waking up.



30



Dan Tsubouchi @Energy_Tidbits · Oct 28



Today's #BigOil CEOs must be so envious of their predecessors when #Oil was understood/accepted to be critical to economic growth. In 1 hr, the grilling starts. Wonder if only grandstanding or some insight, maybe material for @JimmyKimmelLive @LateNightSeth @TheDailyShow #OOT



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Dan Tsubouchi @Energy_Tidbits · Oct 28

"need to be patient & see how the situation will improve in the coming months" @TotalEnergies @PPouyanne on Mozambique #LNG restart. Doesn't point to early 2022 restart. See SAF transcript & SAF 7-pg Apr 28 blog safgroup.ca/news-insights/ Positive for #LNG #NatGas in 2020s. #OOTT

all. October 28, 2021

SA

Blog Summary

Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?

By April 28, 2021 9:00 MT

undergoing review of their Mozambique projects go ahead, and wondering what situation allows? Total CEO Pouyanne the resource coming from Area 1. But our staff. And its not possible at the point we indicated in September during the will improve in the coming months".

The next six months will determine the size and length of the new LNG supply gap that is hitting harder and faster than anyone expected six months ago. Optimists will say the Mozambique government will bring sustainable security and safety to the northern Cabo Delgado province and provide the confidence to Total to quickly get back to LNG development such that its LNG in-service delay is a matter of months and not years. We hope so for Mozambique's domestic situation, but will it be that easy for Total's board to quickly look thru what just happened? Total suspended LNG development for 3 months, restarted development on March 25, but then 3 days of violence led it to suspend development again on March 28, and announce force majeure on Monday April 26. Even if the optimists are right, Mozambique LNG is counted on for LNG supply and the major LNG supply project that are in LNG supply forecasts are now all delayed - Total Phase 1 of 1.7 bcf/d and its follow on Phase 2 of 1.3 bcf/d, and Exxon's Rozuma Phase 1 of 2.0 bcf/d. It is important to remember this 5.0 bcf/d of major LNG supply is being counted in LNG supply forecasts and starting in 2024. At a minimum, we think the more likely scenario is a delay of at least 2 years in this 5.0 bcf/d from the pre-Covid timelines. And this creates a much bigger and sooner LNG supply gap starting ~2025 and stronger outlook for LNG prices. Thermal coal in Asia will play a role in keeping a lid on LNG prices. But there will be the opportunity for LNG suppliers to at least review the potential for brownfield LNG projects to fill the growing supply gap. The thought of increasing capex was a non-starter six months ago, but there is a much stronger outlook for global oil and gas prices. Oil and gas companies are pivoting from cutting capex to small increases in 2021 capex and expecting higher capex in 2022. We believe this sets the stage for looking at potential FID of brownfield LNG projects before the end of 2021 to be included in 2022 capex budgets. Mozambique is causing an LNG supply gap that someone will try to fill. And if brownfield LNG is needed, what

For Details, Please See The 7 Page Blog <http://safgroup.ca/news-insights/mozambique-chaos/>



Dan Tsubouchi @Energy_Tidbits · Oct 28

Sounds like @TotalEnergies not ready to restart Mozambique #LNG in early 2022. @business on \$SPM just ended cap mks day "Saipem's Mozambique LNG project expected to restart in mid-2022". @TotalEnergies Q3 call in 45 min. LNG supply gap for ...



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Dan Tsubouchi @Energy_Tidbits · Oct 28

Sounds like @TotalEnergies not ready to restart Mozambique #LNG in early 2022. @business on \$SPM just ended cap mks day "Saipem's Mozambique LNG project expected to restart in mid-2022". @TotalEnergies Q3 call in 45 min. LNG supply gap for 2020s. See SAF 7-pg Apr 28 blog. #OOTT

Blog Summary

Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?

Posted Wednesday April 28, 2021, 9:00 MT

The next six months will determine the size and length of the new LNG supply gap that is hitting harder and faster than anyone expected six months ago. Optimists will say the Mozambique government will bring sustainable security and safety to the northern Cabo Delgado province and provide the confidence to Total to quickly get back to LNG development such that its LNG in-service delay is a matter of months and not years. We hope so for Mozambique's domestic situation, but will it be that easy for Total's board to quickly look thru what just happened? Total suspended LNG development for 3 months, restarted development on March 25, but then 3 days of violence led it to suspend development again on March 28, and announce force majeure on Monday April 26. Even if the optimists are right, Mozambique LNG is counted on for LNG supply and the major LNG supply project that are in LNG supply forecasts are now all delayed - Total Phase 1 of 1.7 bcf/d and its follow on Phase 2 of 1.3 bcf/d, and Exxon's Rozuma Phase 1 of 2.0 bcf/d. It is important to remember this 5.0 bcf/d of major LNG supply is being counted in LNG supply forecasts and starting in 2024. At a minimum, we think the more likely scenario is a delay of at least 2 years in this 5.0 bcf/d from the pre-Covid timelines. And this creates a much bigger and sooner LNG supply gap starting ~2025 and stronger outlook for LNG prices. Thermal coal in Asia will play a role in keeping a lid on LNG prices. But there will be the opportunity for LNG suppliers to at least review the potential for brownfield LNG projects to fill the growing supply gap. The thought of increasing capex was a non-starter six months ago, but there is a much stronger outlook for global oil and gas prices. Oil and gas companies are pivoting from cutting capex to small increases in 2021 capex and expecting higher capex in 2022. We believe this sets the stage for looking at potential FID of brownfield LNG projects before the end of 2021 to be included in 2022 capex budgets. Mozambique is causing an LNG supply gap that someone will try to fill. And if brownfield LNG is needed, what



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Dan Tsubouchi @Energy_Tidbits · Oct 27

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Liberals to eliminate fossil fuels subsidies by 2023, not 2025, new Environment Minister Guilbeault just said to @EvanLSolomon @CTV_PowerPlay. never clear what is meant by the broad term fossil fuel subsidies. #OOTT

SAF Dan Tsubouchi @Energy_Tidbits · Oct 26

Buckle up Cdn #Oil #NatGas sector. New environment minister is what CBC calls long-time environmental activist Steven Guilbeault. New Natural Resources minister is Jonathan Wilkinson, former Minister of Environment and Climate Change. #OOTT
twitter.com/BoyerMichel/st...

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13



Dan Tsubouchi @Energy_Tidbits · Oct 27

...

H2/22 #Oil supply gap >0.5 mmbd heavy/med to PADD 3. #Pemex Dos Bocas refinery start up 07/01/22, AMLO says MX oil prod needed for refineries & to stop exports. Should be upside to heavy/med. Thx @CarolinaBGP. See SAF Group 12/27/20 Energy Tidbits safgroup.ca/news-insights/ #OOTT

By Carolina Gonzalez (Bloomberg) — The government of President Andrés B López Obrador is preparing to cancel crude oil export contracts if necessary, since the new Dos Bocas refinery is finished, says newspaper El Universal reported.

“There are instructions from the president to stop exporting to allocate all crude oil to the National Refining System and the new refinery that will be inaugurated on July 1, 2022,” energy sector officials told El Universal.

* With the Dos Bocas refinery, at least 1.5 million barrels of crude oil will be required for domestic consumption each day next year, the sources explained.

* Foreign trade in crude oil has represented a large income for Mexico, but this administration’s priority is to feed all the crude produced to the six refineries operated by Pemex, according to El Universal.

** There is a commitment within the cabinet that the first barrels of gasoline and diesel from the new refinery will be obtained in the second half of 2022.

To contact the reporter on this story:
Carolina Gonzalez in New York at cgonzalez2156@bloomberg.net
To contact the editor responsible for this story:
Ney Hayashi at nehayashi@bloomberg.net

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Dan Tsubouchi @Energy_Tidbits · Oct 27

EU #NatGas: Putin to #Gazprom "I ask you, after you finish pumping gas into underground storage facilities in Russia, by November 7 or 8, to start scheduled work to increase the volume of gas in your UGS facilities in Europe - in Austria & Germany" #OOTT



tass.ru

Путин поручил "Газпрому" увеличить закачку газа в хранилища в Е...
Глава компании Алексей Миллер заверил, что "Газпром" выполнит это поручение



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Dan Tsubouchi @Energy_Tidbits · Oct 27

For those not at their laptop, @EIAgov weekly #Oil #Gasoline #Distillates inventory data as of Oct 22 just out. Prior to release, WTI was \$83.04. #OOTT

ir.eia.gov/wpsr/overview...

Oil/Products Inventory Oct 22: EIA, Bloomberg Survey Expectations, API			
(million barrels)	EIA	Expectations	API
Oil	4.27	2.00	2.32
Gasoline	-1.99	-2.23	0.53
Distillates	-0.43	-2.25	0.99
	1.85	-2.48	3.84
Note: NOT included in the above was 1.1 mmb draw from SPR for Oct 22 week			
Note: Included in the data, Cushing had a draw of 3.90 mmb for Oct 22 week			
Source EIA, Bloomberg			
Prepared by SAF Group			



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Dan Tsubouchi @Energy_Tidbits · Oct 27



"It would start in 2022". be interesting to see if the normal Nov/Dec moves from CA NY to lower tax states TX FL AZ to establish residence for the current tax year turn into more moving to UK and other places in Nov/Dec. Thx @RichardRubinDC for recap.



Richard Rubin @RichardRubinDC · Oct 27

New this morning: Wyden's billionaire tax plan text and details are out.

I explain how it would work.

And we shall see if it goes anywhere.

wsj.com/articles/how-t...

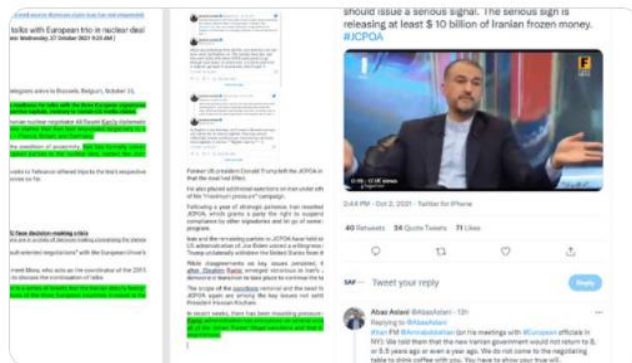
Show this thread



Dan Tsubouchi @Energy_Tidbits · Oct 27



#JCPOA. Iran officially ready for talks, won't do for sake of negotiations. not sure if a translation or was deliberate, but one missing item was requiring a sign in advance that the US has serious intentions ie. remember the backed off \$10b frozen money. #OOTT





Dan Tsubouchi @Energy_Tidbits · Oct 27

China's declining #CrudeOil stocks. China crude #Oil stocks down 108 mmb since March, incl commercial down 95 mmb, strategic reserves down 13 mmb. And down 35 mmb MoM. Great data from @Kayros, Thx for report @iamsharoncho #OOTT

By Sharon Cho

(Bloomberg) -- China's crude oil stockpiles declined to 919.34m bbls as of Oct. 24, which is 59% of capacity, according to data analytics firm Kayros.

* That's the lowest since Nov. 2018 in terms of filled capacity

* Of the nationwide crude inventories, commercial stockpiles were at ~574m bbls, while SPR volumes were at ~345m bbls

** That compares with ~608m bbls for commercial and ~346m bbls for SPR a month earlier, which added up to 61% of capacity

* Overall stockpiles have fallen rapidly since March 14, when they were at ~669m bbls for commercial and ~358m bbls for SPR

* NOTE: Kayros tracks crude oil stockpiles at about 190 terminals in China



34



53



Dan Tsubouchi @Energy_Tidbits · Oct 26

"Most of 2022's solar PV projects risk delay or cancellation due to soaring material & shipping costs" @RystadEnergy new blog. See 09/14 tweet, higher 21/22 solar costs not reflected in #COP26 plans. #NatGas electricity will be needed for longer. #OOTT rystadenergy.com/newsevents/new...

--- Dan Tsubouchi @Energy_Tidbits · Sep 14

No surprise, US #solar costs up across all segments in 2021 & expected up again in 2022. Is this reflected in #EnergyTransition plans like DOE Solar Futures Study that say electricity costs aren't going up? Hmm! #NatGas will be needed for longer. Thx @danmurtaugh



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Dan Tsubouchi @Energy_Tidbits · Oct 26

these look good assuming you live where there is green grass in the winter

Zimma Exclusive @ZimmaExclusive · Oct 25
 The Perfect Thermal Gloves For Winter!
 Waterproof Touch Screen Friendly

50% Off Shop Now zimmastore.com/warm-gloves



🗨️ ↻️ ❤️ 📤



Dan Tsubouchi @Energy_Tidbits · Oct 26

Buckle up Cdn #Oil #NatGas sector. New environment minister is what CBC calls long-time environmental activist Steven Guilbeault. New Natural Resources minister is Jonathan Wilkinson, former Minister of Environment and Climate Change. #OOTT

Michel Boyer @BoyerMichel · Oct 26

BREAKING: Prime Minister Justin Trudeau unveils his new cabinet. Notable absences: Garneau, Carr and Chagger. #cdnpoli

ted as follows:

remains Deputy Prime Minister and
 nains Minister of Transport
 nes Minister of National Defence
 ocomes Minister of Mental Health
 of Health

u remains Minister of Agriculture
 President of the Queen's Privy Co
 icy Preparedness

ilt becomes Minister of Tourism a

🗨️ 6 ↻️ 3 ❤️ 14 📤

SAF

Dan Tsubouchi @Energy_Tidbits · Oct 25

2/3. Whereas yr ago, a much less certain outlook for #Oil #NatGas #LNG prices. Yet \$XOM CEO 10/21/20 pep talk "this is a compelling investment case for the industry & our company, & is foundational to our long term strategies & plans" ie time to invest in #Oil #LNG projects. #OOTT

This understanding underpins our approach to addressing the dual challenge.

Addressing dual challenge

In the near term, we work to mitigate emissions from our own operations, which we do by investing in cogeneration, energy efficiency, and efforts to reduce flaring and methane emissions. We help consumers reduce their emissions with products that improve their efficiency, such as light-weight plastics and fuel-efficiency efforts, and by expanding the supply of cleaner burning natural gas, which is especially important in power generation.

For the longer term, we are deploying our competencies in breakthrough technology development. We are pursuing advances in the high-emission sectors - power generation, commercial transportation and industrial - where current technologies are insufficient to achieve deep emission reductions.

Breakthroughs in these areas are critical to reducing emissions and would make a meaningful contribution to achieving the goals of the Paris Agreement, which we support.

We are partnering with academia, government and industry to research technologies that experts involved in the Intergovernmental Panel on Climate Change say will be needed, such as biofuels, direct air capture, and reducing the cost of carbon capture, usage and storage.

Global oil demand

Our outlook projects oil demand to grow at 0.5 percent a year and gas demand to grow by 1.3 percent. With regular OPEC, heavy oil production needs to increase by nearly 3 percent per year, and natural gas by 6 percent.

Under any demand scenario, depletion supports the need for significant investment.

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Dan Tsubouchi @Energy_Tidbits · Oct 25

3/3. Could it link to @EmilyGlazer @cmatthews9 @WSJ report #Exxon debates abandoning some of its biggest projects ie. 2 bfcid Rozuma MZ #LNG? Hard to message like 10/21/20 & then abandon key big projects? If so, bullish to #LNG #NatGas for 2020s #OOTT

sources say

By @cmatthews9 + me



SAF

Dan Tsubouchi @Energy_Tidbits · Oct 20



Must read @EmilyGlazer report. Bullish to an already bullish #LNG in 2020s if #Exxon abandons Rozuma Mozambique LNG. Pre-Covid, was 1st LNG in 2024. See SAF Group 7-pg Apr 28/21 Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap ...

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Dan Tsubouchi @Energy_Tidbits · Oct 25

Reminder a huge YoY positive for #NatGas prices in 2022 is startup of 1.3 bcf Calcasieu Pass LNG & 0.7 bcf Sabine Pass Train 7. Means >700 bcf of US #NatGas for delivery to #LNG export contracts. See SAF Group July 25, 2021 Energy Tidbits. safgroup.ca/news-insights/ #OOTT

Welcome to new Energy Tidbits memo readers. We are continuing to add new readers to our Energy Tidbits memo, energy blogs and tweets. The focus and concept for the memo was set in 1999 with input from PMs, who were looking for research (both positive and negative items) that helped them shape their investment thesis to the energy space, and not just focusing on daily trading. Our priority was and still is to not just report on events, but also try to interpret and point out implications therefrom. The best example is our review of investor days, conferences and earnings calls focusing on sector developments that are relevant to the sector and not just a specific company results. Our target is to write on 48 to 50 weekends per year and to post by noon mountain time on Sunday.

This week's memo highlights:

1. BloombergNEF forecasts Oct 31/22 storage at 2.64 tcf, which would be hugely bullish for 2022/23 prices H1/AECO prices. [\(Click Here\)](#)
2. Nord Stream 2 now set to be completed and put in-service post US/Germany agreement. [\(Click Here\)](#)
3. Japan's new 2030 target energy mix hits LNG the hardest and makes us wonder if it also reflects concern on future LNG supply/cost. [\(Click Here\)](#)
4. Precision reminds Cdn public E&P years of building sustainable models are why they, not the US peers, are able to take advantage of high prices. [\(Click Here\)](#)
5. Quebec's reasons for rejecting Saguenay LNG will likely be used in future Liberals rejections. [\(Click Here\)](#)
6. Please follow us on Twitter at [@INKO](#) for breaking news that ultimately ends up in the weekly Energy Tidbits memo.



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Dan Tsubouchi @Energy_Tidbits · Oct 25

Reminder, the return of comp to higher than pre-Covid is happening or will be happenign across the entire oil and gas sector. There were comps cuts in H1/2020, and the outlook for both #Oil & #NatGas prices is much stronger for the 2020s than pre-Covid. #OOTT



Kevin Crowley @CrowleyKev · Oct 25

NEW: Exxon to boost salaries to stop brain drain

"Everyone [...] knows that we're having some major attrition issues," an employee told CEO Darren Woods at a town hall in Houston last week.

[bloomberg.com/news/articles/...](https://www.bloomberg.com/news/articles/...)



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Dan Tsubouchi @Energy_Tidbits · Oct 25

Big M memories. 60's, his dad sharpening skates at Leaside arena. 70s, seeing him in his travel agency on Avenue Road. 80s, raining in Paris, sat down at this cafe in Left Bank under the awning & Big M was sitting there, he bought me a glass of wine. a wonderful person.



Dan Tsubouchi @Energy_Tidbits · Oct 25



hey @FerroTV, frank mahovich isn't just an ice hockey player. it's the Big M, former @MapleLeafs @CanadiensMTL great. always great to hear an @tomkeene hockey should put on @Bloomberg.



Dan Tsubouchi @Energy_Tidbits · Oct 25

autocorrect typo. meant shout out.



Dan Tsubouchi @Energy_Tidbits · Oct 25

hey @FerroTV, frank mahovich isn't just an ice hockey player. it's the Big M, former @MapleLeafs @CanadiensMTL great. always great to hear an @tomkeene hockey should put on @Bloomberg.





Dan Tsubouchi @Energy_Tidbits · Oct 24

How many \$trillions for US #EnergyTransition? Princeton est \$7.8-13.9t. Inherently speculative, but at least they gave it a go. Recall @SenJohnKennedy couldn't get @SecGranholm to say how many \$t. See SAF 06/27 Energy Tidbits Thx @shaneshifflett #OOTT

[wsj.com/articles/the-u...](https://www.wsj.com/articles/the-u...)

shoot down any views that the energy transition will make energy very expensive in the future. We recognize that Senate and House hearings with Biden cabinet members, in this case Energy Secretary Granholm, are basically used by the questioners to make their political point. However, in this case, we tweeted on an exchange between Rep Senator Kennedy and Granholm. Kennedy's problem is that the Biden's push to reduce emissions won't mean much if China and India don't similarly step up. But linked to that was the jexchange that caused us to tweet [LINK] "US can't control what CN IN actually spend to be #CarbonNeutral, but politics aside, shouldn't #Biden admin have a rough estimate of how many \$trillions to get US to carbon neutral? How can anyone say #EnergyTransition won't cost more? #NoGas #OOTT". The exchange starts with Kennedy asking Granholm how many trillions it will cost to get the world to carbon neutral, she doesn't have a number, he asks hundreds of trillions and she replies "it would be a lot, for sure" with a smile. We don't think we are being bias by saying most people think she is a well liked person and we suspect she probably that might be enough to change questions. However, it was Kennedy so he comes back asking how much the energy department thinks it will cost to make the US carbon neutral? Granholm replies, "again, it would be a lot", Kenney asks "hundreds of trillions?", Granholm "I don't know about hundreds of trillions but it would a lot of money", Kennedy "it'd be in the trillions", Granholm "Yes", Kennedy "mid trillions?", Granholm "I don't know". We recognize Kennedy is trying to play at gotcha you in getting Granholm to commit to an estimate but, the more we thought about it, we thought it was a good question - shouldn't the Biden administration have some even really rough idea of what they think it will cost? Because without some rough cost with many unproven assumptions, how can they continue to argue that estimates or even calls that the energy transition will be expensive are incorrect or based on old thinking? Didn't Granholm take away their credibility to say that in the future. The gotcha you question may not have worked the way Kennedy wanted, but really did work in a different way. Our Supplemental Documents package includes the transcript of the Kennedy/Granholm exchange.

Its understandable, but a little scary that Biden has no idea what it will cost. The clear reminder from the Granholm comments is that the Biden administration has no idea how much this energy transition will cost the US, who will be required to pay up to get there and what it means to the cost of energy relative to today. No one can or at least should not disagree with the ambition to reduce global emissions. But it is a little scary to be committed to a path with no idea of what it costs. Maybe this is okay for the US, but think about how countries in the world can commit to a similar path? Maybe there is an estimate but the only reason we can think she would not disclose it is, if it was very high. But, if we take her at face value, there isn't

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Dan Tsubouchi @Energy_Tidbits · Oct 24

"Yes, I do. I -- look, I support a lot of these proposals. We don't need all of the things I support to pay for this but I do support that" @POTUS on 09/24 re tax unrealized cap gains for billionaires. See SAF Group 09/26 Energy Tidbits safgroup.ca/news-insights/ Thx @WSJ

Excerpt SAF Group September 26, 2023, Energy Tidbits Memo <https://safgroup.ca/news-insights/>

Capital Markets – Is Biden opening door for new taxes on wealthy Americans?
We have to wonder if we are seeing Biden open the door to the introduction of new types of taxes on the wealthy. We don't know if anyone can accurately predict all the details on how the current House, Senate and Biden will resolve the various spending bills. But it was interesting to see Biden's response to questions at his press conference delivering remarks on Covid response. We aren't aware that he has previously stated a clear position on taxing unrealized capital gains for the wealthy but, on Friday, Biden clearly said he was in favor of taxing unrealized capital gains for the wealthy. The potentially big negative is that he seems to be opening the door to a new type of tax on the wealthy and, if so, its sets up the potential for other new taxes on the wealthy like a wealth tax. Bloomberg transcript reported on his response to questions at his press conference on Friday on Covid response. Bloomberg wrote "And then separately, you mentioned how you're going to pay for some of these provisions. Senator Wyden has a proposal on annual taxes on billionaires' unrealized gains. Is that a proposal that you support? BIDEN: Yes, I do. I -- look, I support a lot of these proposals. We don't need all of the things I support to pay for this but I do support that. Look, you -- if you -- if you get a -- if you file with a W-2 form, you know, the -- the IRS has access to your bank account, and your bank tells you how much you make, what you have in there, and if -- you know -- and they estimate your tax. Well, if you -- if you have no income, you're just -- it's all -- I mean, if you have no earned income and it's all invested income, it's hard to figure out what the hell you -- excuse me -- what the heck you have. And that's why we have to -- and I know some people don't like this. That's why we have to retire some IRS agents, and not to do anything -- not to try to make people pay something they don't owe, just say "hey, step up -- step up and pay like everybody else does."

Ken Thomas @KThomasDC · Oct 24

A new annual tax on billionaires' unrealized capital gains is likely to be included in the social policy and climate package, via @kristinapet & @RichardRubinDC [wsj.com/articles/tax-o...](https://www.wsj.com/articles/tax-o...)

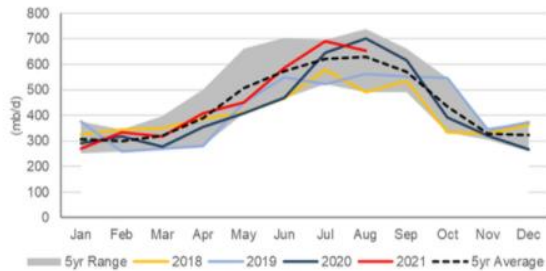
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Dan Tsubouchi @Energy_Tidbits · Oct 24

Reminder, even before any production increases, Saudi will have more #Oil for export as it has started the normal seasonal decline in oil used for electricity. Summer peak to winter trough normally down 400-500,000 b/d. #OOTT

Figure 31: Saudi Arabia Direct Use of Crude Oil For Electric Generation



Source: JODI



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Dan Tsubouchi @Energy_Tidbits · Oct 24

Our weekly SAF Oct 24, 2021 Energy Tidbits memo is posted on our SAF Group website. This 50-pg energy research memo expands upon & covers more items than tweeted this week. See news/insights section of SAF website #Oil #OOTT #LNG #NatGas #EnergyTransition safgroup.ca/news-insights/

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This week's memo highlights:

1. Abdulaziz on technology not ready for Net Zero "if you impact negatively your economic well being, you are actually impacting the well being of your people" ([Click Here](#))
2. Baker Hughes forecasts added +45 bcf/d LNG capacity needed by 2030. ([Click Here](#))
3. Petronet forecasts India LNG imports to grow by 12.4 bcf/d to 2030. ([Click Here](#))
4. Another Asian LNG buyer (China's Sinopec) is locking in long term LNG supply. ([Click Here](#))
5. Reuters reporting "Canada oil producers grapple with Trudeau's demand for faster emissions cuts". ([Click Here](#))
6. Please follow us on Twitter at [LINK](#) for breaking news that ultimately ends up in the weekly Energy Tidbits memo that doesn't get posted until Sunday noon MT.
7. For new readers to our Energy Tidbits and our blogs, you will need to sign up at our blog site in the coming future.



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