

Energy Tidbits

Vitol's Mike Muller on Oil: *"Market is Justified in Feeling Upbeat and Positive About Chinese Demand Growth"*

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HEATING DEGREE DAY DATA WEEKLY SUMMARY
POPULATION-WEIGHTED STATE, REGIONAL, AND NATIONAL AVERAGES
CLIMATE PREDICTION CENTER-NCEP-NWS-NOAA

LAST DATE OF DATA COLLECTION PERIOD IS FEB 25, 2023
ACCUMULATIONS ARE FROM JUL 1, 2022 TO FEB 25, 2023
-999 = NORMAL LESS THAN 100 OR RATIO INCALCULABLE

STATE	WEEK TOTAL	WEEK DEV FROM NORM	WEEK WEEK DEV FROM L YR	CUM TOTAL	CUM DEV FROM NORM	CUM DEV FROM L YR	CUM DEV FROM NORM PRCT	CUM DEV FROM L YR PRCT
ALABAMA	39	-75	-38	1804	-451	-59	-20	-3
ALASKA	313	-26	57	7233	-668	-224	-8	-3
ARIZONA	113	33	-2	2071	399	661	24	47
ARKANSAS	94	-43	-75	2511	-273	168	-10	7
CALIFORNIA	141	52	11	1983	190	362	11	22
COLORADO	274	35	-32	5047	-143	632	-3	14
CONNECTICUT	213	-25	-4	3599	-731	-260	-17	-7
DELAWARE	139	-58	-26	2964	-518	-120	-15	-4
DISTRCT COLUMBIA	96	-78	-42	2467	-598	-139	-20	-5
FLORIDA	3	-30	-3	371	-214	-27	-37	-7
GEORGIA	41	-75	-32	1950	-320	49	-14	3
HAWAII	0	0	0	0	0	-1	-999	-999
IDAHO	274	53	-21	5096	110	308	2	6
ILLINOIS	211	-33	-48	4216	-482	-22	-10	-1
INDIANA	168	-61	-55	3870	-499	-64	-11	-2
IOWA	285	19	-29	5106	-190	179	-4	4
KANSAS	220	25	-48	3950	21	494	1	14
KENTUCKY	105	-76	-66	3048	-446	-17	-13	-1
LOUISIANA	24	-49	-31	1438	-52	176	-3	14
MAINE	302	7	21	4688	-915	-475	-16	-9
MARYLAND	134	-64	-29	3070	-523	-60	-15	-2
MASSACHUSETTS	231	-16	6	3803	-701	-206	-16	-5
MICHIGAN	242	-27	-30	4358	-602	-130	-12	-3
MINNESOTA	381	64	-26	5996	-465	-102	-7	-2
MISSISSIPPI	34	-69	-47	1735	-340	18	-16	1
MISSOURI	175	-27	-64	3698	-292	182	-7	5
MONTANA	357	98	-17	5778	-132	390	-2	7
NEBRASKA	294	53	-27	4892	-4	725	0	17
NEVADA	189	61	4	3231	397	539	14	20
NEW HAMPSHIRE	272	-11	2	4483	-913	-322	-17	-7
NEW JERSEY	183	-36	-10	3351	-584	-138	-15	-4
NEW MEXICO	168	2	-31	3759	168	440	5	13
NEW YORK	212	-31	-9	3564	-779	-170	-18	-5
NORTH CAROLINA	70	-74	-29	2413	-302	42	-11	2
NORTH DAKOTA	444	113	-8	6723	-225	339	-3	5
OHIO	165	-68	-42	3751	-598	-87	-14	-2
OKLAHOMA	142	-5	-76	2869	-107	307	-4	12
OREGON	218	64	-2	3563	34	86	1	2
PENNSYLVANIA	174	-58	-28	3779	-493	-103	-12	-3
RHODE ISLAND	214	-16	-3	3597	-480	-247	-12	-6
SOUTH CAROLINA	45	-71	-19	1868	-352	-30	-16	-2
SOUTH DAKOTA	367	90	-18	5695	-69	661	-1	13
TENNESSEE	83	-74	-64	2714	-370	-39	-12	-1
TEXAS	36	-44	-79	1498	-164	204	-10	16
UTAH	268	45	-9	4895	136	408	3	9
VERMONT	295	-11	13	5075	-685	-293	-12	-5
VIRGINIA	105	-76	-33	2914	-428	38	-13	1

WASHINGTON	224	58	-1	3896	45	66	1	2
WEST VIRGINIA	129	-76	-39	3430	-459	-24	-12	-1
WISCONSIN	289	2	-33	5144	-486	-82	-9	-2
WYOMING	348	82	-10	5737	-109	723	-2	14
REGION								
NEW ENGLAND	238	-16	4	3935	-729	-261	-16	-6
MIDDLE ATLANTIC	194	-41	-15	3585	-651	-142	-15	-4
E N CENTRAL	210	-40	-42	4194	-539	-75	-11	-2
W N CENTRAL	278	27	-40	4821	-240	225	-5	5
SOUTH ATLANTIC	58	-59	-22	1854	-332	-1	-15	0
E S CENTRAL	69	-74	-55	2392	-404	-29	-14	-1
W S CENTRAL	51	-40	-72	1726	-150	208	-8	14
MOUNTAIN	214	41	-15	3918	154	551	4	16
PACIFIC	158	53	8	2369	157	300	7	14
UNITED STATES	151	-21	-26	3017	-301	74	-9	2

GAS HOME HEATING CUSTOMER WEIGHTED

REGION								
NEW ENGLAND	229	-17	3	3801	-696	-232	-15	-6
MIDDLE ATLANTIC	193	-40	-15	3575	-644	-142	-15	-4
E N CENTRAL	211	-40	-42	4197	-541	-75	-11	-2
W N CENTRAL	279	27	-39	4827	-238	223	-5	5
SOUTH ATLANTIC	79	-69	-29	2397	-384	6	-14	0
E S CENTRAL	70	-74	-55	2422	-407	-29	-14	-1
W S CENTRAL	56	-39	-71	1796	-149	212	-8	13
MOUNTAIN	230	41	-17	4212	104	544	3	15
PACIFIC	151	53	9	2214	171	325	8	17
UNITED STATES	171	-16	-27	3302	-303	89	-8	3

OIL HOME HEATING CUSTOMER WEIGHTED

REGION								
NEW ENGLAND	244	-14	5	4014	-749	-281	-16	-7
MIDDLE ATLANTIC	197	-40	-15	3596	-667	-146	-16	-4
E N CENTRAL	218	-38	-39	4297	-553	-90	-11	-2
W N CENTRAL	357	60	-26	5734	-336	107	-6	2
SOUTH ATLANTIC	96	-69	-28	2633	-406	-3	-13	0
E S CENTRAL	89	-75	-63	2779	-411	-29	-13	-1
W S CENTRAL	51	-41	-67	1751	-143	204	-8	13
MOUNTAIN	267	61	-14	4733	118	409	3	9
PACIFIC	210	59	0	3501	62	116	2	3
UNITED STATES	200	-31	-13	3662	-610	-142	-14	-4

ELECTRIC HOME HEATING CUSTOMER WEIGHTED

REGION								
NEW ENGLAND	231	-18	3	3827	-720	-244	-16	-6
MIDDLE ATLANTIC	189	-44	-18	3623	-612	-133	-14	-4
E N CENTRAL	197	-47	-44	4091	-538	-71	-12	-2
W N CENTRAL	262	20	-43	4636	-229	253	-5	6
SOUTH ATLANTIC	42	-52	-16	1444	-297	-6	-17	0
E S CENTRAL	69	-74	-55	2404	-403	-32	-14	-1
W S CENTRAL	45	-42	-71	1651	-150	204	-8	14
MOUNTAIN	177	41	-9	3221	258	587	9	22
PACIFIC	175	55	6	2746	127	239	5	10
UNITED STATES	104	-27	-28	2352	-231	91	-9	4

AMERICAN GAS ASSOCIATION

Interoffice Memorandum

TO: Distribution

Date: **February 27, 2023**

FROM: Paul Pierson

SUBJECT: Weekly Heating Degree Day Data

HEATING DEGREE DAY SUMMARY

For the week ending February 25, the weather in the United States was 13.6 percent warmer than last year and 8.6 percent warmer than normal. All regions experienced warmer temperatures than last year except the New England and Pacific regions. All regions experienced warmer temperatures than normal except the W.N. Central, Mountain, and Pacific regions. For the month of January, the weather in the United States was 19.1 percent warmer than last year and 18.1 percent warmer than normal.

WEEKLY COMPARISON

<u>Week Ending</u>	<u>2022/2023</u>	<u>2021/2022</u>	<u>Normal</u>	<u>% Change: 22/23 from 21/22</u>		<u>% Change: 22/23 from Normal</u>	
10/01/22	41	20	36	105.0	Colder	13.9	Colder
10/08/22	50	15	48	233.3	Colder	4.2	Colder
10/15/22	56	30	61	86.7	Colder	8.2	Warmer
10/22/22	89	58	76	53.4	Colder	17.1	Colder
10/29/22	75	77	91	2.6	Warmer	17.6	Warmer
11/05/22	72	111	106	35.1	Warmer	32.1	Warmer
11/12/22	97	95	122	2.1	Colder	20.5	Warmer
11/19/22	194	127	139	52.8	Colder	39.6	Colder
11/26/22	161	152	155	5.9	Colder	3.9	Colder
12/03/22	165	137	170	20.4	Colder	2.9	Warmer
12/10/22	163	161	185	1.2	Colder	11.9	Warmer
12/17/22	188	139	197	35.3	Colder	4.6	Warmer
12/24/22	254	183	209	38.8	Colder	21.5	Colder
12/31/22	200	156	218	28.2	Colder	8.3	Warmer
01/07/23	152	214	223	29.0	Warmer	31.8	Warmer
01/14/23	179	208	226	13.9	Warmer	20.8	Warmer
01/21/23	178	229	225	22.3	Warmer	20.9	Warmer
01/28/23	202	248	222	18.5	Warmer	9.0	Warmer
02/04/23	240	231	217	3.9	Colder	10.6	Colder
02/11/23	169	194	210	12.9	Warmer	19.5	Warmer
02/18/23	168	193	199	13.0	Warmer	15.6	Warmer
02/25/23	171	198	187	13.6	Warmer	8.6	Warmer
Cumulative	3264	3176	3522	2.8	Colder	7.3	Warmer

MONTHLY COMPARISON

<u>Month Ending</u>	<u>2022/2023</u>	<u>2021/2022</u>	<u>Normal</u>	<u>% Change: 22/23 from 21/22</u>		<u>% Change: 22/23 from Normal</u>	
September	66	42	87	57.1	Colder	24.1	Warmer
October	299	205	310	45.9	Colder	3.5	Warmer
November	588	677	676	13.1	Warmer	13.0	Warmer
December	883	688	884	28.3	Colder	0.1	Warmer
January	811	1003	990	19.1	Warmer	18.1	Warmer

HEATING DEGREE DAYS BY CENSUS REGION FOR THE WEEK ENDING February 25, 2023

<u>Region</u>	<u>2022/ 2023</u>	<u>2021/ 2022</u>	<u>Normal</u>	<u>% Change: 22/23 from 21/22</u>		<u>% Change: 22/23 from Normal</u>	
New England	229	226	246	1.3	Colder	6.9	Warmer
Middle Atlantic	193	208	233	7.2	Warmer	17.2	Warmer
E N Central	211	253	251	16.6	Warmer	15.9	Warmer
W N Central	279	318	252	12.3	Warmer	10.7	Colder
South Atlantic	79	108	148	26.9	Warmer	46.6	Warmer
E S Central	70	125	144	44.0	Warmer	51.4	Warmer
W S Central	56	127	95	55.9	Warmer	41.1	Warmer
Mountain	230	247	189	6.9	Warmer	21.7	Colder
Pacific	151	142	98	6.3	Colder	54.1	Colder
United States	171	198	187	13.6	Warmer	8.6	Warmer

CUMULATIVE HEATING DEGREE DAYS BY CENSUS REGION

<u>Region</u>	<u>2022/ 2023</u>	<u>2021/ 2022</u>	<u>Normal</u>	<u>% Change: 22/23 from 21/22</u>		<u>% Change: 22/23 from Normal</u>	
New England	3727	3982	4380	6.4	Warmer	14.9	Warmer
Middle Atlantic	3535	3691	4136	4.2	Warmer	14.5	Warmer
E N Central	4131	4206	4628	1.8	Warmer	10.7	Warmer
W N Central	4766	4542	4928	4.9	Colder	3.3	Warmer
South Atlantic	2386	2385	2761	0.0	Colder	13.6	Warmer
E S Central	2416	2440	2812	1.0	Warmer	14.1	Warmer
W S Central	1797	1584	1939	13.4	Colder	7.3	Warmer
Mountain	4159	3611	3943	15.2	Colder	5.5	Colder
Pacific	2195	1866	1974	17.6	Colder	11.2	Colder
United States	3264	3176	3522	2.8	Colder	7.3	Warmer

The regional degree day statistics stated in this memo are weighted by gas home heating customers instead of by population.

A heating degree day is a measure of the coldness of the weather experienced, based on the extent to which the daily mean temperature falls below 65 degrees Fahrenheit. A daily mean temperature represents the sum of the high and low reading, divided by two.

Source: U.S. Department of Commerce, National Oceanic and Atmospheric Administration

Table 1. Summary of natural gas supply and disposition in the United States, 2017-2022

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
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 total	40,780	36,447	2,548	33,899	61	-1,916	-503	-408	31,132
2020									
January	3,597	3,194	239	2,955	6	-248	581	28	3,321
February	3,363	2,985	223	2,761	5	-216	545	-37	3,059
March	3,582	3,196	239	2,957	6	-284	53	-10	2,722
April	3,374	3,012	225	2,786	5	-231	-311	7	2,257
May	3,285	2,927	219	2,708	5	-209	-454	22	2,072
June	3,217	2,873	215	2,658	5	-151	-363	-21	2,128
July	3,374	3,021	226	2,795	5	-139	-165	-33	2,464
August	3,350	3,012	225	2,786	5	-149	-232	-11	2,400
September	3,265	2,918	218	2,699	5	-221	-329	-3	2,151
October	3,364	2,992	224	2,768	5	-282	-96	-79	2,316
November	3,352	2,985	223	2,761	5	-317	-6	-1	2,442
December	3,490	3,089	231	2,858	5	-287	597	9	3,183
Total	40,614	36,202	2,710	33,493	63	-2,734	-180	-129	30,513
2021									
January	3,517	3,118	235	2,884	6	-279	719	16	3,344
February	2,950	2,609	196	2,412	5	-152	795	40	3,099
March	3,518	3,144	237	2,907	6	-357	64	30	2,649
April	3,438	3,069	231	2,838	5	-356	-180	-42	2,265
May	3,535	3,168	239	2,930	6	-373	-424	-21	2,117
June	3,400	3,056	230	2,826	5	-331	-254	-8	2,238
July	3,514	3,182	240	2,943	6	-338	-175	-23	2,412
August	3,545	3,196	241	2,956	6	-343	-164	-20	2,434
September	3,423	3,087	232	2,854	5	-315	-398	-4	2,142
October	3,600	3,245	244	3,001	6	-317	-368	-60	2,263
November	3,545	3,170	239	2,931	6	-315	137	-66	2,693
December	3,680	3,284	247	3,037	6	-368	330	3	3,007
Total	41,666	37,328	2,811	34,518	66	-3,845	82	-157	30,665
2022									
January	£3,591	£3,199	246	£2,953	7	-314	994	-47	3,592
February	£3,227	£2,870	223	£2,647	6	-288	658	£38	3,061
March	£3,614	£3,225	267	£2,958	6	-379	163	£32	£2,781
April	£3,520	£3,152	257	£2,895	6	-342	-214	£22	£2,367
May	£3,667	£3,296	266	£3,030	6	-384	-403	-6	2,242
June	£3,557	£3,215	259	£2,956	4	-322	-324	4	2,318
July	£3,690	£3,330	276	£3,055	6	-300	-180	2	2,583
August	£3,699	£3,349	270	£3,079	6	-320	-206	*	£2,559
September	£3,638	£3,281	265	£3,016	4	-293	-436	£-3	£2,288
October	£3,769	£3,394	275	£3,119	5	£-315	-422	£-21	£2,366
November	£3,682	£3,296	269	£3,027	4	£-308	71	£-21	£2,774
December	£3,717	£3,317	249	£3,068	6	-304	573	43	3,385
Total	£43,370	£38,924	3,120	£35,804	65	-3,870	275	44	32,318

^a We derive monthly natural gas plant liquid (NGPL) production, gaseous equivalent, 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 We only collect supplemental gaseous fuels data on an annual basis except for the Dakota Gasification Co. coal gasification facility, which provides data each month. We calculate the ratio of annual supplemental fuels (excluding Dakota Gasification Co.) to the sum of dry gas production, net imports, and net withdrawals from storage. We apply this ratio to the monthly sum of these three elements. We add the Dakota Gasification Co. monthly value to the result to produce the monthly supplemental fuels estimate.

^d Monthly and annual data for 2017 through 2020 include underground storage and liquefied natural gas storage. Data for January 2021 forward include underground storage only. Appendix A, Explanatory Note 5, contains a 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): 212 for 2021; 209 for 2020; -8 for 2019; -12 for 2018; and 14 for 2017. Appendix A, Explanatory Note 7, contains a full discussion of balancing item calculations.

^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.

* Volume is between -500 MMcf and 500 MMcf.

^E Estimated data.

^{RE} Revised estimated data.

Source: 2017-2021: U.S. Energy Information Administration (EIA), *Natural Gas Annual 2021*. January 2022 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 and Carbon Management, *Natural Gas Imports and Exports*. Table 7 includes detailed source notes for Marketed Production. Appendix A, Notes 3 and 4, includes discussion of computation and estimation procedures and revision policies.

Note: Data for 2017 through 2020 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.

Table 5. U.S. natural gas exports, 2020-2022

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

								2022
	Total	December	November	October	September	August	July	June
Exports								
Volume (million cubic feet)								
Pipeline								
Canada	952,317	98,718	90,179	72,738	61,926	74,120	68,521	68,763
Mexico	2,074,340	158,638	160,986	171,766	169,159	181,124	188,178	181,700
Total pipeline exports	3,026,657	257,355	251,165	244,505	231,086	255,244	256,699	250,463
LNG								
Exports								
By vessel								
Antigua and Barbuda	22	1	2	2	3	2	2	3
Argentina	66,939	0	0	0	0	2,202	9,448	25,246
Bahamas	489	42	35	40	43	53	45	47
Bangladesh	12,663	0	0	0	0	0	0	0
Barbados	93	0	1	0	0	0	0	0
Belgium	80,245	3,274	0	7,190	9,165	3,589	0	7,023
Brazil	71,998	0	0	3,439	0	10,542	5,192	3,857
Chile	30,131	0	0	0	3,365	0	6,917	0
China	97,741	3,753	17,308	26,919	10,275	10,272	784	7,329
Colombia	5,703	0	0	3,699	0	606	0	912
Croatia	77,286	6,204	5,122	2,922	9,073	7,824	4,600	7,925
Dominican Republic	50,824	6,644	0	3,469	3,196	3,357	6,532	5,838
Egypt	0	0	0	0	0	0	0	0
Finland	329	329	0	0	0	0	0	0
France	571,399	38,311	50,655	41,959	57,943	33,885	53,443	37,564
Germany	7,113	7,112	1	0	0	0	0	0
Greece	69,031	2,869	421	4,424	0	10,763	12,922	9,633
Haiti	115	9	0	0	8	11	8	13
India	122,518	14,139	10,138	7,005	10,528	10,265	13,902	10,653
Indonesia	6,579	3,256	505	625	509	967	0	0
Israel	0	0	0	0	0	0	0	0
Italy	116,034	6,992	3,205	0	8,355	15,462	9,914	7,137
Jamaica	1,516	147	137	144	240	110	121	48
Japan	212,459	23,774	24,396	10,684	7,005	20,156	18,189	21,561
Jordan	0	0	0	0	0	0	0	0
Kuwait	57,018	0	0	3,299	7,038	6,415	5,382	8,105
Lithuania	77,212	3,281	3,708	7,072	3,541	7,579	7,947	6,729
Malaysia	0	0	0	0	0	0	0	0
Malta	5,273	0	2,928	0	0	0	0	0
Mexico	3,832	539	0	0	0	0	0	3,292
Netherlands	378,329	39,893	20,645	39,703	30,924	50,020	32,637	34,420
Nicaragua	0	0	0	0	0	0	0	0
Pakistan	3,074	0	0	0	0	0	0	0
Panama	13,759	249	3,833	0	0	0	0	623
Poland	127,404	13,885	3,453	7,095	16,917	6,885	17,780	14,282
Portugal	69,583	10,025	3,732	7,005	5,806	3,202	6,412	5,582
Singapore	22,876	0	0	6,523	0	0	6,275	3,352
South Korea	288,516	24,700	14,069	34,628	19,736	36,033	34,342	25,054
Spain	426,657	33,847	26,445	26,369	21,263	26,140	34,396	29,639
Taiwan	106,738	9,203	3,592	9,041	9,753	8,901	9,353	6,892
Thailand	25,988	0	0	0	3,673	3,607	0	6,920
Turkiye	192,067	17,979	31,430	10,333	5,458	0	0	7,542
United Arab Emirates	0	0	0	0	0	0	0	0
United Kingdom	464,462	69,332	76,693	46,040	51,467	21,263	3,797	3,326
By truck								
Canada	76	8	0	19	0	0	0	8
Mexico	1,552	160	153	175	94	103	76	105
Re-exports								
By vessel								
Argentina	0	0	0	0	0	0	0	0
Brazil	0	0	0	0	0	0	0	0
Japan	0	0	0	0	0	0	0	0
South Korea	0	0	0	0	0	0	0	0
United Kingdom	0	0	0	0	0	0	0	0
Total LNG exports	3,865,643	339,960	302,608	309,823	295,379	300,215	300,415	300,659
CNG								
Canada	2	0	*	1	*	*	1	*
Total CNG exports	2	0	*	1	*	*	1	*
Total exports	6,892,303	597,316	553,774	554,328	526,465	555,459	557,114	551,123

See footnotes at end of table.

Table 5. U.S. natural gas exports, 2020-2022

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

	2022					2021		
	May	April	March	February	January	Total	December	November
Exports								
Volume (million cubic feet)								
Pipeline								
Canada	77,512	79,930	104,177	74,313	81,420	937,124	108,568	85,136
Mexico	185,965	176,440	169,885	155,032	175,467	2,154,457	166,956	165,449
Total pipeline exports	263,477	256,370	274,061	229,345	256,887	3,091,580	275,524	250,585
LNG								
Exports								
By vessel								
Antigua and Barbuda	2	3	2	0	2	8	3	2
Argentina	20,111	9,933	0	0	0	83,449	2,077	0
Bahamas	42	34	43	31	34	486	36	34
Bangladesh	3,346	0	3,421	5,896	0	37,734	0	0
Barbados	0	0	34	31	28	297	34	27
Belgium	3,441	7,341	17,743	7,691	13,786	5,584	0	0
Brazil	15,303	3,448	2,236	10,660	17,322	307,714	24,246	10,715
Chile	9,943	3,530	3,214	0	3,162	121,881	2,938	2,956
China	0	10,217	7,527	3,357	0	453,304	17,050	50,228
Colombia	0	0	0	0	486	2,247	0	0
Croatia	8,543	6,763	3,358	5,870	9,084	36,133	3,117	9,416
Dominican Republic	4,964	3,645	6,530	0	6,647	53,095	5,969	2,780
Egypt	0	0	0	0	0	0	0	0
Finland	0	0	0	0	0	0	0	0
France	47,150	56,343	64,415	39,646	50,084	170,780	33,892	10,021
Germany	0	0	0	0	0	0	0	0
Greece	12,650	1,336	4,116	8,094	1,802	39,708	5,305	7,629
Haiti	9	11	10	16	20	137	4	8
India	7,152	14,223	10,438	7,210	6,866	196,218	3,203	14,807
Indonesia	0	0	0	717	0	3,269	1,218	456
Israel	0	0	0	0	0	8,906	0	0
Italy	21,696	15,519	7,088	13,629	7,037	34,210	0	0
Jamaica	144	135	92	111	86	25,276	113	715
Japan	24,024	13,231	17,697	10,214	21,527	354,948	24,297	33,947
Jordan	0	0	0	0	0	0	0	0
Kuwait	14,204	7,298	0	5,277	0	34,476	0	0
Lithuania	11,237	13,770	5,700	3,131	3,518	30,919	0	0
Malaysia	0	0	0	0	0	0	0	0
Malta	0	0	0	2,345	0	5,427	0	0
Mexico	0	0	0	0	0	15,200	0	0
Netherlands	28,902	28,395	24,922	31,591	16,279	174,339	23,354	8,829
Nicaragua	0	0	0	0	0	1	0	0
Pakistan	0	3,074	0	0	0	45,818	0	2,490
Panama	1,192	1,536	0	3,069	3,255	8,436	0	0
Poland	18,224	13,882	3,831	7,475	3,695	56,320	7,159	7,068
Portugal	3,888	6,632	10,728	3,703	2,868	65,865	9,630	5,380
Singapore	0	0	6,725	0	0	20,918	0	3,728
South Korea	17,538	13,813	19,289	27,489	21,824	453,483	38,201	30,787
Spain	40,337	40,259	59,224	39,359	49,379	215,062	32,579	22,821
Taiwan	15,975	9,541	12,161	6,115	6,211	99,350	12,034	3,404
Thailand	3,419	0	0	4,880	3,490	14,548	0	0
Turkiye	7,281	6,637	16,629	43,697	45,081	188,849	38,420	47,330
United Arab Emirates	0	0	0	0	0	0	0	0
United Kingdom	10,608	39,775	56,799	25,301	60,060	195,046	60,315	30,648
By truck								
Canada	8	15	0	4	13	128	20	8
Mexico	115	122	144	157	148	1,250	148	160
Re-exports								
By vessel								
Argentina	0	0	0	0	0	0	0	0
Brazil	0	0	0	0	0	0	0	0
Japan	0	0	0	0	0	0	0	0
South Korea	0	0	0	0	0	0	0	0
United Kingdom	0	0	0	0	0	0	0	0
Total LNG exports	351,448	330,463	364,116	316,766	353,791	3,560,818	345,363	306,397
CNG								
Canada	0	0	*	0	0	211	0	0
Total CNG exports	0	0	*	0	0	211	0	0
Total exports	614,925	586,833	638,177	546,111	610,678	6,652,609	620,886	556,982

See footnotes at end of table.

Table 5. U.S. natural gas exports, 2020-2022

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

								2021
	October	September	August	July	June	May	April	March
Exports								
Volume (million cubic feet)								
Pipeline								
Canada	62,464	72,023	71,586	68,264	69,528	70,561	74,567	91,301
Mexico	184,472	178,746	193,710	197,623	198,242	192,549	182,918	183,051
Total pipeline exports	246,936	250,769	265,296	265,887	267,770	263,110	257,485	274,352
LNG								
Exports								
By vessel								
Antigua and Barbuda	0	3	0	0	0	0	0	0
Argentina	0	1,950	14,363	22,798	19,312	16,226	4,485	2,238
Bahamas	36	43	56	46	48	45	46	39
Bangladesh	0	3,276	7,085	0	3,493	6,948	10,219	3,566
Barbados	25	33	27	31	22	19	30	14
Belgium	0	0	0	0	0	2,100	0	3,484
Brazil	40,769	38,282	34,204	39,637	32,293	19,726	11,615	21,977
Chile	6,364	7,929	16,262	19,913	0	17,598	10,293	21,320
China	42,202	48,584	51,662	42,222	42,319	37,731	50,474	28,476
Colombia	0	436	919	0	0	0	892	0
Croatia	0	0	2,980	3,299	2,923	3,364	3,666	7,367
Dominican Republic	5,619	0	5,901	1,806	4,670	5,283	2,905	5,577
Egypt	0	0	0	0	0	0	0	0
Finland	0	0	0	0	0	0	0	0
France	9,333	6,578	7,111	0	3,683	11,926	36,120	33,678
Germany	0	0	0	0	0	0	0	0
Greece	1,515	799	3,607	6,651	0	6,796	0	6,805
Haiti	17	10	24	8	18	12	3	10
India	10,548	23,941	20,592	13,090	16,503	28,259	13,752	17,381
Indonesia	477	1,118	0	0	0	0	0	0
Israel	0	2,855	0	0	0	0	3,225	2,826
Italy	0	0	3,401	6,826	3,425	2,923	6,896	10,739
Jamaica	1,858	2,931	2,907	0	2,927	2,925	2,370	2,458
Japan	37,666	10,290	19,979	24,895	39,783	25,058	28,756	27,673
Jordan	0	0	0	0	0	0	0	0
Kuwait	6,193	10,333	3,298	0	7,126	0	3,705	3,821
Lithuania	0	3,282	1,677	6,469	3,285	3,049	3,078	3,228
Malaysia	0	0	0	0	0	0	0	0
Malta	0	2,498	0	0	0	0	2,928	0
Mexico	1,088	0	0	758	0	0	0	0
Netherlands	17,157	10,424	7,347	10,597	3,030	26,611	17,060	24,204
Nicaragua	0	0	0	1	0	0	0	0
Pakistan	3,138	9,642	3,319	13,428	3,376	0	3,323	3,421
Panama	911	0	1,390	0	0	2,341	0	3,279
Poland	3,270	0	0	6,619	10,635	3,581	7,382	3,507
Portugal	10,459	3,696	6,382	3,296	5,538	10,765	7,358	0
Singapore	0	0	0	3,449	0	3,089	3,660	3,303
South Korea	33,836	31,375	50,101	39,314	55,918	46,033	21,683	32,203
Spain	35,638	31,274	23,068	8,630	7,833	5,234	22,974	13,900
Taiwan	7,123	5,789	6,728	20,653	3,097	10,157	6,594	13,450
Thailand	0	0	3,707	0	0	3,453	7,388	0
Turkiye	19,385	24,176	0	5,591	0	3,017	0	3,619
United Arab Emirates	0	0	0	0	0	0	0	0
United Kingdom	3,302	3,099	0	0	0	10,586	13,877	17,440
By truck								
Canada	8	19	18	16	7	18	15	0
Mexico	182	150	147	97	105	48	48	19
Re-exports								
By vessel								
Argentina	0	0	0	0	0	0	0	0
Brazil	0	0	0	0	0	0	0	0
Japan	0	0	0	0	0	0	0	0
South Korea	0	0	0	0	0	0	0	0
United Kingdom	0	0	0	0	0	0	0	0
Total LNG exports	298,119	284,813	298,262	300,143	271,368	314,922	306,818	321,023
CNG								
Canada	0	0	14	16	27	25	29	36
Total CNG exports	0	0	14	16	27	25	29	36
Total exports	545,055	535,583	563,572	566,046	539,165	578,056	564,333	595,411

See footnotes at end of table.

Table 5. U.S. natural gas exports, 2020-2022

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

	2021						2020	
	February	January	Total	December	November	October	September	August
Exports								
Volume (million cubic feet)								
Pipeline								
Canada	78,198	84,927	903,520	84,307	81,358	72,833	62,211	61,881
Mexico	137,381	173,360	1,990,809	164,577	166,135	185,799	182,068	185,867
Total pipeline exports	215,579	258,287	2,894,329	248,884	247,493	258,632	244,279	247,748
LNG								
Exports								
By vessel								
Antigua and Barbuda	0	0	0	0	0	0	0	0
Argentina	0	0	15,068	0	0	0	0	2,249
Bahamas	29	28	257	36	31	25	20	21
Bangladesh	0	3,148	10,660	0	0	0	0	0
Barbados	19	17	241	25	15	17	14	14
Belgium	0	0	31,946	0	3,633	3,285	0	0
Brazil	13,118	21,132	111,826	29,927	30,191	22,427	0	3,520
Chile	6,524	9,784	80,615	9,793	3,252	6,836	3,277	7,428
China	3,415	38,940	214,401	45,525	45,083	35,115	11,245	13,699
Colombia	0	0	4,626	0	0	0	2,548	550
Croatia	0	0	3,275	3,275	0	0	0	0
Dominican Republic	5,689	6,895	26,050	5,000	5,106	5,909	0	2,772
Egypt	0	0	0	0	0	0	0	0
Finland	0	0	0	0	0	0	0	0
France	14,851	3,587	90,237	3,752	3,390	6,639	0	0
Germany	0	0	0	0	0	0	0	0
Greece	0	600	48,403	3,382	3,543	0	7,027	0
Haiti	11	12	118	17	11	9	8	11
India	13,776	20,367	124,402	10,241	10,299	17,762	10,514	10,319
Indonesia	0	0	0	0	0	0	0	0
Israel	0	0	15,834	0	0	0	3,041	3,001
Italy	0	0	68,453	0	3,083	0	0	6,734
Jamaica	2,365	3,708	17,052	2,374	0	2,514	2,610	0
Japan	18,271	64,331	287,672	54,004	32,967	31,554	6,855	22,541
Jordan	0	0	6,872	0	0	0	3,578	0
Kuwait	0	0	17,293	0	0	3,603	3,508	6,886
Lithuania	6,851	0	28,879	6,291	3,621	6,191	3,308	0
Malaysia	0	0	0	0	0	0	0	0
Malta	0	0	2,648	0	0	0	0	0
Mexico	13,354	0	34,408	0	3,056	7,398	3,285	3,701
Netherlands	22,777	2,949	85,573	3,316	6,684	3,603	6,671	0
Nicaragua	0	0	0	0	0	0	0	0
Pakistan	0	3,682	36,934	0	3,436	10,009	9,853	3,412
Panama	0	516	12,764	271	1,448	433	3,228	0
Poland	7,099	0	36,900	7,033	0	3,157	0	0
Portugal	3,360	0	36,922	3,711	5,830	3,564	6,853	0
Singapore	0	3,688	28,341	0	7,658	3,416	0	2,967
South Korea	18,094	55,936	316,227	39,617	49,103	14,239	32,126	13,814
Spain	3,733	7,377	199,966	13,583	9,907	14,118	15,206	3,222
Taiwan	0	10,319	64,363	12,470	6,216	3,636	9,007	0
Thailand	0	0	32,622	0	3,705	0	0	0
Turkiye	20,652	26,659	123,957	20,188	12,817	0	3,611	0
United Arab Emirates	0	0	10,110	0	0	0	0	3,359
United Kingdom	34,343	21,436	160,199	30,378	26,544	17,191	3,664	0
By truck								
Canada	0	0	10	8	0	0	0	0
Mexico	63	83	822	46	52	68	73	78
Re-exports								
By vessel								
Argentina	0	0	2,164	0	0	0	0	2,164
Brazil	0	0	82	0	0	82	0	0
Japan	0	0	387	0	0	82	0	0
South Korea	0	0	387	0	0	82	0	0
United Kingdom	0	0	0	0	0	0	0	0
Total LNG exports	208,394	305,196	2,389,963	304,263	280,682	222,963	151,128	112,462
CNG								
Canada	32	32	386	29	35	26	17	20
Total CNG exports	32	32	386	29	35	26	17	20
Total exports	424,004	563,515	5,284,678	553,176	528,210	481,621	395,424	360,230

See footnotes at end of table.

Table 5. U.S. natural gas exports, 2020-2022

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

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

See footnotes at end of table.

Table 7. Marketed production of natural gas in selected states and the Federal Gulf of Mexico, 2017-2022

million cubic feet

Year and month	Alaska	Arkansas	California	Colorado	Kansas	Louisiana	Montana	New Mexico	North Dakota	Ohio
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 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	31,667	39,285	11,467	160,766	12,900	276,873	3,292	173,929	83,193	193,911
February	28,365	30,183	10,846	143,192	10,142	223,268	2,859	144,804	70,129	175,146
March	31,483	42,466	12,136	157,254	13,251	282,668	3,299	180,669	83,243	193,911
April	29,514	37,756	11,791	156,092	12,842	273,643	3,078	178,912	82,917	185,964
May	29,005	38,563	12,342	162,416	13,063	283,576	3,328	187,994	85,384	192,163
June	27,715	36,918	11,885	154,617	12,716	276,142	2,975	184,732	82,520	185,964
July	26,280	38,045	12,141	160,287	13,215	299,939	3,321	195,904	80,072	189,515
August	27,864	37,753	12,076	158,586	13,224	292,784	3,343	199,365	84,297	189,515
September	28,534	36,508	11,617	153,270	12,769	290,606	3,283	194,290	85,041	183,401
October	30,458	37,626	11,655	160,291	13,213	307,744	3,460	200,567	87,446	199,379
November	30,735	36,079	11,279	155,653	12,722	310,363	3,291	195,365	87,089	192,947
December	33,039	37,006	11,371	157,031	12,928	313,823	3,163	201,176	87,692	199,379
Total	354,660	448,187	140,604	1,879,457	152,986	3,431,429	38,693	2,237,706	999,025	2,281,193
2022										
January	32,865	£37,302	£11,186	£151,815	£12,255	£311,786	£3,092	£196,780	£81,699	£196,005
February	30,014	£33,465	£9,336	£138,369	£10,930	£284,177	£2,801	£183,345	£74,429	£172,829
March	32,473	£37,518	£11,388	£155,246	£12,194	£313,229	£3,214	£219,028	£86,190	£187,872
April	30,910	£36,247	£11,212	£151,319	£12,037	£313,229	£3,042	£215,953	£68,484	£179,444
May	31,677	£37,042	£11,489	£155,982	£12,469	£340,363	£3,152	£223,843	£80,563	£189,214
June	28,644	£35,573	£11,057	£150,046	£12,037	£335,290	£3,464	£214,602	£86,013	£190,021
July	29,654	£36,446	£11,651	£153,067	£12,457	£345,647	£3,465	£227,099	£89,572	£193,519
August	29,380	£36,659	£11,970	£154,806	£12,526	£355,454	£3,634	£230,690	£88,700	£196,604
September	29,288	£34,405	£11,100	£151,415	£11,565	£346,479	£3,572	£233,548	£88,797	£189,795
October	31,122	RE35,354	£11,358	RE155,354	RE12,749	RE363,490	RE3,540	RE247,855	RE90,617	£195,926
November	30,934	RE33,758	RE10,906	RE151,426	RE12,023	RE354,713	RE3,372	RE237,417	RE84,557	RE195,558
December	36,181	£33,179	£11,079	£150,322	£11,632	£359,650	£3,315	£250,414	£76,052	£186,874
Total	373,142	£426,948	£133,730	£1,819,168	£144,874	£4,023,507	£39,663	£2,680,575	£995,673	£2,273,661

See footnotes at end of table.

Table 7. Marketed production of natural gas in selected states and the Federal Gulf of Mexico, 2017-2022

million cubic feet – continued

Year and month	Oklahoma	Pennsylvania	Texas	Utah	West		Other states	Federal Gulf of Mexico	U.S. total
					Virginia	Wyoming			
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 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	221,544	652,640	798,426	19,392	234,432	97,657	35,223	71,772	3,118,370
February	163,094	585,371	609,757	18,126	208,571	89,337	31,366	64,024	2,608,580
March	220,130	645,407	826,381	20,404	227,218	95,164	34,671	74,200	3,143,955
April	214,334	615,899	820,570	19,783	229,075	92,340	34,427	69,762	3,068,700
May	223,372	635,584	844,723	20,313	234,118	94,341	35,868	72,053	3,168,206
June	213,314	616,270	815,947	19,502	227,987	90,259	29,234	67,429	3,056,126
July	221,002	638,200	858,526	20,601	229,376	93,644	30,467	71,744	3,182,278
August	222,329	646,169	863,509	20,347	241,373	89,749	32,659	61,377	3,196,320
September	216,455	622,275	855,425	19,928	216,452	91,662	30,611	34,559	3,086,687
October	223,093	645,126	873,479	20,457	240,446	93,162	37,663	60,037	3,245,301
November	214,361	646,233	836,104	20,014	229,812	90,176	32,023	65,610	3,169,856
December	218,805	677,331	872,543	20,538	241,569	91,741	36,962	67,903	3,283,998
Total	2,571,834	7,626,504	9,875,390	239,405	2,760,429	1,109,232	401,172	780,471	37,328,378
2022									
January	£213,419	£660,345	£853,214	£20,789	£234,795	£85,192	£31,292	£65,454	£3,199,287
February	£192,596	£581,432	£766,441	£18,966	£209,707	£76,605	£28,839	£55,884	£2,870,165
March	£219,732	£635,076	£871,961	£21,315	£239,344	£84,319	£31,519	£63,547	£3,225,163
April	£223,078	£616,181	£856,759	£21,254	£235,580	£81,405	£29,705	£65,810	£3,151,649
May	£237,032	£640,189	£887,465	£22,840	£247,179	£82,036	£31,011	£62,326	£3,295,871
June	£230,337	£616,632	£862,817	£22,278	£240,568	£80,395	£31,237	£63,627	£3,214,637
July	£239,295	£641,726	£887,919	£23,066	£251,625	£85,506	£32,355	£66,393	£3,330,463
August	£238,265	£632,014	£897,401	£23,500	£255,603	£81,633	£32,294	£68,280	£3,349,415
September	£236,726	£613,657	£882,979	£22,110	£245,734	£81,528	£31,485	£66,585	£3,280,768
October	RE241,688	£629,461	RE915,309	RE22,164	£251,647	RE87,030	RE31,961	RE67,352	RE3,393,976
November	RE236,407	RE605,477	RE883,026	RE21,344	RE255,296	RE84,554	RE30,838	RE64,138	RE3,295,747
December	£236,693	£611,429	£897,589	£22,593	£253,760	£80,912	£30,852	£64,047	£3,316,574
Total	£2,745,269	£7,483,621	£10,462,88	£262,220	£2,920,837	£991,115	£373,387	£773,443	£38,923,715

E Estimated data.

RE Revised estimated data.

Source: 2017-2021: U.S. Energy Information Administration (EIA), *Natural Gas Annual 2021*, Bureau of Safety and Environmental Enforcement (BSEE), IHS Markit, and Enverus.January 2022 through current month: Form EIA-914, *Monthly Crude Oil and Lease Condensate, and Natural Gas Production Report*; and EIA computations.

Note: For 2022 forward, we estimate state monthly marketed production from gross withdrawals using historical relationships between the two. We collect 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 individually 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 2022, Federal Offshore Pacific is included in California. We obtain all data for Alaska 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 because of independent rounding.

Summary

Overview of Activity for December 2022

- **Top five countries of destination, representing 60.7% of total U.S. LNG exports in December 2022**
 - United Kingdom (69.3 Bcf), Netherlands (39.9 Bcf), France (38.3 Bcf), Spain (33.8 Bcf), and South Korea (24.7 Bcf)
- **339.6 Bcf of exports in December 2022**
 - 12.3% increase from November 2022
 - 1.6% less than December 2021
- **111 cargos shipped in December 2022**
 - Sabine Pass (41), Cameron (37), Corpus Christi (20), Cove Point (10), Elba (3), and Freeport (0)
 - 95 cargos in November 2022
 - 111 cargos in December 2021

1a. Table of Exports of Domestically-Produced LNG Delivered by Region (Cumulative from February 2016 through December 2022)

Region	Number of Countries Receiving Per Region	Volume Exported (Bcf)	Percentage Receipts of Total Volume Exported (%)	Number of Cargos*
East Asia and Pacific	8	4,474.1	32.9%	1323
Europe and Central Asia	16	5,790.1	42.6%	1817
Latin America and the Caribbean**	13	2,135.9	15.7%	761
Middle East and North Africa	5	376.6	2.8%	110
South Asia	3	823.4	6.1%	245
Sub-Saharan Africa	0	0.0	0.0%	0
Total LNG Exports	45	13,600.1	100.0%	4,256

*Split cargos counted as both individual cargos and countries

**Number of cargos does not include the shipments by ISO container

1b. Shipments of Domestically-Produced LNG Delivered – by Country (Cumulative from February 2016 through December 2022)

Country of Destination	Region	Number of Cargos	Volume (Bcf of Natural Gas)	Percentage of Total U.S LNG Exports (%)
1. South Korea*	East Asia and Pacific	494	1,717.6	12.6%
2. Japan*	East Asia and Pacific	364	1,245.8	9.2%
3. Spain*	Europe and Central Asia	335	1,050.9	7.7%
4. United Kingdom*	Europe and Central Asia	299	989.3	7.3%
5. China*	East Asia and Pacific	289	983.4	7.2%
6. France*	Europe and Central Asia	298	971.7	7.1%
7. Netherlands*	Europe and Central Asia	220	734.8	5.4%
8. India*	South Asia	186	630.1	4.6%
9. Brazil*	Latin America and the Caribbean	217	608.3	4.5%
10. Turkey*	Europe and Central Asia	186	592.3	4.4%
11. Mexico*	Latin America and the Caribbean	164	546.8	4.0%
12. Chile*	Latin America and the Caribbean	132	419.3	3.1%
13. Taiwan*	East Asia and Pacific	103	323.6	2.4%
14. Italy*	Europe and Central Asia	99	314.6	2.3%
15. Poland*	Europe and Central Asia	80	268.8	2.0%
16. Argentina*	Latin America and the Caribbean	110	265.2	1.9%
17. Portugal*	Europe and Central Asia	82	261.4	1.9%
18. Greece*	Europe and Central Asia	74	175.5	1.3%
19. Dominican Republic*	Latin America and the Caribbean	65	157.8	1.2%
20. Kuwait	Middle East and North Africa	45	156.4	1.1%
21. Lithuania	Europe and Central Asia	48	147.3	1.1%
22. Belgium*	Europe and Central Asia	44	141.7	1.0%
23. Pakistan*	South Asia	40	128.9	0.9%
24. Jordan*	Middle East and North Africa	36	124.2	0.9%
25. Croatia	Europe and Central Asia	39	116.7	0.9%
26. Singapore*	East Asia and Pacific	33	107.3	0.8%
27. Thailand*	East Asia and Pacific	24	82.9	0.6%
28. Bangladesh*	South Asia	19	64.5	0.5%
29. Jamaica*	Latin America and the Caribbean	26	57.4	0.4%
30. Panama*	Latin America and the Caribbean	29	52.0	0.4%
31. United Arab Emirates	Middle East and North Africa	15	51.1	0.4%
32. Israel*	Middle East and North Africa	9	28.0	0.2%
33. Colombia*	Latin America and the Caribbean	18	24.2	0.2%
34. Malta*	Europe and Central Asia	10	17.6	0.1%
35. Egypt*	Middle East and North Africa	5	16.9	0.1%
36. Indonesia*	East Asia and Pacific	15	9.8	0.1%
37. Germany	Europe and Central Asia	2	7.1	0.1%
38. Malaysia	East Asia and Pacific	1	3.7	0.0%
39. Finland	Europe and Central Asia	1	0.3	0.0%
Total Exports by Vessel		4,256	13,595.2	
Germany	Europe and Central Asia	1	0.0	0.0%
40. Antigua and Barbuda	Latin America and the Caribbean	34	0.0	0.0%
41. Nicaragua	Latin America and the Caribbean	1	0.0	0.0%
42. Haiti	Latin America and the Caribbean	129	0.4	0.0%
43. Barbados	Latin America and the Caribbean	305	1.3	0.0%
Jamaica	Latin America and the Caribbean	142	1.5	0.0%
44. Bahamas	Latin America and the Caribbean	661	1.6	0.0%
Total Exports by ISO		1273	4.9	
Total Exports by Vessel and ISO		5,529	13,600.1	

Note:

Volume and Number of Cargos are the cumulative totals of each individual Country of Destination by Region starting from February 2016.

Jamaica has received U.S. LNG exports by both vessel and ISO container. The volumes are totaled separately

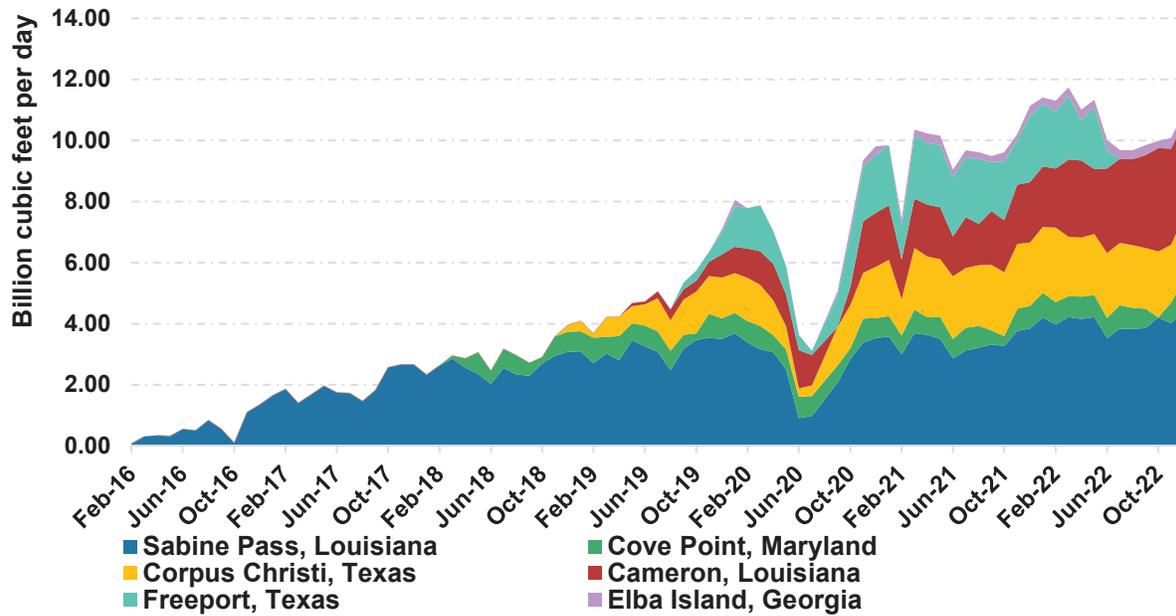
* Split cargos counted as both individual cargos and countries.

Vessel = LNG Exports by Vessel and ISO container = LNG Exports by Vessel in ISO Containers.

Does not include re-exports of previously-imported LNG. See table 2c for re-exports data.

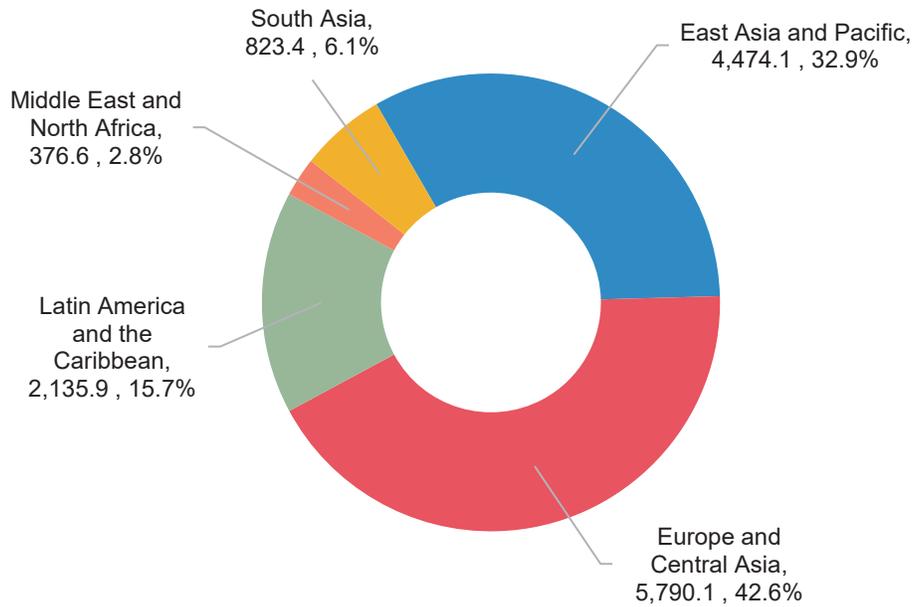
Totals may not equal sum of components because of independent rounding.

1c. Domestically-Produced LNG Exported by Point of Exit (February 2016 through December 2022)



The Cameron, LA point of exit includes exports from Cameron LNG and Venture Global Calcasieu Pass.

1d. Domestically-Produced LNG Exported by Region (Cumulative from February 2016 through December 2022) (Bcf, %)



would add almost 1 million tonnes of production and two full containment LNG storage tanks. You can see the rendering of the project on this slide. We have been hard at work on early-stage development of this project and have back already engaged on front-end engineering and design work and are excited about transforming the engineering drawing on this slide into reality at Sabine Pass.

FINAL

We will develop the Sabine Pass expansion project, utilizing the same rigorous and financially disciplined approach, the project development and capital investment you've become accustomed to from Cheniere. The SPL expansion project is consistent with the significant growth plans we laid out in our capital allocation presentation in September. We showed a potential 90 million tonne platform across the Sabine Pass in Corpus Christi. Our infrastructure platform is an enormous competitive advantage, which this project is expected to capitalize on in order to deliver brownfield economics.

As the world cost for more LNG capacity, Cheniere is in an economically and environmentally advantaged position to provide that incremental capacity. We look forward to updating you on this large-scale growth project at Sabine Pass as well as the developments at Corpus as we move through this process.

Thank you again for your continued support of Cheniere. I'll now turn the call over to Anatol, who will provide an update on the LNG market.

Anatol Feygin {BIO 1959069 <GO>}

Thanks, Jack, and good morning, everyone. Please turn to Slide 9. An accelerated post-pandemic recovery followed by the curtailment of Russian gas flows into Europe, made for a sharp increase in LNG demand in 2022. With limited new liquefaction capacity in several production outages, the LNG market remained extremely tight throughout the year as we saw prices reach all-time highs and remain elevated.

Despite the supply side challenges, global LNG trade grew by approximately 5% from 2021 or an additional approximately 19 million tonnes. Overall, U.S. exports increased 9% year-on-year, up 6.3 million tonnes to 76.5 mtpa in 2022 despite the Freeport outage during the second half of the year. U.S. LNG represented nearly 40% of the growth in global LNG supply and the early completion of our ninth train meaningfully contributed to that growth.

As Jack noted, our increase in production enabled Cheniere to help answer Europe's call for reliable, flexible natural gas supply. Having lost Russia as a significant supplier Europe became a substantial demand center for LNG, attracting approximately 70% of all U.S. LNG in 2022 as prices reached record levels and redirected destination flexible U.S. LNG volumes to address the deficit.

The TTF monthly settlement prices averaged around \$40 per MMBtu in 2022, over 180% higher than the \$14 average in 2021. In the fourth quarter, TTF monthly settlement prices averaged \$42 per MMBtu or 46% higher year-on-year, but significantly lower than the peak of nearly \$100 an MMBtu in late August.

Bloomberg Transcript

Similarly, the 2022 JKM average settlement price increased by over 125% year-on-year to an average of \$34 per MMBtu, with the fourth quarter average price increasing 38% year-on-year to an average of \$38, but well below the summer peak of nearly 70. In the U.S., Henry Hub price averaged nearly \$7.22 but has moderated considerably since the peak in September and is now trading well below \$3 per MMBtu.

This rapid correction driven by North American production growth, again, demonstrates the relative attractiveness of Cheniere's Henry Hub denominated long-term FOB and DES contracts and underpins producers' desire to diversify away from solely domestic indices. Despite the retreat of global gas prices to pre-war levels beginning in the fourth quarter and into 2023 on the back of a mild winter and demand reduction efforts in Europe, the overall market remains volatile, and we expect volatility to remain elevated as Europe sorts out its near and long-term gas supply strategies and the impact of a post-COVID China on the market becomes more apparent.

Let's now turn to Slide 10 to address regional dynamics in some more detail. As noted, much of the flexible LNG in the market was directed to Europe and was able to offset a large part, approximately 84% of the 74 Bcm or 55 million tonne reduction in Russian gas supply. Europe's LNG imports totaled over 120 million tonnes, of which 110 million tonnes went to EU plus U.K., which is a 69% increase year-on-year. U.S. LNG to the block plus the U.K. totaled 48 million tonnes, a 165% increase year-on-year. Clearly, destination flexible U.S. LNG was able to answer Europe's call for natural gas supply in 2022.

Throughout the year, the EU implemented several extraordinary measures to mitigate the potential impact of a complete cutoff of Russian gas and a potentially cold winter amid low nuclear and hydro generation output. As Jack noted, the challenges the European nations faced were significant, but these measures, along with mild weather and demand price response enabled Europe to replenish its inventories and avoid a potentially crippling energy crisis in the near term.

Some of the coordinated initiatives included a regulatory push to immediately increase LNG import infrastructure, diversified supply sources and reduce natural gas demand. To date, five new re-gasification terminals have commenced service in Europe since September, a key enabler of Europe's ability to grow LNG imports to record levels in the fourth quarter.

Demand reduction efforts have also been made across Europe. Residential, commercial and industrial customers were able to reduce aggregate demand by an estimated 12% during the year as power generation resorted to increased coal usage, a trend that we think will reverse in 2023 given elevated gas storage levels and again, a mild weather outlook. At present, it appears the European gas system will make it through this winter without the enforced supply restrictions many had feared.

Amid historically high LNG prices, the global inflationary environment, lower economic activity and lower market liquidity, some of the more price-sensitive Asian buyers withdrew from the spot LNG market. Imports into Asia declined by 20 million tonnes or 7% year-on-year with nearly 16 million tonnes of the drop attributable to China. This was the

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first substantial annual decline in LNG imports since the country began importing in 2006. China's economy faced extended COVID restrictions, a property sector crisis and severe drought, all of which led to a drop in total gas demand of 4 Bcm in 2022 with the decline led by the industrial and power generation sectors.

Similar to parts of Europe, low hydro output and high gas prices supported increased coal generation in the second half of 2022. However, with JKM and TTF prices moderating, we expect to see price-sensitive Asian LNG demand resume and indications of higher industrial activity in China as COVID restrictions are lifted. The latter, of course, could have a potentially material impact on next winter's global balance.

Let's move to Slide 11. Europe shift away from Russia created an immediate supply gap of approximately 70 Bcm in 2022, which will likely rise to approximately 110 Bcm in 2023. Assuming Russian pipeline supplies are eventually fully curtailed, the gap created of 100 mtpa is equivalent to around 1/4 of the current global LNG market. The magnitude of the supply shock stressed the global LNG market in 2022, resulting in some demand destruction in certain regions during the year.

More important, however, as Jack noted, the market dynamics of '22 highlighted the critical role of LNG in ensuring energy security, underscoring the importance of long-term contracted reliable LNG supply in the global energy mix. While short-term dynamics have dominated headlines and narratives over the last year, the long-term fundamentals are central to our strategic planning and positioning and the need for further investment in LNG capacity was again laid bare last year.

Bloomberg Transcript

Over the next few decades, both the supply and demand side are supportive of new liquefaction infrastructure. In addition to high project development hurdles, capital intensity and long construction timelines for new LNG facilities, legacy plant utilization rates worldwide continued to decline as a result of outages, feedstock limitations and fleet inefficiencies as well as competing domestic demand in some markets. Since 2010, the volume produced from these legacy projects has declined by 23% or over 25 million tonnes, further contributing to the need for more capacity.

While these facilities produced about 1/4 of all total volume last year, their contribution will likely decline overtime. As feedstock resources deplete, their ability to export declines and their performance potentially degrades. Meanwhile, investment in downstream LNG infrastructure continues to grow not only in Europe, but also in other parts of the world. Over 370 million tonnes of re-gas capacity is under development, which is equivalent to about 80% of global LNG trade today. Furthermore, nine new markets are expected to enter the LNG trade in the next two years, including Vietnam, the Philippines and Ghana, just to name a few.

Investments in new LNG supply are critically needed not only to address the current market imbalance and meet the expected long-term demand growth, but also to offset declining production from certain legacy production facilities.

operations, above all else. With respect to our annual results. Average production for the year was 132,282 Boe per day comprised of over 80% oil and liquids, which was in line with our annual guidance.

In our Kaybob Duvernay play. We continued to achieve strong production results highlighting the consistency in our operational execution. For example, we recently brought on stream our six fully operated multi-well pad in the liquids-rich phase of the basin with an average IP30 rate of over 1200 boe per day per well, comprised of 51% condensate 15% NGLs and 34% gas. This is yet another highly productive multi-well pad for us that demonstrates our continued successful execution in the play and the scalability of this asset. All of our results to date have generated strong reserve bookings from our independent reserve evaluators McDaniel and Associates. The wells we have drilled and or completed since entering the play the independent

Ken Lamont {BIO 7483493 <GO>}

Years have currently booked wells with expected ultimate recoverable reserves ranging from 700,000 boe, with 70% liquids up to CAD2 million boe with 45% liquids depending on their location within the basin. Those that are not as familiar with the Kaybob Duvernay the basin has multiple phase windows within it. And then North, It is more condensate rich and has more oil resource in place. As you move south into the more liquids-rich. And then, lean gas areas the basin deepens and becomes gassier with a large gas resource in place. In addition to the condensate oil and natural gas liquids that are prevalent throughout the basin.

Our land base is primarily located in the Northern volatile oil condensate rich window, which delivers high condensate production. However, we also have lands in the liquids-rich and lean gas windows, each area generates very competitive returns with significant profitability. We've been very pleased with this asset since entering the play in 2021 and are currently on track to generate approximately CAD900 million of excess free cash flow or net operating income less CapEx by the end of first quarter 2023.

This equates to a very quick two-year payback on our original acquisition. After nearly two years of operating within the basin, we made the strategic decision in late 2022 to increase our land position, and in so doing, have increased our drilling inventory in the play to over 20 years, which underpins our corporate 10-year plan. These recent acquisitions and the outperformance, we have achieved in the play, we now plan to grow our Kaybob Duvernay production from 40,000 boe per day to over 60,000 boe per day in our five-year plan.

Outside of Kaybob. We continued to build momentum in our other resource plays during this past year. For example in the Viewfield Bakken, we have identified, approximately 150 new drilling locations or four years of additional inventory in the play by successfully implementing new well bore designs in open-hole multilateral drilling. Our two most recent eight leg wells using this new design delivered strong IP30 rates averaging over 225 barrels per day of oil with ultimate recovery is expected to be three to four times greater than a traditional infill well. We plan to drill. Several of these open hole wells in

2023 and are evaluating the potential to apply this technology in other areas within our portfolio.

INITIAL DRAFT

In addition to these asset development advancements. We also achieved great success in lowering our emissions profile earlier. In 2022, we successfully reached our target to reduce our direct emissions intensity by 50%, including a 70% reduction in absolute methane emissions three years ahead of schedule. We continue our momentum we said and even more ambitious target

Ryan Gritzfeldt {BIO 16616059 <GO>}

Our direct and indirect emissions intensity. The 0.02 time [ph] of CO2 equivalent per boe by 2030. Or 38% reduction from 2020 levels. We also announced two new water targets in addition to our goal to reduce our inactive well inventory by 30% by 2031. Before I hand it back to Craig, I will briefly speak to our reserve highlights. A year-end 2022, our 2P reserves totaled CAD713 million boe comprised of 82% liquids while our 1P and PDP reserves totaled CAD482 million boe and CAD301 million boe respectively.

On a 2P basis we added approximately CAD55 million boe during the year, replacing 130% of our 2022 production. Majority of this increase in reserves was from organic adds relating to our development execution in our Kaybob Duvernay play and included net positive performance related technical revisions, within our Kaybob Duvernay asset we generated an attractive F&D of approximately \$12 per BOE for wells brought on stream in 2022 which equates to a strong recycle ratio of over five times.

Overall, our reserve-life index is approximately 15 years based on our 2022 production giving us significant running room in the years ahead. Our reserve adds generated attractive recycle ratios of 3.4 times based on PDP SD&A or 2.3 times on a 2P basis both, including changes in future development capital. Altogether our 2P net asset value reached CAD21 million \$21.50 per share, a year-end 2022, while our 1P and PDP NAVs were CAD15.14 and CAD10.38 per share, respectively.

These per share are after deducting our net debt at year-end, reflecting an increase of 30% to 35% across all categories from the prior year. I'll now turn things over to Craig to provide some closing remarks.

Craig Bryksa {BIO 18851844 <GO>}

Thanks, Ryan. As you can see we had some great accomplishments during the past year that have really set us up for success going forward. To the continued execution of our strategy over the last few years we have significantly enhanced our free cash flow generation, improved our long-term sustainability and ultimately increase the underlying value of the business. We've consistently demonstrated our strong technical know-how and continue to optimize our assets while prioritizing safe operations. This execution further reinforces my belief that our asset teams are the best in the business as they continue to innovate and build upon our track record of operational excellence. We continue to look forward into 2023 and beyond to our five and 10-year plans we are well positioned to deliver sustainable returns for our shareholders. And well into the future.

Bloomberg Transcript

Our value proposition continues to be centered around returning meaningful amount of capital back to our shareholders. Combined with sustainable per share growth and a strong balance sheet. In closing, I'd like to thank our shareholders for all their support and continued engagement. Operator, please open the line for questions.

Questions And Answers

Operator

(Operator Instructions). And your first question will be from Travis Wood at National Bank. Please go ahead.

Q - Unidentified Participant

Yeah, good morning, guys and thanks for taking the question. It's probably for Ryan, I just wanted to see if you could provide some context around the kind of multi-lateral locations that you've identified, it looks like you've kind of been pushing the Bakken boundary at Viewfield with the first couple of those. Is there opportunity to bring that back into the core and even taking it a step further. Is there opportunity to potentially go back into existing wells and recomplete goes, so to speak.

A - Ryan Gritzfeldt {BIO 16616059 <GO>}

Yeah, hey, Travis. Thanks for the question. Yeah, I would say, I mean we're looking at applying this across all of our areas. I don't know if it would be applicable to go back into the core where this really works. As we've said we're pushing the boundaries of the pool, where it gets a little bit thinner and there's over line large pool water so fracking doesn't exactly work that well because you bring in water from above. So these multilaterals are definitely pushing the boundaries of the pool, we see approximately 150 more locations and essentially the way to think about it is you can basically drill these multilaterals for 1.5 times the capital of a kind of a traditional infill well.

And we're expecting three to four times the the EURs. So definitely better economics and pushing the boundaries of the play where our kind of traditional fracked wells wouldn't access those reserves.

Q - Unidentified Participant

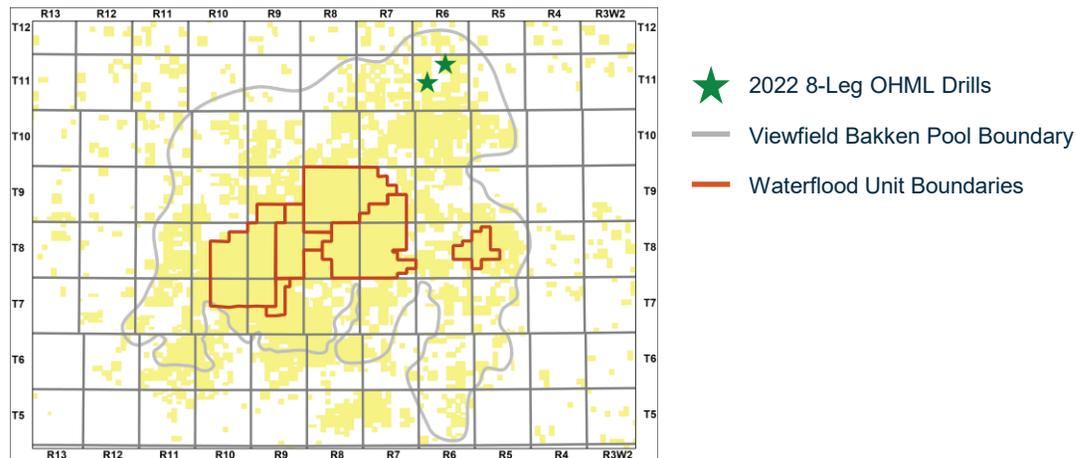
Okay, perfect. And then you kind of alluded to that in terms of pushing into-- and trying to deploy this across other plays, would this work in the Shaunavon, as you think about the reservoir there as well.

A - Ryan Gritzfeldt {BIO 16616059 <GO>}

Yeah, you bet and the Shaunavon is thicker as well. So maybe instead of just doing multilaterals that our The kind of the same height, maybe we start to access more vertical heights in our reservoirs in Shaunavon, but early days there, it's a different reservoir different rock, but our teams are looking at it and exciting to try something here soon.

Innovation in the Viewfield Bakken

- Began leveraging open hole multi-lateral drilling technique in the Viewfield Bakken in H2 2022
 - **Strong performance from most recent eight-leg wells with IP30 averaging >225 bbl/d (100% oil)**
- Open hole multi-laterals **improve returns by enhancing EURs, lowering water cuts and improving capital efficiencies**
 - As a result, **internally identified ~150 additional locations within Viewfield Bakken or ~4 years of inventory**
- Plan to drill several additional open hole multi-lateral wells in the Viewfield Bakken in 2023
 - Exploring the potential to implement the technology in other areas within the asset portfolio



1.5x capital compared to an infill well, resulting in 3x – 4x greater EUR and enhanced economics

Iran can make fissile material for a bomb 'in about 12 days' - U.S. official

[Reuters](#)



[1/2] Colin Kahl, Under Secretary of Defense for Policy, testifies as Department of Defense Inspector General Robert Storch and Director for Operations of the Joint Chiefs of Staff U.S. Army Lt. Gen. Douglas A. Sims II listens, during a House Armed Services Committee hearing on oversight of U.S. military support to Ukraine, on Capitol Hill in Washington, U.S., February 28, 2023.

REUTERS/Elizabeth Frantz

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12

WASHINGTON, Feb 28 (Reuters) - Iran could make enough fissile for one nuclear bomb in "about 12 days," a top U.S. Defense Department official said on Tuesday, down from the estimated one year it would have taken while the 2015 Iran nuclear deal was in effect.

Under Secretary of Defense for Policy Colin Kahl made the comment to a House of Representatives hearing when pressed by a Republican lawmaker why the Biden administration had sought to revive the deal, the Joint Comprehensive Plan of Action (JCPOA)

"Because Iran's nuclear progress since we left the JCPOA has been remarkable. Back in 2018, when the previous administration decided to leave the JCPOA it

would have taken Iran about 12 months to produce one bomb's worth of fissile material. Now it would take about 12 days," Kahl, the third ranking Defense Department official, told lawmakers.

"And so I think there is still the view that if you could resolve this issue diplomatically and put constraints back on their nuclear program, it is better than the other options. But right now, the JCPOA is on ice," Kahl added.

U.S. officials have repeatedly estimated Iran's breakout time - how long it would take to acquire the fissile material for one bomb if it decided to - at weeks but have not been as specific as Kahl was.

While U.S. officials say Iran has grown closer to producing fissile material they do not believe it has mastered the technology to actually build a bomb.

Under the 2015 deal, which then-U.S. President Donald Trump abandoned in 2018, Iran had reined in its nuclear program in return for relief from economic sanctions.

Trump reimposed U.S. sanctions on Iran, leading Tehran to resume previously banned nuclear work and reviving U.S., European and Israeli fears that Iran may seek an atomic bomb. Iran denies any such ambition.

The Biden administration has tried but failed to revive the pact over the last two years.

Reporting By Idrees Ali; Writing by Arshad Mohammed Editing by Alistair Bell
Our Standards: [The Thomson Reuters Trust Principles.](#)

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Daily Energy Markets
VIDEO PODCAST RECORDING
 SUNDAY /// MARCH 5th /// 10:30AM (UAE)
"MONTH IN REVIEW // OUTLOOK AHEAD"

Mike Muller
 Head, Vitol Asia

Christof Rühl
 Senior Research Scholar
 Center on Global Energy Policy, Columbia University

Zoom ID: 843 8266 1096 Password: 12345

SAF Group created transcript of comments by Mike Muller, Head Vitol Asia, with Dyala Sabbagh (COO and Partner, Gulf Intelligence) and Christof Rühl (Senior Research Scholar, Center on Global Energy Policy, Columbia University) on Gulf Intelligence's Daily Energy Markets – March 5th podcast https://twitter.com/gulf_intel/status/1632267183039582208

Items in "italics" are SAF created transcript.

At 13:38 min mark, Muller "Yes indeed and they lead up to the Congress later this month. China has made some policy statements and China has had some better economic news. In the weeks after Chinese New Year, the net migration figures weren't quite as strong as some had predicted they would be during Chinese New Year because, for the first time in three years, Chinese city workers were not told to refrain from going to see their families in the countryside. *But we have seen the beginnings of a reasonable uptick in air travel. We have to remind ourselves it is still not possible to visit China as a tourist.* They are not issuing tourist visas and they are not allowing people to go on tourist trips leaving China either. So it's only open for business travel. And therefore, the vast majority of the Chinese commercial aviation fleet is still not utilized around it. And it is that pent up demand that everyone is expecting will be unleashed at some point later because there are no Covid concerns.

I was fortunate to visit Shanghai just under a month ago and we have travels planned back into China again. And the mask wearing is the same as it is here in Singapore. Of course, Shanghai is perhaps not representative of China but there is a lot of construction, lots of cranes, even some structures that looked like they were consuming lots and lots of concrete. So we know that the property sector is the one that was the Achilles Heel in China. And it obviously had a knock on effect on steel, the other ingredients, cement that go into construction in the first place. But *there do seem to be some very real policy incentives from provincial governments to start building roads, construction of municipal buildings, etc, etc.*

The congestion was very much normal and everyone is saying that things are busier. For example, if you go into Shanghai before Covid, they had such a congestion problem that they had to rule out certain number plates on certain days. So when my colleagues connected me from cities outside Shanghai, they had to come into the city the day before because they couldn't have driven into Shanghai to pick me up in their car. So back to normal in that sense.

But, I think this has led to a sense of optimism, as you said Dyala, in terms of [???] *see a surge in Chinese demand. Not just for jet fuel as the Chinese tourists come back and vice versa, but in terms of Chinese economy, with full support of their pretty cash rich central government, consuming more.*

And we *see it in the behaviour of the Chinese actors in the oil and gas space.* On the gas side, there has been a severe winter drought in [??] so the hydroelectric power is not there so that will lead to more coal and LNG imports potentially. *But we are seeing it in terms of reduced exports of petroleum products in stark contrast to Q4 where we had a policy directive for Chinese refiners to crank up their runs and maximize exports* in what some people believe was an attempt

to improve trade balance at the tail end of the year. Those exports all but dried up because domestic margins were, domestic consumption was good. And there seemed to be some desire to build inventory as opposed to putting it into the international marketplace. So China went from supplying too much oil [products] to not supplying very much. So that gave us a rather bullish tone straight after Chinese New Year.

And now the question is What from Here?

It's awfully difficult to read, of course, but that just serves to illustrate that the market is justified in feeling upbeat and positive about Chinese demand growth. Most analysts seem to be revising their estimates for Chinese oil and gas consumption up for the balance of this year. Substantially so, which will make 2023 one of the biggest year-on-year demand growth stories that we've seen. With the big ones being I think 2009 and 2001 or 2 if I remember correctly. In one of those years, just after the turn of the millennium, China grew by 2 million barrels a day of oil demand, year-on-year.

So the fear of that happening again has the bulls talking their book and suggesting that we could enter a world where spare capacity is in the hands of Russia and Saudi Arabia only. And effectively, that is base case for many people going forward into the second half of the year.

And if you look at where the spare production can come from, you are looking at escalating costs of producing shale liquids in the US and people not necessarily deploying the number of drills, drill rigs that we would have expected a few months ago.

Prepare by SAF Group <https://safgroup.ca/news-insights/>

Foreign airlines ramp up international flights to China amid rising demand

By Global Times Published: Feb 20, 2023 10:08 PM



Beijing airport Photo: VCG

A number of foreign airlines that have benefited from the rapid growth of China's outbound travel are working hard to restart flights serving the country as China has lifted the travel ban, bringing a fast recovery of demand.

KLM Royal Dutch Airlines, a subsidiary of the Air France-KLM Group, said it will increase the frequency of flights connecting with China starting from March 26. It also plans to have three flights from Amsterdam to Hong Kong and to start six direct flights per week to Beijing and Shanghai on the same day, and increase service to a daily flight from May.

Air France plans to increase the frequency of flights between Paris and Beijing, Shanghai and Hong Kong to one daily from July.

As a leading European airline group in China, Lufthansa Group has a long history. The first Lufthansa flight arrived in Beijing from Berlin in 1926.

After the reopening of the Chinese mainland, Lufthansa Group further increased its flight frequency. Starting from March, Lufthansa will double its flights to the Chinese mainland from five weekly flights to nine.

China is always a very important intercontinental market of Lufthansa, the company told the Global Times on Monday.

Airlines in Southeast Asia, which are favored by Chinese tourists, are expanding more rapidly. AirAsia restarted the Guangzhou-Kuala Lumpur route on February 11, and it plans to increase service to eight flights per week from March 2.

Emirates will increase flights between Dubai and Shanghai to daily from March, and will restart the Dubai-Beijing route on March 15. Qatar Airways announced that it will resume daily flight services from Doha to Beijing Daxing International Airport from March 26, while increasing services between Doha and Guangzhou to daily flights.

China-UK direct flights, which were interrupted during the COVID-19 epidemic, are set to resume soon.

According to British Airways, the route between London Heathrow Airport and Shanghai Pudong International Airport will be resumed operations on April 23, with seven flights per week, and British Airways will resume London Heathrow to Beijing Daxing International Airport on June 3.

China has maintained a fast recovery of international flights, as resumed weekly fixed passenger flights have increased by more than 60 percent over the week before downgrading management of COVID-19 on January 8.

The number of fixed international passenger flights stood at 795 across 98 carriers from home and abroad from February 6 to 12, covering 58 countries and regions, the Civil Aviation Administration of China said on Thursday.

The number of flights was up 65 percent over the week from January 2 to 8, the week before China prioritized its COVID-19 management.

Although the return of international routes is accelerating overall, market analysts said it is difficult for domestic airports to see a sharp increase in a short time.

By looking at routes longer than 3,000 miles, the number of flights departing from East Asian airports in the first quarter of this year was 41 percent lower than in the first quarter of 2019. The figure was partly influenced by the Chinese region, a report released by industry consultancy Cirium sent to the Global Times on Monday showed.

Due to the reopening of China, there may be significant changes to flight schedules in the region. The China flight schedule for the first quarter of 2023 shows that while inbound and outbound capacity is roughly 82 percent below pre-pandemic levels, it is more than double that of the first quarter of 2022, Cirium said.

Global Times

China oil markets monthly snapshot

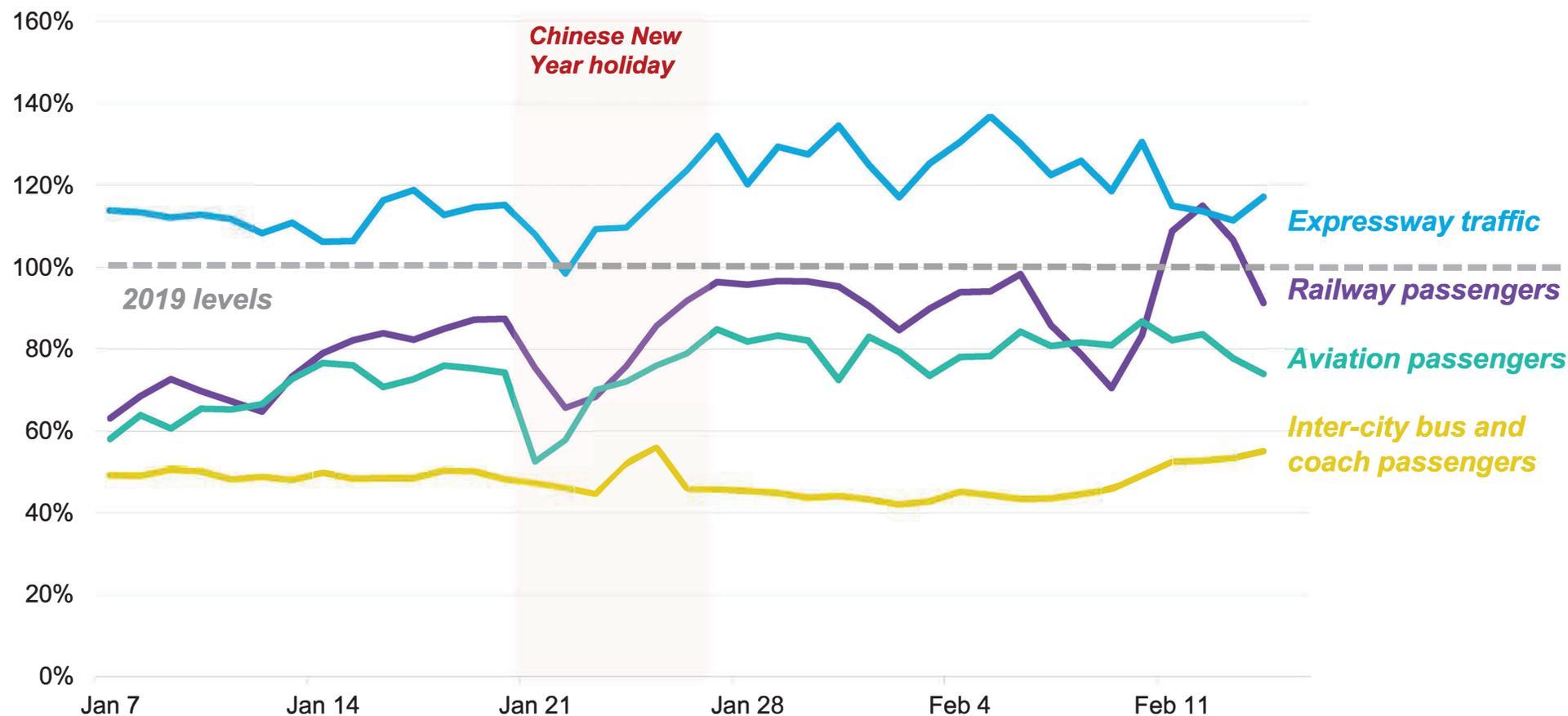
	Indicator	Value	Change		Last update	Comment
Demand	Traffic		M-o-M	Y-o-Y		
	Road freight volume	603 bln ton-km	+1%	-2%	Dec 2022	<ul style="list-style-type: none"> China's mobility data is showing a strong recovery in activity, painting a positive outlook for oil demand. The number of vehicles on China's expressways is consistently 20-30% higher than in 2019, as more people prefer to drive privately. The road congestion index rebounded sharply in February, rising 47% month-on-month. Subway ridership across major cities has rallied to 110% of pre-pandemic levels, indicating a resumption of mobility activity. Flight schedules remain high after the Chinese New Year holiday. International flights are set to increase after March as regulators approve schedule plans for the next two quarters. For further details, see the spotlight and demand sections.
	Air passenger traffic	31 bln ppl-km	+53%	-25%	Dec 2022	
	Port cargo throughput	1.37 bln tons	-1%	+3%	Dec 2022	
	High frequency index		W-o-W	M-o-M		
	Road congestion index	153%	-9 ppt	+132 ppt	Feb 23, 2023	
	Subway traffic index	110%	-0 ppt	+78 ppt	Feb 22, 2023	
	Flight schedules		Increase	Increase	Feb 15-21, 2023	
Refining	Refinery utilization		M-o-M	Y-o-Y		
	State-owned refineries	77%	+4 ppt	-1 ppt	Feb 23, 2023	
	Independent refineries	66%	+0 ppt	+1 ppt	Feb 24, 2023	
	Refinery output (monthly)					
	Gasoline	11.7m tons	-5%	-13%	Dec 2022	
	Diesel	19.0m tons	+1%	+16%	Dec 2022	
Trade	Jet kerosene	3.0m tons	+23%	+32%	Dec 2022	
	Crude imports		M-o-M	Y-o-Y		<ul style="list-style-type: none"> China is handing out generous import and export quotas to refiners to encourage more oil refining, as central regulators strive to boost the economy. Saudi Arabia and Russia remain the biggest sources of China's crude imports. Total crude imports for 2022 were 1% below those of 2021. Refiners are expected to reduce diesel exports in the coming months to meet domestic demand. This comes after the export hikes in the last two months of 2022. For more details, see the trade section on page 13.
	National total	11.4m b/d	-0%	+4%	Dec 2022	
	Selected routes (BBG)	4.4m b/d	-18%	-5%	Jan 2023	
	Fuel exports					
	Quota usage*	97%	(*gasoline, diesel and kerosene only)		Jan-Dec 2022	
	Gasoline	1.9m tons	+28%	+103%	Dec 2022	
Diesel	2.8m tons	+33%	+758%	Dec 2022		

China's Lunar New Year mobility tracker

Expressway traffic is 20% higher than 2019 levels as more people drive privately

China's mobility recovery

Recovery rate (2019 holiday levels = 100%)



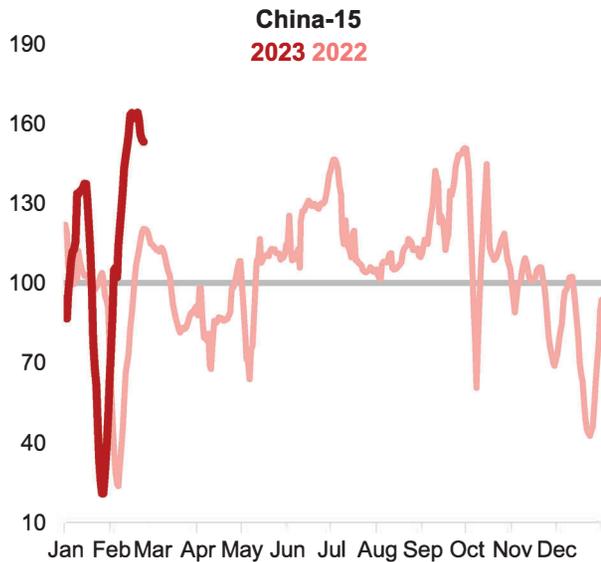
Source: BloombergNEF based on Ministry of Transport data. Note: The 2023 Chunyun, or China's Lunar New Year travel rush, lasts for 40 days from January 7 to February 15. Terminal ticker for expressway traffic is CDPVEWV Index.

China city-level road congestion index

Traffic continues to spike above 2022 highs

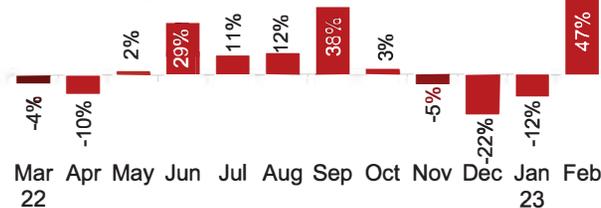
China congestion index (calculated from Baidu data)

Daily peak congestion levels, indexed to January 2021 (seven-day moving average)



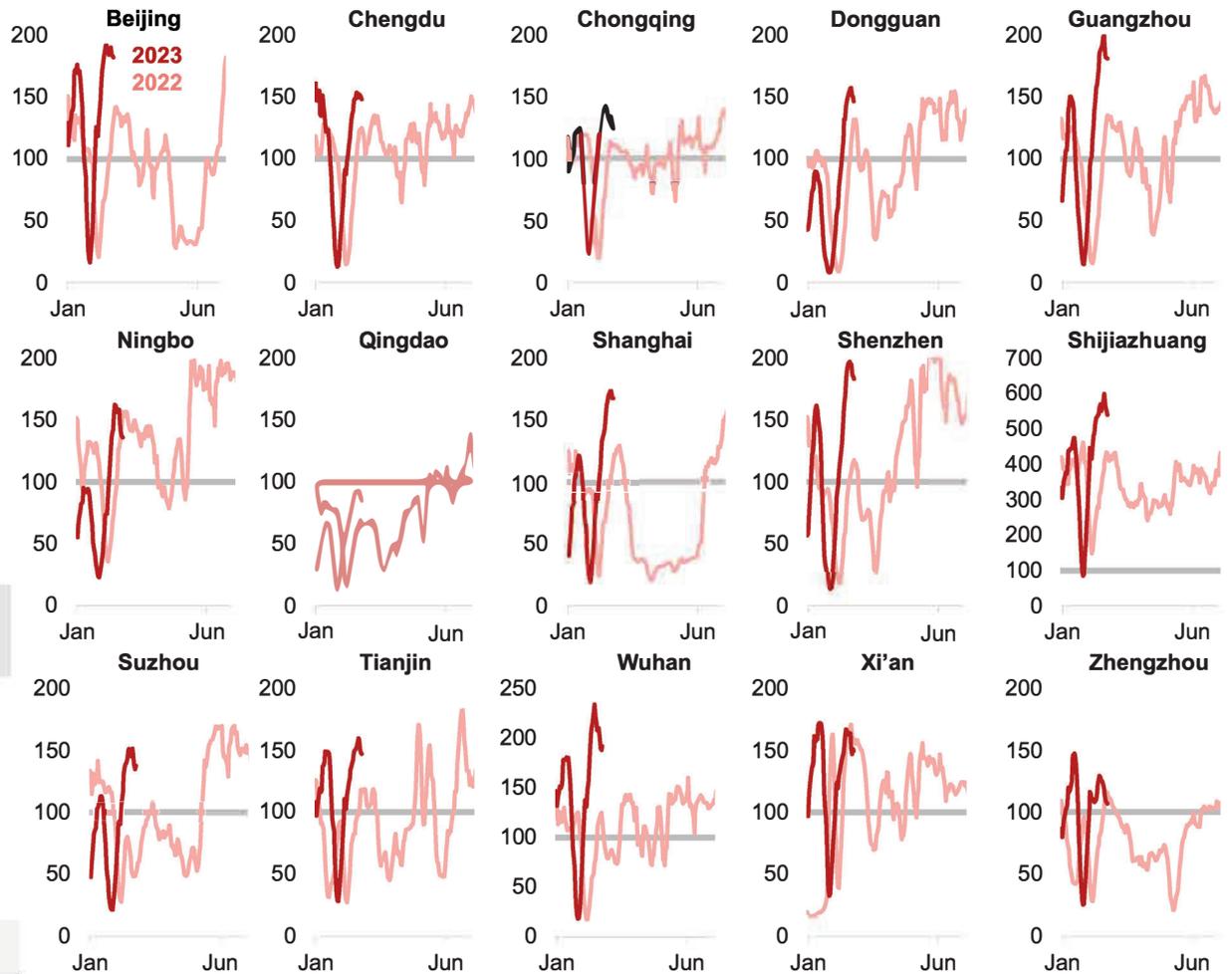
Congestion levels in China in the week ending February 23 were down 8.7 percentage points to 153% of January 2021 levels.

Monthly % change from January 2021 level



	Latest: Feb 23	Weekly Δ vs. Feb 16	Four-week Δ vs. Feb 16
China - 15	153.0	-8.7 (-5%)	131.9 (+626.6%)

Daily peak congestion levels, indexed to January 2021 (seven-day moving average)



Our weekly road traffic report is available on the BNEF website or the Bloomberg Terminal

Source: BloombergNEF, calculated from Baidu's data. Note: **Data updated to February 23, 2023.** City-level charts display the 15 cities with the highest number of vehicle registrations (excluding two- and three-wheelers). The China-15 congestion level is calculated by taking the weighted average of the congestion levels in the 15 cities and their vehicle registration numbers. Δ = change.

China city-level subway rides tracker

Subway rides rebound above 2019 levels – a big jump from January lows

Daily subway passenger volumes, indexed to December 2019



Source: BloombergNEF, daily Weibo update from each city's metro company. Note: The charts show seven-day moving averages. Last updated on **February 22, 2023**. Please note the subway networks in some Chinese cities have seen significant expansions since 2019. Data for Suzhou Metro have been unavailable since late January.

Oil demand

Recovery shows strong momentum

- China's mobility data is showing a strong recovery in activity, painting a positive outlook for oil demand.
- The number of vehicles on China's expressways is consistently 20-30% higher than in 2019, as more people prefer to drive privately.
- The road congestion index rebounded sharply in February, rising 47% month-on-month. Subway ridership across major cities has rallied to 110% of pre-pandemic levels, indicating a resumption of mobility activity.
- Flight schedules remain high after the Chinese New Year holiday. International flights are set to increase after March as regulators approve schedule plans for the next two quarters.

Demand

Refinery

Traffic

Monthly demand indicators

The lifting of travel restrictions is set to boost oil demand

Road freight volume

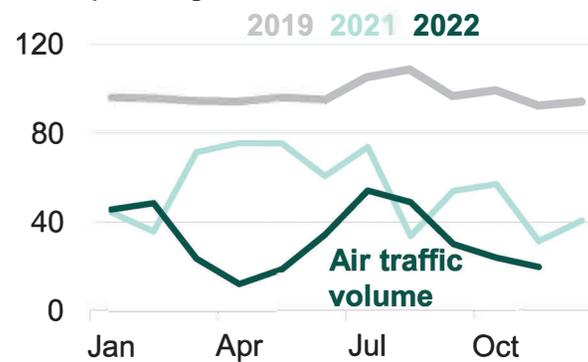
Billion ton-km



Source: National Bureau of Statistics of China, BloombergNEF.

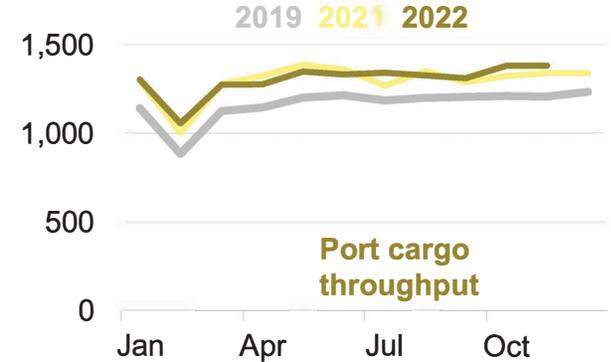
Air traffic volume

Billion passenger-km



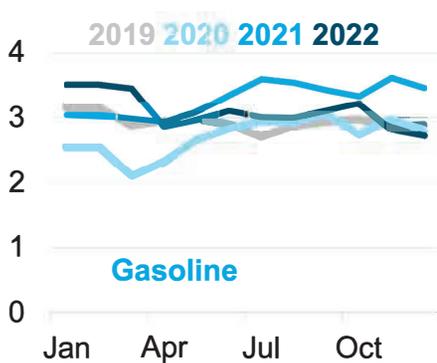
Port cargo volume

Million tons

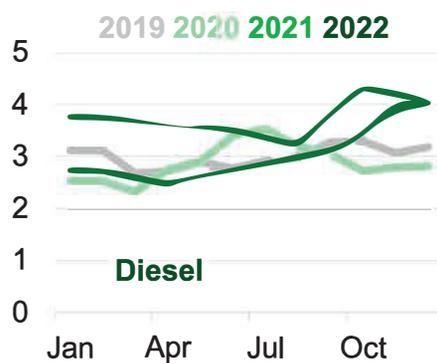


Apparent demand for transport fuels

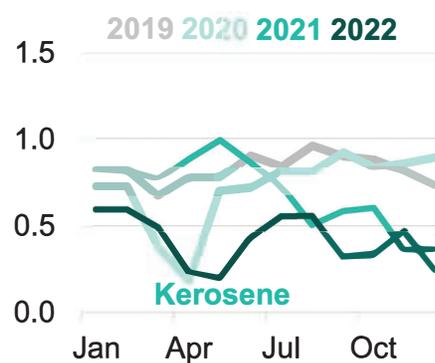
Million b/d



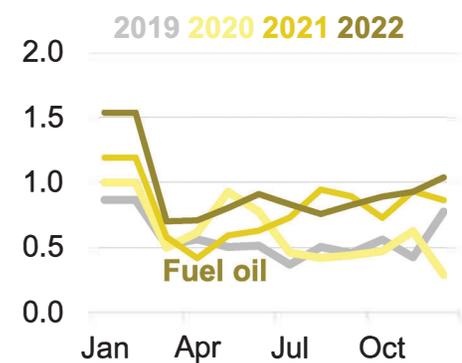
Million b/d



Million b/d



Million b/d



Source: Bloomberg Terminal, BloombergNEF. Note: Apparent demand is calculated by deducting net exports from production (apparent demand = production + imports – exports). China's National Bureau of Statistics reports a combined value for January and February. The charts represent this as an even split between the two months for illustrative purposes.

High-frequency transport data

Major cities see a big increase in mobility indicators

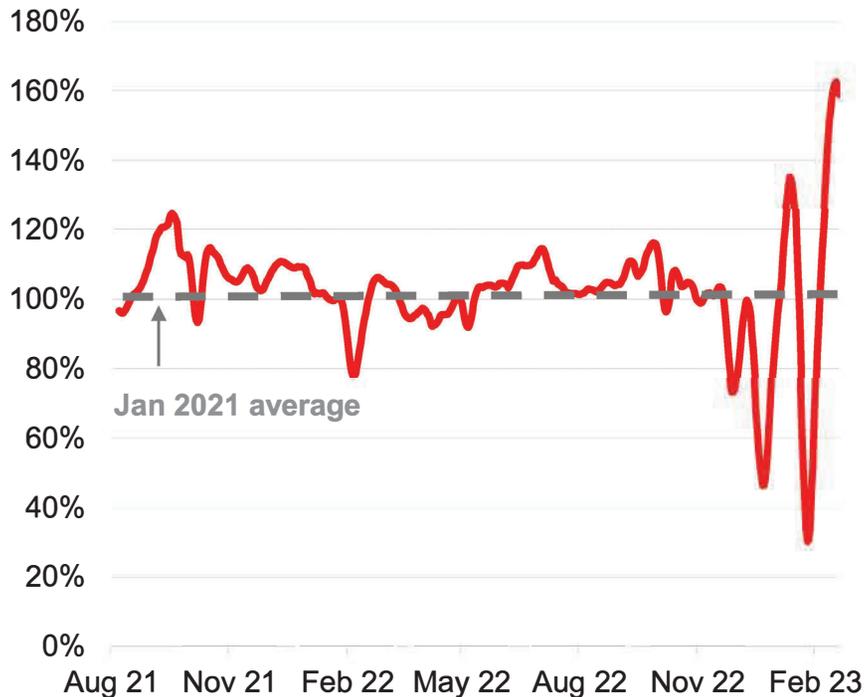
Our weekly **road traffic report** is available on the BNEF website  or the Bloomberg Terminal 

Our weekly **global aviation report** is available on the BNEF website  or the Bloomberg Terminal 

- BloombergNEF tracks road congestion data to gauge the impact of the Covid-19 outbreak on road fuel demand.
 - The China-15 congestion level is calculated by taking the weighted average of the congestion levels in the 15 cities and their vehicle registration numbers. The cities are the top 15 cities with the highest number of vehicle registrations. The peak congestion index is calculated based on average levels in January 2021 (Jan 2021 average = 100%).
- We track the daily subway rides of 11 major cities to measure overall usage of public transportation.

Road congestion

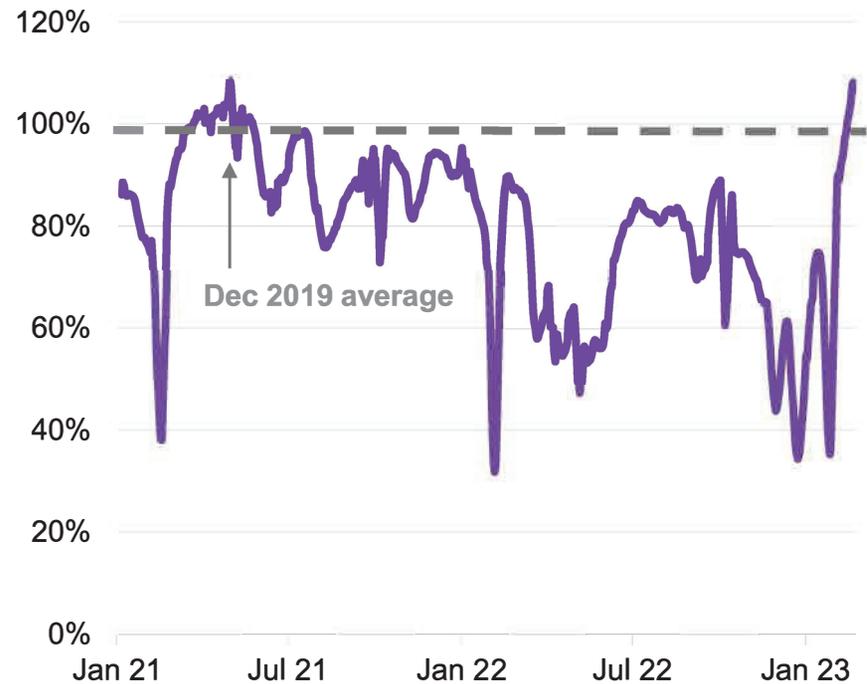
Peak congestion index



Source: Baidu, BloombergNEF. Note: The chart shows seven-day moving averages. Last updated on February 23, 2023.

Subway rides

Rebased Dec 2019 = 100%



Source: BloombergNEF, daily Weibo update from each city's metro company. Note: The chart shows seven-day moving averages. Last updated on February 22, 2023.

Flight schedules and jet fuel demand

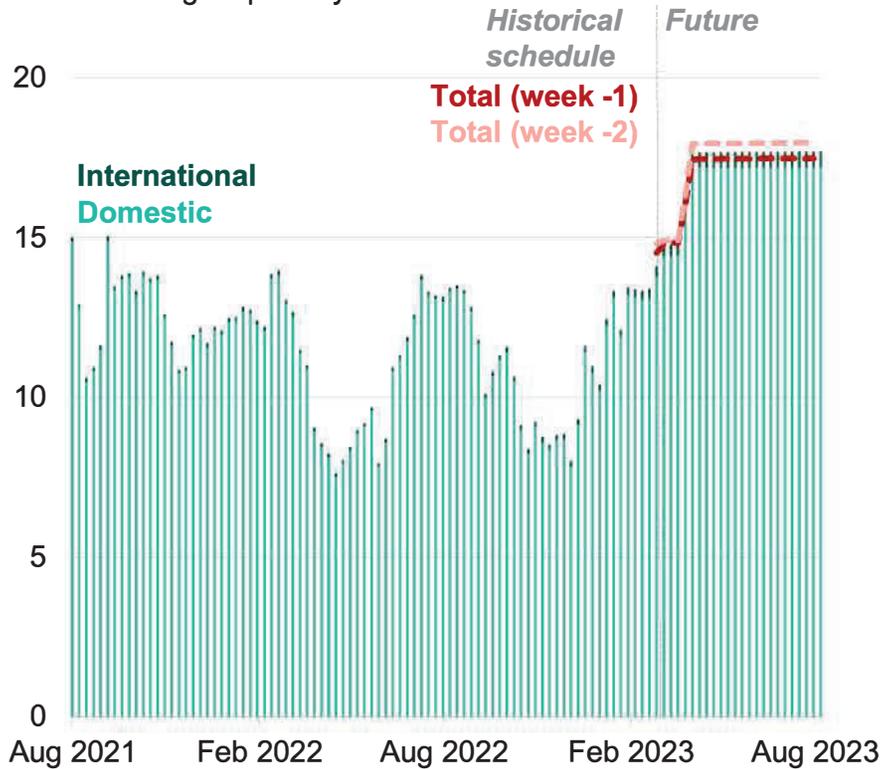
Jet fuel demand remains high after the holiday, overseas travel to surge in 2Q

Our weekly **global aviation report** is available on the BNEF website  or the Bloomberg Terminal 

- We track the flight schedules in major Chinese airports and estimate jet fuel consumption for the next six months based on data for planned routes and aircraft.
 - Schedules are based on the average daily scheduled passenger flight departures from Chinese airports.
 - Oil consumption is based on the aircraft type, distance between origin and destination and the average volume of fuel consumed by each aircraft type for a given distance.
- **NEW:** Bloomberg Terminal users can use our new **DSET FLY <GO>** tool to track jet fuel demand and flight schedules.

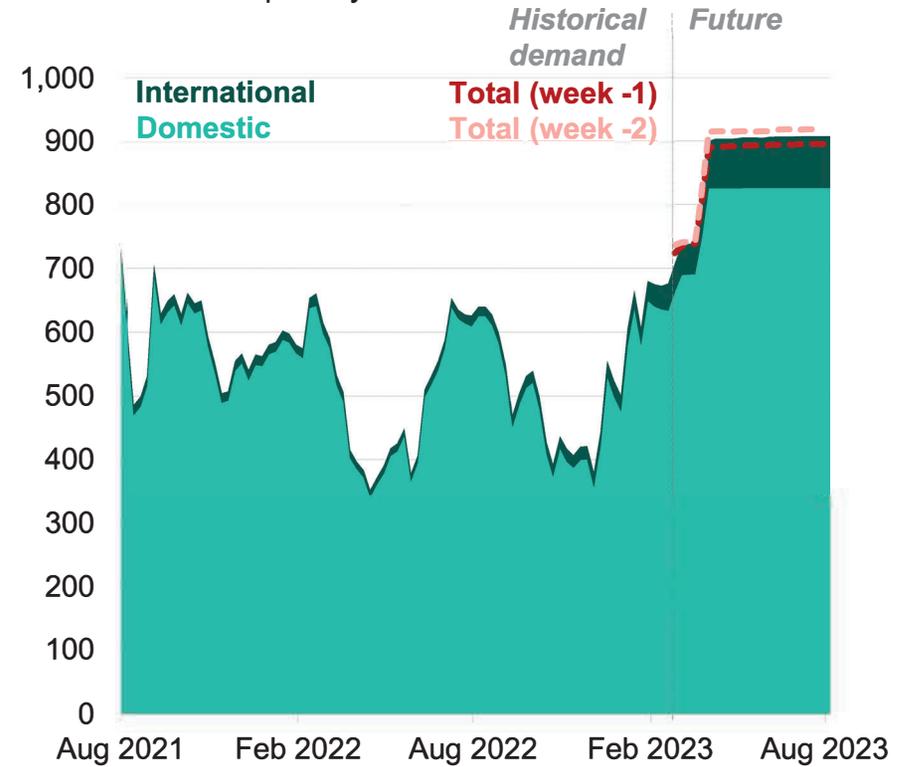
Chinese airport flight departure schedules

Thousand flights per day



Implied jet fuel demand

Thousand barrels per day



Source: BloombergNEF, Bloomberg Terminal FLY <GO>. Note: Last updated on February 15, 2023. Excludes cargo flights. The future flight schedule is subject to change. Terminal users can check DSET FLY <GO> for more details.



Caixin China General Manufacturing PMI™

Manufacturing sector returns to growth in February

Latest PMI data indicated that China's manufacturing sector returned to growth in February amid the recent roll back of pandemic restrictions. Firms signalled renewed and solid upturns in both production and new orders as operations and customer demand revived. Fresh increases in employment and purchasing activity were also seen, while pressure on supply chains eased and lead times improved to the greatest extent in eight years.

The return to more normal business conditions and expectations of further increases in client demand pushed up business confidence regarding the year-ahead to a 23-month high.

At 51.6 in February, the headline seasonally adjusted *Purchasing Managers' Index™ (PMI™)* – a composite indicator designed to provide a single-figure snapshot of operating conditions in the manufacturing economy – increased from 49.2 in January and signalled an improvement in overall business conditions across China's manufacturing sector. Though modest, it marked the first improvement for seven months, with the reading the second-highest recorded by the survey since May 2021.

The higher headline index reading was supported by a renewed increase in production volumes in February. This marked the first upturn in output since last August, with the rate of expansion the steepest since June 2022. Firms frequently mentioned that the recent easing of COVID-19 containment measures and recovery of operations and client demand had underpinned the increase in production.

Similarly, total new business expanded for the first time in seven months, and at the quickest rate since May 2021. Higher sales were linked to the recent roll back of pandemic restrictions and subsequent improvement in demand conditions. Companies also noted an improvement in foreign demand for Chinese manufactured goods, with new export orders rising for the first time since July 2022.

Higher production requirements and improved sales also drove a renewed increase in employment during February. Although staffing levels rose marginally overall, it was the first expansion seen since March 2022. There were signs of increased pressure on operating capacities, however, as backlogs of work rose for the second straight month and at the quickest rate since October 2021.

Purchasing activity meanwhile increased for the first time in four months, and at the fastest rate since June 2021. Inventories data indicated that both stocks of pre- and post-production items fell again in February, albeit at slower rates than in January. A number of firms mentioned the increased usage of current input inventories to supplement production, as well as of finished goods to fulfil incoming new orders.

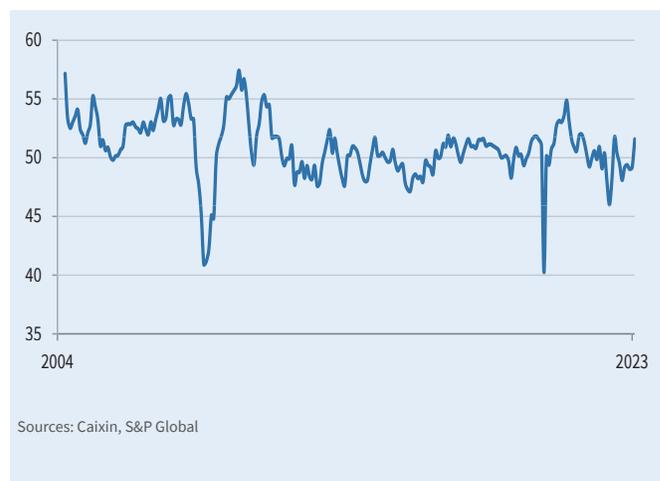
The removal of COVID-19 restrictions, including those around mobility, also had a positive impact on supply chains in February. Average delivery times for inputs improved for the first time since last June, and to the greatest extent in eight years.

Prices data indicated that inflationary pressures remained relatively muted, with input costs rising only modestly in February. Average selling prices were meanwhile lifted for the first time in ten months, albeit only slightly.

Business confidence continued to strengthen in February, with overall optimism the highest since March 2021. Companies widely anticipate further increases in production over the next year amid expectations of a sustained recovery in customer demand.

China General Manufacturing PMI

sa, >50 = improvement since previous month



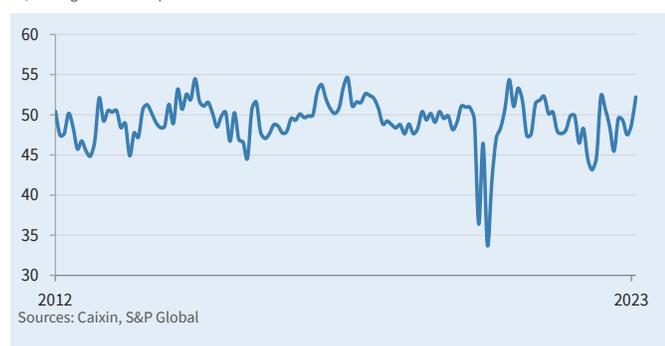
Sources: Caixin, S&P Global

Key findings:

- Renewed increases in output, new orders and employment
- Suppliers' delivery times improve at quickest rate for eight years
- Business confidence strengthens to near two-year high

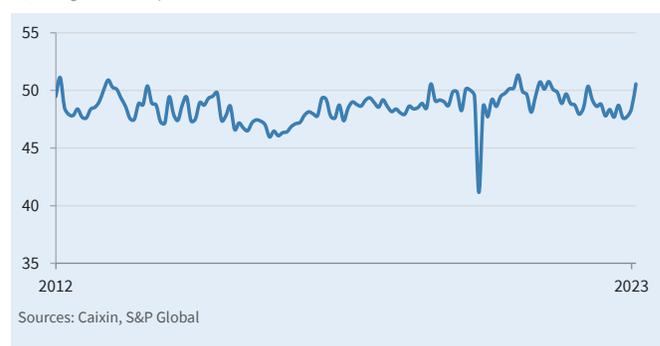
New Export Orders Index

sa, >50 = growth since previous month



Employment Index

sa, >50 = growth since previous month



Commenting on the China General Manufacturing PMI™ data, Dr. Wang Zhe, Senior Economist at Caixin Insight Group said:

“In February, the Caixin China General Manufacturing PMI grew 2.4 points from the previous month to 51.6, rising above 50 for the first time in seven months and logging a new high since June. The recovery in manufacturing activity came as the most recent wave of Covid-19 infections subsided.

“Both manufacturing supply and demand expanded last month, as production gradually returned to normal while both domestic and external demand improved after a Covid policy shift. The readings for output, total new orders and new export orders all rose into expansionary territory, each logging a new high in eight, 21 and eight months, respectively.

“Employment in the sector picked up. Improved market supply and demand as well as an increase in orders significantly boosted employment, driving the subindex above 50 for the first time in 11 months. But the growing number of workers were not able to fulfil all new orders, with the measure for backlogs of work climbing within expansionary territory.

“Prices remained stable in February. Both input and output prices ticked up, albeit only marginally under modest inflationary pressure. The rise in input costs was mainly driven by elevated industrial metal prices, whereas output prices increased as market demand picked up. It is worth noting that the last time the output prices index was above 50 was in April 2022.

“Suppliers’ delivery times continued to improve. With Covid controls optimized, the subindex for suppliers’ delivery times rose to a new high since February 2015 as logistics were restored to normal at a faster pace. In February, the quantity of purchases rose, while stocks of raw materials and inventories of finished products shrank modestly as market activity rebounded.

“Optimism continued to improve among manufacturers in February. The reading for their expectations for future output reached a high not seen since

March 2021. They expressed strong confidence in a post-Covid economic recovery.

“In a nutshell for February, the economy saw a faster pace of recovery following a peak in the recent wave of Covid infections as supply and demand expanded, overseas demand surged, employment started to rebound, and logistics recovered at a faster pace. The quantity of purchases also increased, while inventories dropped, and prices remained stable. Manufacturers expressed stronger confidence in future economic activity.

“Covid infections quickly reached its peak after a Covid policy shift, with the economy entering a post-Covid recovery period. But the impact of the pandemic remains far-reaching. Currently, the foundation for economic recovery is not yet solid, and it will take time to fully restore production and social order to normal. The central government said restoring and expanding consumption should be prioritized. Income and expectation are the basis of consumption. In the coming period, relevant policies should focus more on increasing household income and improving market expectations.”

CAPP Projects Upstream Oil and Natural Gas Investment Will Reach \$40 Billion in 2023

March 1, 2023 (Calgary, Alberta)

The Canadian Association of Petroleum Producers (CAPP) is forecasting oil and natural gas investment in upstream production will hit \$40.0 billion in 2023, surpassing pre-Covid investment levels. That represents \$4.0 billion, or 11 per cent, more in additional spending across Canada's economy than the prior year (all figures in Canadian dollars).

"Investment into Canada's oil and natural gas industry circulates back into the economy, benefiting all Canadians," says Lisa Baiton, CAPP President & CEO. "The expected \$40 billion of investment this year will be spent with businesses across the country, including hundreds of which are Indigenous-owned, support hundreds of thousands of jobs, and direct new spending towards improving environmental performance and emission-lowering technologies, such as carbon capture."

"In addition, the oil and natural gas production from this level of industry spending will continue to generate tens of billions of dollars in royalty and tax revenues to governments to support investment into our hospitals, schools, social programs and infrastructure projects across the country," adds Baiton.

Producers are expected to remain focused on disciplined investment with the increased spending going towards maintenance and incremental growth projects while also managing inflationary pressures which are impacting the entire supply chain. Additional spending is also expected to go towards environmental protection and emission reduction technologies such as advancing the development of carbon capture utilization and storage (CCUS). A report issued by BMO Capital markets showed Canadian oil and natural gas producers have invested an average of \$1.2 billion annually since 2012 into research and development, much of that focused on reducing emissions. The report estimates in 2022 that investment rose to \$1.4 billion and could exceed \$2 billion by 2025. In addition, Canada's upstream oil and natural gas industry is the largest investor in environmental protection, spending over \$3.0 billion annually in areas such as biodiversity habitat protection, air quality management and water protection.

Conventional oil and natural gas capital investment for 2023 is forecast at \$28.5 billion, while oil sands investment is expected to reach \$11.5 billion.

The \$40.0 billion mark represents the third straight year of consistent growth in upstream investment, delivering over 80 per cent growth since the 2020 low of \$22.0 billion reached during the Covid-19 pandemic.

“The year 2023 may be one of the most pivotal moments in time for Canada’s oil and natural gas industry. With an emerging liquefied natural gas export industry, the expected completion of the Trans Mountain pipeline expansion, and billions of dollars in emissions reduction investments waiting to be unlocked, Canada is positioned to play a much larger role in providing responsibly produced energy resources to the world,” adds Baiton “To capture this opportunity, industry and all levels of government will need to work collaboratively on critical pieces of policy to create the conditions for Canada’s oil and natural gas industry to continue to thrive for decades to come.”

Regional Review

Alberta

In Alberta, investment is expected to reach \$28.0 billion in 2023, representing about 70 per cent of all upstream oil and natural gas investment nationally. The growth in investment is being driven both in the conventional and oil sands sectors.

British Columbia

Changing and growing global markets for natural gas have translated into stronger natural gas prices over the past year. Producers in British Columbia are expected to grow investment in the province by about \$1.0 billion in 2023, reaching a total of \$7.2 billion. Investment in the province is expected to be helped by the recent agreements signed by the Province of British Columbia with several Indigenous Nations which satisfies the courts, establishes a process to manage cumulative effects and provides for resource development authorizations and a path towards long-term sustainable development.

Saskatchewan

In 2023, the province is expected to maintain investment of about \$2.7 billion compared to about \$2.6 billion in 2022.

Offshore

In Newfoundland and Labrador, offshore investment is expected to remain relatively flat at \$1.3 billion in 2023. In 2022, Canada’s offshore development showed positive signs with the federal government’s environmental assessment approval of the potential Bay du Nord project as well as the announced restart of the West White Rose Project. Offshore investment in Canada is not growing at the same pace as the broader Canadian oil and natural industry or the global offshore industry, although Canada’s offshore holds significant potential with some of the lowest emission oil in the world as well as its proximity to global markets. The pending investment decision on the Bay du Nord project,

and upcoming exploration programs will be critical to the future of Newfoundland and Labrador's offshore industry.

Additional quotes from Lisa Baiton, President and CEO:

- “Major energy infrastructure projects under construction, like the Trans Mountain expansion, are incredibly important to Canada reaching its potential as a provider of secure energy to our trading partners. The completion of Trans Mountain will enable Canada to export nearly 900 thousand barrels of oil per day to world markets, helping to ensure Canadians get greater value for their natural resources while significantly increasing our role in the global energy market.”
- “Reaching pre-Covid levels of investment is a significant milestone, signaling that the upstream oil and natural gas industry is continuing to grow investment to develop Canadian energy. As countries around the world struggle with the energy crisis, Canada's oil and natural gas production is becoming incredibly important to helping meet global needs while providing a stable supply of energy for Canadians and driving increased investment into our economy.”
- “A secure energy transition requires investment into the current energy system concurrently with growing alternatives. In this transition we should be investing in the best forms of energy to meet growing demand. That list includes Canadian oil and natural gas which is produced with some of the highest environmental, human rights and emissions standards anywhere in the ”
- “Globally, LNG is one of the fastest growing sources of energy and Canada is one of the few stable and democratic countries that have the reserves and capacity to become an exporter of natural gas for decades to come. One of the most effective ways Canada can help lower global greenhouse gas emissions and enhance global energy security is by exporting our lower emission LNG to countries that are relying on coal or Russian natural gas to power their economies.”

The Canadian Association of Petroleum Producers (CAPP) is the trusted voice for companies, large and small, that explore for, develop and produce natural gas and oil throughout Canada. CAPP's member companies produce about 80 per cent of Canada's natural gas and oil. CAPP's associate members provide a wide range of services that support the upstream oil and natural gas industry. Together CAPP's members and associate members are a solution-oriented partner to Canada and the world's needs for safe, secure, reliable, affordable and responsibly produced energy, and an important part of a national industry with revenues from oil and natural gas production of about \$116 billion a year. CAPP supports industry efforts to continue to reduce upstream GHG emissions and play a role in support of Indigenous participation and prosperity. As a non-partisan organization, CAPP works with all governments and all parties to ensure that our industry is long-standing.

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Cutting oil and gas production is not healthy, says Shell boss Wael Sawan

2023-03-03 09:39:14.500 GMT

(The Times)

It has been two months since Wael Sawan became the first non-European chief executive of Europe's biggest oil and gas company. "I still pinch myself at the fact that I am the CEO of Shell," says Sawan, a Lebanese-Canadian citizen who began his career with the group 25 years ago.

"When I joined, there weren't many Middle Easterners in the company, let alone Middle Easterners at executive level." The top job, he says, was "never something I wanted to entertain because I didn't believe it was possible and I didn't think that I was the best of the best".

Since succeeding Ben van Beurden in January, Sawan, 48, has been thrust into the spotlight as he unveiled Shell's results for 2022: its \$40 billion profits were the highest in the company's 115-year history. The bumper haul was branded "obscene" and the "windfalls of war" by critics, who accused Shell of having failed to invest enough of its fossil fuel riches in the green energy transition.

Sawan says his ability to deal with such criticism is one of the reasons he was hired. "I still don't think I'm in this job because I'm the best at anything," he says in his first in-depth interview as chief executive. "I have the right qualities for this phase of the journey that Shell is on: I'm a truth-teller. I'm very comfortable taking some of the flak that comes with a job like this and being able to say, 'Look: I wish it was different but this is the reality.'"

Sawan's beliefs about the realities of the global energy system are grounded in his family background. He was born in Lebanon, to which his Palestinian father had fled as a refugee in 1948, although he was raised primarily in Dubai where his father worked. Sawan's mother died when he was in his early twenties but his father lives today in Lebanon.

"I come from a context where I go back home to see my father and we don't get the privilege of electricity more than a couple of hours a day from the grid, and then you have a diesel generator that supplements a bit of the rest, then you have some batteries that supplement the rest of it. That's a reality that's in my father's house today."

He recalls childhood summers visiting Lebanon where the family would use a single tub of bathwater and a recent visit with his sons when fuel was being rationed and they queued for hours at a service station to fill up half a tank. "That context means at the core of what I believe is, 'Don't deny people energy.'"

The experience of last year, when Russia curtailed gas supplies sending prices soaring, has shown "the fragility of the energy system when we starve it of the supply that is required", Sawan says. "I am of a firm view that the world will need oil and gas for a long time to come. As such, cutting oil and gas production is not healthy."

Shell, the world's biggest liquefied natural gas trader, has already made clear that it plans to grow its gas business. However, Sawan's statement stands in contrast to Shell's stated plan for its oil output to decline by 1 to 2 per cent each year this decade, from a peak in 2019. Does the target still stand? "Until advised otherwise," Sawan says, promising to say more at the company's capital markets day in June and making clear that it is under review. "We're reflecting on what is the right guidance to the market."

Shell's stated plan is for its oil output to decline by 1 to 2 per cent annually this decade from a peak in 2019

Shell had anticipated gradual production decline as it offloaded non-core assets, such that at most its oil output would have fallen from about 1.8 million barrels per day in 2019 to about 1.5 million barrels per day by 2030. It sold assets more quickly than expected, however, and its production has already dropped below that level.

"When we set that target the context was not, 'I would like to shrink my oil business.' That was never the intent. The intent of the target was we were just too diluted and we needed to really focus on the core countries that create the majority of our value."

Shell has pledged to achieve net-zero emissions by 2050 and Sawan says it stands by this and its "powering progress" strategy, set out in 2021. "It's a strategy that looks at investing in oil and gas with lower and lower carbon over the coming years while at the same time investing in zero and low-carbon energy for the future. That hasn't changed."

Rebuffing activist investor calls to break itself up, Shell has argued that its oil and gas business can provide the capital needed to invest in green energy. "But there is an onus on our zero and low-carbon energy investments to make money in their own right," Sawan says. "This is not about one part of Shell subsidising another part of Shell."

It is also not about becoming the biggest electricity company, an ambition that Shell floated a few years ago that Sawan says no longer stands: "That's not our forte."

He says it would be short-sighted to judge its renewables efforts purely by solar and wind, where achieving desired returns from standalone projects is "a challenge", especially in offshore wind where Shell is grappling with supply chain pressures and cost inflation. He sees much greater potential for Shell in biofuels and hydrogen — "a lot of our strengths will sit in green molecules" — as well as in electric vehicle charging, where it has almost 140,000 charge points globally, more than some of its peers are aiming to have this decade.

What this all adds up to is unclear. Only 14 per cent, or \$3.5 billion, of Shell's capital expenditure last year was in its "renewables and energy solutions" division but this excludes things such as biofuels and Sawan has said that a third of its total spending is on the "energy transition".

The small print shows, however, that this category includes spending on non-energy products and services that happen to have low emissions, such as its global convenience store network, which sells 450 million cups of coffee a year. Can this really be labelled as “energy transition”? “It’s a fair challenge,” Sawan says, adding that this too is under review.

Our interview takes place at the Shell Centre in London, now the company’s global headquarters after it moved from the Netherlands last year. On the wall in Sawan’s office is a vintage poster he inherited from Van Beurden that reads: “Everywhere you go, you can be sure of Shell.” The old fuel advertising slogan used to be applied to Shell as an investment proposition, too, until 2020 when the pandemic hit, oil prices crashed and Shell cut its dividend for the first time since the Second World War. “It was the prudent thing to do; we didn’t know where Covid was going to take us. Have we lost [the] confidence of some? Absolutely.” He says it will take years to rebuild that confidence.

The challenge does not just stem from the dividend cut: over the past few years, as Shell has increased its commitments to the energy transition, its shares have underperformed its more oil-focused American rivals such as ExxonMobil.

“Right now I fundamentally believe — at least every single one of my investors is telling me — we are significantly undervalued,” Sawan says. “We’re in this dilemma where we have some shareholders who are very, very keen to stick to the old approach and other shareholders, who are a small representation, saying ‘can you do a bit more in energy transition?’.”

He argues that green investors who shun Shell because they do not believe it is moving fast enough in the energy transition are suppressing its share price, thereby increasing its cost of capital and actually preventing it from investing as much as it would like in green energy. “Many of the detractors will, if anything, perversely move us backwards in the energy transition.

“What we need is those shareholders who are keen on us to be a force for good in the energy transition to be saying, ‘We’re going to put our capital behind you.’ Right now those are not the voices that are necessarily really investing in Shell.”

Sawan laments that in northwest Europe many see Shell “wrongly, to be part of the problem rather than part of the solution”; in the Americas, he says, there is “enormous pride” in what it is doing.

Would Shell not be better valued if it relocated and switched its primary listing to the United States, as it briefly considered doing before the move to London? “It was just 2019 that we were within a whisker of ExxonMobil. So before I jump to the conclusion that it is just a question of where we’re listed, there’s a number of things we can do better. I’d much rather focus on the things that are immediate and controllable rather than get distracted about where our headquarters should be. You might get to a conclusion at some point that I need to look at more options but there’s a lot more running room to increase the value of the company before we get to the question of, ‘Where do we need to be domiciled?’.”

Sawan's immediate priorities are on "performance and discipline" to ensure that Shell can deliver the short-term returns that its investors expect: "We can do much better. We have left far too much money on the table."

Shell needs to address reliability issues such as Prelude, its trouble-prone floating liquefied natural gas plant off Australia, and to cut its costs, which are "way too high", although "the intent is not to start with job cuts", he says. "The bigger prize is in really focusing on a handful of things and really getting them right." Sawan has already started a review of Shell's loss-making UK household energy supply business, which he says is "just not sustainable".

"We're going to have to have the fortitude to call it when it's not working. Without performance and discipline, we won't be able to bridge the valuation gap; we won't be able to lower our cost of capital. Therefore, we won't be able to move as quickly as we would like into the energy transition."

For a man who was widely seen as a continuity candidate, Sawan appears poised to make significant changes. One thing he will not be getting rid of, however, is that vintage poster on his wall, which serves as a "good reminder" of his mission. "If I finish my tenure and there's still a question as to whether you can be 'sure of Shell', then I'll have not achieved what I wanted to achieve."

Q&A

Who is your mentor? Andy Brown [former Shell upstream director]. He always saw more in me than I saw in myself.

Does money motivate you? In part, but what motivates me more is mobilising a team to achieve big things.

What does leadership mean to you? Helping to remove obstacles in the way of our people, enabling them to deliver our strategic intent.

Who do you most admire? My father. He faced significant adversity in life yet managed to overcome and rise above it.

What's the most important event in your career? Working in Shell's retail business. It was the first job where I had multiple layers reporting to me. I remember visiting a site and remarking on the dirty state of a bathroom. I came back the following year and it was gleaming. It made me appreciate the incredible influence and responsibility you have on the people you lead. The shadow a leader casts is such an important one. You need to choose carefully what shadow it is that you want to cast.

How do you relax? Playing football with the kids, followed by a gin and tonic with my wife. I love football. I used to play twice a week in the Netherlands.

What's your favourite TV programme? I watch football and I watch Netflix. I typically watch whatever my wife is interested in watching because I typically sleep through it, gin and tonic in hand.

Age 48

Education McGill University, Canada, BA & MA in chemical engineering; Harvard Business School, MBA

Career 1997-present, Shell: various roles, then general manager Shell Retail (2007-08), vice-president for commercial new business development and LNG (2009-12), managing director of Qatar Shell companies (2012-15), executive vice-president, global deep water (2015-19), director of upstream (2019-21), director of integrated gas, renewables and energy solutions (2021-22), chief executive (2023-)

Lives London

Family Married to Nicole; three sons

-0- Mar/03/2023 09:39 GMT

To view this story in Bloomberg click here:

<https://blinks.bloomberg.com/news/stories/RQXUTECEX0QP>

Excerpt SAF Group Dec 19, 2021 Energy Tidbits memo

Energy Transition – CPPIB's #MacronMoment, a “new” oil & gas investment approach

There was a significant positive to oil and gas investing this week and one that we expect others to follow, and this will lead to more long term investor capital allocation to oil and gas. On Wednesday, CPPIB announced its “new” investment approach in its release “*CPP Investments highlights importance of decarbonizing hard-to-abate sectors in addressing climate change*”. [\[LINK\]](#) This is a significant change for a couple of reasons and one that we have been expecting based on the feedback we hear from long term investors. CPPIB calls it a “*new investment approach*” including on oil and gas. (i) CPPIB is a leader and is providing the messaging framework that we expect others to follow. Big long term investors like CPPIB have mostly all come out plans on how they taking their investment strategy to Net Zero. But, in discussions, more are realizing the Energy Transition isn't happening as fast as expected so their challenge is how to slow play their capital allocation to Net Zero. CPPIB provide the messaging on how they will do so. (ii) **CPPIB now calls oil and gas a “strategic sector” and one for capital allocation.** CPPIB said “*helping businesses decarbonize is critical to addressing climate change, according to a recent perspective published by Canada Pension Plan Investment Board (CPP Investments). The perspective, “Investing to enable an economy-wide evolution to a low-carbon future,” highlights the opportunity decarbonization presents for long-term investors, noting the need to address a particularly serious obstacle to decarbonization: strategic sectors that are essential, high-emitting and hard-to-abate. The perspective also outlines CPP Investments’ new investment approach which aims to identify, fund and support companies that are committed to creating value by lowering their emissions over time, consistent with CPP Investments’ time horizon advantage. “High-emitting companies that successfully navigate the economy-wide evolution to a low-carbon future will preserve and deliver embedded value for patient long-term investors like CPP Investments,” said Deb Orida, Global Head of Real Assets & Chief Sustainability Officer. “This new investment approach complements the Fund’s ongoing commitment to investing in companies that have the potential to develop innovative climate technologies around the world and furthers our existing capabilities in technologies that enable the energy evolution.” Strategic sectors that are essential, high emitting and hard-to-abate within this investment approach include agriculture, chemicals, cement, conventional power, oil and gas, steel and heavy transportation. The successful decarbonization of these sectors is not only essential to meet wider net-zero ambitions, but also to sustain economic growth, stability and a responsible transition.*” Our Supplemental Documents package includes the CPPIB announcement.

Prepared by SAF Group <https://safgroup.ca/news-insights/>

<https://www.newswire.ca/news-releases/cpp-investments-partners-with-ikav-to-acquire-aera-energy-801639189.html>

CPP Investments Partners with IKAV to Acquire Aera Energy

NEWS PROVIDED BY

Canada Pension Plan Investment Board

Feb 28, 2023, 17:50 ET

Partnership will accelerate Aera Energy's ability to further reduce carbon intensity and support the development of carbon capture and storage and other emerging technologies.

TORONTO and HAMBURG, Germany, Feb. 28, 2023 /CNW/ - Canada Pension Plan Investment Board ([CPP Investments](#)) will partner with international asset management group IKAV to acquire California energy producer Aera Energy LLC.

In September 2022, IKAV, which has deep renewables expertise as well as a strong track record managing U.S. conventional energy assets, announced plans to acquire Aera Energy. CPP Investments, one of the world's largest institutional investors, agreed to purchase 49% of Aera Energy from IKAV. Created as a joint venture between Shell and ExxonMobil, Aera Energy is California's second-largest oil and gas producer and accounts for nearly 25% of the state's production.

IKAV, CPP Investments and Aera Energy recognize that meeting the complex challenge of climate change will require innovation across the global economy at a significant scale. CPP Investments and IKAV intend to help Aera balance its energy transition efforts with the need to continue meeting California's conventional energy demands by investing in a renewable energy portfolio that will power Aera's existing operations. Over time, renewable power will be deployed across

Aera's land holdings, while selected legacy oil and gas infrastructure will be repurposed to create carbon capture and storage capability.

Constantin von Wasserschleben, Chairman of IKAV, comments: "We are aligned with CPP Investments in our commitment to achieving a smooth and sustainable transition to renewable energy. By delivering an energy solution at Aera that ties renewable growth with the safe and responsible operation of conventional energy assets, we are pursuing the right steps to balance California's energy demand with its future climate goals."

Bruce Hogg, Managing Director, Head of Sustainable Energies at CPP Investments, comments: "Our investment in Aera Energy is consistent with a number of investments we've made which will help California transition to secure, green energy supplies, while at the same time will deliver long-term risk-adjusted returns for the CPP Fund. CPP Investments believes that enabling emissions reduction and business transformation in the energy sector can drive strong returns for long-term investors as part of the whole economy transition, and partnering with a like-minded investor like IKAV presents an excellent opportunity to put that decarbonization investment approach into action."

Erik Bartsch, Aera Energy President and CEO, comments: "We are excited about the IKAV and CPP Investments joint ownership of Aera Energy. It tells us they believe in the need to meet the energy needs of Californians for decades to come and are confident in our ability to deliver innovative solutions that will help the state meet its bold climate goals. Aera will continue to power the California economy and live our values of exceptional care for people and the environment. We also remain committed to the principles that make us an employer of choice and a valued partner in the communities where we live and work."

About IKAV

IKAV is an international asset management group headquartered in Germany, with local offices in Luxembourg, Italy, Spain, Portugal, USA and France. The group was established in 2010. It provides institutional investors with investment solutions spanning a broad range of infrastructure energy assets, including solar, concentrated solar power, wind, energy efficiency, geothermal, thermal power plants & upstream. IKAV is a buy & hold investor with a vertically integrated business model to optimize its investment portfolio and to make its assets in line with the global net zero strategy over the upcoming decades. For more information, please visit ikav.com.

About CPP Investments

Canada Pension Plan Investment Board (CPP Investments™) is a professional investment management organization that manages the Fund in the best interest of the 21 million contributors and beneficiaries of the Canada Pension Plan. In order to build diversified portfolios of assets, investments are made around the world in public equities, private equities, real estate, infrastructure and fixed income. Headquartered in Toronto, with offices in Hong Kong, London, Luxembourg, Mumbai, New York City, San Francisco, São Paulo and Sydney, CPP Investments is governed and managed independently of the Canada Pension Plan and at arm's length from governments. At December 31, 2022, the Fund totalled \$536 billion. For more information, please visit www.cppinvestments.com or follow us on [LinkedIn](#), [Facebook](#) or [Twitter](#).

About Aera Energy LLC

Aera Energy is a California company and a long-time leader in the energy industry accounting for nearly 25 percent of the state's oil production. Formed in 1997, it is headquartered in Bakersfield and known for excellent safety and environmental performance, innovative business practices, application of cutting-edge technology, a dynamic company culture and being a valued community partner. With operations centered in the San Joaquin Valley, much of Aera's oil production comes from Kern County. Aera also has active oil field operations in Ventura, Monterey and Fresno counties. For more information, please visit www.aeraenergy.com or follow us on LinkedIn, Facebook or Twitter.

SOURCE Canada Pension Plan Investment Board

<https://www.cppinvestments.com/public-media/headlines/2021/cpp-investments-highlights-importance-of-decarbonizing-hard-to-abate-sectors-in-addressing-climate-change>

CPP Investments highlights importance of decarbonizing hard-to-abate sectors in addressing climate change

- CPP Investments releases position outlining investors' role in enabling an economy-wide evolution to a low-carbon future
- Introduces new investment approach that will identify, fund and support companies in their effort to decarbonize

Toronto, CANADA (December 15, 2021) – Helping essential, high-emitting businesses decarbonize is critical to addressing climate change, according to a recent perspective published by Canada Pension Plan Investment Board (CPP Investments). The perspective, "Investing to enable an economy-wide evolution to a low-carbon future," highlights the opportunity decarbonization presents for long-term investors, noting the need to address a particularly serious obstacle to decarbonization: strategic sectors that are essential, high-emitting and hard-to-abate.

The perspective also outlines CPP Investments' new investment approach which aims to identify, fund and support companies that are committed to creating value by lowering their emissions over time, consistent with CPP Investments' time horizon advantage.

"High-emitting companies that successfully navigate the economy-wide evolution to a low-carbon future will preserve and deliver embedded value for patient long-term investors like CPP Investments," said Deb Orida, Global Head of Real Assets & Chief Sustainability Officer. "This new investment approach complements the Fund's ongoing commitment to investing in companies that have the potential to develop innovative climate technologies around the world and furthers our existing capabilities in technologies that enable the energy evolution."

Strategic sectors that are essential, high emitting and hard-to-abate within this investment approach include agriculture, chemicals, cement, conventional power, oil and gas, steel and heavy transportation. The successful decarbonization of these sectors is not only essential to meet wider net-zero ambitions, but also to sustain economic growth, stability and a responsible transition. CPP Investments plans to work in partnership with like-minded companies, industry leaders, investors, and other interested parties to build out a dedicated investment approach to support current and future portfolio companies in their evolution.

CPP Investments also released a related perspective today focusing on an additional key element of sustainable investing, "Financing a greener future," highlighting green bonds as part of the Fund's approach to deploying capital for projects with environmental benefits. The paper outlines how for green bonds to go from a fast-growing niche to a mainstream offering, standards will have to grow out of a mix of evolving draft rules into something closer to the bond market's extant framework for governing how debt is rated, issued and evaluated for performance. The imperative is to improve green bond standards and practices quickly. Doing so can help the financial sector realize its enormous potential for guiding capital toward investments that support the transition to a low-carbon economy while also boosting returns. In 2018, CPP Investments was the world's first pension fund to issue green bonds and has floated six more issuances since.

For more information, the "Investing to enable an economy-wide evolution to a low-carbon future" perspective can be found on the CPP Investments website [here](#). The "Financing a greener future" paper can be found [here](#).

About CPP Investments

Canada Pension Plan Investment Board (CPP Investments™) is a professional investment management organization that manages the Fund in the best interest of the more than 20 million contributors and beneficiaries of the Canada Pension Plan. In order to build diversified portfolios of assets, investments are made around the world in public equities, private equities, real estate, infrastructure and fixed income.

Headquartered in Toronto, with offices in Hong Kong, London, Luxembourg, Mumbai, New York City, San Francisco, São Paulo and Sydney, CPP Investments is governed and managed independently of the Canada Pension Plan and at arm's length from governments. At September 30, 2021, the Fund totalled \$541.5 billion. For more information, please visit www.cppinvestments.com or follow us on [LinkedIn](#), [Facebook](#) or [Twitter](#).

Ownership and climate risk in the GPFG - on the instruments for managing climate risk in the GPFG

Speech by Deputy Governor Øystein Børsum, 21 December 2021.

Actual performance may differ from published text

Introduction

Climate challenges are an engaging theme.

Figure: Emissions must be reduced

The world economy, as it operates today, is not sustainable. It must be, and then emissions must go down. It concerns us all - and not least our common fund. With a broadly diversified, global portfolio and a long horizon, we are in many ways burdened with the world economy.

Norges Bank is a financial investor. We will secure and create financial value for future generations. It is our task as manager of the fund. But how the assignment is carried out can also have an impact beyond the purely financial. Among other things, in the transition to a low-emission society. What our role should be - what our work should consist of - is what I want to talk about today.

This summer, an expert group submitted a report to the Ministry of Finance with recommendations on how climate risk should be managed in the fund. During the autumn, we at Norges Bank worked to assess the proposals and look at how they can be implemented.

A couple of days ago, the Executive Board sent its response to the Ministry of Finance. In the bank's management of climate risk, a lot is already being done, and we are outlining even more ambitious plans for the future. As a long-term and global investor with ownership interests in several thousand companies, we have a financial interest in the companies adapting to the risk and opportunities that climate change entails in a good way.

We propose that Norges Bank be a driving force for the companies we are invested in to adjust to net zero emissions over time - that the companies we invest in reflect the restructuring that the world has to go through.

The fund as an investor

Our characteristics as an investor

The climate risk in the fund is related to who we are as an investor and our overall investment strategy. In short: The fund is large, broadly diversified, long-term and close to the index.

Chart: Large, broadly diversified, long-term and index-linked

Of the fund's more than 12,000 billion, 70 per cent is invested in shares. With that, we are one of the world's largest shareholders. We are owners of 9000 companies in 70 countries.

And we are long-term. **By using only the real return, the fund can in principle be perpetual.**

The strategy is based somewhat simply on the following: **If we are to achieve the best balance between expected return and risk, we must spread the investments widely and own a little of everything in the market.** There is a solid professional basis for this approach.

How climate risk is relevant to the fund

What does this way of managing the fund have to say for the fund's climate risk? **By spreading the investments widely, we are protected against incidents that only affect individual companies or special sectors. But we can not protect ourselves from events or developments that affect everyone.**

The fund is exposed to two types of climate risk - physical risk and transition risk.

Transition risk is about whether the *companies* we own will manage the transition to a low-emission economy. Here the challenge is very different across sectors and companies.

Chart: Transition risk and the fund

The fund's equity investments can be categorized according to transition risk as assessed by the research company MSCI today. The blue bars in the figure show shares of the fund's portfolio. The white bars show the emissions in the companies. The companies that have ended up in the category «restructuring» have high emissions and must therefore restructure significantly. They make up 14 percent of the equity portfolio. The rest are companies that are either considered to be neutrally positioned or are considered to make a positive contribution to a green transition. The latter are thus part of the solution. [1]

Physical risk is more directly linked to climate change. The easiest to think about are acute events such as extreme weather, but also more gradual changes such as warmer climates, droughts and increased sea levels can affect individual investments in both negative and positive directions.

In a scenario where the world does not succeed in the transition to a low-emission economy, the risk increases, also for the fund, because the consequences of major climate change will be felt everywhere. As owners of shares, bonds and real assets, we are invested in everything from real estate and infrastructure, forestry and the food industry to all kinds of production capital. All of these are investments that can be affected by changes in the environment, including heat waves, floods and fires. We own a little of everything.

For a large, long-term, global fund, there will be nowhere to hide.

Climate risk is a long-term and important risk that the fund must deal with.

What does a long-term goal of net zero emissions mean for the fund?

A key recommendation from the expert group is that Norges Bank's responsible management be given a long-term goal of working towards net zero emissions from the companies in which the fund is invested. Norges Bank supports this recommendation.

Some may interpret this as a plan to sell shares in companies with large emissions.

But that is not our approach, nor is it the expert group's proposal. Instead of selling ourselves out, we will through active ownership be a *driving force* for the companies to adapt. In order to influence, we must actually be owners.

And we believe that ownership work works.

It works because we are big. Norges Bank is among the ten largest owners in about half of the companies we are invested in, and we have experienced that the companies listen when we talk.

Responsible management - a chain of instruments

Figure: Responsible management - a chain of instruments

Responsible management is our foremost tool in the work with climate risk and climate-related investment opportunities. I will now consider some important parts of this work. We are already doing a lot, and now we want to do even more.

The work can be grouped into three: The work we do towards the markets, towards the companies and with the portfolio. Together, this constitutes a coherent chain of instruments. I can not take a full review of the work here, but will highlight some points.

Default setting

The first point, standard setting, is about standards for reporting and measuring companies' climate risk.

Good common standards are important. This enables us as managers to assess the companies' prospects, prioritize ownership work and make good investment decisions.

But not just us. Better reporting will make the financial markets more well-functioning and better able to allocate capital. International standards provide equal conditions across markets and set the list for all companies. We, and other major investors, have an important role to play in contributing to the development of these standards.

Among the particularly important initiatives we have supported are climate reporting from the Task Force on Climate-Related Financial Disclosures (TCFD). Such reporting has been voluntary, but we believe that it must now become a requirement. Another issue we are working on is a comprehensive standard for sustainability reporting in line with the recently launched International Sustainability Standards Board (ISSB).

We will also work for good standards for reporting on companies' indirect emissions in the value chain, so-called "framework 3". In many sectors, this is crucial for understanding the companies' climate risk. We will also work with other climate-related issues where international standards may be appropriate. The use of various forms of climate quotas can be an example of this.

Our work with the companies starts with setting clear expectations.

We have formulated our expectations in our own expectations documents. In the climate area, we already expect companies to have a climate strategy, set emission targets, report on developments and stress test their business models against different climate scenarios. Going forward, it is natural for us to emphasize the horizon towards zero emissions. This will provide a clearer direction for the exercise of ownership.

Exercise of ownership

The exercise of ownership will be central to the work to manage the fund's climate risk. Not least, the dialogue with the companies is important.

Figure: Climate is more often a theme in the dialogue

The dialogue with the companies follows our expectations. Last year we had about 3,000 meetings with the companies, and as you can see from this figure, sustainability is increasingly on the agenda.

Going forward, we will increase ownership activity on climate, both in scope and depth.

We will give particular priority to ownership activity towards the companies that have the largest emissions, towards those that have not published their own climate plans or have inadequate climate reporting. We will also strengthen the ownership activity aimed at the financial sector, which is indirectly exposed to climate risk through lending and investments.

The dialogue is adapted to the sector and situation. Steel and cement are an example. These companies currently have large emissions, but are also manufacturers of products we also need in a low-emission society. Therefore, the dialogue is precisely about transition plans, much about the technological measures and investments needed for change. We also address the need for industry standards and lobbying, which is a significant challenge.

Figure: Companies report better on climate

We see signs that the work is working. For example, when we analyze the reporting from 1,500 companies, we see that the companies we have been actively involved in have made greater progress in reporting on climate strategy than the other companies. Of course, we should not take all the credit for these advances. But there is progress.

In the future, we will report more about the dialogue with the companies, what they are about and changes we see. That it is visible is a tool in itself.

Reporting and voting

The dialogue with the companies will not succeed in all cases. We can then hold the boards responsible for their decisions through our voting. This year, we have, among other things, in six cases voted against renewed confidence in board members due to inadequate management of climate risk. This sounds small, but in the future we will work to use this tool to a greater extent than today.

We have started by announcing our voting five days before the actual voting. What we do is noticed.

Another alternative is to promote shareholder proposals, alone or together with others. In the past year, we have supported 19 shareholder proposals on climate. One of those who gained a majority led to a large international company initiating work on reporting on emissions in the value chain ("Box 3"). Going forward, we will also consider promoting our own shareholder proposals.

Risk-based divestments

A last resort, when the exercise of ownership does not succeed, is the sale. It will not be the case that we automatically sell out if the ownership work does not succeed. But in some cases it can be the result.

Norges Bank can sell out of a company on a financial basis. This is what we call risk-based divestments. These are companies that we believe handle climate risk in a very deficient way - and thus provide an increased financial risk. This is about avoiding companies that we believe do not have sustainable business models.

Figure: More than half of the sales are related to climate

Risk-based divestments are active decisions made by Norges Bank, which draw on the fund's framework for deviations from the benchmark index. In the period 2012-2020, we have made more than 300 such sales, and more than half have been linked to climate change.

We are ready to do more of this in the future.

As a continuation of risk-based divestments, we have also begun to systematically assess companies' sustainability risk before entering the fund's benchmark index.

The fund is managed close to the index. Risk-based divestments will therefore mainly be relevant for smaller companies. For larger companies, we have more limited room for maneuver, as such sales will to a greater extent draw on the framework for deviations from the benchmark index.

The behavioral criterion

Figure - Responsible management - a chain of instruments

This takes me over to the second form of divestiture, namely exclusion on ethical grounds. The fund's ethical guidelines contain both a product-based coal criterion and a behavior-based climate criterion.

The latter includes companies that are linked to serious environmental damage or to an unacceptable degree lead to greenhouse gas emissions.

The Council on Ethics advises observing or excluding a company based on this criterion. Based on their recommendations, the Executive Board of Norges Bank makes the final decision based on these recommendations. A decision on exclusion means that the company is excluded from both the portfolio and the benchmark index. It therefore does not draw on our framework for deviations.

It is our experience that the practice of this criterion is complex and that it requires broad insight and detailed information about companies' activities and plans.

Norges Bank expects that we will - in light of the work I have talked about today - gather further detailed information about the companies' climate risk and climate plans. We will share this information with the Council on Ethics.

Downsizing or exclusion is the last link in the chain of instruments, but far from the most important. We plan for Norges Bank to be a driving force for the companies in the portfolio to adjust to net zero emissions over time. Active ownership is the key tool.

End

Before I conclude, I would like to mention that we invest in companies that can contribute to solutions to the climate challenges, both through the environmental mandates and in the rest of equity management. We are now also in the process of building up a portfolio of high-quality wind and solar power plants.

The first environmental mandates were established in December 2009, and have had positive learning effects for several parts of the organization. As we write in the letter to the ministry, we will in future draw more on the competence of the managers of the environmental mandates in other parts of the administration.

Overall: Our ambition is for us to be a leader in responsible management. In collaboration with other large investors, we will contribute to the development of standards and methods for reporting. We will strengthen our dialogue with companies about climate both in scope and depth, and utilize the entire toolbox we have as an investor. We will influence companies to take the restructuring seriously. We expect concrete plans, not empty words or greenwashing! And not least - we must have a clear voice in our ownership work.

Footnote

[\[1\]](#) The calculations are based on the analysis company MSCI's classification of companies' transition risk. 80 per cent of the market value of the fund's equity portfolio ends up in the group of companies that are neutrally exposed to transition risk.

PUBLISHED December 21, 2021 9:00 AM

bp Integrated Energy Company strategy update: Growing investment, growing value, growing distributions

7 February 2023

- **Performing while transforming:**

- Performing: 2022 EBITDA \$60.7 billion; full year operating cash flow \$40.9 billion; net debt \$21.4 billion, lowest for almost a decade; ROACE 30.5%; full year tax \$15.1 billion; strongest upstream plant reliability on record; lowest production costs in 16 years
- Transforming: investment in transition growth engines c. 30% of 2022 total investment, up from c. 3% in 2019

- **Leaning further into bp's strategy:**

- Investing more in the energy transition and bp's transition, investing more in supporting energy security and energy affordability today
- Up to \$8 billion more into transition growth engines by 2030 – growing in higher-return bioenergy, and convenience & EV charging; focusing hydrogen and renewables & power where bp can leverage integration
- Up to \$8 billion more into oil and gas by 2030 – targeting short-cycle fast-payback opportunities with lower additional operational emissions
- Aim to materially increase earnings through 2030 – aiming for \$51-56 billion group EBITDA in 2030

- **Delivering for shareholders:**

- Growing dividends: 10% increase in dividend per ordinary share for fourth quarter, representing 21% growth from 4Q 2021
- Growing buybacks: further \$2.75 billion buybacks announced today; total of \$11.25 billion buybacks announced from 2022 surplus cash flow
- Increasing targets: over 12% annual EBITDA per share growth to 2025; over 18% ROACE in 2025 and 2030

Since introducing its new purpose, net zero ambition, organisation and strategy in 2020, bp has built strong momentum across its strategy and delivered value for shareholders. The major global uncertainties experienced in the past three years – from the pandemic and its aftermath to the impact of Russia’s attack on Ukraine – have increased the world’s focus on energy security and affordability as well as accelerated the drive towards a lower carbon energy system.

bp chief executive Bernard Looney said: “It’s clearer than ever after the past three years that the world wants and needs energy that is secure and affordable as well as lower carbon – all three together, what’s known as the energy trilemma. To tackle that, action is needed to accelerate the transition. And – at the same time – action is needed to make sure that the transition is orderly, so that affordable energy keeps flowing where it’s needed today.

“As an integrated energy company, bp is very deliberately set up to help on both counts. With three years of delivery and track record – we have increased confidence our strategy is working. And with today’s announcement we are leaning further in. We are growing our investment into our transition and, at the same time, growing investment into today’s energy system. In doing so - we see tremendous opportunity to create value. And it’s what governments and customers are asking of companies like us.”

bp now aims to accelerate the growth in earnings from its transition growth engines (TGEs) while also delivering higher earnings than previously expected from its oil and gas businesses through 2030 - both compared to bp’s previous aims⁽¹⁾.

bp plans to support this growth by disciplined increases in investment over the period to 2030 of up to \$8 billion in the TGEs and up to \$8 billion in oil and gas. bp is adjusting its target capital expenditure range to \$14-18 billion a year out to 2030⁽²⁾, from the previous range of \$14-16 billion. All investments will remain subject to disciplined application of bp’s balanced investment and returns criteria.

bp expects this additional incremental investment to deliver around \$3 billion additional group EBITDA in 2025 and is aiming for that to grow to \$5-6 billion in 2030. This would comprise an additional \$2 billion from the TGEs and \$3-4 billion from oil and gas projects in 2030. bp has also raised its oil and gas price and refining margin assumptions⁽³⁾.

As a result of both factors, bp is now targeting group EBITDA of \$46-49 billion in 2025 and is aiming for \$51-56 billion in 2030, in a \$70/barrel (2021 real) oil price environment. These compare to its previous target and aim, from May 2022, of around \$38 billion in 2025 and \$39-46 billion in 2030 at \$60/barrel (2020 real).

Performing while transforming

After setting out its new purpose, net zero ambition, structure and strategy in 2020, bp’s focus is now on delivering its transformation into an Integrated Energy Company.

Bernard Looney: “Throughout 2022, bp continued to focus on delivery of our Integrated Energy Company strategy. We are helping provide the energy the world needs today and – at the same time – investing with discipline into our transition and the energy transition – as demonstrated by the Archaea

Energy acquisition. We are strengthening bp, with our strongest upstream plant reliability on record and our lowest production costs in 16 years, helping to generate strong returns and reducing debt for the 11th quarter in a row. Importantly, we are delivering for our shareholders – with buybacks and a growing dividend. This is exactly what we said we would do and will continue to do – performing while transforming.”

In 2022, bp delivered EBITDA of \$61 billion, operating cash flow of \$41 billion, including around \$7 billion working capital build, and reported underlying replacement cost profit of \$28 billion.

It continued to strengthen its finances, reducing net debt by \$9.2 billion over the year to \$21.4 billion – the lowest for over nine years. ROACE for the year was 30.5%. For 2022, bp incurred a total tax charge of \$15.1 billion on an underlying basis, representing an effective tax rate of 34%.

bp also delivered sector-leading distributions for its shareholders in 2022. bp today announced a 10% increase in the quarterly dividend for the fourth quarter of 2022, to 6.61c per ordinary share. Together with the 10% rise in the second quarter of 2022, this represents 21% growth in the dividend compared to the fourth quarter of 2021.

With plans for \$2.75 billion share buybacks from fourth quarter surplus cash flow announced today, bp has also announced a total of \$11.25 billion share buybacks from 2022 surplus cash flow.

Through 2022, bp also continued to deliver its transformation, notably with the acquisition of biogas producer Archaea Energy, forming Azule Energy with Eni in Angola, and adding significant potential opportunities for hydrogen, including in Australia, Abu Dhabi, Egypt, Oman and Mauritania.

In 2022, it invested \$4.9 billion, around 30% of its total \$16.3 billion capital expenditure, into its transition growth engines – including the acquisition of Archaea Energy. This compares to around 3% in 2019. bp continues to expect this proportion to grow to around 50% in 2030.

Leaning further into bp’s strategy

More investment in bp’s transition:

bp aims to increase investment in its TGEs by up to \$1 billion a year on average, or up to a cumulative additional \$8 billion to 2030. bp’s investment in its TGEs is now expected to reach \$7-9 billion a year in 2030⁽⁴⁾ - with cumulative investment over 2023-2030 around \$55-65 billion.

bp aims to invest around half of this cumulative total in the TGEs where bp has established businesses, capabilities and track record – in bioenergy, and in convenience and EV charging; the other half in hydrogen and renewables & power.

bp expects to achieve returns of greater than 15% from bioenergy, and from convenience and EV charging combined, and double digit returns from hydrogen. It expects 6-8% unlevered returns in renewables.

Earnings from bp's TGEs are expected to grow as a result of these changes. bp now expects the TGEs to deliver \$3.4 billion EBITDA in 2025, and is aiming for \$10-12 billion in 2030, comprising: over \$4 billion from bioenergy; over \$4 billion from convenience and EV charging; and \$2-3 billion from hydrogen and renewables & power.

Bernard Looney: "We will increase our focus on the transition growth engines able to deliver nearer-term solutions – like EV chargers and sustainable aviation fuels – that can help people and businesses decarbonise sooner. And we will continue to build our hydrogen and renewables and power businesses for the longer term, based around projects where bp's integrated approach can create significant additional value."

Bioenergy: bp plans to grow its established bioenergy businesses materially. It plans to increase its supply of biogas six-fold, underpinned by Archaea Energy, to up to 70,000 barrels of oil equivalent a day in 2030. bp aims to increase biofuel production to around 100,000 barrels a day by 2030, supported by five major new projects at bp refineries, focused on production of sustainable aviation fuel.

Convenience and EV charging: expansion of bp's strategic convenience site networks is expected to drive growth in bp's convenience gross margin by around 10% a year to 2030. Together with EV charging they are expected to help grow bp's ability to offer lower carbon transport solutions for customers. Today bp has 22,000 EV charge points and aims for more than 100,000 by 2030 - around 90% rapid or ultra-fast. It is developing leading positions in key geographies worldwide, underpinned by partnerships with major fleet operators.

Hydrogen and renewables & power: through this decade bp aims to establish the foundations of a material business for the future. bp aims to build a leading position globally in hydrogen, initially supplying its own refineries, scaling up to meet growing customer demand and in parallel, as markets develop, developing global export hubs for hydrogen and its derivatives. By 2030 bp aims to produce between 0.5-0.7 million tonnes a year of primarily green hydrogen, also pursuing selected blue hydrogen opportunities.

In **renewables & power**, bp will focus investment on opportunities where it can create integration value and enhance returns. bp aims to build a portfolio – including a global position in offshore wind - in support of green hydrogen, e-fuels, EV charging and power trading, together with continued growth in its self-funded solar joint venture Lightsource bp. bp remains on track to deliver its aim of having developed 50GW renewable power to FID by 2030; of this it aims to have around 10GW net installed capacity – largely operated. bp also expects to have assets under construction and for Lightsource bp to contribute materially.

More investment in today's energy system:

bp also aims to increase investment into resilient high-quality oil and gas projects - again by an average of up to \$1 billion a year, or up to a cumulative \$8 billion to 2030. The investment will help to meet near-term demand for secure supplies of oil and gas, generating additional earnings that can further strengthen bp and support investment in its transition.

The incremental investment to 2025 will target shorter-term, fast-payback projects that maximise value and can deliver rapidly, with minimal new infrastructure. While bp will continue to high-grade its global oil and gas portfolio, due to improving operational reliability and commerciality over the past four years it also now anticipates retaining some oil and gas assets longer than previously envisaged.

Bernard Looney: “We need continuing near-term investment into today’s energy system – which depends on oil and gas – to meet today’s demands and to make sure the transition is an orderly one. We have high-quality options throughout our portfolio, allowing us to choose only the best. We will prioritise projects where we can deliver quickly, at low cost, using our existing infrastructure, allowing us to minimise additional emissions and maximise both value and our contribution to energy security and affordability.”

As a result of these changes, bp anticipates its oil and gas production will be around 2.3 million barrels of oil equivalent a day (mmbœ/d) in 2025 and aims for it to be around 2.0 mmbœ/d in 2030. This 2030 production would be around 25% lower than bp’s production in 2019, excluding production from Rosneft, compared to bp’s previous expectation of a reduction of around 40%. bp correspondingly now aims for a fall of 20% to 30% in emissions from the carbon in its oil and gas production⁽⁵⁾ in 2030 compared to a 2019 baseline, lower than the previous aim of 35-40%.

From the first quarter of 2022, bp has no longer reported oil and gas production from Russia. With the removal of this Russian production, bp’s full year average reported production in 2022 was around 40% lower than the total production bp reported in 2019.

Delivering for shareholders

bp remains focused on the disciplined delivery of its financial frame. Through the financial frame and bp’s business plans out to 2025, in a \$70 per barrel price environment, bp aims to offer:

- **Accelerating growth:** with a compound average growth rate for EBIDA per share of over 12% between 2H 2019/1H2020 to 2025 at \$70 per barrel 2021 real.
- **Competitive returns:** expecting to achieve a return on average capital employed (ROACE) of over 18% in both 2025 and 2030 at \$70 per barrel 2021 real.
- **Debt reduction:** intending to allocate around 40% of 2023 surplus cash flow to further strengthening the balance sheet.
- **Compelling shareholder distributions:**
 - **Dividends:** bp expects to maintain a resilient cash balance point of around \$40 per barrel Brent oil price, with \$11 per barrel refining margin and \$3 per million BTU Henry Hub gas price. bp continues to see the capacity to continue to grow its dividend per ordinary share by around 4% a year at around \$60/barrel, subject to the board’s discretion⁽⁶⁾.

- Buybacks⁽⁶⁾: bp is committed to allocating 60% of 2023 surplus cash flow to share buybacks, expecting a buyback of around \$4 billion a year - at around \$60 a barrel, at the lower end of its capital expenditure range and subject to maintaining a strong investment grade credit rating. The buyback commitment offers leverage to higher price environments.

This announcement contains inside information. The person responsible for arranging the release of this announcement on behalf of BP p.l.c. is Ben Mathews, Company Secretary.

bp's fourth quarter and full year 2022 results can be seen at www.bp.com/results.

Notes

- (1) Compared to aims set out by bp in February 2022.
- (2) Capital expenditure in 2023 planned to be in range \$16-18 billion.
- (3) Assumptions to 2030, all 2021 real: Brent oil price \$70/barrel; Henry Hub gas price \$4/million Btu; bp refining marker margin, \$14/barrel. See also note 1 of bp 4Q and full year results 2022.
- (4) bp's investment in TGEs is expected to be \$6-8 billion in 2025.
- (5) bp's aim to reach net zero* CO₂ emissions, in accordance with bp's Aim 2, from the carbon in our oil and gas production, in respect of the estimated CO₂ emissions from the combustion of upstream production of crude oil, natural gas and natural gas liquids on a bp equity share basis based on bp's net share of production, excluding bp's share of Rosneft production and assuming that all produced volumes undergo full stoichiometric combustion to CO₂. Aim 2 is bp's Scope 3 aim and relates to Scope 3, category 11 emissions. Any interim target or aim in respect of bp's Aim 2 is defined in terms of absolute reductions relative to the baseline year of 2019.
- (6) In setting the dividend per ordinary share and the buyback each quarter the board will take into account factors including the cumulative level of and outlook for surplus cash flow, the cash balance point and the maintenance of a strong investment grade credit rating.
 - For the purposes of this announcement, each of the following terms has the meaning given to it in bp's fourth quarter and full year 2022 financial results announcement: operating cash flow; net debt; ROACE; upstream plant reliability; EV charge points; surplus cash flow; cash balance point; capital expenditure; refining marker margin (RMM); strategic convenience sites and underlying replacement cost (RC) profit.
 - For the purposes of this announcement, each of the following terms has the meaning given to it in the bp Annual Report and Form 20-F 2021: convenience gross margin.
 - EBIDA: has the meaning given to the term Adjusted EBIDA in bp's fourth quarter and full year 2022 financial results announcement.

- EBIDA per share: share buybacks are modelled across a range of share prices in this calculation and EBIDA is after impact of planned divestments.
- EBITDA: has the meaning given to the term Adjusted EBITDA in bp's fourth quarter and full year 2022 financial results announcement.
- Net zero: References to net zero for bp in the context of our ambition and Aims 1, 2 and 3 mean achieving a balance between (a) the relevant Scope 1 and 2 emissions (for Aim 1), Scope 3 emissions (for Aim 2) or product lifecycle emissions (for Aim 3), and (b) the aggregate of applicable deductions from qualifying activities such as sinks under our methodology at the applicable time.
- Rapid or ultra-fast: rapid charging $\geq 50\text{kW}$ and ultra-fast charging $\geq 150\text{kW}$.

Further information

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Cautionary statement

In order to utilize the 'safe harbor' provisions of the United States Private Securities Litigation Reform Act of 1995 (the 'PSLRA') and the general doctrine of cautionary statements, bp is providing the following cautionary statement: The discussion in this results announcement contains certain forecasts, projections and forward-looking statements - that is, statements related to future, not past events and circumstances - with respect to the financial condition, results of operations and businesses of bp and certain of the plans and objectives of bp with respect to these items. These statements may generally, but not always, be identified by the use of words such as 'will', 'expects', 'is expected to', 'aims', 'should', 'may', 'objective', 'is likely to', 'intends', 'believes', 'anticipates', 'plans', 'we see', 'focus on' or similar expressions.

In particular, the following, among other statements, are all forward looking in nature: plans and expectations regarding bp's performance, earnings, returns, capital expenditure, targets and market position through 2025 and/or 2030; expectations related to oil and gas prices and refining margins; expectations regarding bp's plans to invest up to an additional \$8 billion in its transition growth engines and up to additional \$8 billion in oil and gas projects, both by 2030; plans and expectations related to earnings growth, including the aim of group EBITDA of \$51-56 billion in 2030 at oil prices of \$70 per barrel in 2021 real terms; plans and expectations related to bp's target of growing EBIDA per share at over 12% compound average growth rate through 2025, and growing ROACE to over

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Press release

01. March 2023

EV sales collapse as subsidies and tax credits come to an abrupt halt

The global electric vehicle (EV) market is reeling from one of the most dramatic collapses in monthly sales to date, with Rystad Energy research showing that only 672,000 units were sold in January, almost half of December 2022 sales and a mere 3% year-on-year increase over January 2022. The EV market share among all passenger car sales also tumbled to 14% in January, well down on the 23% seen in December.

EV sales have been on a relatively consistent upward trajectory in recent years – aside from periods impacted by Covid-19 pandemic-related supply chain issues – and a significant collapse in sales is worrying news for the industry. Tax credits and government subsidies have propped up the EV market to date as countries identify passenger car fleet electrification as a core tactic for meeting net-zero emissions goals, but the reduction or removal of these subsidies this year has dampened consumer sentiment. Automakers are now scrambling to reverse the downward spiral and salvage the market in 2023.

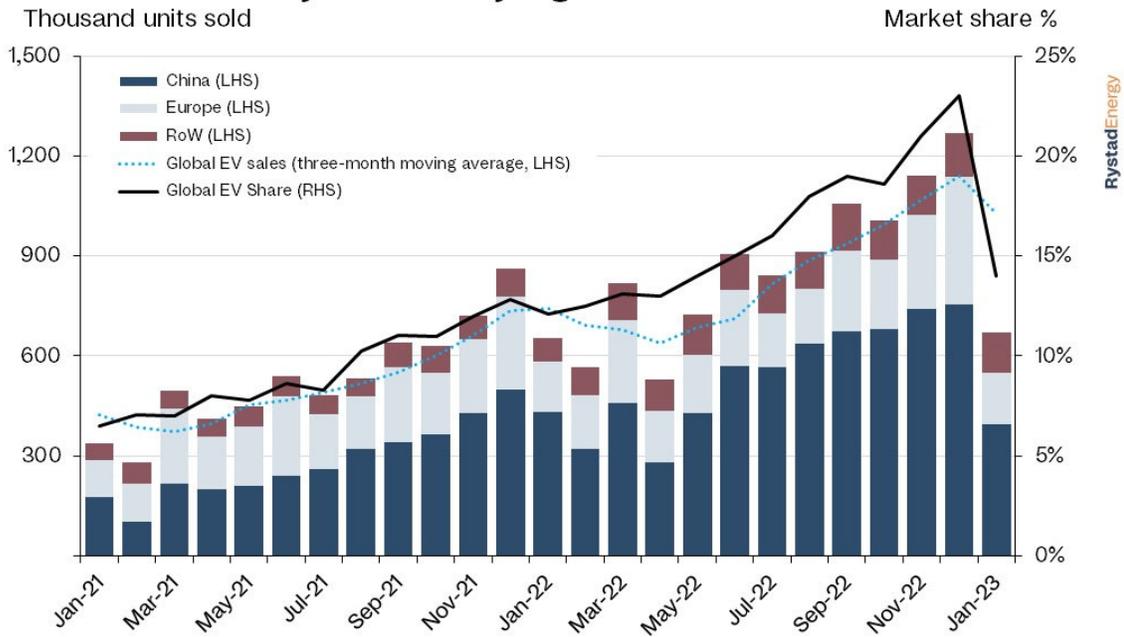
The automotive market is usually cyclical, with sales taking a hit after new subsidy rules come into effect at the start of each year, followed by a gradual recovery. However, the cuts in January this year hit harder than normal, triggering this dramatic collapse. The ramifications of this will be long-lasting and will impact sales through the first quarter of the year and potentially the rest of 2023.

EV subsidies in many European countries and mainland China were sliced at the start of the year, and a return of any significance is highly unlikely in the immediate future. One ray of hope for the global outlook is the US market, which is just beginning its electrification journey and rolling out tax credits thanks to the Inflation Reduction Act. The US was the only major market that saw an increase in both EV sales and market share year-on-year, although its contribution to the global total is still relatively minimal.

The sands are shifting for the global EV market. Consumer appetite for electric cars remains strong, but it's clear that tax credits and subsidies still play a significant role in convincing consumers to make the switch. Carmakers may have no option but to respond with reduced prices.

Abhishek Murali, clean tech analyst, Rystad Energy

Monthly EV* sales by region and market share



*EV includes battery electric vehicles (BEV) and plug-in hybrid electric vehicles (PHEV)
 Source: Rystad Energy's Battery Solution, March 2023
 A Rystad Energy graphic

Learn more with Rystad Energy's [low-carbon solutions](#).

China, the largest EV market globally, experienced a near 50% cut in EV sales in January 2023 compared to the prior month, but the year-over-year change was relatively flat due to the affinity of consumers for cheaper domestic-made models. The Chinese Association of Automotive Manufacturers forecasts a slowing of sales momentum this year, predicting around 8 million EV sales this year. We expect slow sales to continue through the first quarter, but CATL's announcement of a price cut in battery cells for automotive off-takers will help boost sales again.

Although there was a marginal year-on-year growth in EV sales in Europe last month, market performance has been grim, with many countries showing a steep drop in EV sales from December 2022. With EV subsidies coming to an end, many consumers brought forward their purchases from the first quarter of 2023 to December 2022, leading to a massive spike in purchases before the end of the year. Widespread subsidy reductions will have a lasting impact on sales activity, but automakers will not tolerate this weakening for long – Tesla is already testing their pricing limits, offering a massive discount, triggering a large volume of pre-orders.

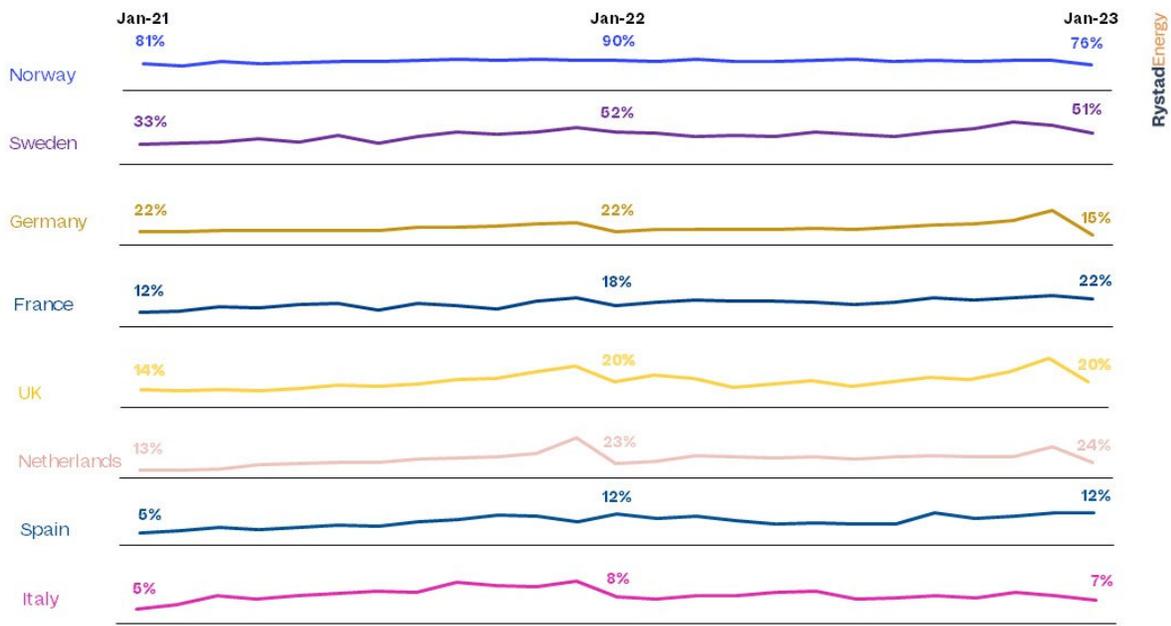
Germany has seen a steep falloff in sales and market share. Sales in Germany dropped about a third in January compared to 2022, totaling only 27,000 for the month. Market share in the country also fell off a cliff – after EVs accounted for 55% of all car sales in December 2022, the market share fell to just 15%. Elsewhere in Europe, the EV market share in the UK halved from about 40% to 20% month-to-month and from 50% to 24% in the Netherlands. This downward trend is replicated across much of Europe and will be giving automakers sleepless nights.

Norway experienced the worst monthly passenger car sales in over 60 years, with just 1,860 vehicles sold, including EVs. Electric cars accounted for 76.3% of those sales, totaling 1,419 units. That market share was

also the lowest and dipped below 80% for the first time in two years. A slew of new taxes have contributed to this, and battery electric vehicles are now impacted by two new taxes that will negatively impact sales.

Across the Atlantic, the US anticipated falling EV sales and was one of the only markets to implement fresh incentives through federal tax credits. Around 80,000 EVs were sold in January – a 7.8% market share. However, there was no sales surge from these credits as automakers made the prudent decision to offer EV discounts in December to avoid an unmanageable influx of orders. US automakers are also grappling to make smart pricing decisions for their EV models. Tesla, for instance, is slowly increasing vehicle prices to gauge consumer price ceilings after previously offering sizeable discounts. The US market outlook for 2023 is strong, and the country is expected to break the 10% adoption mark this year.

EV market share* for select European countries



*Market share = ratio of new EV registrations vs. total vehicle registrations
Source: Rystad Energy's Battery Solution, March 2023. A Rystad Energy graphic

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EV Charging During Peak Hours Now Comes With Premium Price: BNEF

2023-03-03 14:18:48.317 GMT

By Charlotte Adriaenssens

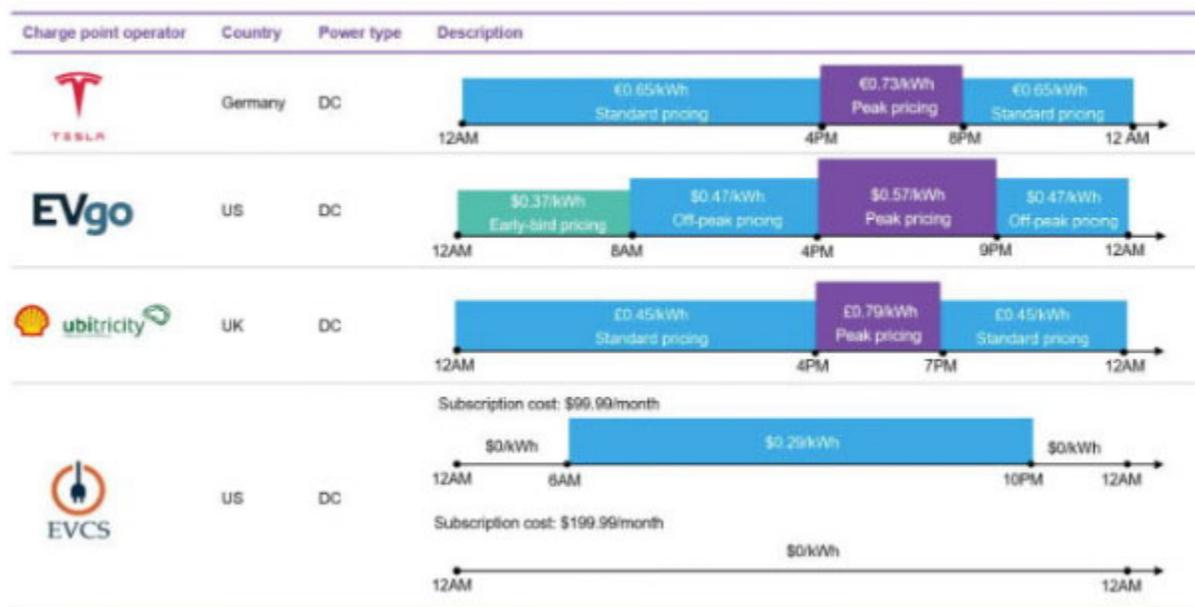
(BloombergNEF) -- Companies offering public electric vehicle charging in the US and Europe have introduced increased prices for periods of high demand to incentivize drivers to charge outside peak hours. It now costs more to charge between 4 p.m and 9 p.m., coinciding with peak electricity prices and demand across the grid.

Grid operators raise costs to use the network at peak times to recoup some of the required grid investment costs stemming from higher utilization. Yet, higher prices dissuade further peak demand and the need for grid upgrades, while also reducing queuing for drivers.

There are differences between the various time-of-use tariffs. Tesla and Ubitricity have two pricing periods, while EVgo offers three, including a cheap overnight tariff to boost demand when utilization is low.

US charging operator EVCS has subscription-based time-of-use rates. For \$99.99 per month, consumers get free charging from 10 p.m. to 6 a.m. and pay a reduced rate to charge in the day. They can also pay more for unlimited access without time restrictions.

Example time-of-use rates offered by public EV charging operators (Note: EVgo prices in the chart are the pay-as-you-go price in Arizona. Evgas has four types of time-of-use tariffs, with three pricing periods. Every tariff has a different price depending on the period and the region.)



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Top Personal Income Tax Rates in Europe

February 28, 2023

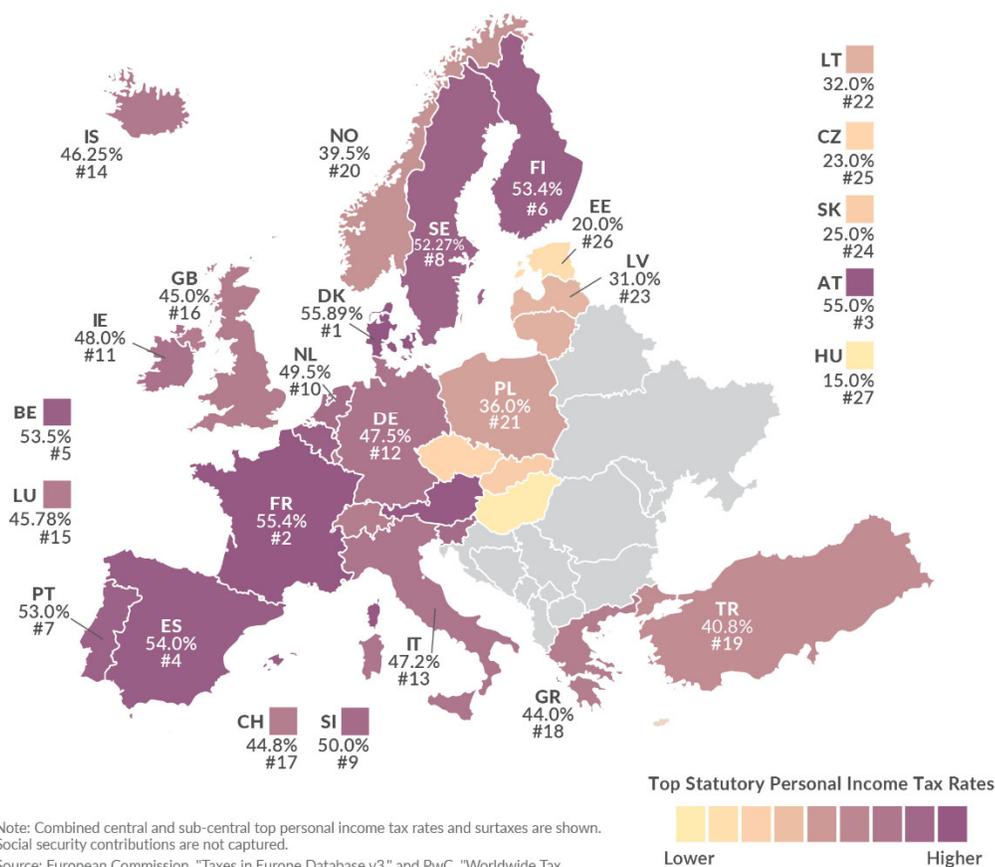
Cristina Enache

Most countries' personal income taxes have a progressive structure, meaning that the tax rate paid by individuals increases as they earn higher wages. The highest tax rate individuals pay differs significantly across European OECD countries—as shown in today's map.

The top statutory personal income tax rate applies to the share of income that falls into the highest tax bracket. For instance, if a country has five tax brackets, and the top income tax rate of 50 percent has a threshold of €1 million, then each additional euro of income over €1 million would be taxed at 50 percent.

Top Personal Income Tax Rates in Europe

Top Statutory Personal Income Tax Rates in European OECD Countries, 2022



Denmark ([55.9 percent](#)), France (55.4 percent), and Austria (55 percent) had the highest top statutory personal income tax rates in Europe among OECD countries in 2022. Hungary (15 percent), Estonia (20 percent), and the Czech Republic (23 percent) had the lowest top statutory personal income top rates in Europe.

Top Personal Income Tax Rates in Europe

European OECD Country	Top Statutory Personal Income Tax Rate
Austria (AT)	55.0%
Belgium (BE)	53.5%
Czech Republic (CZ)	23.0%
Denmark (DK)	55.9%
Estonia (EE)	20.0%
Finland (FI)	53.4%
France (FR)	55.4%
Germany (DE)	47.5%
Greece (GR)	44.0%
Hungary (HU)	15.0%
Iceland (IS)	46.3%
Ireland (IE)	48.0%
Italy (IT)	47.2%
Latvia (LV)	31.0%
Lithuania (LT)	32.0%
Luxembourg (LU)	45.8%
Netherlands (NL)	49.5%
Norway (NO)	39.5%
Poland (PL)	36.0%
Portugal (PT)	53.0%
Slovakia (SK)	25.0%
Slovenia (SI)	50.0%
Spain (ES), Valencia	54.0%
Sweden (SE)	52.3%
Switzerland (CH)	44.8%
Turkey (TR)	40.8%
United Kingdom (GB)	45.0%

Source: PwC, "Worldwide Tax Summaries," accessed Feb. 15, 2023, taxsummaries.pwc.com.

From Shelters to Stardom: Chase and Sydney Brown's Path to Gridiron Glory

The Brown brothers lived through a life of change—switching homes and schools and fighting through financial hardships to play football. Together again in Champaign, Chase and Sydney have found stability and stardom.

- **PAT FORDE** OCT 27, 2022

In this story:



ILLINOIS FIGHTING ILLINI

It was time to go. Time to get back into her stepfather's Lincoln Town Car for a 1,300-mile drive home, from Florida to Canada, and Raechel Brown could barely tolerate what she was doing. "I'm going to shove these kids back in the car," she thought to herself.

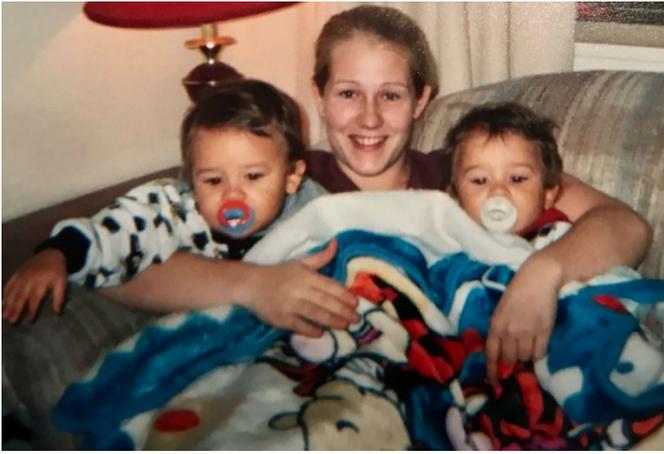
She didn't. Instead she forced herself to say goodbye to her twin 16-year-old sons, Chase and Sydney, leaving them in the care of a couple she had just met two days earlier. Racked with doubt and guilt, she knew in her gut that taking her beloved boys to this strange place was the best chance to do right by them.

Watch More

"It was the most difficult thing I've ever done," Raechel says. "It was totally unnatural, leaving your kids in another country with people you don't know. I cried the whole way back."

Raechel can say that now, with the gift of knowing it all worked out, as her boys star in the football revival at No. 17 Illinois—running back Chase, an unlikely Heisman Trophy candidate; safety Sydney, a captain of the nation's No. 1 defense. But none of that was visible six years ago. She chose an option that broke her heart but gave her boys a chance to dream.

So she drove away, back to London, Ontario, where the family had lost their home. Chase and Sydney had to leave to pursue a future that included high-level football and greater stability. Canada was a hard place for players to get noticed by U.S. universities, and the family's monetary situation had deteriorated.



Chase (left) and Sydney (right) with their mother, Raechel.

Courtesy Raechel Brown



Twins Chase (left) and Sydney (right) were born two minutes apart in London, Ontario.

Courtesy Raechel Brown

Raechel says she became ill after the birth of her daughter, Mya, and was unable to work for an extended period of time. Then her father died, and a family member with mental health issues and a drug addiction had used most of the inheritance. “He became mine to try to help, but he couldn’t be on drugs and be in our home,” Raechel says. “The money from my dad went to him.”

The Browns were floating between living in a shelter and with Raechel’s mother. The boys were struggling in school. Looking for an alternative, they were connected by Canadian football talent scout Justin Dillon to a private school in Bradenton, Fla., Saint Stephen’s Episcopal School. It was August 2016, and the boys were about to start their junior year of high school. Everything began to move very quickly.

On a Friday afternoon, Saint Stephen's football coach Tod Creneti called an old friend, Phil Yates. He was looking for a host family for two incoming players from Canada, of all places. "Oh, by the way," Creneti said, "they're really good."

Phil and Karen Yates were empty-nesters, their two children having graduated from Saint Stephen's. They had the room in their house, so they said yes to something they hadn't previously envisioned. "There really wasn't any question in our minds," Karen Yates says. "But I remember lying in bed that Friday night thinking, 'Is this really going to happen?'"

On Monday, Karen and Raechel talked on the phone. On Tuesday, the Browns began their drive down to Florida. On Wednesday, the Browns and Yateses had dinner together at a restaurant. On Thursday, they toured the school and had dinner at the Yateses' home. On Friday, Raechel said goodbye and began her bereaved drive home.

It would get worse before it got better.

Raechel got back into permanent housing, but money was still tight. And now there was a tuition bill to pay for Saint Stephen's. The Yates family gave Chase and Sydney beds and meals and transportation to school, familial structure and parental guidance where needed, but Raechel had to come up with the money to pay for school.

"Tuition or paying the rent was the choice," Raechel says. "So we paid tuition."

She lost her home a second time, moving back into a shelter. Raechel says she kept some of the reality of her circumstances hidden from the boys, not wanting them to worry or feel guilty.

"It was not something I really told them," she says. "I just said they couldn't come home."

There was no going back for Chase and Sydney, only forward. Tough times and tough decisions have yielded to the current reality—the brothers are starring for one of the breakthrough programs in college football, their mom's financial footing has improved and once-inconceivable professional goals are now in focus.

For this to become a happy story, it required several ingredients. It took a mother's sacrifice, the kindness of strangers, a recruiting chance taken, a year spent apart, the prohibitive cost of aviation lessons, a transfer and ultimately the arrival of a new coaching staff that could shake Illinois out of its long malaise. Mostly, it took two boys' acute appreciation of the opportunity they were given and unstinting effort to make the most of it.

"There was some stuff that pushed us out of Canada," Sydney says of the family struggles. "That really told us, 'O.K., it's time to go. It's really time to get it right.' It's been a journey."

Sitting in a recruiting lounge within the Illinois football facility this week, you can tell the twins are finish-each-other's-sentences close. They currently have different hairstyles, which is one of the few ways to tell them apart—both are about 6 feet tall and 200 pounds, similarly sculpted. From a demeanor standpoint, Sydney is more animated and intense—the neat one at home, to the point of obsessiveness. Chase is more reserved and laid-back.

They are fastidious about nutrition, fanatical about workouts and driven to make the most of what likely will be their last football season together. "It's something we've worked for, so it's been well deserved, but the work's not done," Sydney says. "Still got a lot to go. We're focused on Nebraska this week and the process for that game, but I can't imagine what 9–1 would be like going into the Michigan game [Nov. 19]."

A 9–1 Illinois playing what could be a 10–0 Michigan team would indeed be a stunning turn of events. But really, the Browns' personal odyssey since childhood is every bit as unimaginable.

The boys were always quiet in public, going until age 12 before they could summon the nerve to order for themselves in a restaurant. But they were rambunctious at home, always competing, occasionally fighting. They played several sports and loved martial arts, but never played hockey. Eventually they gravitated to something with only niche popularity at the youth-league levels in Canada—football.

The country has produced a steady pipeline of college basketball talent to the U.S. In football there have been a few standouts—Chuba Hubbard at Oklahoma State, John Metchie at Alabama, Jesse Luketa at Penn State—but it’s a comparative trickle.

Strong, fast and tough, the Brown brothers were well suited for football. Some of the men in their family had played football, including their father, Darren Isaac, but it was utterly foreign to Raechel. “It’s just not something kids from our part of the world get to experience,” she says, then laughs. “For a long time I didn’t even know what Sydney’s position is. I knew he stopped players from getting touchdowns, but that’s about it.”



Chase (wearing No. 2) and Sydney (No. 30) have both become impact players for Illinois.

Scott Taetsch/Getty Images

Commensurate with the scant local interest, the coaching and financial investment was minimal compared to the sprawling business of youth football in the U.S. The Browns’ talents outstripped their surroundings, which spurred some of the initial interest in American options. And Florida was the football Promised Land. Still, when the boys arrived in Bradenton, they weren’t even thinking about going to college. Saint Stephen’s was an opportunity to play ball and improve their grades. It

took a while to entertain the idea of higher education and Saturday games in big stadiums.

The Browns helped Saint Stephen's program hit a new level, as the team went undefeated in the brothers' junior and senior seasons and won two State I-A championships. Phil and Karen Yates gave them a starting point, but the boys supplied their own motivation to excel on the gridiron.

"They had the foundation laid before they ever came to us," Karen Yates says. "Raechel and their grandparents, they're just good people. I'm just so in awe of Raechel to have the courage and forethought to bring her kids to Florida."

Phil Yates got a new job in Dallas during the boys' senior year, which put their living arrangements in flux again. That's when some neighbors stepped up. Michelle Cross drove into the neighborhood one evening to find Chase walking the Yateses' dog, and stopped to ask him whether they'd found a new host family. The answer was no. She went home and talked to her husband, Tom, about taking in the Browns. They had two young sons of their own, but decided to do it.

"To our sons, Chase and Sydney were superheroes," Tom Cross says. "They thought it was the coolest thing ever. They set good examples. I've not encountered many people at 17 or 18 who were as hardworking and motivated as they were. They worked their butts off. Both were very aware of the opportunity they were presented with."

As their exploits grew, college recruiters followed. Phil Yates spent time tutoring them in various subjects, an undertaking that proved especially satisfying when both boys scored well enough on the ACT for immediate college eligibility. Chase, born two minutes earlier than Sydney, was the more obvious prospect, drawing a three-star recruiting rating. But he committed in October 2017 to Western Michigan and didn't waver when offers came in from Power 5 conference programs. The biggest reason? Western Michigan's aviation program. Yates was a pilot, and Chase thought it looked like a great life.

"He would fly to the Bahamas one day, fly back," Chase says. "I thought that seemed cool. I wanted that. He seemed happy, and I just saw myself doing that. I would have hung up the helmet and continued that dream that I had. Any school

could have offered me at that point, but I was just so invested in following that dream and that goal.”

Sydney, meanwhile, was a two-star prospect who didn’t receive much interest from FBS schools. He visited Illinois and Tulane and wound up committing to the Illini. On signing day, he was just another name in small type in then coach Lovie Smith’s modestly rated recruiting class. At that point, and against their mother’s wishes, the twins went their separate ways. Both made immediate impacts—Chase as a running back and kick returner at Western Michigan, Sydney as an aggressive safety at Illinois.

They might have continued on those divergent paths if it weren’t for an unwelcome surprise Chase encountered at WMU: flight classes cost up to \$60,000, and his scholarship wouldn’t cover those expenses. That spurred interest in transferring, and Sydney said good things about Illinois. Chase matriculated to Champaign, and the boys resumed living together.



Chase continues to make the argument for inclusion within this year’s Heisman Trophy race.

Ron Johnson/USA TODAY Sports

Chase redshirted in 2019, playing the maximum four games but not making an impact. Sydney continued to play a big role at safety, finishing second on the team in tackles. Illinois made a bowl game for the first time since ’14, but finished the season 6–7 and on a three-game losing streak. That put Smith on the hot seat for ’20. Chase became Illinois’s leading rusher that season, and Sydney again was a key player on the defense. But the Illini went 2–6, and Smith was fired. Still, the Browns held firm in their commitment to the school and to each other. “The portal

was an option, but without a plan, the transfer portal is a mess, to be honest,” Sydney says.

Enter new coach Bret Bielema and defensive coordinator Ryan Walters. Sydney’s role remained constant on defense, while Chase’s grew on offense. Bielema has always loved a run-based offense and has turned running backs into stars at Wisconsin and Arkansas. But first, Bielema had to learn what not to do with Chase and Sydney—namely, not pit them against each other in practice. During one scrimmage situation in 2021, Sydney was blitzing when Chase was in on pass protection. The collision in the backfield sparked a confrontation. It might have looked familiar to their mother but came as a shock to the new coaching staff.

“It did not end well,” Bielema says with a smile. “I had to throw them both out of the scrimmage. I literally got done with that scrimmage and told my staff, ‘That will be the last time we see the Brown brothers together on the field in a live environment.’ It didn’t do us any good to have those two fighting over who was better.”

But Bielema knew this much: He had two vicious competitors to build around.

Chase Brown was banged up and sharing time through the first five games of the Bielema era in 2021. The Illini were 1–4 and hosting Charlotte when Chase erupted for 257 yards on 26 carries in a 24–14 victory. From that point forward, he became the barometer for Illinois success. When Brown rushed for more than 100 yards in a game, the Illini were 4–0 (including a road upset of Penn State, in which he had 33 carries for 223 yards). When he ran for fewer than 100 yards, the Illini were 1–5. When he didn’t play, they were 0–2.

This season, it was clear from the start Chase would be the hub of the Illinois offense. The better the competition, the more he touches the ball—and the better the results. In three blowouts of nonconference competition, Chase averaged 19.7 carries. Against Big Ten competition, that number jumps to 33.3. And in the past two games, against Iowa and Minnesota, Chase has seven receptions for 70 yards and a touchdown.

His 192 rushing attempts (27.4 per game) lead the nation. So do his 1,059 rushing yards. By the time his season is over—he still has another year of eligibility but will

assuredly turn pro—he should easily be the school’s No. 2 all-time rusher. And he will be another entry on Bielema’s list of great backs. The coach had Montee Ball, Melvin Gordon, James White and John Clay at Wisconsin—all of them running for between 3,400 and 5,200 career yards. He had Alex Collins (No. 2 all-time rusher at Arkansas) and Jonathan Williams (No. 11).

But Bielema sees a running versatility in Brown he hasn’t had before. He listed the three traits good backs have: the ability to run away from tacklers, run through tacklers and make tacklers miss. “Backs usually have one or two, but not all three,” Bielema says. “Chase has all three.”



Sydney, a two-star prospect, didn’t originally receive much interest from FBS schools before landing at Illinois.

Joe Robbins/Icon Sportswire/Getty Images

If Chase keeps piling up yards and Illinois keeps winning, he will move more prominently into the Heisman discussion. Illinois has a puzzlingly meager football history, and the school’s top Heisman vote-getters reflect that. The Illini haven’t had

a top-10 finisher in 40 years (Tony Eason was eighth in 1982) or a top-five finisher since Jim Grabowski was third in '65.

Sydney, meanwhile, has served as an anchor on a defense that leads the nation in fewest yards allowed per game (221.1), fewest points allowed per game (8.9) and pass-efficiency defense (75.4—which is probably not sustainable through the season but would be an FBS-best in more than a decade). Sydney is tied for second on the team in both solo tackles (18) and passes broken up (seven), in addition to having an interception and a forced fumble.

Phil and Karen Yates, the Browns' original host family, watch all the Illinois games with beaming pride. They've been to Illinois games in 2019, '21 and this year, and they plan to attend whatever bowl game the Illini play in. Tom and Michelle Cross have trekked to Champaign as well for games, watch more on TV and try to FaceTime with the twins every few weeks.

“We got as much from the experience of hosting them as we gave,” Tom says.

For Raechel, the hardships of 2016 have been replaced with a joy she couldn't see coming beyond unquestioning belief—in her sons, and in the help of strangers. But she gave her boys a chance, as difficult as it was, and they have rewarded her sacrifice abundantly.

“They're so hardworking and so dedicated in everything they do,” she says. “They deserve this so much. They've done so many things we've never imagined.”

More College Football Coverage: