

Energy Tidbits

March 21, 2021

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Supplemental Documents

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Year-over-year summary

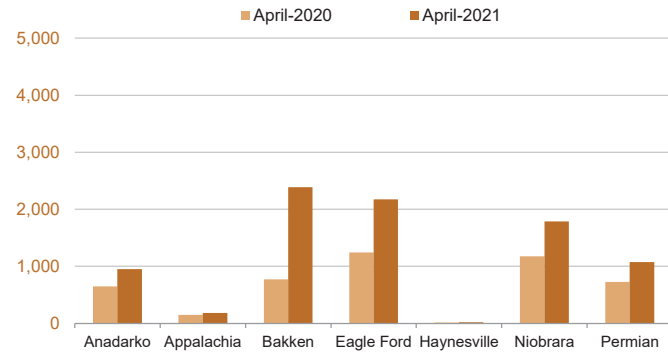
March 2021

Drilling Productivity Report

drilling data through February
projected production through April

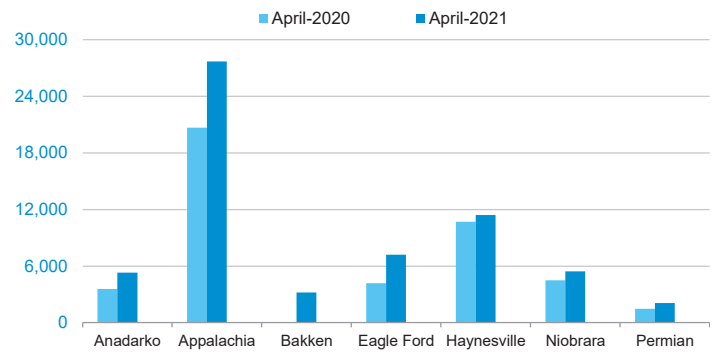
New-well oil production per rig

barrels/day



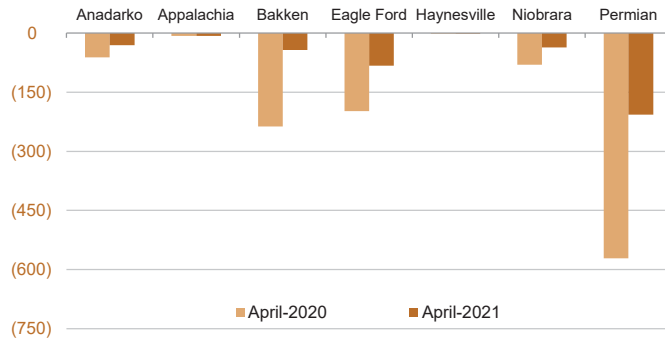
New-well gas production per rig

thousand cubic feet/day



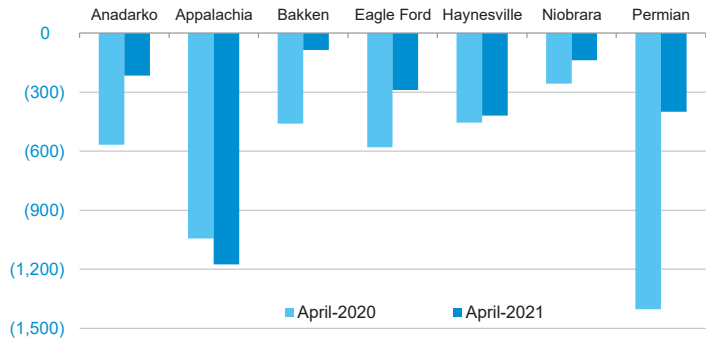
Legacy oil production change

thousand barrels/day



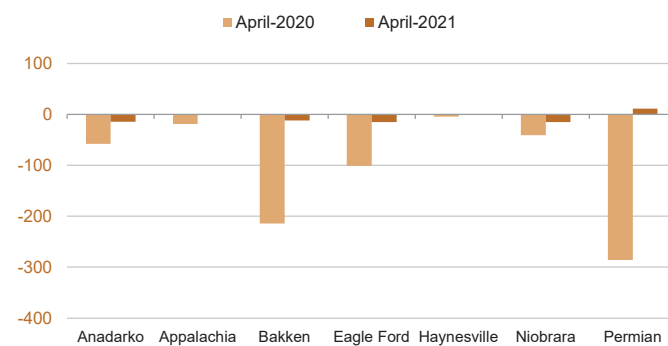
Legacy gas production change

million cubic feet/day



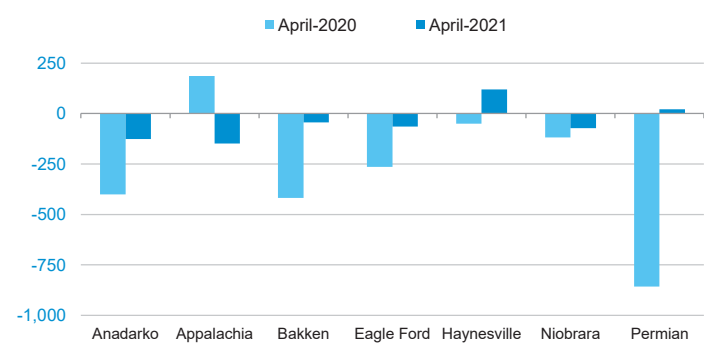
Indicated monthly change in oil production (Apr vs. Mar)

thousand barrels/day



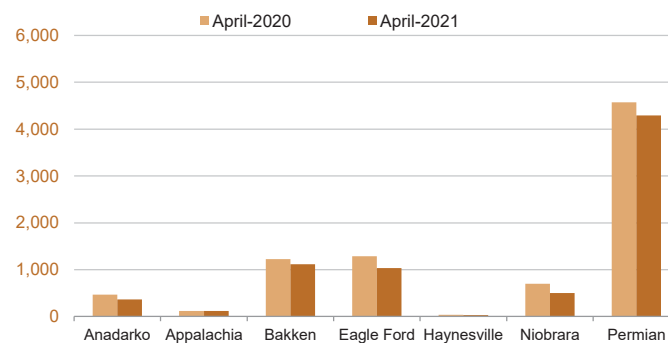
Indicated monthly change in gas production (Apr vs. Mar)

million cubic feet/day



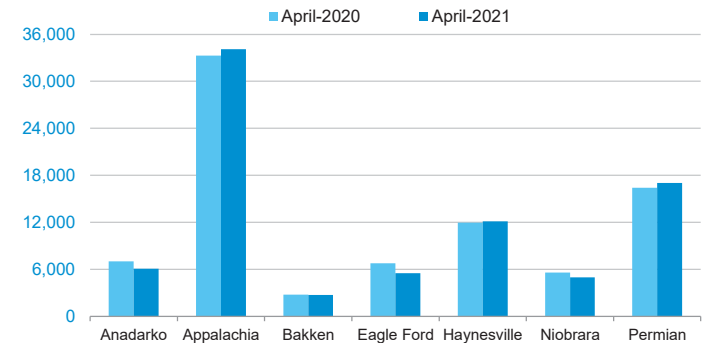
Oil production

thousand barrels/day



Natural gas production

million cubic feet/day



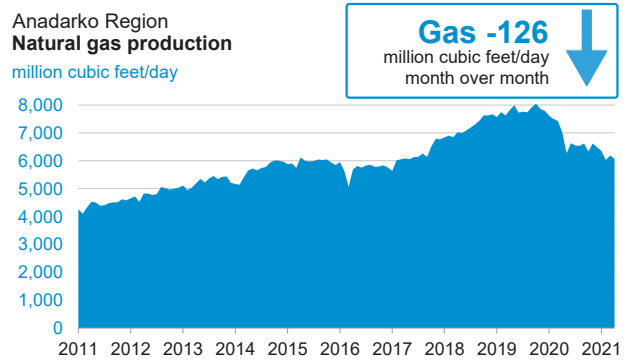
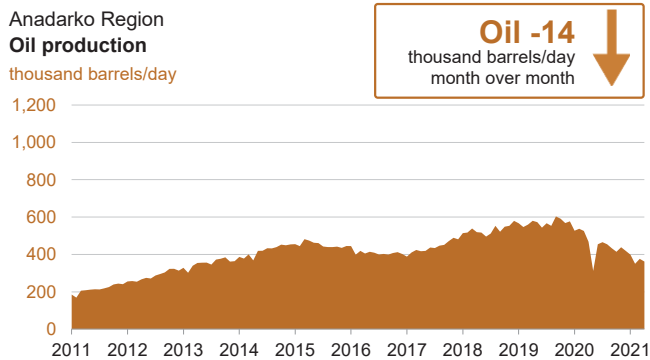
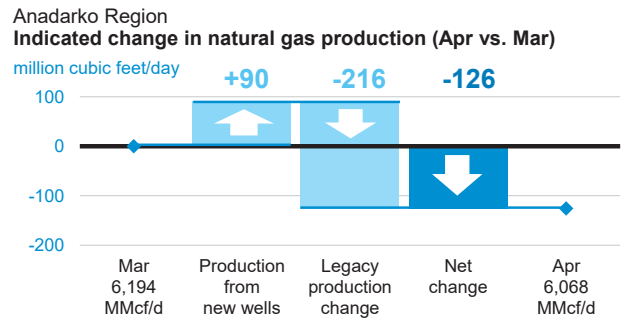
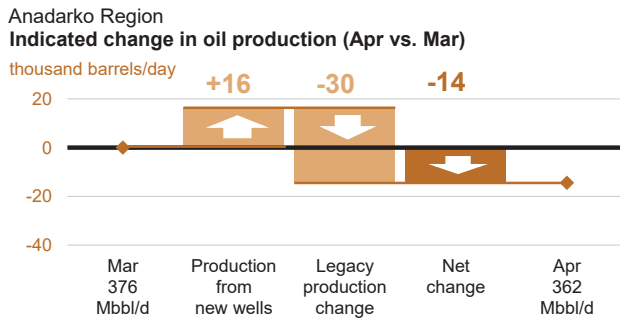
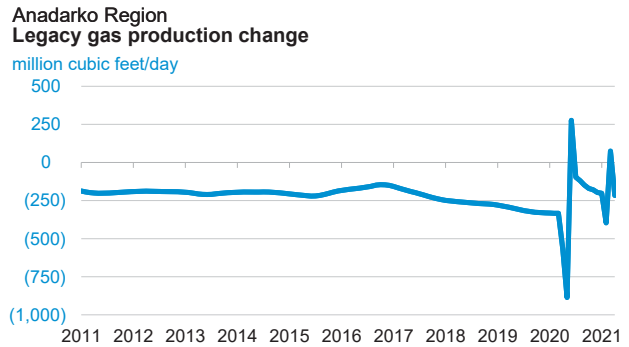
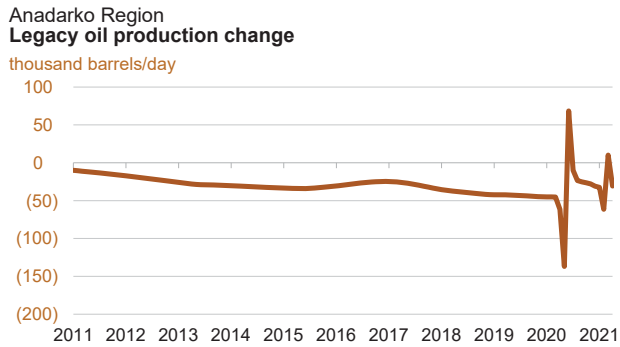
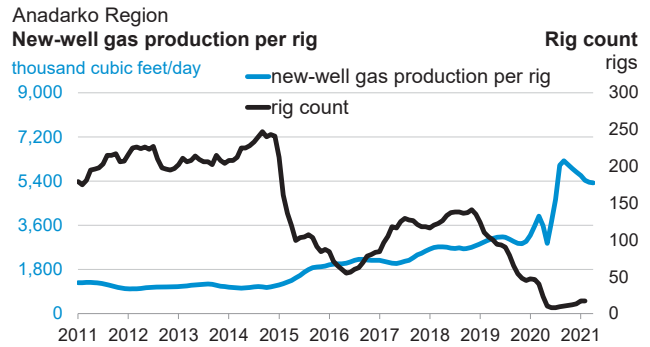
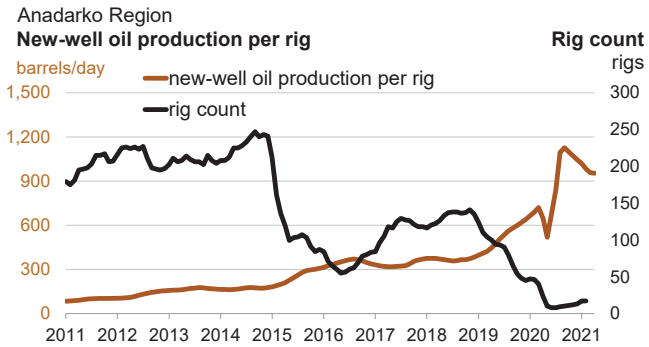
Oil
-4
barrels/day
month over month

953 April
957 March
barrels/day

Monthly
additions
from one
average rig

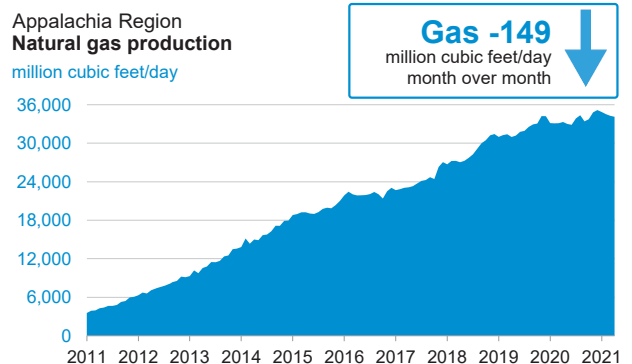
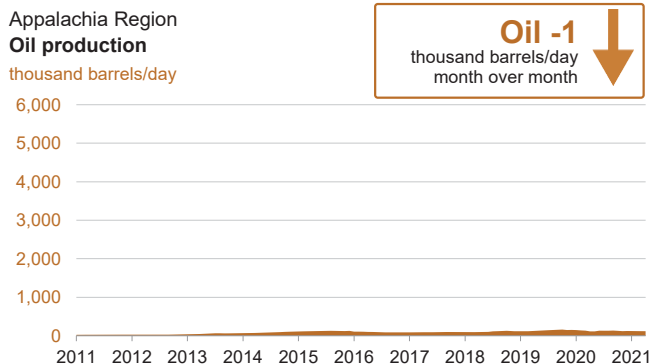
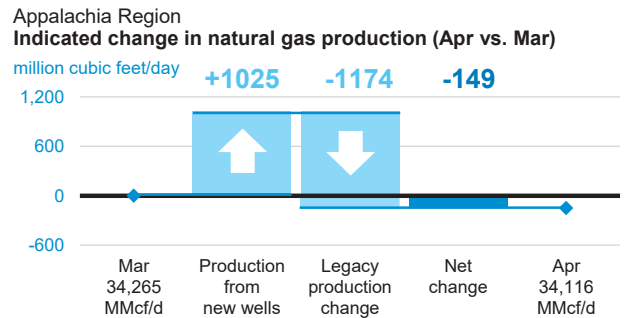
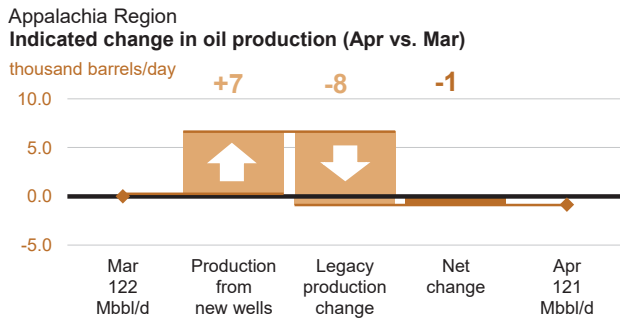
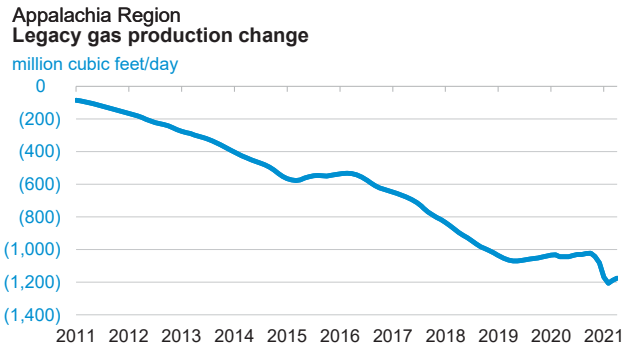
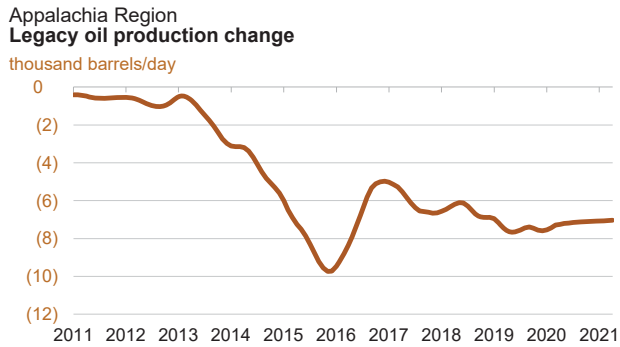
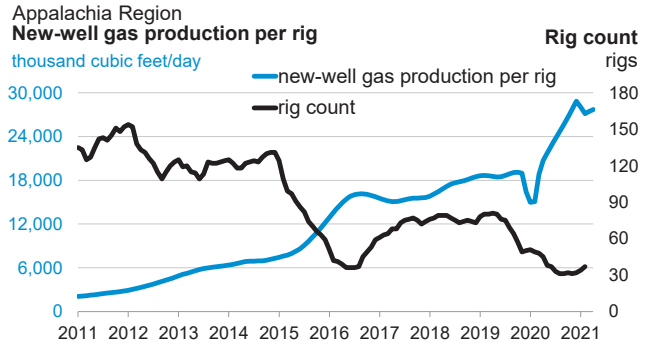
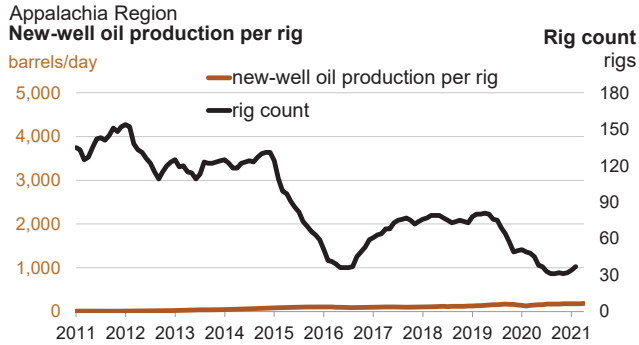
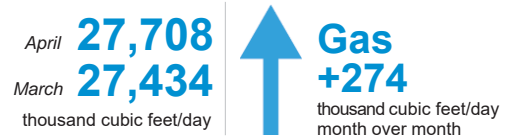
April **5,316**
March **5,343**
thousand cubic feet/day

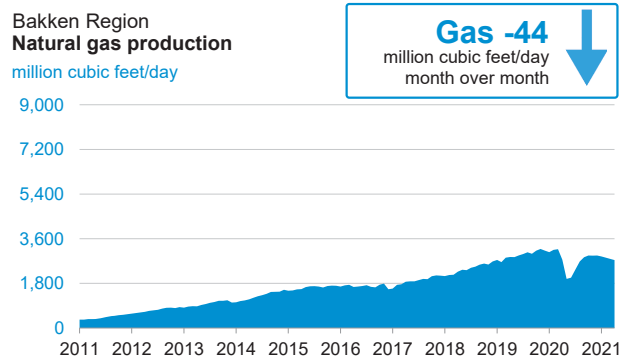
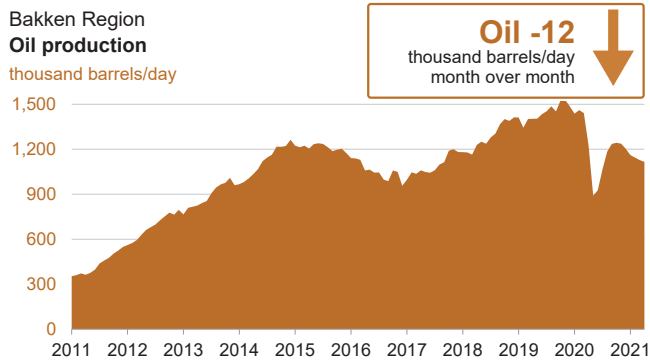
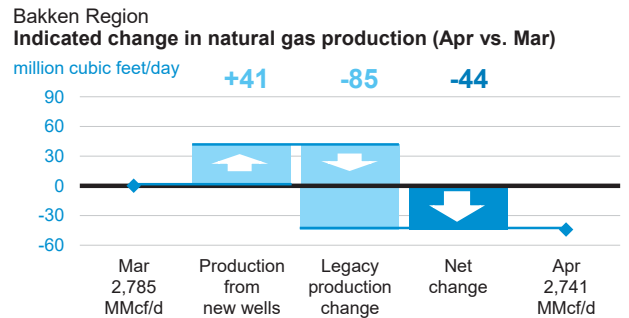
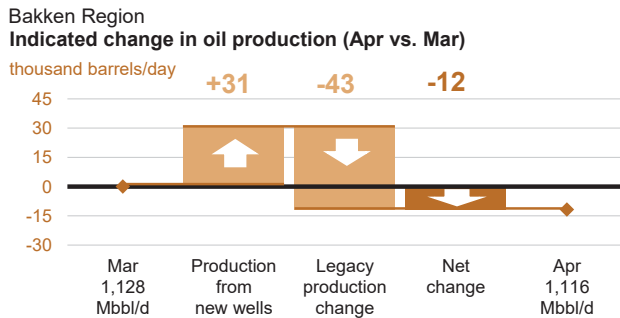
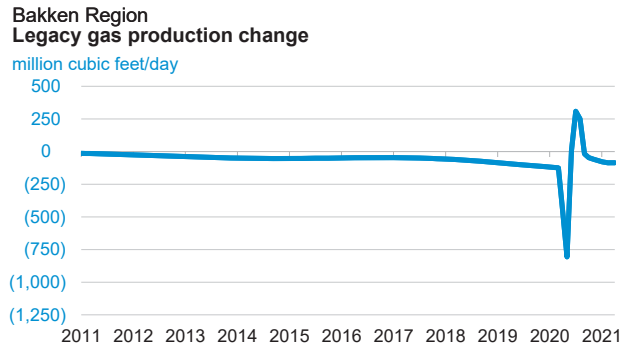
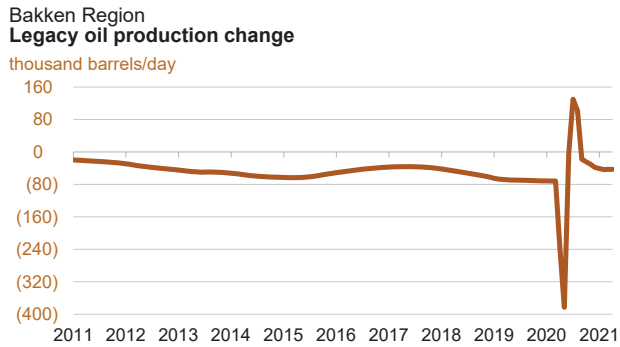
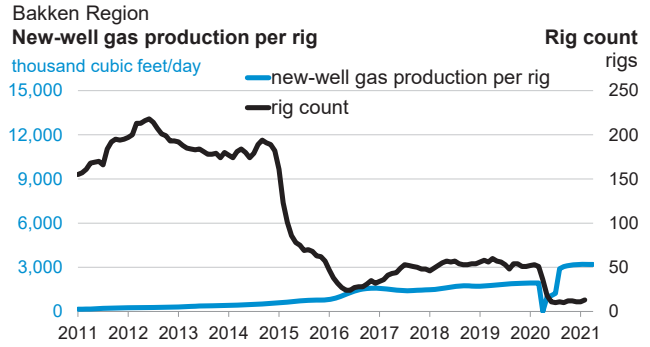
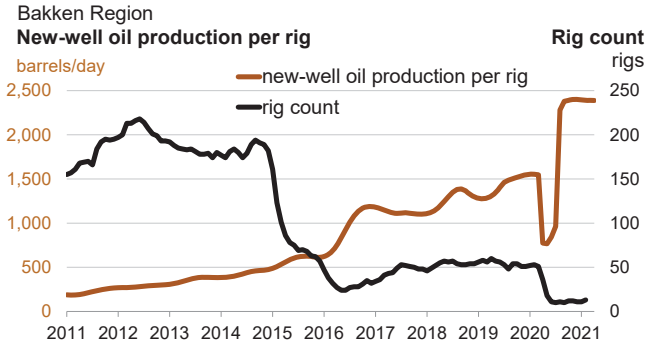
Gas
-27
thousand cubic feet/day
month over month





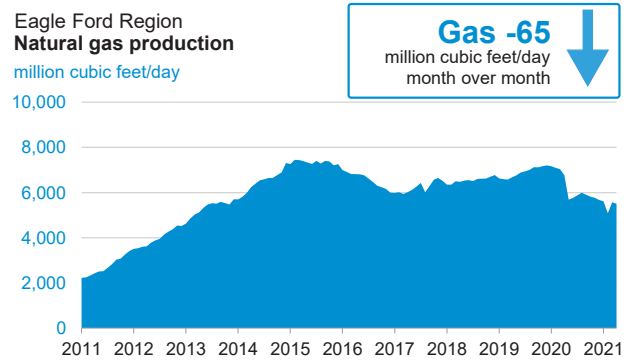
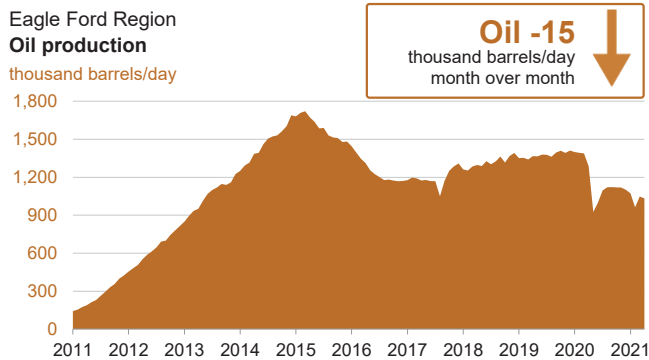
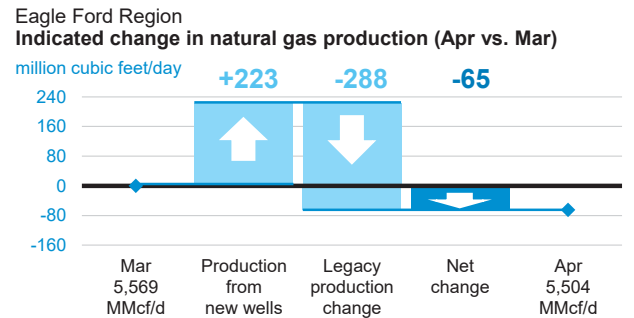
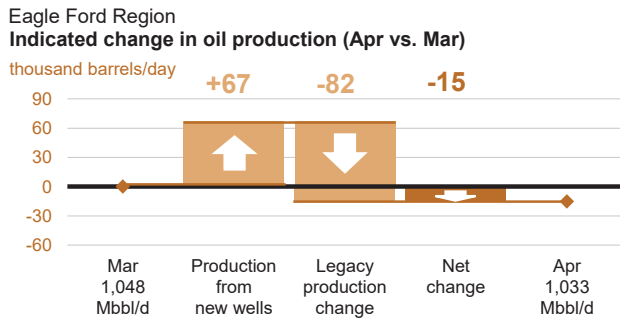
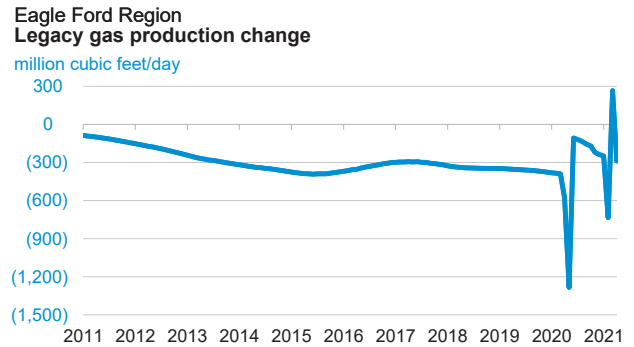
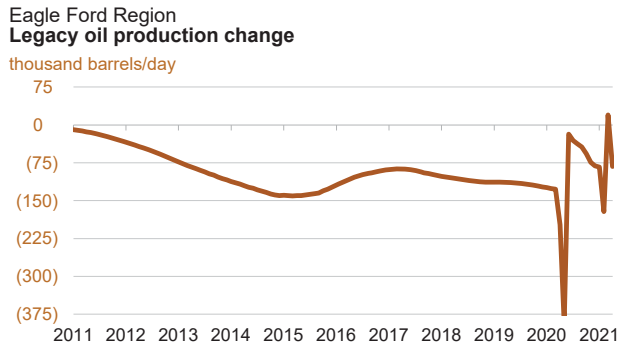
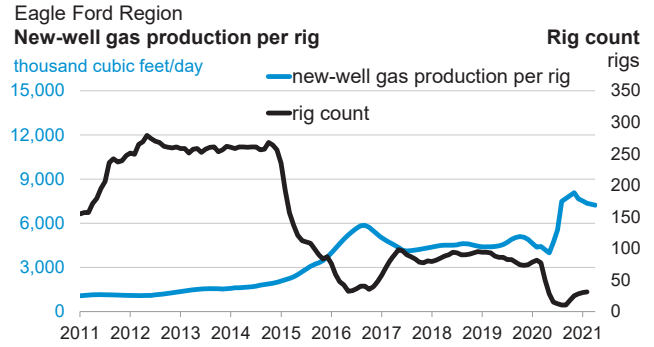
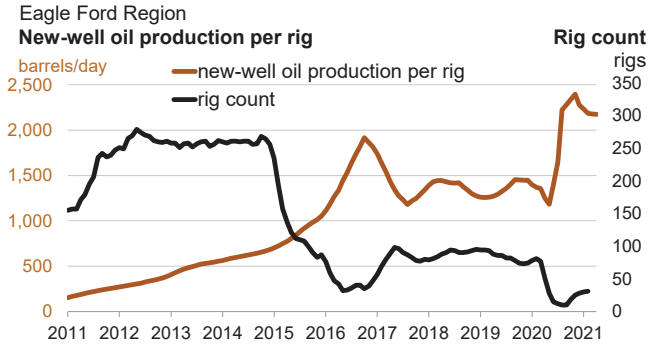
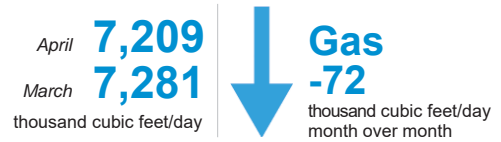
Monthly additions from one average rig







Monthly
additions
from one
average rig



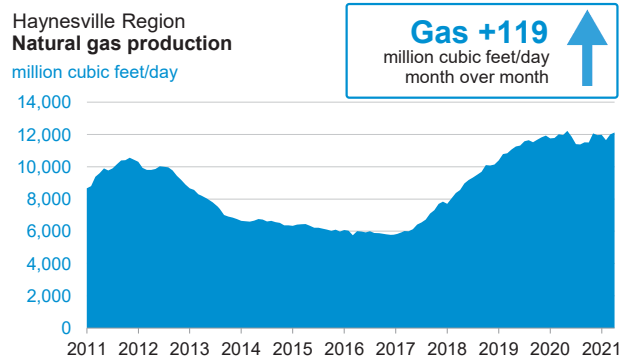
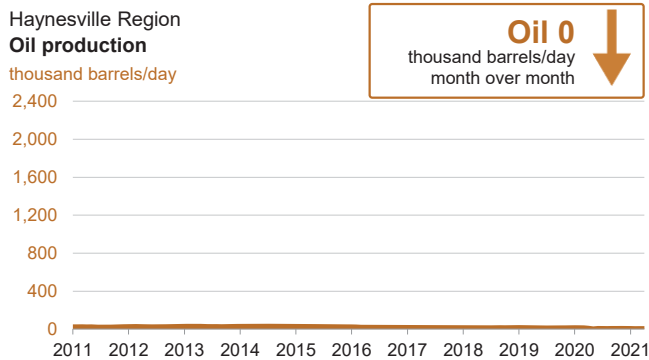
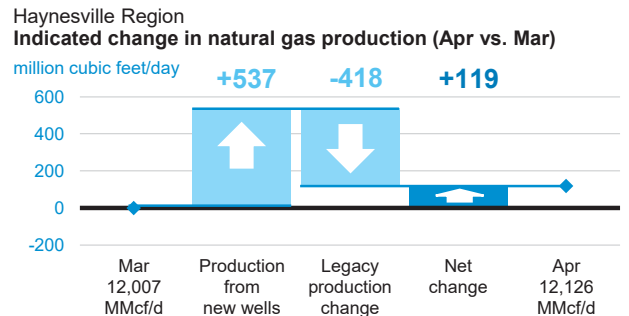
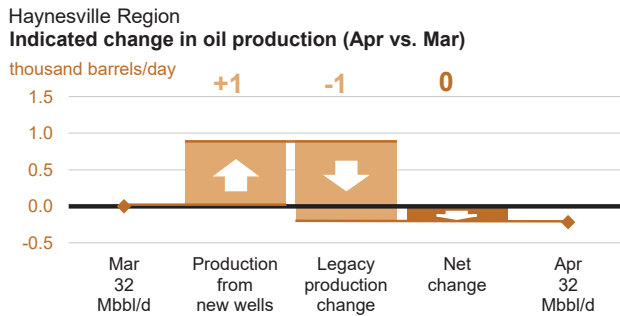
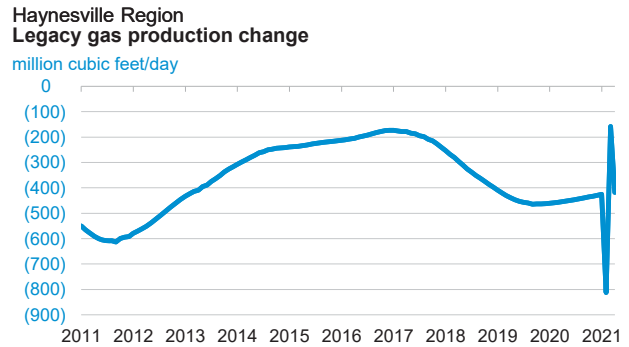
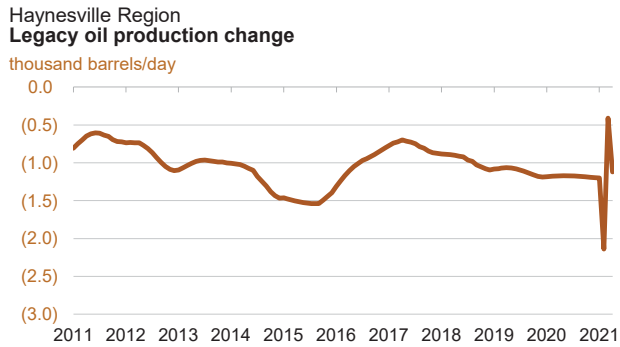
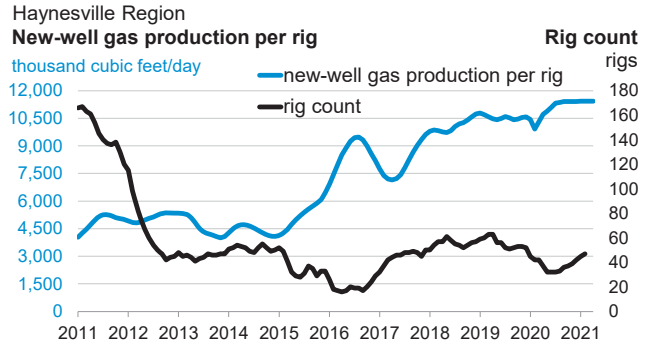
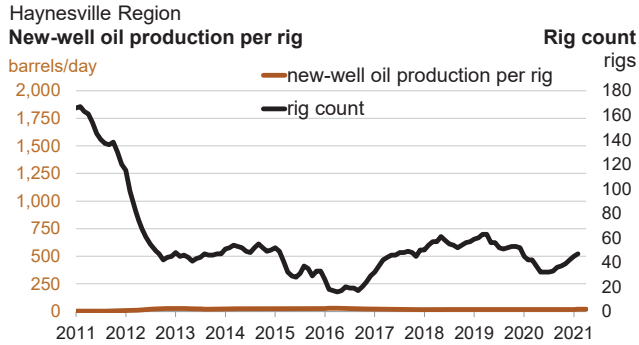
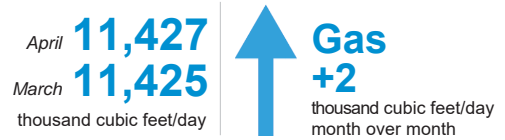
Haynesville Region

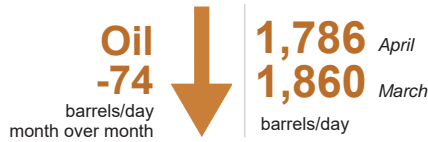
Drilling Productivity Report

March 2021
drilling data through February
projected production through April

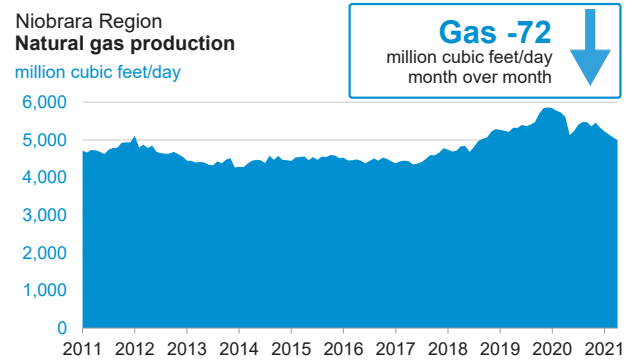
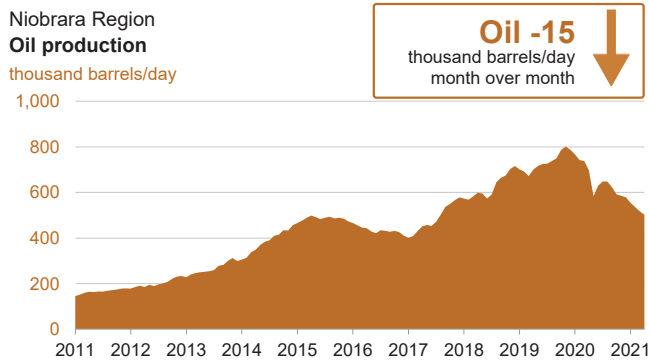
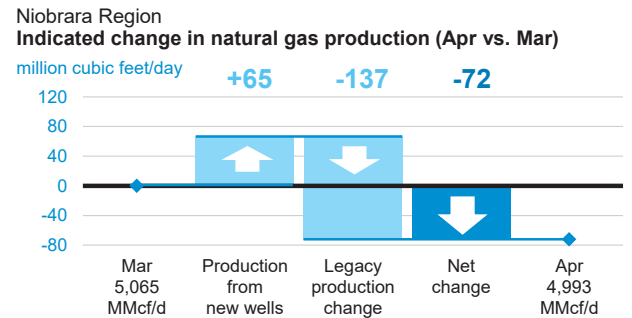
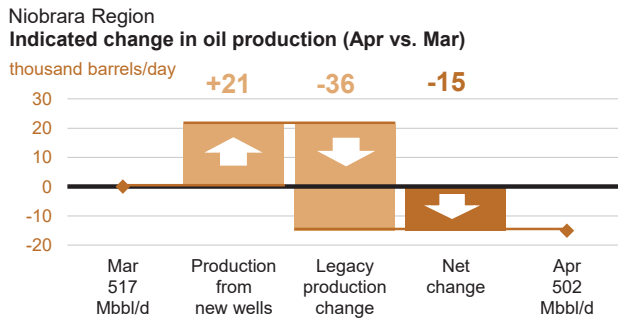
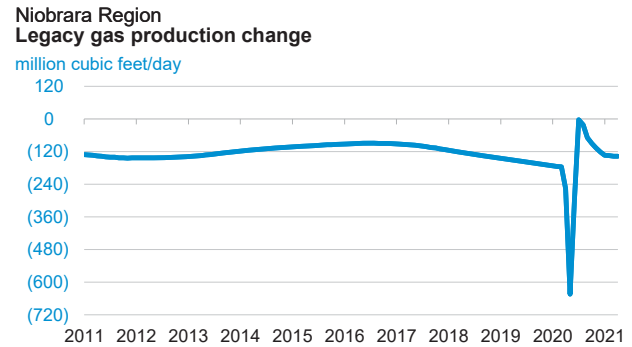
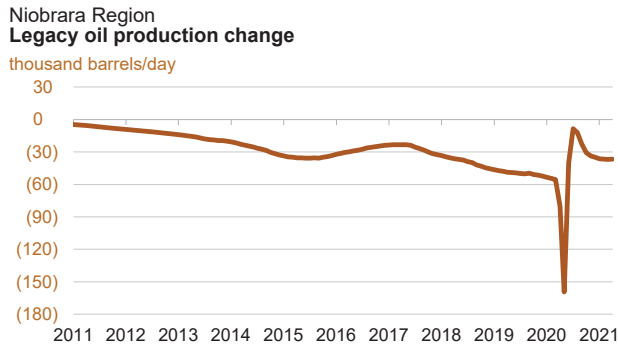
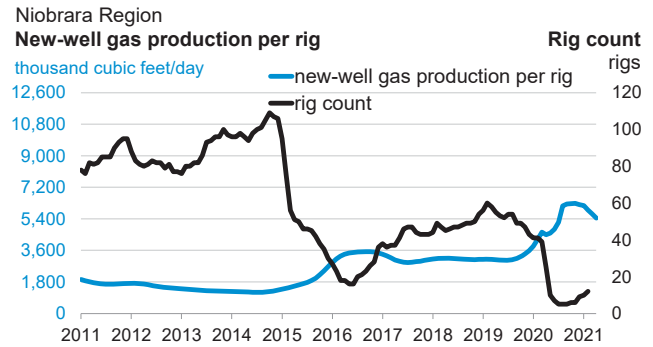
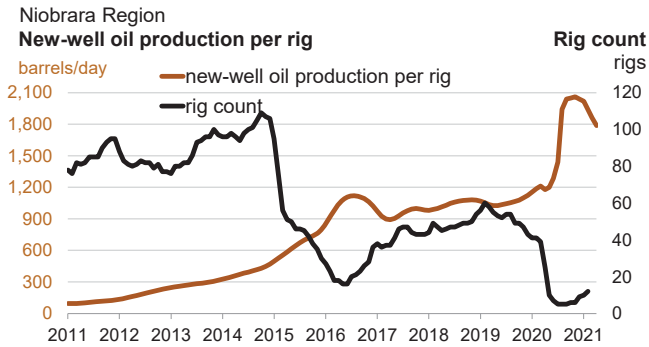


Monthly additions from one average rig



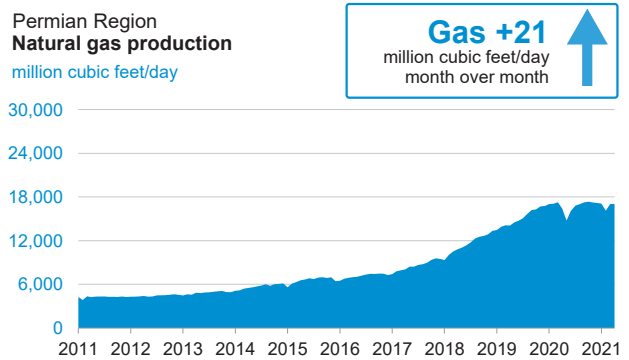
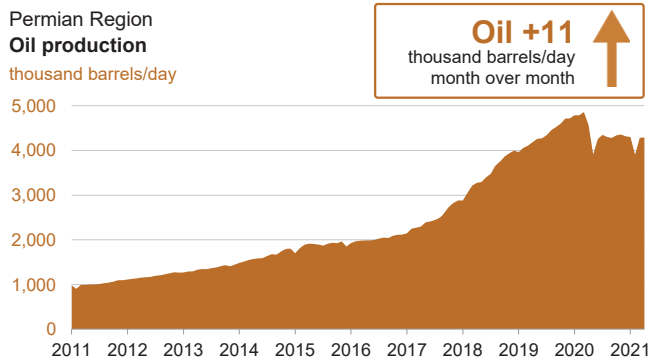
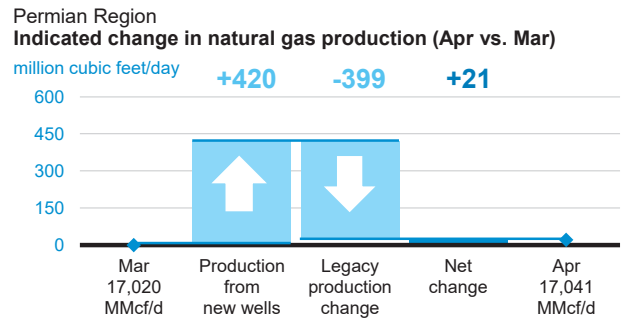
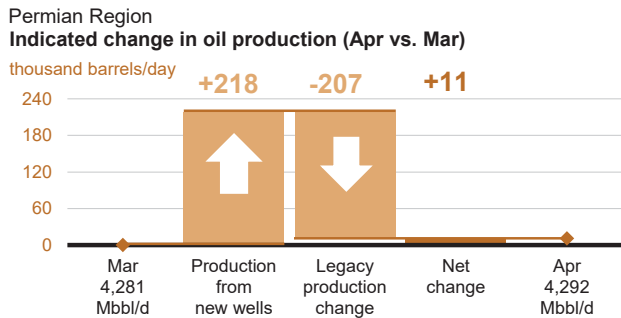
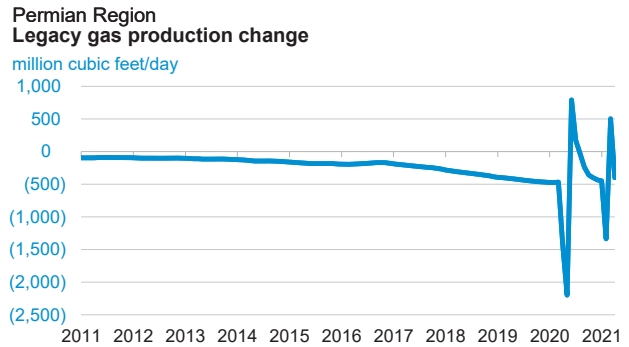
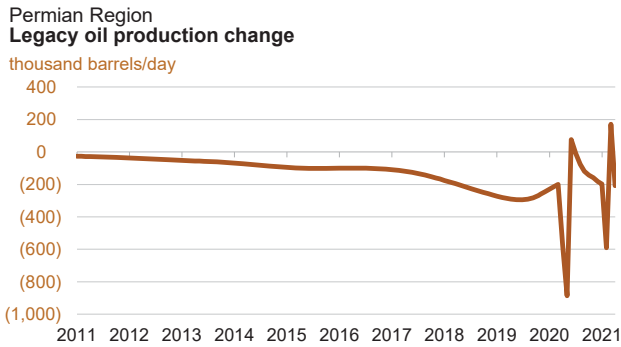
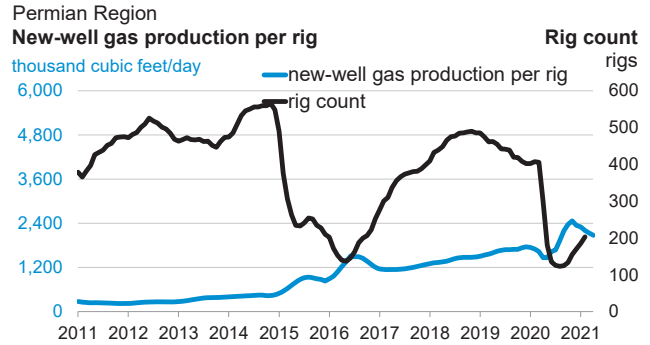
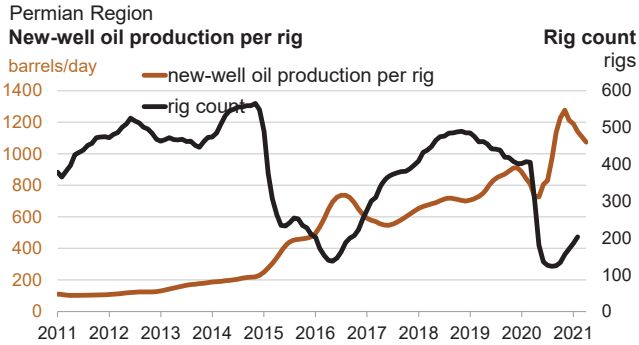
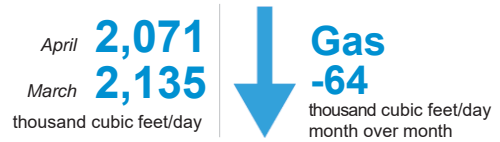


Monthly
additions
from one
average rig





Monthly
additions
from one
average rig





The Drilling Productivity Report uses recent data on the total number of drilling rigs in operation along with estimates of drilling productivity and estimated changes in production from existing oil and natural gas wells to provide estimated changes in oil¹ and natural gas² production for seven key regions. EIA's approach does not distinguish between oil-directed rigs and gas-directed rigs because once a well is completed it may produce both oil and gas; more than half of the wells do that.

Monthly additions from one average rig

Monthly additions from one average rig represent EIA's estimate of an average rig's³ contribution to production of oil and natural gas from new wells.⁴ The estimation of new-well production per rig uses several months of recent historical data on total production from new wells for each field divided by the region's monthly rig count, lagged by two months.⁵ Current- and next-month values are listed on the top header. The month-over-month change is listed alongside, with +/- signs and color-coded arrows to highlight the growth or decline in oil (brown) or natural gas (blue).

New-well oil/gas production per rig

Charts present historical estimated monthly additions from one average rig coupled with the number of total drilling rigs as reported by Baker Hughes.

Legacy oil and natural gas production change

Charts present EIA's estimates of total oil and gas production changes from all the wells other than the new wells. The trend is dominated by the well depletion rates, but other circumstances can influence the direction of the change. For example, well freeze-offs or hurricanes can cause production to significantly decline in any given month, resulting in a production increase the next month when production simply returns to normal levels.

Projected change in monthly oil/gas production

Charts present the combined effects of new-well production and changes to legacy production. Total new-well production is offset by the anticipated change in legacy production to derive the net change in production. The estimated change in production does not reflect external circumstances that can affect the actual rates, such as infrastructure constraints, bad weather, or shut-ins based on environmental or economic issues.

Oil/gas production

Charts present all oil and natural gas production from both new and legacy wells since 2007. This production is based on all wells reported to the state oil and gas agencies. Where state data are not immediately available, EIA estimates the production based on estimated changes in new-well oil/gas production and the corresponding legacy change.

Footnotes:

1. Oil production represents both crude and condensate production from all formations in the region. Production is not limited to tight formations. The regions are defined by all selected counties, which include areas outside of tight oil formations.
2. Gas production represents gross (before processing) gas production from all formations in the region. Production is not limited to shale formations. The regions are defined by all selected counties, which include areas outside of shale formations.
3. The monthly average rig count used in this report is calculated from weekly data on total oil and gas rigs reported by Baker Hughes.
4. A new well is defined as one that began producing for the first time in the previous month. Each well belongs to the new-well category for only one month. Reworked and recompleted wells are excluded from the calculation.
5. Rig count data lag production data because EIA has observed that the best predictor of the number of new wells beginning production in a given month is the count of rigs in operation two months earlier.



The data used in the preparation of this report come from the following sources. EIA is solely responsible for the analysis, calculations, and conclusions.

Drilling Info (<http://www.drillinginfo.com>) Source of production, permit, and spud data for counties associated with this report. Source of real-time rig location to estimate new wells spudded and completed throughout the United States.

Baker Hughes (<http://www.bakerhughes.com>) Source of rig and well counts by county, state, and basin.

North Dakota Oil and Gas Division (<https://www.dmr.nd.gov/oilgas>) Source of well production, permit, and completion data in the counties associated with this report in North Dakota

Railroad Commission of Texas (<http://www.rrc.state.tx.us>) Source of well production, permit, and completion data in the counties associated with this report in Texas

Pennsylvania Department of Environmental Protection

(<https://www.paoilandgasreporting.state.pa.us/publicreports/Modules/Welcome/Welcome.aspx>) Source of well production, permit, and completion data in the counties associated with this report in Pennsylvania

West Virginia Department of Environmental Protection (<http://www.dep.wv.gov/oil-and-gas/Pages/default.aspx>) Source of well production, permit, and completion data in the counties associated with this report in West Virginia

Colorado Oil and Gas Conservation Commission (<http://cogcc.state.co.us>) Source of well production, permit, and completion data in the counties associated with this report in Colorado

Wyoming Oil and Conservation Commission (<http://wogcc.state.wy.us>) Source of well production, permit, and completion data in the counties associated with this report in Wyoming

Louisiana Department of Natural Resources (<http://dnr.louisiana.gov>) Source of well production, permit, and completion data in the counties associated with this report in Louisiana

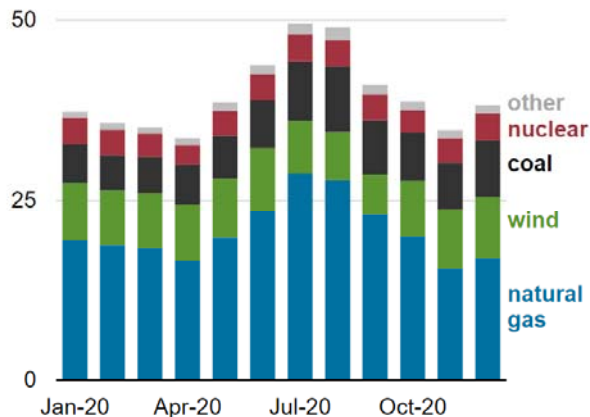
Ohio Department of Natural Resources (<http://oilandgas.ohiodnr.gov>) Source of well production, permit, and completion data in the counties associated with this report in Ohio

Oklahoma Corporation Commission (<http://www.occeweb.com/og/oghome.htm>) Source of well production, permit, and completion data in the counties associated with this report in Oklahoma

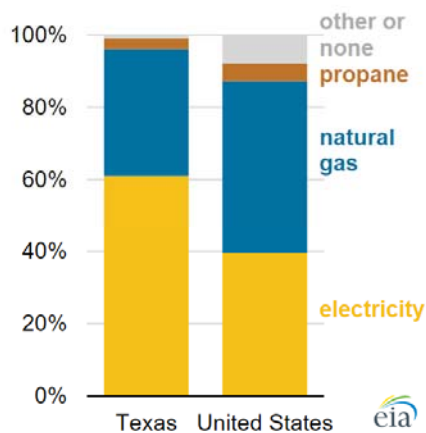
MARCH 12, 2021

Texas uses natural gas for electricity generation and home heating

Texas monthly electricity generation by source (Jan 2020–Dec 2020)
million megawatthours



Primary home heating source (2019)
percentage of total



Source: U.S. Energy Information Administration, [Electricity Data Browser](#); U.S. Census Bureau, [American Community Survey](#), [House Heating Fuel](#)

Note: Data are for total net generation, including both utility-scale and small-scale electricity. Other includes fuel oil, wood, solar, and other fuels.

In February 2021, an extreme [winter weather event](#) affected energy [supply](#) and demand in Texas. The cold temperatures that increased demand for electricity and heating in Texas also disrupted energy supply, causing health and safety concerns. Because natural gas is used to generate a large share of the electricity in Texas (52% in February 2020, according to the U.S. Energy Information Administration's (EIA) [Electricity Data Browser](#)), a drop in natural gas-fired generation during the cold weather event significantly affected total electricity generation.

According to the [U.S. Census Bureau](#), 61% of homes in Texas use electricity as their primary heating source compared with 39% of homes in the United States. Natural gas directly heats about 35% of Texas homes, but most modern natural gas [furnaces](#) require electricity to ignite and to fan heat throughout houses. Almost 3% of homes in Texas use propane as their primary space heating fuel, and another 0.4% report having no heating equipment.

Although four electricity grids serve [Texas](#), the Electric Reliability Council of Texas (ERCOT) operates the state's main electricity grid. Unlike other grids in the United States, ERCOT has limited connections to outside systems, so it depends primarily on its own resources to meet its electricity needs.

EIA's [Hourly Electric Grid Monitor](#) data show that natural gas-fired power [generation fell sharply](#) once ERCOT began implementing rotating outages at midnight on February 15. Coal-fired, wind, and nuclear generation also decreased.

In Texas, natural gas demand for electricity generation usually peaks during the summer when residents increase their air-conditioning use. Natural gas has generated as much as 61% of Texas's monthly net electricity generation during peak summer electricity demand. Natural gas accounts for a smaller share of the state's electricity generation during the winter because total electricity demand is lower and demand for natural gas for heating is higher.

Wind, coal, and nuclear plants generate most of the rest of Texas's electricity. Wind's share of net electricity generation in Texas has [increased substantially](#) during the past decade. In February 2020, wind accounted for 22% of Texas's net electricity generation (including both utility- and small-scale wind farms). Coal's share has declined in recent years; it accounted for 13% of generation in February 2020. Nuclear consistently generates about 10% of electricity in Texas.

Principal contributor: Mickey Francis

<https://ca.finance.yahoo.com/news/chevron-canada-top-funding-further-111253921.html>

Fri., March 19, 2021, 6:14 a.m. · 1 min read

CALGARY — Chevron Canada Ltd. says it will stop funding further feasibility work on its proposed Kitimat LNG project on B.C.'s north coast.

Chevron Canada to stop funding further feasibility work Kitimat LNG project

The company holds a 50 per cent stake in the project in a joint venture with Australia's Woodside Petroleum Ltd.

Chevron, which is the project operator, put its interest up for sale in December 2019, but has failed to find a buyer.

When the company put its stake up for sale, Chevron said it would continue to work with Woodside on agreed project activities that brought value or were required for regulatory and operational compliance.

But in a statement on its website this week, Chevron says that it now plans to stop Chevron-funded further feasibility work.

The project includes upstream resource assets in the Liard and Horn River Basins in northeast B.C., the proposed 471-km Pacific Trail Pipeline and plans for a natural gas liquefaction facility at Bish Cove near Kitimat, B.C.

This report by The Canadian Press was first published March 19, 2021.

The Canadian Press

Highlights for the month

- The consumption of petroleum products in February 2021 (with 28 days) with a volume of 17.2 MMT recovered to 95% of the volume of 18.1 MMT in February 2020 (with 29 days). Petroleum products consumption during the period April to February 2021 recovered almost 89% of the consumption during the same period previous year.
- The products which registered a growth in the month of February 2021 were LPG 7.7%, Naphtha 0.3%, Lubes & Greases 0.8%, Light Diesel Oil (LDO) 46.5%, Pet coke 0.5% and products categorised under “Others” category 5.5%.
- Ethanol blending with Petrol was 7.8% during February 2021 and cumulative during December 2020-February 2021 was 6.9%.
- Total consumption of natural gas (including internal consumption) for the month of February, 2021 was 5045 MMSCM which was 12.7% lower than the corresponding month of the previous year. The cumulative consumption of 55053 MMSCM for the current year till February, 2021 was lower by 6.4% compared with the corresponding period of the previous year.
- Indigenous crude oil and condensate production during February 2021 was lower by 3.2% than that of February 2020 as compared to a de-growth of 4.6% during January 2021. OIL registered a de-growth of 9.1 % and ONGC registered a de-growth of 7.7 % during February 2021 as compared to February 2020. PSC registered growth of 14.9% during February 2021 as compared to February 2020. De-growth of 5.4% was registered in the total crude oil and condensate production during April- February 2021 over the corresponding period of the previous year.
- Crude oil processed during February 2021 was 18.6 MMT, which was 11.8% lower than February 2020 as compared to a growth of 0.6% during January 2021 . De-growth of 13.9% was registered in the total crude oil processing during April-February 2021 over the corresponding period of the previous year.
- Production of petroleum products saw a de-growth of 10.9% during February 2021 over February 2020 as compared to a de-growth of 2.5% during January 2020. De-growth of 12.2% was registered in the total POL production during April- February 2021 over the corresponding period of the previous year.

	<ul style="list-style-type: none"> Gross production of natural gas for the month of February, 2021 was 2307 MMSCM which was lower by 1.4% compared with the corresponding month of the previous year. The cumulative gross production of natural gas of 23680 MMSCM for the current financial year till February, 2021 was lower by 9.7% compared with the corresponding period of the previous year.
	<ul style="list-style-type: none"> Crude oil imports decreased by 18.3% and 14.2% during February 2021 and April-February 2021 respectively as compared to the corresponding period of the previous year.
	<ul style="list-style-type: none"> POL products imports increased by 11.1% and decreased by 1.6% during February 2021 and April-February 2021 respectively as compared to the corresponding period of the previous year. Decrease in POL products imports during April-February 2021 was due to decrease in imports of high speed diesel (HSD), motor sprit (MS), LOBS/Lube oil, naphtha and aviation turbine fuel (ATF).
	<ul style="list-style-type: none"> LNG import for the month of February, 2021 was 2810 MMSCM which was 20.2% lower than the corresponding month of the previous year. The cumulative import of 29883 MMSCM for the current year till February, 2021 was lower by 3.3% compared with the corresponding period of the previous year.
	<ul style="list-style-type: none"> Exports of POL products decreased by 17.6% and 15.2% during February 2021 and April-February 2021 respectively as compared to the corresponding period of the previous year. Decrease in POL products exports during April-February 2021 (P) was due to decrease in exports of all products except LOBS/Lube oil and petcoke/CBFS.
	<ul style="list-style-type: none"> The price of Brent Crude averaged \$62.22/bbl during February, 2021 as against \$54.84/bbl during January 2021 and \$55.44/bbl during February 2020. The Indian basket crude price averaged \$61.22/bbl during February 2021 as against \$54.79/bbl during January 2021 and \$54.63 /bbl during February 2020.

2. Crude oil, LNG and petroleum products at a glance

Details		Unit/ Base	2018-19	2019-20	February		April-February	
					2019-20	2020-21 (P)	2019-20	2020-21 (P)
1	Crude oil production in India	MMT	34.2	32.2	2.4	2.3	29.5	27.9
2	Consumption of petroleum products*	MMT	213.2	214.1	18.1	17.2	198.2	175.8
3	Production of petroleum products	MMT	262.4	262.9	21.8	19.4	240.0	210.7
4	Gross natural gas production	MMSCM	32,875	31,184	2,341	2,307	28,769	25,987
5	Natural gas consumption	MMSCM	60,798	64,144	5,778	5,045	58,847	55,053
6	Imports & exports:							
	Crude oil imports	MMT	226.5	227.0	18.6	15.2	207.4	178.1
		\$ Billion	111.9	101.4	7.7	6.6	95.6	53.8
	Petroleum products (POL) imports*	MMT	33.3	43.8	3.5	3.9	40.0	39.4
		\$ Billion	16.3	17.7	1.5	1.6	16.4	12.4
	Gross petroleum imports (Crude + POL)	MMT	259.8	270.7	22.2	19.1	247.5	217.5
		\$ Billion	128.3	119.1	9.2	8.2	112.0	66.2
	Petroleum products (POL) export	MMT	61.1	65.7	5.0	4.1	59.8	50.7
		\$ Billion	38.2	35.8	2.6	2.2	33.9	18.0
	LNG imports*	MMSCM	28,740	33,887	3,520	2,810	30,917	29,883
		\$ Billion	10.3	9.5	0.9	0.8	8.8	6.6
7	Petroleum imports as percentage of India's gross imports (in value terms)	%	24.9	25.1	24.3	20.2	25.3	19.4
8	Petroleum exports as percentage of India's gross exports (in value terms)	%	11.6	11.4	9.3	8.0	11.6	7.0
9	Import dependency of crude (on consumption basis)	%	83.8	85.0	86.6	87.3	85.2	84.3

*Jul 2020- Feb 2021 DGCIS data prorated

3. Indigenous crude oil production (Million Metric Tonnes)

Details	2018-19	2019-20	February			April-February		
			2019-20	2020-21 Target*	2020-21 (P)	2019-20	2020-21 Target*	2020-21 (P)
ONGC	19.6	19.2	1.6	1.6	1.5	17.6	19.2	17.4
Oil India Limited (OIL)	3.3	3.1	0.2	0.3	0.2	2.9	3.0	2.7
Private / Joint Ventures (JVs)	9.6	8.2	0.5	0.7	0.5	7.5	7.5	6.5
Total Crude Oil	32.5	30.5	2.3	2.5	2.2	28.0	29.7	26.6
ONGC condensate	1.5	1.4	0.1		0.1	1.3		1.0
PSC condensate	0.2	0.3	0.02		0.02	0.2		0.2
Total condensate	1.7	1.6	0.1		0.1	1.5		1.3
Total (Crude + Condensate) (MMT)	34.2	32.2	2.4	2.5	2.3	29.5	29.7	27.9
Total (Crude + Condensate) (Million Bbl/Day)	0.69	0.64	0.61		0.61	0.64		0.61

*Provisional targets inclusive of condensate.

4. Domestic oil & gas production vis-à-vis overseas production

Details	2018-19	2019-20	February		April-February	
			2019-20	2020-21 (P)	2019-20	2020-21 (P)
Total domestic production (MMTOE)	67.1	63.4	4.7	4.6	58.2	53.9
Overseas production (MMTOE)	24.7	24.5	1.9	1.6	22.5	20.0
Overseas production as percentage of domestic production	36.8%	38.7%	40.0%	35.6%	38.6%	37.2%

Source: ONGC Videsh, GAIL, OIL, IOCL, HPCL & BPRL

5. High Sulphur (HS) & Low Sulphur (LS) crude oil processing (MMT)

Details	2018-19	2019-20	February		April-February	
			2019-20	2020-21 (P)	2019-20	2020-21 (P)
1 High Sulphur crude	194.2	192.4	16.5	13.0	176.1	146.0
2 Low Sulphur crude	63.0	62.0	4.6	5.6	57.1	54.8
Total crude processed (MMT)	257.2	254.4	21.1	18.6	233.2	200.8
Total crude processed (Million Bbl/Day)	5.17	5.09	5.34	4.87	5.10	4.41
Percentage share of HS crude in total crude oil processing	75.5%	75.6%	78.1%	69.8%	75.5%	72.7%

8. Refineries: Installed capacity and crude oil processing (MMTPA / MMT)

Company	Refinery	Installed capacity (1.3.2021) MMTPA	Crude oil processing (MMT)							
			2018-19	2019-20	February			April-February		
					2019-20	2020-21 (Target)	2020-21 (P)	2019-20	2020-21 (Target)	2020-21 (P)
IOCL	Barauni (1964)	6.0	6.7	6.5	0.5	0.5	0.5	6.0	5.8	4.9
	Koyali (1965)	13.7	13.5	13.1	1.2	0.9	0.9	11.9	12.8	10.7
	Haldia (1975)	8.0	8.0	6.5	0.5	0.7	0.7	5.9	7.6	6.1
	Mathura (1982)	8.0	9.7	8.9	0.7	0.8	0.8	8.2	8.7	8.1
	Panipat (1998)	15.0	15.3	15.0	1.3	1.0	1.0	13.8	14.7	12.0
	Guwahati (1962)	1.0	0.9	0.9	0.05	0.07	0.08	0.9	0.8	0.8
	Digboi (1901)	0.65	0.7	0.7	0.06	0.06	0.02	0.6	0.6	0.6
	Bongaigaon(1979)*	2.70	2.5	2.0	0.1	0.2	0.2	1.9	2.4	2.2
	Paradip (2016)	15.0	14.6	15.8	1.2	1.0	1.2	14.5	12.6	11.1
	IOCL-TOTAL	70.1	71.8	69.4	5.7	5.3	5.4	63.7	65.9	56.4
CPCL	Manali (1969)	10.5	10.3	10.2	0.7	0.8	0.8	9.3	8.1	7.3
	CBR (1993)	1.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CPCL-TOTAL	11.5	10.7	10.2	0.7	0.8	0.8	9.3	8.1	7.3
BPCL	Mumbai (1955)	12.0	14.8	15.0	1.3	1.1	1.3	13.7	13.7	11.6
	Kochi (1966)	15.5	16.1	16.5	1.4	1.3	1.4	15.1	14.8	11.9
BORL	Bina (2011)	7.8	5.7	7.9	0.7	0.6	0.6	7.2	7.1	5.6
NRL	Numaligarh (1999)	3.0	2.9	2.4	0.2	0.2	0.2	2.1	2.5	2.5
	BPCL-TOTAL	38.3	39.4	41.8	3.5	3.3	3.5	38.1	38.0	31.5

*Full capacity utilization of BGR@2700 TMTA (higher by + 350 TMTA) will be possible by May-June'2021 after revamp & commissioning of OIL's Barauni-BGR crude PPL from 2300 to 3000 TMTA

Company	Refinery	Installed capacity (1.3.2021) (MMTPA)	Crude oil processing (MMT)							
			2018-19	2019-20	February			April-February		
					2019-20	2020-21 (Target)	2020-21 (P)	2019-20	2020-21 (Target)	2020-21 (P)
ONGC	Tatipaka (2001)	0.066	0.066	0.087	0.006	0.005	0.007	0.080	0.058	0.073
MRPL	Mangalore (1996)	15.0	16.2	14.0	1.3	1.3	1.3	12.8	14.0	10.1
	ONGC-TOTAL	15.1	16.3	14.0	1.3	1.3	1.3	12.8	14.1	10.2
HPCL	Mumbai (1954)	7.5	8.7	8.1	0.7	0.7	0.6	7.3	6.3	6.7
	Visakh (1957)	8.3	9.8	9.1	0.8	1.0	0.7	8.3	9.5	8.2
HMEL	Bathinda (2012)	11.3	12.5	12.2	1.0	0.7	0.0	11.3	6.2	9.0
	HPCL- TOTAL	27.1	30.9	29.4	2.5	2.4	1.4	26.9	22.1	23.9
RIL	Jamnagar (DTA) (1999)	33.0	31.8	33.0	2.9	2.9	2.7	30.0	30.0	31.3
	Jamnagar (SEZ) (2008)	35.2	37.4	35.9	2.8	2.8	2.2	33.4	33.4	24.8
NEL	Vadinar (2006)	20.0	18.9	20.6	1.6	1.6	1.4	18.9	18.9	15.4
All India (MMT)		250.2	257.2	254.4	21.1	20.4	18.6	233.2	230.5	200.8
All India (Million Bbl/Day)		5.03	5.17	5.09	5.34		4.87	5.10		4.41

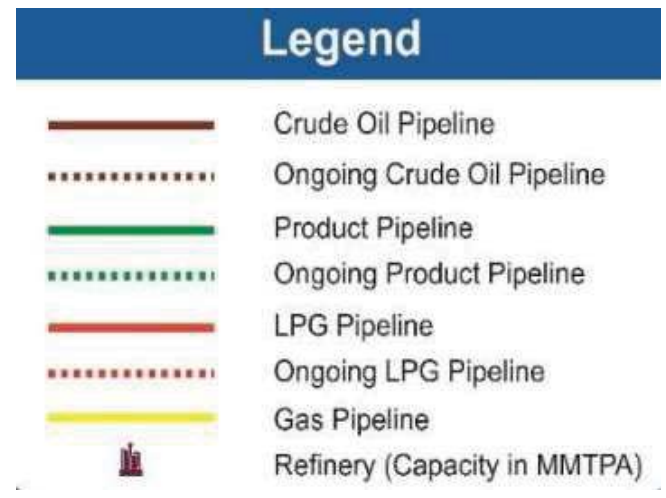
Note: Provisional Targets; Some sub-totals/ totals may not add up due to rounding off at individual levels.

9. Major crude oil and product pipeline network (as on 01.03.2021)

Details		ONGC	OIL	Cairn	HMEL	IOCL	BPCL	HPCL	Others*	Total
Crude Oil	Length (KM)	1,283	1,193	688	1,017	5,301	937			10,419
	Cap (MMTPA)	60.6	9.0	10.7	11.3	48.6	7.8			147.9
Products	Length (KM)		654			9,400	2,241	3,775	2,395	18,465
	Cap (MMTPA)		1.7			46.0	19.5	34.7	9.4	111.3

*Others include GAIL and Petronet India. HPCL and BPCL lubes pipeline included in products pipeline data

Pipeline Network



Note: Pipelines shown are indicative only.

12. Production and consumption of petroleum products (Million Metric Tonnes)

Products	2018-19		2019-20		February 2020		February 2021 (P)		Apr-Feb 2019-20		Apr-Feb 2020-21 (P)	
	Prod	Cons	Prod	Cons	Prod	Cons	Prod	Cons	Prod	Cons	Prod	Cons
LPG	12.8	24.9	12.8	26.3	1.1	2.1	1.0	2.3	11.7	24.0	11.0	25.3
MS	38.0	28.3	38.6	30.0	3.1	2.5	3.0	2.4	35.3	27.8	32.2	25.2
NAPHTHA	19.6	14.1	20.6	14.3	1.8	1.2	1.6	1.2	18.7	13.0	17.5	12.9
ATF	15.5	8.3	15.2	8.0	1.3	0.7	0.8	0.4	14.1	7.5	6.2	3.2
SKO	4.1	3.5	3.2	2.4	0.3	0.2	0.1	0.1	2.9	2.2	2.1	1.6
HSD	110.6	83.5	111.1	82.6	8.9	7.2	8.4	6.6	101.4	76.9	90.8	65.5
LDO	0.7	0.6	0.6	0.6	0.05	0.05	0.06	0.08	0.6	0.6	0.6	0.7
LUBES	0.9	3.7	0.9	3.8	0.1	0.3	0.1	0.3	0.8	3.6	0.9	3.2
FO/LSHS	10.0	6.6	9.3	6.3	0.8	0.6	0.5	0.5	8.5	5.8	7.6	5.5
BITUMEN	5.6	6.7	4.9	6.7	0.5	0.8	0.6	0.7	4.4	6.1	4.2	6.2
PET COKE	13.7	21.3	14.6	21.7	1.2	1.6	1.0	1.6	13.3	20.1	10.9	16.7
OTHERS	31.0	11.7	31.0	11.4	2.7	0.9	2.2	0.9	28.3	10.5	26.6	9.8
ALL INDIA	262.4	213.2	262.9	214.1	21.8	18.1	19.4	17.2	240.0	198.2	210.7	175.8
Growth (%)	3.2%	3.4%	0.2%	0.4%	7.4%	3.8%	-10.9%	-4.9%	0.2%	2.3%	-12.2%	-11.3%

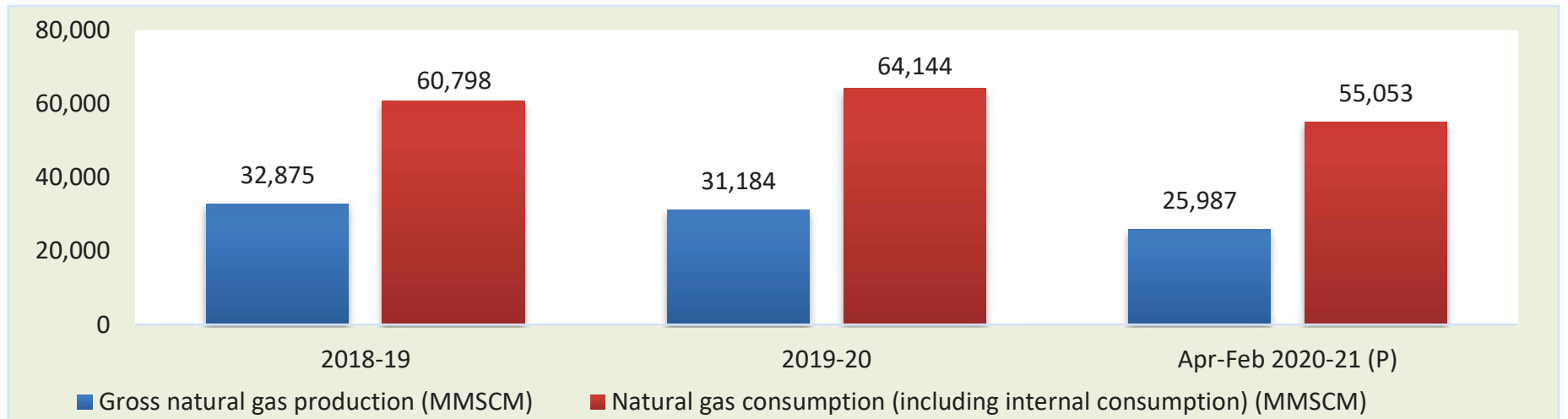
Note: Prod - Production; Cons - Consumption

19. Natural gas at a glance

(MMSCM)

Details	2018-19	2019-20	February			April-February		
			2019-20	2020-21 (Target)	2020-21 (P)	2019-20	2020-21 (Target)	2020-21 (P)
(a) Gross production	32,875	31,184	2,341	2,859	2,307	28,769	30,410	25,987
- ONGC	24,677	23,746	1,870	1,852	1,630	21,841	21,933	20,040
- Oil India Limited (OIL)	2,722	2,668	201	238	188	2,457	2,500	2,270
- Private / Joint Ventures (JVs)	5,477	4,770	270	769	489	4,471	5,977	3,677
(b) Net production (excluding flare gas and loss)	32,058	30,257	2,257		2,235	27,930		25,171
(c) LNG import [#]	28,740	33,887	3,520		2,810	30,917		29,883
(d) Total consumption including internal consumption (b+c)	60,798	64,144	5,778		5,045	58,847		55,053
(e) Total consumption (in BCM)	60.8	64.1	5.8		5.0	58.8		55.1
(f) Import dependency based on consumption (%), {c/d*100}	47.3	52.8	60.9		55.7	52.5		54.3

[#]Jul 2020-Feb 2021 DGCIS data prorated.



20. Coal Bed Methane (CBM) gas development in India

Prognosticated CBM resources		91.8	TCF
Established CBM resources		10.4	TCF
CBM Resources (33 Blocks)		62.8	TCF
Total available coal bearing areas (India)		32,760	Sq. KM
Total available coal bearing areas with MoPNG/DGH		21,659	Sq. KM
Area awarded		16,613	Sq. KM
Blocks awarded		33	Nos.
Exploration initiated (Area considered if any boreholes were drilled in the		10,517	Sq. KM
Production of CBM gas	April-February 2020-21 (P)	585.26	MMSCM
Production of CBM gas	February 2021 (P)	56.25	MMSCM

21. Natural gas pipeline network as on 31.12.2020

Nature of pipeline		GAIL	GSPL	PIL	IOCL	AGCL	RGPL	GGL	DFPCL	ONGC	GIGL	GITL	Others*	Total
Operational	Length	8,241	2,265	1,460	132	105	312	73	42	24				12,654
	Capacity	171.6	43.0	85.0	20.0	2.4	3.5	5.1	0.7	6.0				337.3
Partially commissioned [#]	Length	3,643			23						442	364		4,472
	Capacity	-			-						-	-		-
Total operational length		11,884	2,265	1,460	155	105	312	73	42	24	442	364	0	17,126
Under construction	Length	6,242			1,398						2,335	1,678	3,780	15,433
	Capacity	23.2			-						-	-	157.7	-
Total length		18,126	2,265	1,460	1,553	105	312	73	42	24	2,777	2,042	3,780	32,559

Source: PNGRB; Length in KMs ; Authorized Capacity in MMSCMD; *Others-APGDC, HEPL, IGGL, IMC, Consortium of H-Energy

22. Existing LNG terminals

Location	Promoters	Capacity as on 01.03.2021	% Capacity utilisation (Apr-Jan 2020-21)
Dahej	Petronet LNG Ltd (PLL)	17.5 MMTPA	93.6
Hazira	Shell Energy India Pvt. Ltd.	5 MMTPA	83.4
Dabhol	Konkan LNG Limited	*5 MMTPA	64.9
Kochi	Petronet LNG Ltd (PLL)	5 MMTPA	17.0
Ennore	Indian Oil LNG Pvt Ltd	5 MMTPA	12.0
Mundra	GSPC LNG Limited	5 MMTPA	36.1
Total Capacity		42.5 MMTPA	

* To increase to 5 MMTPA with breakwater. Only HP stream of capacity of 2.9 MMTPA is commissioned

23. Status of PNG connections and CNG stations across India (Nos.), as on 31.01.2021 (P)

State/Union Territory	Geographical Area/CGD Networks	Authorized CGD Entity	CNG stations	PNG connections		
				Domestic	Commercial	Industrial
Andhra Pradesh	East Godavari District (EAAA)	Godavari Gas Private Limited	13	41,346	5	0
	Kakinada	Bhagyanagar Gas Limited	10	54,802	118	2
	Krishna District (EAAA)	Megha Engineering & Infrastructure Limited	15	9,802	82	15
	Vijaywada	Bhagyanagar Gas Limited	23	38,142	36	0
	West Godavari District	Godavari Gas Private Limited	11	38,510	11	1
Andhra Pradesh Total			72	182,602	252	18
Andhra Pradesh, Karnataka & Tamil Nadu	Chittoor, Kolar and Vellore Districts	AGP City Gas Private Limited	0	0	0	1
Andhra Pradesh, Karnataka & Tamil Nadu Total			0	0	0	1
Assam	Cachar, Hailakandi & Karimganj Districts	Purba Bharati Gas Private Limited	0	131	0	0
	Upper Assam	Assam Gas Company Limited	1	35,876	1,164	404
Assam Total			1	36,007	1,164	404
Bihar	Aurangabad, Kaimur & Rohtas Districts	Indian Oil Corporation Limited	1	0	0	0
	Begusarai District	Think Gas Begusarai Private Limited	1	0	0	0
	Patna District	GAIL (India) Limited	8	24,313	9	0
Bihar Total			10	24,313	9	0
Chandigarh (UT), Haryana, Punjab & Himachal Pradesh	Chandigarh	Indian-Oil Adani Gas Private Limited	15	111,567	37	9
Chandigarh (UT), Haryana, Punjab & Himachal Pradesh Total			15	111,567	37	9
Dadra & Nagar Haveli (UT)	UT of Dadra & Nagar Haveli	Gujarat Gas Limited	7	5,995	52	43
Dadra & Nagar Haveli (UT) Total			7	5,995	52	43
Daman & Diu (UT)	UT of Daman	Indian-Oil Adani Gas Private Limited	4	4,768	28	26
Daman & Diu (UT) Total			4	4,768	28	26
Daman and Diu & Gujarat	Diu & Gir Somnath Districts	IRM Energy Private Limited	9	0	0	0
Daman and Diu & Gujarat Total			9	0	0	0
Goa	North Goa District	Goa Natural Gas Private Limited	4	4,936	2	6
Goa Total			4	4,936	2	6
Gujarat	Ahmedabad City (Only for CNG)	Hindustan Petroleum Corporation Limited	22	0	0	0
	Ahmedabad City and Daskroi Area	Adani Gas Limited	66	404,479	2,854	849
	Ahmedabad District (EAAA)	Gujarat Gas Limited	8	0	0	0
	Amreli District	Gujarat Gas Limited	13	4,849	26	1
	Anand area including Kanjari & Vadtal Villages (in Kheda District)	Charotar Gas Sahakari Mandali Limited	6	33,672	670	136
	Anand District (EAAA)	Gujarat Gas Limited	27	37,374	240	15
	Banaskantha District	IRM Energy Private Limited	29	25,100	98	10
	Barwala & Ranpur Talukas	Adani Gas Limited	3	0	0	0
	Bhavnagar	Gujarat Gas Limited	23	34,872	281	62
	Dahej Vagra Taluka	Gujarat Gas Limited	4	1,059	12	27
	Dahod District	Gujarat Gas Limited	10	2,887	7	17
	Gandhinagar	Gujarat Gas Limited	14	125,949	535	27
	Gandhinagar Mehsana Sabarkantha	Sabarmati Gas Limited	106	201,754	872	350
	Hazira	Gujarat Gas Limited	1	36,121	122	17
	Jamnagar	Gujarat Gas Limited	18	21,385	158	97
	Junagadh District	Torrent Gas Private Limited	11	0	0	0
	Kheda District (EAAA) & Mahisagar District	Adani Gas Limited	10	0	0	0
	Kutch (West)	Gujarat Gas Limited	12	1,460	23	2
	Nadiad	Gujarat Gas Limited	29	64,340	379	19

State/Union Territory	Geographical Area/CGD Networks	Authorized CGD Entity	CNG stations	PNG connections		
				Domestic	Commercial	Industrial
Gujarat	Narmada (Rajpipla) District	Gujarat Gas Limited	3	0	0	0
	Navsari	Gujarat Gas Limited	23	104,555	253	51
	Navsari District (EAAA), Surat District (EAAA), Tapi District (EAAA) & the Dangs District	Adani Gas Limited	5	0	0	0
	Panchmahal District	Gujarat Gas Limited	25	15,885	89	83
	Patan District	Sabarmati Gas Limited	19	11,906	24	6
	Porbandar District	Adani Gas Limited	3	0	0	0
	Rajkot	Gujarat Gas Limited	70	251,984	1,428	996
	Surat, Bharuch, Ankleshwar	Gujarat Gas Limited	104	676,658	9,142	999
	Surendranagar	Gujarat Gas Limited	18	25,101	215	362
	Surendranagar District (EAAA) & Morbi District (EAAA)	Adani Gas Limited	5	0	0	0
	Vadodara	Vadodara Gas Limited	20	170,993	2,617	3
	Vadodara	Adani Gas Limited	6	616	1	89
	Valsad	Gujarat Gas Limited	25	108,845	359	685
Gujarat Total			738	2,361,844	20,405	4,903
Haryana	Ambala & Kurukshetra Districts	HPOIL Gas Private Limited	6	5,261	0	0
	Bhiwani, Charkhi Dadri & Mahendragarh Districts	Adani Gas Limited	5	0	0	0
	Faridabad	Adani Gas Limited	20	59,953	186	366
	Gurugram	Haryana City Gas Distribution Limited	29	22,337	140	160
	Hisar District	HCG (KCE) Private Limited	2	0	0	0
	Jhajjar District	Haryana City Gas (KCE) Private Limited	3	24	0	0
	Kaithal District	Indraprastha Gas Limited	2	8,521	0	0
	Karnal District	Indraprastha Gas Limited	7	9,535	1	7
	Nuh and Palwal Districts	Adani Gas Limited	8	1,476	4	35
	Panipat District	Indian-Oil Adani Gas Private Limited	11	16,939	10	23
	Rewari District	Indraprastha Gas Limited	13	9,484	15	64
	Rohtak District	Bharat Petroleum Corporation Limited	2	1,050	0	0
	Sonipat	GAIL Gas Limited	16	24,586	41	165
	Sonipat District (EAAA) & Jind District	Hindustan Petroleum Corporation Limited	6	0	0	0
	Yamunanagar District	Bharat Petroleum Corporation Limited	4	6,089	0	0
Gurugram	Indraprastha Gas Limited	9	13,740	90	18	
Haryana Total			143	178,995	487	838
Haryana & Himachal Pradesh	Panchkula District (EAAA), Sirmaur, Shimla & Solan (EAAA) Districts	Indian-Oil Adani Gas Private Limited	3	0	0	0
Haryana & Himachal Pradesh Total			3	0	0	0
Haryana & Punjab	Sirsa, Fatehabad and Mansa (Punjab) Districts	Gujarat Gas Limited	5	0	0	0
Haryana & Punjab Total			5	0	0	0
Himachal Pradesh	Bilaspur, Hamirpur & Una Districts	Bharat Gas Resources Limited	1	1,000	0	0
Himachal Pradesh Total			1	1,000	0	0
Jharkhand	East Singhbhum District	GAIL (India) Limited	4	10,067	0	0
	Ranchi District	GAIL (India) Limited	4	12,750	0	0
	Bokaro, Hazaribagh & Ramgarh Districts	Indian Oil Corporation Limited	5	0	0	0
	Giridih & Dhanbad Districts	GAIL Gas Limited	0	4,591	0	0
	Seraikela-Kharsawan District	GAIL Gas Limited	0	154	0	0
Jharkhand Total			13	27,562	0	0
Karnataka	Ballari & Gadag Districts	Bharat Gas Resources Limited	4	0	0	0
	Belgaum District	Megha Engineering & Infrastructure Limited	2	12,375	57	21
	Bengaluru Rural and Urban Districts	GAIL Gas Limited	31	179,321	199	126

State/Union Territory	Geographical Area/CGD Networks	Authorized CGD Entity	CNG stations	PNG connections		
				Domestic	Commercial	Industrial
Karnataka	Bidar District	Bharat Gas Resources Limited	1	0	0	0
	Chitradurga & Davanagere Districts	Unison Enviro Private Limited	2	0	0	0
	Dakshina Kannada District*	GAIL Gas Limited	7	4,732	0	0
	Dharwad District	Indian-Oil Adani Gas Private Limited	2	11,681	3	0
	Ramanagara District	Maharashtra Natural Gas Limited	6	686	0	1
	Tumkur District	Megha Engineering & Infrastructure Limited	0	15,207	86	33
Karnataka Total			55	224,002	345	181
Kerala	Alapuzha, Kollam and Thiruvananthapuram Districts	AGP City Gas Private Limited	2	0	0	2
	Ernakulam District	Indian-Oil Adani Gas Private Limited	9	42,419	11	8
	Palakkad & Thrissur Districts	Indian-Oil Adani Gas Private Limited	6	0	0	0
Kerala Total			17	42,419	11	10
Madhya Pradesh	Bhopal & Rajgarh Districts	Think Gas Bhopal Private Limited	11	0	0	0
	Dewas	GAIL Gas Limited	3	12,679	28	40
	Dhar District	Naveriya Gas Private Limited	2	535	14	0
	Guna District	Indian Oil Corporation Limited	1	403	0	0
	Gwalior	Aavantika Gas Limited	15	23,491	44	7
	Gwalior (EAAA) District and Sheopur District	Rajasthan State Gas Limited	2	0	0	0
	Indore (including Ujjain City)	Aavantika Gas Limited	39	60,628	93	231
	Rewa District	Indian Oil Corporation Limited	1	583	0	0
	Satna & Shandol Districts	Bharat Gas Resources Limited	2	1,310	0	0
Ujjain (EAAA) District, Dewas (EAAA) District and Indore (EAAA) District	Gujarat Gas Limited	4	0	0	0	
Madhya Pradesh Total			80	99,629	179	278
Madhya Pradesh and Rajasthan	Jhabua, Banswara, Ratlam and Dungarpur Districts	Gujarat Gas Limited	4	0	0	0
Madhya Pradesh and Rajasthan Total			4	0	0	0
Madhya Pradesh and Uttar Pradesh	Jhansi (EAAA) District, Bhind, Jalaun, Lalitpur and Datia Districts	Adani Gas Limited	2	0	0	0
Madhya Pradesh and Uttar Pradesh Total			2	0	0	0
Maharashtra	Ahmednagar & Aurangabad Districts	Bharat Gas Resources Limited	6	0	0	0
	Kolhapur District	HPOL Gas Private Limited	4	1,321	0	0
	Latur & Osmanabad Districts	Unison Enviro Private Limited	2	0	0	0
	Mumbai & Greater Mumbai	Mahanagar Gas Limited	141	921,325	3,134	15
	Palghar District & Thane Rural	Gujarat Gas Limited	17	368	11	38
	Pune City including Pimpri - Chichwad & adjoining contiguous areas Hinjewadi, Chakan, Talegaon	Maharashtra Natural Gas Limited	87	325,717	370	222
	Pune District (EAAA)	Torrent Gas Pune Limited	21	890	0	4
	Raigarh District (EAAA)	Mahanagar Gas Limited	18	39,937	0	1
	Ratnagiri District	Unison Enviro Private Limited	14	1,073	1	25
	Sangli & Satara Districts	Bharat Gas Resources Limited	5	179	0	0
	Sindhudurg District	Maharashtra Natural Gas Limited	4	1,201	0	0
Thane urban and adjoining Municipalities	Mahanagar Gas Limited	107	602,011	912	61	
Maharashtra Total			426	1,894,022	4,428	366
Maharashtra & Gujarat	Valsad (EAAA), Dhule & Nashik Districts	Maharashtra Natural Gas Limited	19	16,605	0	0
Maharashtra & Gujarat Total			19	16,605	0	0
National Capital Territory of Delhi (UT)	National Capital Territory of Delhi	Indraprastha Gas Limited	424	1,021,505	2,551	1,539
National Capital Territory of Delhi (UT) Total			424	1,021,505	2,551	1,539
Odisha	Cuttack District	GAIL (India) Limited	6	6,235	0	0
	Ganjam, Nayagarh & Puri Districts	GAIL Gas Limited	2	18	0	0

State/Union Territory	Geographical Area/CGD Networks	Authorized CGD Entity	CNG stations	PNG connections		
				Domestic	Commercial	Industrial
Odisha	Khordha District	GAIL (India) Limited	10	13,413	0	0
	Sundargarh & Jharsuguda Districts	GAIL Gas Limited	2	0	0	0
	Odisha Total			20	19,666	0
Puducherry & Tamil Nadu	Karaikal & Nagapattinam Districts	Torrent Gas Private Limited	2	0	0	0
Puducherry & Tamil Nadu Total			2	0	0	0
Punjab	Amritsar District	Gujarat Gas Limited	13	2,785	34	2
	Bhatinda District	Gujarat Gas Limited	4	603	0	0
	Fatehgarh Sahib District	IRM Energy Private Limited	5	1,380	18	33
	Ferozepur, Faridkot and Sri Muktsar Sahib Districts	Gujarat Gas Limited	1	0	0	0
	Hoshiarpur and Gurdaspur Districts	Gujarat Gas Limited	8	0	0	0
	Jalandhar	Jay Madhok Energy Private Limited led Consortium	3	0	0	0
	Jalandhar District (EAAA), Kapurthala & SBS Nagar Districts	Think Gas Ludhiana Private Limited	10	0	0	0
	Ludhiana	Jay Madhok Energy Private Limited led Consortium	3	0	0	0
	Ludhiana District (EAAA), Barnala & Moga Districts	Think Gas Ludhiana Private Limited	9	41	0	0
	Rupnagar District	Bharat Petroleum Corporation Limited	6	4,950	0	0
SAS Nagar District (EAAA), Patiala & Sangrur Districts	Torrent Gas Private Limited	13	0	0	0	
Punjab Total			75	9,759	52	35
Rajasthan	Ajmer, Pali and Rajsamand Districts	Indraprastha Gas Limited	0	20,479	0	0
	Barmer, Jaisalmer & Jodhpur Districts	AGP CGD India Private Limited	5	2	1	2
	Bhilwara & Bundi Districts	Adani Gas Limited	4	0	0	0
	Bhiwadi (in Alwar District)	Haryana City Gas Distribution (Bhiwadi) Limited	1	1,750	0	47
	Chittorgarh (Other than Rawatbhata Taluka) & Udaipur Districts*	Adani Gas Limited	9	0	0	0
	CNG (DBS) NOC	Rajasthan State Gas Limited	2	-	-	-
	Dholpur District	Dholpur CGD Private Limited	4	0	0	0
	Jalore and Sirohi Districts	Gujarat Gas Limited	6	0	0	0
	Kota	Rajasthan State Gas Limited	7	15,358	17	15
	Kota District (EAAA), Baran & Chittorgarh (Only Rawatbhata Taluka) Districts	Torrent Gas Private Limited	10	0	0	0
Rajasthan Total			48	37,589	18	64
Tamil Nadu	Ramanathapuram District	AGP CGD India Private Limited	2	0	0	0
Tamil Nadu Total			2	0	0	0
Telangana	Hyderabad	Bhagyanagar Gas Limited	62	121,396	17	42
	Medak, Siddipet & Sangareddy Districts	Torrent Gas Private Limited	12	0	0	0
	Telangana Total			74	121,396	17
Tripura	Agartala	Tripura Natural Gas Company Limited	5	42,276	491	60
	Gomati District	Tripura Natural Gas Company Limited	3	0	0	0
	West Tripura (EAAA) District	Tripura Natural Gas Company Limited	3	5,923	0	0
Tripura Total			11	48,199	491	60
	Agra	Green Gas Limited	23	72,651	61	17
	Allahabad	Indian-Oil Adani Gas Private Limited	6	35,949	23	4
	Allahabad District (EAAA), Bhadohi & Kaushambi Districts	Indian-Oil Adani Gas Private Limited	9	297	0	0
	Amethi, Pratapgarh & Raebareilly Districts	Bharat Gas Resources Limited	3	1,522	0	0
	Auraiya, Kanpur Dehat & Etawah Districts	Torrent Gas Private Limited	14	0	0	0
	Azamgarh, Mau and Ballia Districts	Torrent Gas Private Limited	3	0	0	0
	Bagpat District	Bagpat Green Energy Private Limited	3	0	0	0
	Bareilly	Central UP Gas Limited	14	29,398	122	23
	Bareilly (EAAA) District, Pilibhit and Rampur Districts	Hindustan Petroleum Corporation Limited	4	0	0	0

State/Union Territory	Geographical Area/CGD Networks	Authorized CGD Entity	CNG stations	PNG connections		
				Domestic	Commercial	Industrial
Uttar Pradesh	Basti and Ambedkarnagar Districts	Torrent Gas Private Limited	3	0	0	0
	Bulandshahr (part) District	Indian-Oil Adani Gas Private Limited	4	0	0	0
	Bulandshahr District (EAAA), Aligarh & Hathras Districts	Indian-Oil Adani Gas Private Limited	4	0	0	0
	Faizabad & Sultanpur Districts	Green Gas Limited	2	0	0	0
	Farrukhabad, Etah and Hardoi Districts	Hindustan Petroleum Corporation Limited	4	0	0	0
	Gautam Budh Nagar District	Indraprastha Gas Limited	49	248,867	600	860
	Ghaziabad & Hapur Districts	Indraprastha Gas Limited	53	235,291	292	373
	Gonda and Barabanki Districts	Torrent Gas Private Limited	6	0	0	0
	Jaunpur and Ghazipur Districts	Indian-Oil Adani Gas Private Limited	2	0	0	0
	Jhansi	Central UP Gas Limited	4	533	0	0
	Kanpur	Central UP Gas Limited	30	73,586	213	76
	Kanpur (EAAA) District, Fatehpur and Hamirpur Districts	Indraprastha Gas Limited	5	10,736	0	0
	Khurja	Adani Gas Limited	4	6,206	5	232
	Lucknow	Green Gas Limited	34	61,398	57	11
	Mainpuri and Kannauj Districts	Hindustan Petroleum Corporation Limited	3	0	0	0
	Mathura	Sanwariya Gas Limited	11	4,585	39	77
	Meerut	GAIL Gas Limited	17	47,815	41	59
	Meerut District (EAAA), Muzaffarnagar & Shamli Districts	Indraprastha Gas Limited	10	14,997	3	0
	Mirzapur, Chandauli and Sonbhadra Districts	GAIL Gas Limited	1	56	0	0
	Moradabad	Torrent Gas Moradabad Limited	5	9,140	12	78
Moradabad (EAAA) District	Torrent Gas Private Limited	9	513	0	1	
Saharanpur District	Bharat Petroleum Corporation Limited	5	8,634	0	0	
Shahjahanpur and Budaun Districts	Hindustan Petroleum Corporation Limited	3	0	0	0	
Unnao (EAAA) District	Green Gas Limited	1	0	0	0	
Varanasi District	GAIL (India) Limited	10	29,909	29	0	
Gorakhpur, Sant Kabir Nagar & Kushinagar Districts	Torrent Gas Private Limited	12	0	0	0	
Uttar Pradesh Total			370	892,083	1,497	1,811
Uttar Pradesh & Rajasthan	Firozabad (Taj Trapezium Zone)	GAIL Gas Limited	25	17,063	1	341
Uttar Pradesh & Rajasthan Total			25	17,063	1	341
Uttar Pradesh and Uttrakhand	Bijnor and Nainital Districts	Hindustan Petroleum Corporation Limited	4	0	0	0
Uttar Pradesh and Uttrakhand Total			4	0	0	0
Uttrakhand	Dehradun District	GAIL Gas Limited	4	5,235	0	0
	Haridwar District	Haridwar Natrural Gas Private Limited	4	20,190	0	0
	Udham Singh Nagar District	Indian-Oil Adani Gas Private Limited	5	10,196	33	35
Uttrakhand Total			13	35,621	33	35
West Bengal	Burdwan District	Indian-Oil Adani Gas Private Limited	7	0	0	0
	Howrah (EAAA) District and Hoogly (EAAA) District	Hindustan Petroleum Corporation Limited	2	0	0	0
	Nadia (EAAA) District and North 24 Parganas (EAAA) District	Hindustan Petroleum Corporation Limited	1	0	0	0
	CNG Stations	Great Eastern Energy Corporation Limited	7	0	0	0
West Bengal Total			17	0	0	0
Grand Total			2,713	7,419,147	32,059	11,010

Source- PNGRB & GEECL

Note-

1. All the GAs where PNG connections/CNG Stations have been established is considered as Operational.
2. Under normal conditions, operation of any particular GA commences within around one year of authorization.
3. EAAA stands for Excluding/Except Area Already Authorized | * stands for Sub-Judice | # stands for authorization of GA cancelled

should not hurt our own economy. Yet that's precisely what the Biden administration is doing. By signing an Executive Order to ban all new oil, coal, gas leases on federal lands, the president is taking a sledgehammer to western states' economies.

A ban on federal leasing could result in 33,000 workers losing their jobs in Wyoming. In Representative Haaland's home state of New Mexico, 62,000 workers stand to lose their jobs. Our states will also lose hundreds of millions of dollars in revenue that is used for essential services, including hundreds of millions of dollars in funding of K through 12 public education.

The Biden administration's moratorium robs our children of their vital education funding, and the Senate agrees. On February 4th, the Senate voted 98 to 2 for my amendment in an effort to restore the hundreds of millions of education dollars that will be lost to the Biden administration's policies.

In his first month in office, President Biden has declared war on American energy, has crushed jobs, and threatened vital education funds for our children. Representative Haaland's past statements show she agrees with this strategy. In May of 2019, Representative Haaland said unequivocally in an interview with The Guardian newspaper is quote, "I am wholeheartedly against fracking and drilling on public lands."

On her campaign Web site, Representative Haaland said we need to quote, "keep fossil fuels in the ground." And then went on to say, "I pledge to vote against all new fossil fuel infrastructure," close quote.

Representative Haaland's positions are squarely at odds with the mission of the Department of the Interior. That mission includes managing our nation's oil, gas, and coal resources in a responsible manner, not eliminating access to them.

I am willing to work with Representative Haaland and the Biden administration to conserve our national parks and our monuments, to uphold our nation's trust responsibilities, and to protect multiple use of our public lands. But if Representative Haaland intends to use the Department of the Interior to crush the economy of Wyoming and other Western states, then I'm going to oppose the nomination.

Today's hearing gives us an opportunity to hear directly from Congresswoman Haaland and to get more clarity regarding her views and vision for the Department of the Interior. Thank you Mr. Chairman. I look forward to her testimony.

MANCHIN: Thank you, Senator Barrasso. And now I'm going to introduce or recognize Senator Heinrich to introduce Representative Haaland to our committee. Senator Heinrich?

traditional home.

It was there that I learned about my culture from my grandmother by watching her cook and by participating in traditional feast days and ceremonies. Within the cornfields with my grandfather where I learned the importance of water and protecting our resources where I gained a deep respect for the earth.

As a military family, we moved every few years when I was a kid, but no matter where we leave, my dad taught me and my siblings to appreciate nature, whether on a mountain trail or walking along the beach.

I'm not a stranger -- stranger to the struggles many families across America face today. I lived most of my adult life paycheck to paycheck. I pieced together health care for me and my child as a single mom and at times relied on food stamps food on the table.

It's because of these struggles that I fully understand the role interior must play in the president's plan to build back better, to responsibly manage our natural resources to protect them for future generations so that we can continue to work, live, hunt, fish and prey among them.

I understand how important the department is for all the stakeholders who rely on it in the communities whose economies are connected to it. I know the bipartisan accomplishments of this committee stand out in Congress.

Your work led to interior having significant resources and authorities, especially with the Great American Outdoors Act and the Public Lands Package. I will work collaboratively -- collaboratively with all members of this committee to ensure these acts are implemented well.

As chair of the subcommittee on National Parks Forest in Public Lands, I also worked on these issues in Congress and listen to all of my colleague and constituents about ways to improve management of the department. I am proud of the bipartisan manner in which we move these bills through my subcommittee and to the house floor.

As I've learned in this role, there's no question that fossil energy does and will continue to play a major role in America for years to come. I know how important oil and gas revenues are to critical services, but we must also recognize that the energy industry is innovating and our climate challenge must be addressed.

Together we can work to position our nation and all of its people for success in the future. And I am committed to working cooperatively with all stakeholders and all of Congress to strike the right balance going forward.

As part of this balance, the department has a role in harnessing the clean energy potential of our public land and to create jobs and a new economic opportunity. The president's agenda demonstrate that America's public lands can and should be engines for clean energy production.

President Biden also knows that restoring and conserving our lands through a civilian climate core has a potential to spur job creation. If confirmed I will work my heart out for everyone. The family, the fossil fuel workers who help build our country. Ranchers and farmers, who care deeply for their lands. Communities with legacies of toxic pollution, people of color whose stories deserves to be heard and those who want job of the future.

I vowed to leave the Interior Department ethically and with honor and integrity. I will listen to and work with members of Congress on both sides of the aisle. I will support Interior's public servants and be a careful steward of taxpayer dollars. I will ensure that the Interior Department's decisions are based on science. I will honor the sovereignty of the tribal nation and recognized their part in America's story and I'll be a fierce advocate for our public lands.

I believe we all have a stake in the future of our country and I believe that everyone of us, Republicans and Democrats and Independent shared a common bond. Our love for the outdoors and a desire and obligation to keep our nation livable for future generations.

I carry my life experiences with me everywhere I go. It's those experiences that give me hope for the future. As an indigenous woman from hum -- humble beginnings can be confirmed as Secretary of the Interior, our country holds promise for everyone.

Finally, I want to give special thanks you Chairman Manchin, for calling this hearing today and for sharing with me the issues and needs of the people that you represent in West Virginia. If confirmed I will listen to all of the people represented by members of this committee and this Congress.

I'm grateful for your time today and I am ready to serve, and thank you Senator Heinrich for your kind introduction and I look forward to your questions.

MANCHIN: Thank you, Congresswoman Haaland. And now we will begin our questions. Approximately, the United States became a net total energy export in 2019, but it's the first time in 67 years we've been in that position, partly due to the surge and domestic oil and gas production.

And in your opening statement, you noted that fossil energy does and will continue to play a major role in America for years to come. So my question would be, do you believe that it's our best interest to maintain our energy independence and what role do you see fossil energy playing in that?

HAALAND: Thank you, Senator -- Chairman for that question. And yes, of course, we do -- we absolutely need -- need energy independence. And I believe President Biden agrees with that statement as well.

I know that we want to move forward with some clean energy. We want to get to net zero and as the chairwoman of the subcommittee on National Parks Forests and Public Lands, yes, 25 percent of our carbon comes from our public land.

So I think that as we move forward with the technology that you and I spoke about when we had our conversation. We want to move forward with innovation and -- and all of this for our energy needs.

So I think that's not going to happen overnight and so we will absolutely rely on the fossil energy that you and the ranking member spoke about in your opening statements, but at the same time, I think we can move forward with the technology and innovation as well.

MANCHIN: Thank you. You premised -- no, my position on that, I basically -- I'm totally committed in innovation not on elimination because I think we can do it in a practical responsible way.

I said in my opening statement, the department matures a massive, a massive agencies you have just heard the responsibilities that come with that being head of that agency. So if you're focusing on the big picture, what are your top priorities that you see might need to be changed or that you would like to have for your -- for your leadership?

HAALAND: Thank you, Senator. Thank you, Chairman. Well, of course, I -- I feel -- as I mentioned in my opening statement. My mom was a federal employee for 25 years. I value the dedication of our career employees and I believe very strongly that we need to make sure that we are appreciating them the way they should be appreciated so they can do their job.

I -- I want very much to -- to help make sure that everyone's working together. With respect to clean energy, yes, that's absolutely a priority of President Biden, he's build back better plan to -- to create those clean energy jobs across the country. The civilian climate core that I know will engage tens of thousands of -- of Americans in the work of restoring our public lands is also important.

MANCHIN: Thank you, Congresswoman. I have many more questions, but my time is up and I'm going to go now to my friend, Senator Barrasso.

BARRASSO: Well, thanks to much, Senator Manchin. I just like to follow up on some of the things that Senator Manchin started with. Yes or no answers on this, if you could, as a general matter, should the federal government continue to permit oil and gas wells in this country?

HAALAND: Yes. And I believe that's happening.

BARRASSO: And as a general matter, should the federal government continue to permit coal mines in this country?

HAALAND: Yes. And Ranking Member, if I could just say I know that coal mines were not a part of President Biden's executive order.

BARRASSO: As a coal -- as a general matter, should the federal government continue to permit copper, lithium and another hard rock mines in this country? Senator Manchin was just asking about some hard rock mining issues.

HAALAND: Senator, I believe that if we do these things in a responsible manner and protect the health and safety of workers. I see us moving forward. Our -- our -- the earth is here to provide for us and that's my belief.

BARRASSO: As a general matter, should the federal government continue to permit natural gas pipelines in this country?

HAALAND: Senator, as I mentioned in my opening statements. I believe this will go on for quite some time. And I know that President Biden is -- he has put a pause on new leases not existing one.

BARRASSO: The question was on pipelines. So, as a general matter, should the federal government continue to permit oil pipelines in the country?

HAALAND: Senator with respect to the Department of Interior wherever pipelines are -- fall under the authority of the Department of Interior, of course ...

BARRASSO: As a general matter, should the federal government continue to permit electrical transmission lines in this country?

HAALAND: I believe that that would help our energy needs, Sir.

BARRASSO: And as a general matter, should the federal government continue to permit natural gas or nuclear power plants in the country?

HAALAND: Senator, I -- I assume that -- what I would like to say as the -- as -- as the -- if I'm confirm as the secretary, of course, I would follow the law on all of these things.

BARRASSO: I think one of the concerns we have is that, there are three Senators on this committee, are medical doctors. We have Dr. Cassidy, who is a gastroenterologist. Dr. Marshall was an obstetrician. I'm an orthopedic surgeon. And just a couple of months ago, you tweeted Republicans don't believe in science.

Pretty broad statement that you made there and it was on your -- you know, this was in October of 2020, so not too long ago. Now, we're also Republicans, do you think that as medical doctors, we don't believe in science? I mean, how do you stand by the statement?

HAALAND: Senator, I -- I -- I -- yes, if you're a doctor I would assume that you believe in science.

BARRASSO: But we're Republicans as well. So -- I mean, it's -- it's concerning to those of us who've gone through training, believe in science, and yet for a broad brush, were all disbelievers. Do -- you know, it's a concern to -- to those of us, as we're here today to ask questions about, so.

You know, in the -- in the -- in his first few weeks in office, President Biden issued several orders as we talked about banning new oil and natural gas leasing on federal lands and waters. It's estimated this long-term leasing band is going to cost your home state of New Mexico 62,000 jobs, my home state of Wyoming 33,000 jobs.

A long-term leasing band is also going to cost and it kind of run around the -- the table here of members on this committee, Louisiana 48,000 jobs, Colorado 18,000 jobs, Mississippi 14,000 jobs, North Dakota 13,000 jobs, Utah 11,000 jobs, 7000 jobs on Alaska and Montana.

Those are just jobs represented by people on this committee. Now -- now, you would said you will work your heart out for everyone, including fossil fuel workers. My question is for you, why not just let these workers keep their jobs?

HAALAND: Senator, it's my understanding that President Biden has put a -- just a pause on new leases. He didn't ban new leases. He didn't put a moratorium on new leases. It's a pause to review the fossil program at the department -- the Federal Fossil Fuel Program.

And so, I know that there are still thousands of leases and thousands of permits that are moving forward and ...

BARRASSO: So -- and if -- if confirm, would you -- would you tell the president that it's unwise to continue to pause as permanent ban?

HAALAND: I don't believe that it is a permanent ban, Senator. I am more than happy to work with you and to work with, of course, at the pleasure of the president and along with if I'm confirmed, my colleagues to make sure that we're doing everything we can to create jobs for Americans.

BARRASSO: Because Present Biden has justified his ban on new oil and gas leasing on federal lands and waters. He cited climate change. Are you aware of any evidence that suggested a ban on oil and gas leasing on federal lands and waters is going to reduce the world's total production of oil and gas?

HAALAND: I bet, no sir.

BARRASSO: Yeah. I know -- were you aware of any evidence that suggested a ban on oil and gas leasing on federal lands and waters is going to reduce the world's total consumption of oil and gas?

HAALAND: Ranking Member, I haven't actually looked at all of the statistics, but I -- I believe that it's a situation where everyone should work together.

BARRASSO: Yeah. I could -- seems that the president's ban on oil and gas leasing isn't going to reduce the world's production or consumption of oil and gas. So, I would just return to the question of why can -- why we wouldn't let these Americans keep their jobs?

Because we're not seeing any other country has banned energy production because of climate change. Russia hasn't done it, Saudi Arabia, Iran, India, China. So, I -- I continue to believe it's a misguided decision by the President. So, thanks so much and I wish for questions for second-round, Mr. Chairman.

MANCHIN: Senator Cantwell. Thank you, Senator.

CANTWELL: Thank you, Mr. Chairman. Congresswoman Haaland, congratulations on your historic nomination. And I so appreciate your leadership in the house. I tell you had one of the greatest moments, I think for the state of Washington, when you lead the final passage of the Spokane Settlement Bill to see Native American woman standing there on the house floor, helping us get something pass that took such a long time.

And I would venture to say that if you had been Interior

what can you tell me about your efforts to promote a science-based approach to protecting the Arctic wildlife refuge?

HAALAND: I can -- I can promise you that if I'm confirmed the secretary that we will be guided by science and in all of those decisions.

CANTWELL: And then on the issue of wildfires which is a big Pacific Northwest issue. We have -- the Department of Interior has key tools that we have now given to -- in the last big fire package that we were able to work on together.

This is new technology for everything from forecasting, to locating fire fighters, to the implementation of coordination with air support. Will you commit to continue to work to a rapidly implement those provisions of the last legislation on fighting fire?

HAALAND: I believe very strongly, Senator, that technology can play an incredibly helpful role in detecting fires. And I -- yes. I -- I appreciate you caring about that issue as well.

CANTWELL: Thank you. And then the -- just, lastly, we were successful in -- with Chairwoman Murkowski in passing the Acoma Basin Water Strategy bill, which is really about a -- focusing on helping the Pacific Northwest come up with better strategies for farming, for fishing for environmental issues, and I hope you will continue to work with us on the Acoma basin implementation and caring forward on good water strategy for the northwest.

HAALAND: Senator, this is our -- our -- well, our second conversation, I am sure we'll have many more conversations and I will look so forward to hearing more. And I think that with respect -- if I am confirmed, yes. We need to keep moving issues forward for the American people.

CANTWELL: Thank you. Thank you, Mr. Chairman.

MANCHIN: Thank you, Senator. Senator Lee?

LEE: Thank you, Mr. Chairman. Thank you, Representative Haaland for being here and for willingness to serve if confirmed. In 2019, you sent a letter to the Department of the Interior, the department that you've now been nominated to lead.

And in that letter, you mentioned some concerns that you had with the decisions regarding national monuments. And as I recall, the des -- the decisions in particular, you were referring to dealing with monuments with things that you were worried might have been influenced by those who raise, mine or use water on federal lands.

Well above the recovery criteria, well above caring capacity.

Yet, on May 7th 2019, you cosponsored a legislation that provided federal protections for the grizzly bear in perpetuity forever. Why would you sponsor a bill like that when the science tells us the bear numbers are well above the recovery targets?

HAALAND: I imagine at the time I was -- I was caring about the bears.

DAINES: And why don't you believe the grizzly management should return back to the states once recovery targets are met.

HAALAND: Well, I -- I'm not saying that it shouldn't be returned back to the states.

DAINES: But -- but that's what you -- your legislation cosponsored said. Is he would keep it in federal protections forever in perpetuity.

HAALAND: Well, I -- I would be happy to take a look at the issue, Senator. If -- if -- and if I can help with that issue, of course, I would love to speak with you more about it.

DAINES: OK. On November 19th 2020, you said that if you had it your way and I quote, you'd stop the oil and gas leasing on public lands. As secretary, you will get to have it your way. Will you recommend extending the leasing moratorium and how do you justify this moratorium with the requirements of the federal law under the Mineral Leasing Act?

HAALAND: Senator, it's my understanding that it is a pause on just new leases not existing valid leases. And if I'm confirmed the secretary, it is President Biden's agenda, not my own agenda that I would be moving forward. And I appreciate your advice on this issue.

DAINES: Over the last two years, you made numerous statements in opposition energy developments including, and I quote, you know new pipelines, in August of 2018. You call for a ban on fracking in 2020.

Oil and gas development in public lands generate huge revenues for local schools, essential services. I have one county in Montana that over 90 percent of the revenues of their schools come from pipelines.

Unfortunately, this is not the case for wind and solar development on federal lands. What is your plan to make up for any loss, local revenue for public safety insurance education?

HAALAND: Senator, as I mentioned earlier, if -- if I'm

confirmed as Secretary, it is President Biden's agenda that I would move forward, not my own. And -- and I absolutely -- nobody wants children to not have ...

DAINES: But you -- you -- you earlier said you're going to let science and the data dictate policy and outcomes of like -- that's some of the paraphrase that you said. So, I assume you'd would want to make sure you look at the science and the data and not just blindly follow any administration.

HAALAND: Well, I -- I apologize, Senator. Yes, the science and the data I -- assuming would go without saying because I realized that the department relies on science but ...

DAINES: But you support a ban ...

HAALAND: ... on a -- in a broader sense ...

DAINES: You support a ban on fracking and no new pipelines?

HAALAND: Senator, President Biden does not support a ban on fracking, is my understanding. And it would be his agenda that we would get.

DAINES: But do you personally support a ban on fracking and no new pipelines?

HAALAND: Senator, if -- if I could say, if I am confirmed as secretary, I would be serving at the pleasure of the president and it would be his agenda that I would move forward.

DAINES: On October 8th 2020. You stated, quote, anyone who says we have to sacrifice jobs for clean energy is just trying to scare us. We have a county, Fallon county where Baker Montana is, six people just lost their jobs and their benefits.

Union jobs directly because of President Biden's executive actions. What jobs can they turn to now? What do I tell these 60 families that just lost their jobs as a result to President Biden's executive action?

HAALAND: Senator, I -- I want you to know that I -- I understand what this like. I have struggled myself as well and -- and been -- and been without a job various times in my life. I will do everything I can.

As I said, I mean it. I will work my heart out for every American. And if we can move President Biden's agenda forward together, we can create those millions of jobs and I have every -- I have every faith that that's something that we'll be able to get.

DAINES: Yeah, one of the ironies is this executive action direction increase emissions not decrease emissions. The keystone pipeline was a zero net carbon project here by 2030. How do we address the increase in emissions caused by President Biden's actions we've seen over the last month?

HAALAND: Senator, I would be happy to be briefed on the amount of emissions and if I am confirmed, absolutely work with you.

DAINES: Thank you. Mr. Chairman, I'm out of time. I'm just concerned about receiving this nomination. The track record and the ideology in the past I think will perpetuate more divisiveness and will certainly harm Montana's economy and that's why I have some concerns for the Chairman. Thank you.

MANCHIN: Thank you, Senator. Senator Wyden?

WYDEN: Thank you very much, Senator Manchin. And I want to welcome the nominee, and especially appreciate the fact that Congressman Young introduced you Congresswoman Haaland, has been a model of trying to work with people on both sides of the aisle. And I'm -- I'm really -- I'm going to get into that question of bipartisan collaboration because it -- it sounds like you're one of the leaders in terms of actually pulling people together and come up with bipartisan solutions.

In other words, it's fine to talk about ideas and it's also fine to say, well, I'm going to be bipartisan and people can say, well, I'll take somebody's lousy idea. You've really done the hard work to put together bipartisan coalitions and I'm going to start with the first topic of rural jobs because as, you know, Congressman Neguse and I have put together the 21st Century Civilian Conservation Corps, which would put together -- put together an effort with thousands of jobs in rural communities.

And you just think about the number of vendors and I see my friend from New Mexico, who'd been very interested in this issue as well. The number of vendors, for example, that would be selling goods and services, the 21st Century Civilian Conservation Corps would be a huge economic multiplier for rural communities. That's what rural jobs are really all about.

So, I think it be great if you could talk about a couple of the examples that were most important to you, both in terms of generating jobs in rural communities and in terms of coalition building because those are two sides of the same coin in rural America.

My friend from New Mexico always kids me about our Hawaii project that you and I have talked about. After 50 years of fighting and arguing about Hawaii, we now put together what amounts to a

private sector meeting those needs.

The Hawaii legislation, it doesn't happened by osmosis. It be -- it's because you bring people together. And the -- the chairman and I have talked about this very often when I was chairman of the committee, first place I went to was West Virginia because my colleagues have just come on out and, you know, listen, that's what people want is they want people to have a chance to hear each other out and then find some common ground.

And I'm convinced that in the middle of this pandemic, there's going to be an even greater appreciation for collaboration than there was before because we got to do it. It's what the President was talking about. We dole back better and you're setting a very good tone with your answers to my questions.

I look forward to supporting your nomination, Congresswoman, and -- and working with you. Thank you, Mr. Chairman.

MANCHIN: Thank you. Senator Murkowski?

MURKOWSKI: Mr. Chairman, thank you. And Congresswoman, welcome to the committee. Thank you for being here. I think it has been noted certainly by my friend and colleague at the congressman for all Alaska and the dean of the house that it is -- it is indeed very significant, your nomination to this position, as the first Native American woman we respect that.

We've had an opportunity to discuss the very significant impact outsized role that the department plays over Alaskan's lives whether we like it or not. This is a relationship that had -- that some have described as landlord-tenant, that's not a very good relationship to have. We would much prefer it to be more of a partnership.

I -- I want to ask you I am a first round of questions this morning to focus on -- on the public lands aspect in the role again, that that Department of Interior plays with us. The -- the federal government owns over 60 percent of all the land in our states. That's not as significant as in some states.

But when you take into account that Alaska is one fifth the size of the lower 48, it's a lot of land. It's critical to our resource industry. As you know which accounts for billions of dollars in -- in wages -- in acting tax revenues, tens of thousands of jobs and protecting those jobs is critically important at all times, but particularly now, our state has seen the highest loss of revenue of any of the 50 states, we're sitting in about 33 percent revenue loss. Think about that.

In your next closest state is -- is a 20 percent revenue loss. But on average, it's less than one percent, so we're hurting right

now. And so, when -- when we see these executive orders coming out of the White House that not only impact a resource-based state like Alaska but actually call us out by name, call us out by name.

We were one of only two states in the nation that were specifically targeted by President Biden's day one executive orders. And it wasn't just day one that we were targeted, we were called out on seven separate occasions which from Alaska's perspective, you've got to understand that they're looking at this and saying, wait a minute, why is this administration out to get us? I don't think they're out to get us, but I do think that there is a definite threat to the resource industry that our state is blessed to be able to host.

So, if you are confirmed to this very significant position, what is your approach going to be with regards to oil and gas and mineral resource development within a state like Alaska?

HAALAND: Senator, thank you so much. And if I could just quickly say thank you again for all of your help with the missing and murdered indigenous women legislation, that means the world to me.

I -- I realize your time is limited. I mean first of all, Senator, I know that President Biden doesn't want to cripple any -- any state. He put the pause on the new leases in order to review the program.

I want you to know that if I'm confirmed I will rely heavily on our relationship moving forward. I do want to work with you. I do want to make sure that I understand the -- the -- the unique issues in Alaska and to make sure that we are doing all we can to ensure that your constituents have the opportunities that they need.

MURKOWSKI: So, let me, let me just ask then, in that line there've been a number of rulemaking's that were finalized under -- under the Trump administration there now being litigated in court.

This includes the record of decision for Willow, the Andler access project, the issuance of leases in the 10-02. These rods were developed by career civil servants pursuant to all the environmental laws that are out there, all the regulations including NEPA done through regular order in an open and transparent process.

So, a direct question would be whether you would ensure that the department continues to support and defend these projects and the decisions and the environmental reviews that were completed again by interiors career employees?

HAALAND: Thank you, Senator. And yes, of course, anything that's under in the -- in the courts of course we would want to get

Something real down a few issues because of some of your past statements and want to get few things just in conversation. The Osage Nation and the Osage Mineral Counsel, they --they have a lot of oil and gas development in their tribal areas.

They've had challenges, in fact we asked them about it, they said they've had seven years of devastation brought on by onerous BIA regulations restricting access on the oil and gas well records and then official wildlife coming in and adding environmental impact statements that were entirely new to them.

So, significant portion of the income for the tribe is significant to the state as well. What will be your standards on oil and gas development, mineral development in tribal areas?

HAALAND: Thank you for that question, Senator. And first, your comment about Oklahoma having more renewables than in New Mexico, I don't know about Senator Heinrich but that sounds like a challenge to me, so, perhaps we can work on that.

Senator, with respect to the pause on leases, I know that it's - it's just on public lands not on tribal lands. And so, tribes should continue to move forward with -- with their operation.

LANKFORD: Do you assume that the rules would be different for tribal lands as they would be on federal lands in the days ahead? Because as you make recommendations, you made some pretty bold statements in the past saying no fracking, no pipelines, I mean some of the statements you made in the past, you're going to make recommendations to the Biden team.

And you've said several times will follow President Biden's direction, but obviously Secretary of Interior, you're making recommendations than sitting at the table as well. Would your recommendations be different for tribal land development than they would be for federal and development?

HAALAND: Senator, I want to first assure you that if I'm confirmed the secretary. that is a far different role than it is for, you know, than a congresswoman representing one small district in my state.

So, I -- I understand that role, it's to serve all Americans, not just my one district in -- in New Mexico. I -- I, of course I can't answer fully those questions at the moment. I am -- I am not there yet, if I am confirmed the secretary, I will absolutely take all these issues into consideration and -- and of course look forward to consulting with you.

LANKFORD: But would your recommendations be that there would be

unique difference between tribal management of their mineral rights, and oil and gas development, fracking, all of those six pipelines than there would be on federal lands?

HAALAND: Senator, I would be happy to -- to look at the issue to -- to study it then if I'm confirmed and -- and speak with you about.

LANKFORD: This is a map of one of the units for oil and gas area. And it doesn't matter the state, but it shows that the complexity of this for many of these leases that come up a portion of the land would be in this case is an area that is tribal lands is what you see in the tan here.

And then in the salmon color, it's Army Corporate Engineers managed but that still has BLM oil and gas leases on it. So, the challenge becomes there's different sets of rules when they go through this process. What I'm trying to get at is, this is a common look as you go through the different leases that are there is that anytime they start to do any kind of unit developments they get complexity on what the rules are going to be.

The rules are different in each of these areas. Things are there from travel lands to private lands that even changes it more. So, let me ask you a question, permitting wise would you look at this type of mapping to say permits not just the lease, but the permits would be different if the federal lands had a moratorium on them, could they still develop the private lands, could they still develop the tribal lands that are literally right next to the federal lands?

HAALAND: I understand. It's sort of a complicated issue, so...

LANKFORD: But that's what the real world looks like, yes.

HAALAND: Yes, I understand what you're saying and I would be happy to take a look at those be briefed, understand the issue far better and work with you if there's issues in your state.

LANKFORD: OK. Thank you. Look forward to a second round.

MANCHIN: Senator Hirono? Senator, I think you're on mute. I think you're still on mute, senator.

HIRONO: Sorry.

MANCHIN: There you go. There you go.

HIRONO. Thank you.

MANCHIN: OK.

CASSIDY: Congresswoman, thanks. I enjoyed your visit. Your personal story is compelling and one thing we spoke of are those families, such as yours and frankly such as mine growing up whose parents were able to have a better living because of something.

In Louisiana, many of those better livings are related to oil and gas industry, pipelines, et cetera. And we understand that if -- if there's kind of a campaign against them, there's many families which will have a -- a less bright future.

So with that said, let me first ask, do you agree with President Biden's executive order to stop the Keystone XL Pipeline, knowing that 11,000 current or future jobs are eliminated because of it?

HAALAND: Senator, thank you so much for the question. And I -- of course, I know that the Keystone has been - it's been an issue both sides very passionate on both sides and with respect to President Biden's decision, it is his decision, he's the president, and so...

CASSIDY: So then let me ask you this, let me ask you this, and in the context Senator Barrasso mentioned kind of your attitude that your perception as to how Republicans view science.

So, if I get point to a state department report based upon science which said that building the pipeline lowers global greenhouse gas emissions. If you are the president, would you eliminate the pipeline with the 11,000 jobs in the future that are less bright for those families knowing that by not building it based on science from the State Department, we would have increased global greenhouse gas emissions?

HAALAND: Senator, thank you. I will be happy to read any report. I'll be happy to be briefed on any of this...

CASSIDY: No, but I can stipulate, if you just stipulate that because that is a State Department report. That is the science, I'm just hoping, no offense the Democrats pay attention to the science and that's the nature of my question.

So, if you can accept that as a stipulation and where we get it for you but I'm just trying to understand if this administration going to the end, will your department be guided by a prejudice against fossil fuel or will it be guided by science?

HAALAND: Senator, if I could just take the liberty of saying -- I prejudice on fossil fuels, perhaps isn't the way I would describe it. I would say that President Biden is spilling the -- in moving toward the tremendous opportunities that we have in diversifying our energy.

CASSIDY: It's kind of dodging my -- my question, Congresswoman. And -- and I don't mean to be rude but if the science -- is your department is going be guided by science or by something other than science, let me put it prejudicially -- non-prejudicially because clearly the Biden administration was not guided by science and Republicans by the way are guided by science. I'm just seeing if this administration will be and if your department will be.

HAALAND: I have stated many times that if I am confirmed that the Interior Department's decisions will be guided by science.

CASSIDY: Thank you. Now, there is a Wall Street Journal article recently putting out that if the United States cuts its production of oil and gas, global demand will not be affected but global supply will come from other countries. Intuitively, does that make sense to you?

HAALAND: I beg your pardon, Senator. I apologize if you could just repeat that once more?

CASSIDY: So, there was a recent article suggesting that even if United States decreases production of oil and gas that global demand will continue the same?

HAALAND: Well.

CASSIDY: So -- I'm sorry, go ahead.

HAALAND: No, I understand. I mean we are hoping that when we create some of these clean energy opportunities that perhaps that will change.

CASSIDY: So, when you're introduced by Congressman Young, he pointed out that 80 percent of the barrel of oil does not go for a propulsion rather goes for the plastics and chemicals essential to modernity, for example, making the products to go into a wind turbine, the carpet that we are both looking at right now whatever room we're in.

So, given that, even if we have clean energy that 80 percent of that goes for non-propulsion purposes. Would you agree at this point likely that even in the rosiest scenarios they will continue to be demand for oil and gas?

HAALAND: Yes, Senator and I did say that in my opening statement.

CASSIDY: So, I guess I'll finish by asking once more, if global -- if even if we decrease production, is it reasonable to assume that global demand remained roughly constant and that supply will

come from other countries?

HAALAND: Well, and I appreciate the logic that you're explaining to me. I -- I guess I would hope that that moving forward we will all realize that we have a stake in our own future.

CASSIDY: Well, I still believe that. I'll close by saying this. And if the future of those families who just lost their jobs because of the Keystone XL Pipeline being shut down and others involved in an industry producing a product that will be used worldwide but perhaps if we're not guided by science and logic, they will lose their future.

That's my concern and I'm not being personal with you but I am trying to represent those families right now who can't speak but whose jobs are being cost for a political agenda, not based on science. I yield back.

MANCHIN: Thank you, Senator. Senator King? Senator, I think you're on mute. You're getting close to it unmute and nothing.

KING: You've been unmuted, that says.

MANCHIN: Now, you're good.

KING: Now, I'm with you.

MANCHIN: Yes. Just put five minutes back on the clock for Senator King.

KING: Thank you. I first want to tell our witness that about almost 20 years ago, I took an RV trip with my family and for the first time in a serious way, visited the southwest and found that the landscape was so completely different from where I live.

It was a real revelation Bandelier in New Mexico, white sands of the travel that we did in that area was -- was just as I say a revelation. And therefore, if confirmed I want to invite you Representative Haaland to come to New England, in particularly to come to Maine and visit our incredible National Park Acadia and the Cottonwoods Waters National Monument which is only four years old but is already having a positive impact on the region where it's located.

So, I would love to welcome you to Maine and hope that you will take advantage of that invitation should you be confirmed which I hope will be the case.

HAALAND: Thank you, Sir. Yes, I'll come. Thank you.

KING: Good. That was the right answer. You're doing -- you're

doing great so far. Many of us on this committee supported very enthusiastically the Great American Outdoors Act which passed last year as you know but there was some disturbing interpretations and execution of that law at the very end of the previous administration.

I hope that you will review the law. I know that you supported it in the House and be sure that the implementation is corresponding to the intent of Congress. I have a pet model that implementation and execution are as important as vision.

So, I hope you will commit to working with us to be sure that the Great American Outdoors Act is implemented in the way that was intended by Congress to maximize the benefits to the American people.

HAALAND: I absolutely would, Senator.

KING: One of the issues that's of interest in New England and in Maine is offshore wind. It has enormous potential -- energy potential. There is an experimental project underway now in the Maine called Aqua Ventus sponsored by our University of Maine.

And I think one of the important areas that -- that you can pay some attention to is the regulatory process and the timeliness. My approach is already always been we want the toughest regulatory or the toughest environmental rules in the world but we want the most timely and predictable process.

So, I hope that something that you can take a look at because this is an important potential energy source that could really be a huge change for this country and we just don't want that.

I'm all for protecting the environment, protecting the fisheries, protecting the impact on fisheries but I don't want the process itself to be a barrier to this important development.

HAALAND: I understand Senator and I will look forward to working with you on -- on any of those issues.

KING: Final question is on the issue which I think is the low hanging fruit of -- of climate change and that is methane. As you know, there were some serious methane capture regulations of past five or six years ago. They were essentially repealed by the prior administration.

I hope that certainly on -- on public lands that you will look to reintroducing those regulations which are not terribly costly at least that's my understanding but will be enormously beneficial in terms of the elimination of greenhouse gases.

As you know, methane is 80 times as dangerous as CO2. So, anything we can do on eliminating methane and releases in the atmosphere is critically important. Will you commit to reviewing those regulations about methane release in terms of drilling on public lands?

HAALAND: Yes, Senator. And I understand -- and I completely understand and appreciate you caring about this issue. We should be breathing clean air.

KING: Well, I appreciate your -- your testimony here today and your responsiveness and I guess that the final question would be, do you commit to appearing before and cooperating with this committee as we try to exercise our oversight role and really want to be partners with you and the important role of the Department of the Interior.

HAALAND: Absolutely, Senator.

KING: Good. Thank you very much. I look forward to supporting your nomination.

HAALAND: Thank you.

KING: Thank you, Mr. Chairman.

MANCHIN: And now we have Senator Hoeven. Senator Hoeven, you're still on mute. OK.

HOEVEN: Can you hear me now Mr. Chairman?

MANCHIN: We got you. We got you, sir.

HOEVEN: Thank you very much, Mr. Chairman and to the ranking member as well and also to Congresswoman Haaland. Thank you for being here today for your testimony as well as for visiting with me on the phone earlier, appreciate it very much.

In North Dakota we're energy power houses for this nation. We produce energy really from all sources except for nuclear power including (rules), biofuels, and as well as fossil fuels for electric and oil and gas.

We are the second largest fuel for this state in the nation producing about 1.3 or 4 million barrels a day now. One time, we were over a 1.5 million, will probably will back well up over that.

Second only to Texas in terms of oil production. Now, we were very hard to have this latest and greatest environmental status. We continue to work that we want to be an absolute leader for the country in carbon attachment (ph) situation.

That being said, we've got to have transmission lines and pipelines to move energy to market. We've got to have that infrastructure. Very good example of that is the Dakota Access Pipeline which is now been operating for three years safely moving well over a half a million barrels of light cheap crude oil a day to refineries particularly northern state, middle part -- other country and other parts which would otherwise have to get their oil from oil and gas (ph), Saudi Arabia.

Instead we produce it here with the Jack (ph) operations. So, in the case of the Dakota Access Pipeline which we say has been operating for three years safely. You were there and protested the pipeline. Are you still opposed to that pipeline?

HAALAND: Senator, yes, I did go to stand with the water protectors during that several years back. The reason I did that is because I agreed with the tribe that they felt they weren't consulted in the best way. I know the tribal consultation is important and that was the reason that I was there.

HOEVEN: What is your position on the pipeline today?

HAALAND: Well, Senator I know it's an important issue for you and I understand that. I also agree that whenever these projects come up, that we absolutely should make sure that we are consulting the tribes if in fact these projects do affect their lands, their sacred site, and the likes.

HOEVEN: I understand. I'm sorry. I'm sorry, did you -- go ahead. I didn't mean to interrupt.

HAALAND: No, sir. I mean I am happy to get briefed on -- on any of these issues if I'm confirmed. And of course, Senator, I would listen to you and consult with you and -- and work with you to the best of my ability.

HOEVEN: Well, I certainly understand the importance of tribal consultation and that's been going on extensively and it continuous. Right now, the Corps of Engineers is conducting an environmental impact statement pursue to ongoing litigation,

As I say, this pipeline has been operating for three years safely now moving more than half a million of barrels of oil today. But the Corp is going to an EIS process to comply with a court order, do you agree -- do you agree it's important for the Army Corp to complete each review in a fact base objective manner and to do so promptly, do you agree with it?

HAALAND: Senator, thank you for the question and yes, thank you also for raising the issue that it is the Army Corp of Engineers

authority where any of these issues come in to the authority to the Department of the Interior if I'm confirmed, I will absolutely give those things to my attention.

HOEVEN: What your answer is yes, the Corp should complete its go through the proper process and complete its EIS, that is your position?

HAALAND: Senator, I think everyone should follow the law and if that's the law, then absolutely.

HOEVEN: Given -- given your history being at the protest, are you willing to commit to recuse yourself from the matters that come before the Interior related to the Dakota Access Pipeline in order to avoid any conflict of interest?

HAALAND: Senator, it's my understanding that there are attorneys at the Department of the Interior and also ethics folks. If I am confirmed, of course I will heed the advice of those attorneys and the ethics office for any issues where there might be any -- any of those conflicts.

HOEVEN: All right, again thank you for visiting with me earlier and for the time. Thank you.

HAALAND: Senator, thank you also for working with us on the outside to get some important legislation.

HOEVEN: And I know I'm just a little bit over but I would also mention to you that the three affiliated tribes in North Dakota produces just on their reservation alone, they were a state all by the stuff they did about the 9th or 10th largest oil producing state in the nation.

So, they produce an incredible amount of energy for this nation which brings incredible benefit to the affiliate tribes Mandan, Hidatsa and Arikara and their oil goes through that pipeline. Do you have any thoughts on that? Incredibly important for that tribe.

HAALAND: Senator, it's my understanding that with respect to the leases that we've been talking about the pause on the leases don't affect tribal lands just...

HOEVEN: Right. But I'm talking about the ability to access Dakota Access Pipeline, that's how they move their products from (INAUDIBLE).

HAALAND: Thank you so much, Senator, and I look forward to absolutely working on these issues if I'm confirmed and bringing you into the conversation as much as possible.

HOEVEN: Thank you.

MANCHIN: Thank, Senator. Before Senator Cortez Masto for the committee sake, we're going to have two votes here at 11:30 and what we're going to do is try to get through our first round.

I want to come back tomorrow at 10:00 for our second round. Congresswoman, would that be OK with you, can you come back at 10 o'clock tomorrow?

HAALAND: Senator, I will do whatever you tell me.

MANCHIN: Well, I'm respectfully asking if you could be here, it would be much appreciated at 10 o'clock so that will be our second round. So, everyone can kind of hold -- hold on that if you will.

And with that, we'll go try to conclude our first round. We got about three more -- four more Senators, Cortez Masto, Senator Cortez Masto from Nevada. Do we have Senator Catherine Cortez Masto on?

MALE: Thank you, Senator Cortez Masto and...

MANCHIN: Hold on one second now, we're not getting...

MALE: ... Chairman, thank you for your service.

MANCHIN: Hello? Do we have Senator Cortez Masto? OK, we're going to go to Senator Cortez Masto must not be available right now, she might be voting. We'll go to Senator Hickenlooper from Colorado. Senator Hickenlooper?

If Senator Hickenlooper is not available then we're going to go to Senator Hyde-Smith.

HYDE-SMITH: Thank you, Mr. Chairman and welcome Congresswoman Haaland and congratulations on this historic nomination to be Secretary of Interior. And I'm hopeful that through this confirmation process, we can gain a deeper understanding on how you intend to lead the Department of the Interior if you are confirmed.

And as a congressman and I think you came in 1999, you've been there two years, was that about two years?

HAALAND: I was elected in 2018 and sworn in in 2019.

HYDE-SMITH: And since, you had been in that position, you've done on record stating, I pledge to vote against all new fossil fuel infrastructure and to fight instead of 100 percent clean energy.

In Mississippi, of course that's on the outside of my door that says Senator Hyde-Smith has Mississippi under there the state that I

represent along has a substantial energy infrastructure which provides thousands of jobs and hundreds of millions in economic output through the production of fossil fuels in our ports, our refineries are processing plants and many facilities in the great state that I represent.

But by halting this production of essential fossil fuels, Mississippi jobs alone would be just decimated leading families without a source of income during an already troubling time economically and a halting offshore energy production but also deny my state resources that are now dedicated to conservation and all the very good works.

Frankly, your positions on energy are alarming to Mississippians. What do you recommend I tell my constituents that are directly affected by this to assure them that their livelihoods and the way they make a living and provide for their families are still secure?

HAALAND: Senator, thank you so much for the question. And first of all, it might be bear -- it might bear repeating that I was the most bipartisan freshman in my first term in Congress that's because I came here to get work done.

And I -- I realized that serving as cabinet secretary is far different from being a member of Congress where I'm representing one district is representing every single American. And I recognize that there is a difference in those two roles and I want you to know that cabinet secretaries, the administration is a coequal branch of our government just as congress is.

And so, it's important that we're able to work together and I can just promise you that I will listen to you. I'll take - I'll take your -- I will take into consideration your issues and -- and how you want to present them and -- and certainly will look forward to many more conversations about your state and -- and how we can ensure the people of your state, how would they need to move forward.

HYDE-SMITH: So, you don't have any specifics on what I can report back to them of how their livelihoods are still secure with your leadership?

HAALAND: Senator, I would just like to also reiterate perhaps that President Biden has just put a pause on a new leases not valid existing leases and I don't know when that review will be finished.

It is the review the administration wants to do on the fossil -- federal fossil fuel program. And of course, I -- I know that the valid existing leases will move forward, there's thousands of those currently and I -- I believe the department is still moving permits

through. So, I -- I -- I feel like in the short term that hopefully their jobs have not been affected.

HYDE-SMITH: OK, and for the future, you know, I want to discuss the future of offshore oil and gas leasing in the Gulf of Mexico. 2020 analysis concluded that banning federal leasing would result in nearly 14,000 Mississippi jobs lost in a very small state where less than three million.

In the first 12 to 24 months, a decrease in offshore oil production by 44 percent and natural gas by 68 percent via 2030 increase dependency on imports by nearly two million barrels per day and a potential loss of 32 million in our state revenue.

And how do you perceive the future of offshore leasing when the Gulf of Mexico is vital to our nation's energy securing -- security by providing approximately 20 percent of America's oil and natural gas production with your leadership in the future if these things do come in the pass?

HAALAND: Senator, as I mentioned, of course, it's just a pause, it's not a ban. It's my understanding that there are approximately 7700 unused approved permits to drill currently that have not been put into use and so, there is a long way to go before, you know, in order to make use of all the permits that are actually out there and ready to be used.

HYDE-SMITH: Thank you and I have further questions at the appropriate time, Mr. Chairman.

MANCHIN: Thank you, Senator. And Senator Cortez Masto from Nevada, I think she's with us now.

CORTEZ MASTO: I am. Chairman, thank you. Thank you to the ranking member. Congresswoman Haaland, thank you for being here today and thank you for your dedication to public service and for your family's long history of military service to our nation.

I also recognize the numbers of Indian affairs, the historic nature of your nomination as the first Native American woman nominated by the president to lead the Department of Interior.

I want to thank you for taking the time with me prior to this hearing to go through some issues and talk about how we can collaboratively work together at the State of Nevada. As you and I previously discussed over 80 percent of the land in Nevada is managed by the federal government, about 63 percent is specifically managed by the Bureau of Land Management.

So, public lands are vital to my state's economy whether that being mining grading, outdoor recreation, and other means. It is so

<https://www.cpr.ca/en/media/canadian-pacific-and-kansas-city-southern-agree-to-combine-to-create-the-first-us-mexico-canada-rail-network>

Canadian Pacific and Kansas City Southern Agree to Combine to Create the First U.S.-Mexico-Canada Rail Network

See all news **March 21, 2021** Calgary and Kansas City, Mo.

Transaction Creates Enhanced Competition and Better Service for Customers, and Fosters North American Economic Growth

Stock and Cash Transaction Representing an Enterprise Value of Approximately \$29 Billion

Companies to Host Investor Conference Call Today at 2:00 PM Eastern Time

Canadian Pacific Railway Limited (TSX: CP, NYSE: CP) ("CP") and Kansas City Southern (NYSE: KSU) ("KCS") today announced they have entered into a merger agreement, under which CP has agreed to acquire KCS in a stock and cash transaction representing an enterprise value of approximately USD\$29 billion¹, which includes the assumption of \$3.8 billion of outstanding KCS debt. The transaction, which has the unanimous support of both boards of directors, values KCS at \$275 per share, representing a 23% premium², based on the CP and KCS closing prices on March 19, 2021 (and \$270 per share, representing a 26% premium³, based on the respective CP and KCS 30-day volume weighted average prices ("VWAP")).

Following the closing into a voting trust, common shareholders of KCS will receive 0.489 of a CP share and \$90 in cash for each KCS common share held.

Following final approval from the Surface Transportation Board ("STB"), the transaction will combine the two railroads to create the first rail network connecting the U.S., Mexico, and Canada. Joining seamlessly in Kansas City, Mo., in America's heartland, CP and KCS together will connect customers via single-network transportation offerings between points on CP's system throughout Canada, the U.S. Midwest, and the U.S. Northeast and points on KCS' system throughout Mexico and the South Central U.S.

The combined network's new single-line offerings will deliver dramatically expanded market reach for customers served by CP and KCS, provide new competitive transportation service options, and support North American economic growth. The transaction is also expected to create jobs across the combined network. Additionally, efficiency and service improvements are expected to achieve meaningful environmental benefits.



While remaining the smallest of six U.S. Class 1 railroads by revenue, the combined company will be a much larger and more competitive network, operating approximately 20,000 miles of rail, employing close to 20,000 people and generating total revenues of approximately \$8.7 billion based on 2020 actual revenues.

"This transaction will be transformative for North America, providing significant positive impacts for our respective employees, customers, communities, and shareholders," said CP President and Chief Executive Officer Keith Creel. "This will create the first U.S.-Mexico-Canada railroad, bringing together two railroads that have been keenly focused on providing quality service to their customers to unlock the full potential of their networks. CP and KCS have been the two best performing Class 1 railroads for the past three years on a revenue growth basis."

[1] Except where noted, all figures are in U.S. dollars.

[2] Based on KCS and CP closing share prices of \$224.16 and CAD\$474.27 (at 1.2506 FX rate), respectively, as of March 19, 2021.

[3] Based on KCS and CP 30-day volume weighted average prices ("VWAPs") of \$213.87 and US\$368.22, respectively, as of March 19, 2021.

"The new competition we will inject into the North American transportation market cannot happen soon enough, as the new USMCA Trade Agreement among these three countries makes the efficient integration of the continent's supply chains more important than ever before. Over the coming months, we look forward to speaking with customers of all sizes, and communities across the combined network, to outline the compelling case for this combination and reinforce our steadfast commitment to service and safety as we bring these two iconic companies together," said Mr. Creel.

"KCS has long prided itself in being the most customer-friendly transportation provider in North America," said KCS President and Chief Executive Officer Patrick J. Ottensmeyer. "In combining with CP, customers will have access to new, single-line transportation services that will provide them with the best value for their transportation dollar and a strong competitive alternative to the larger Class 1s. Our companies' cultures are aligned and rooted in the highest safety, service and performance standards."

"Importantly, KCS employees will benefit from being part of a truly North American continental enterprise, which creates a strong platform for revenue growth, capital investment, and future job creation. Customers, labor partners, and shareholders will all benefit from the inherent strengths of this combination, including attractive synergies and complementary routes," said Mr. Ottensmeyer.

Mr. Creel and Mr. Ottensmeyer concluded, "We have been champions for the environment recognizing the important role rail plays in lowering overall transportation emissions. This combination advances our shared science-based pledges in-line with the Paris Agreement to improve fuel efficiency and lower emissions in support of a more sustainable North American supply chain."

Transaction to Expand Options and Efficiencies for Customers

The combination will provide an enhanced competitive alternative to existing rail service providers and is expected to result in improved service to customers of all sizes. Grain, automotive, auto-parts, energy, intermodal, and other shippers, will benefit from the increased efficiency and simplicity of the combined network, which is expected to spur greater rail-to-rail competition and support customers in growing their rail volumes.

Following final regulatory approval, a single integrated rail system will connect premier ports on the U.S. Gulf, Atlantic and Pacific coasts with key overseas markets. The combination of CP and KCS networks will offer unprecedented reach via new single-line hauls across the combined company's continent-wide network.

Importantly, no customer will experience a reduction in independent railroad choices as a result of the transaction. Additionally, with both companies' focus on safety and track records of operational excellence, customers will benefit from a seamless integration of the two systems without service disruption.

CP and KCS interchange and operate an existing shared facility in Kansas City, Mo., which is the one point where they connect. This transaction will alleviate the need for a time consuming and expensive interchange, improving efficiency and reducing transit times and costs. The combination also will allow some traffic between KCS-served points and the Upper Midwest and Western Canada to bypass Chicago via the CP route through Iowa. This will improve service and has the potential to contribute to the reduction of rail traffic, fuel burn, and emissions in Chicago, an important hub city.

Improving Highway Traffic, Environmental Sustainability, and Safety

In addition to providing new competition against other railroads, the new single-line routes made possible by the transaction are expected to shift trucks off crowded U.S. highways, yielding reduced highway traffic, lower emissions, and less need for public investments in road and highway bridge repairs. In the Dallas to Chicago corridor alone, the synergies created by this combination are expected to result in meaningful reduction in truck traffic on publicly funded highways.

Rail is four times more fuel efficient than trucking, and one train can keep more than 300 trucks off public roads and produce 75 percent less greenhouse gas emissions. CP is committed to sustainability and is currently developing North America's first line-haul hydrogen-powered locomotive.

CP and KCS operational expertise and track records as PSR railroads, coupled with the hand-in-glove fit of the two networks, will help ensure a smooth, safe and efficient combination of the two railroads. In combination with KCS, CP will continue to build on its record as North America's safest Class 1 railroad for 15 consecutive years based on Federal Railroad Administration-reportable train accident frequency.

Creating Value for KCS and CP Shareholders

Following the closing into a voting trust, common shareholders of KCS will receive 0.489 of a CP share and \$90 in cash for each KCS common share held. Preferred shareholders will receive \$37.50 in cash for each KCS preferred share held. The fixed exchange ratio implies a price for KCS of \$275 per share, representing a 23% premium⁴, based on the CP and KCS closing prices on March 19, 2021 (and \$270 per share, representing a 26% premium⁵, based on the respective CP and KCS 30-day volume weighted average prices ("VWAP")).

Immediately following the closing into trust, KCS common shareholders are expected to own 25 percent of CP's outstanding common shares, providing the ability to participate in the upside of both companies' growth opportunities. Following final STB approval, KCS shareholders will additionally participate in the realization of synergies resulting from the combination.

By accelerating the combined growth strategies of the two fastest-growing Class 1s with new efficiencies for customers and improved on-time performance under their respective PSR programs, the combined company under CP's control is expected to create annualized synergies of approximately \$780 million over three years.

The combination is expected to be accretive to CP's adjusted diluted EPS⁶ in the first full year following CP's acquisition of control of KCS, and is expected to generate double-digit accretion upon the full realization of synergies thereafter.

To fund the stock consideration of the merger, CP will issue 44.5 million new shares. The cash portion will be funded through a combination of cash-on-hand and raising approximately \$8.6 billion in debt, for which financing has been committed. As part of the merger, CP will assume approximately \$3.8 billion of KCS' outstanding debt. Following the closing into trust, CP expects that its outstanding debt will be approximately \$20.2 billion.

Pro forma for the transaction, CP estimates its leverage ratio against 2021E street consensus EBITDA to be approximately 4.0x with the assumption of KCS debt and issuance of new acquisition-related debt. In order to manage this leverage effectively, CP will be temporarily suspending its normal course issuer bid program, and expects to produce approximately \$7 billion of levered free cash flow (after interest and taxes) over the next three years. CP estimates its long-term leverage target of approximately 2.5x to be achieved within 36 months after closing into trust. The combined company will remain committed to maintaining strong investment grade credit ratings while continuing to return capital for the benefit of shareholders.

[4] Based on KCS and CP closing share prices of \$224.16 and CAD\$474.27 (at 1.2506 FX rate), respectively, as of March 19, 2021.

[5] Based on KCS and CP 30-day volume weighted average prices ("VWAPs") of \$213.87 and US\$368.22, respectively, as of March 19, 2021.

[6] Accretion based on adjusted diluted EPS excluding one-time advisory, financing, and integration costs as well as incremental transaction-related amortization.

Two-Step Process to Complete Transaction and Merger

CP's ultimate acquisition of control of KCS' U.S. railways is subject to the approval of the U.S. Surface Transportation Board ("STB").

First, CP will establish a "plain vanilla", independent voting trust to acquire the shares of KCS. Upon shareholder approval of the transaction, and satisfaction of customary closing conditions, CP will acquire KCS shares and place them into the voting trust. This step is currently expected to be completed in the second half of 2021, at which point KCS shareholders will receive their consideration.

CP's placement of KCS shares into the voting trust will insulate KCS from control by CP until the STB authorizes control. KCS' management and Board of Directors will continue to steward the company while it is in trust, pursuing KCS' independent business plan and growth strategies.

The second step of the process is to obtain control approval from the STB and other applicable regulatory authorities. The STB review is expected to be completed by the middle of 2022. Upon obtaining control approval, the two companies will be integrated, unlocking the benefits of the combination.

Board, Management, and Headquarters

Following STB approval of the transaction, CP will acquire control of KCS and Mr. Creel will serve as the Chief Executive Officer of the combined company. The combined entity will be named Canadian Pacific Kansas City ("CPKC").

Calgary will be the global headquarters of CPKC, and Kansas City, Mo. will be designated as the U.S. headquarters. The Mexico headquarters will remain in Mexico City and Monterrey. CP's current U.S. headquarters in Minneapolis-St. Paul will remain an important base of operations.

Four KCS Directors will join CP's expanded Board at the appropriate time, bringing their experience and expertise in overseeing KCS' multinational operations.

Advisors

BMO Capital Markets and Goldman Sachs & Co. LLC are serving as financial advisors to Canadian Pacific. Sullivan & Cromwell LLP, Bennett Jones LLP and the Law Office of David L. Meyer are serving as legal counsel. Creel-García-Cuellar, Aiza y Enríquez, S.C. are serving as Mexican legal counsel to Canadian Pacific. Evercore is serving as the Canadian Pacific Board's financial advisors and Blake, Cassels & Graydon LLP is serving as the Board's legal counsel.

BofA Securities and Morgan Stanley & Co. LLC are serving as financial advisors to Kansas City Southern. Wachtell, Lipton, Rosen & Katz, Baker & Miller PLLC, Davies Ward Phillips & Vineberg LLP, WilmerHale, and White & Case, S.C. are serving as legal counsel to Kansas City Southern.

Conference Call for Investment Community

CP and KCS will host a joint investor conference call today, March 21, 2021, at 2:00PM Eastern Time to discuss the announcement. A live webcast of the call and the replay will be available on the CP website at <https://investor.cpr.ca/events> and the KCS website at <https://investors.kcsouthern.com/events-calendar>. Supporting materials will be posted on www.FutureForFreight.com. To listen to the live conference call, dial (844) 450-0389 in the U.S. or (236) 714-3016 internationally.

A conference call replay will be available on March 21, 2021, at 5:00PM Eastern Time. To access the replay, dial (800) 585-8367 or (416) 621-4642 and reference the passcode 3377895.

CP and KCS Launch Website to Serve as Information Hub for All Stakeholders

Additional information on the transaction and the benefits it is expected to bring to the full range of stakeholders will be online at www.FutureForFreight.com. This website will be updated over the coming months with new information.

Forward Looking Statements and Information

Production figures February 2021

19/03/2021 Preliminary production figures for February 2021 show an average daily production of 2 176 000 barrels of oil, NGL and condensate.

Total gas sales were 9.0 billion Sm³ (GSm³), which is a decrease of 1.2 GSm³ from the previous month.

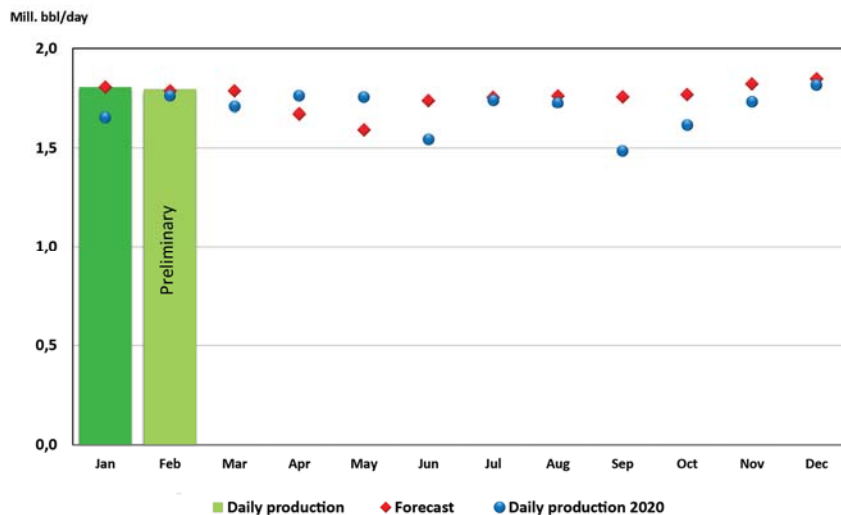
Average daily liquids production in February was: 1 792 000 barrels of oil, 371 000 barrels of NGL and 13 000 barrels of condensate.

Oil production in February is 0.4 percent higher than the NPD's forecast, and 0.1 percent higher than the forecast so far this year.

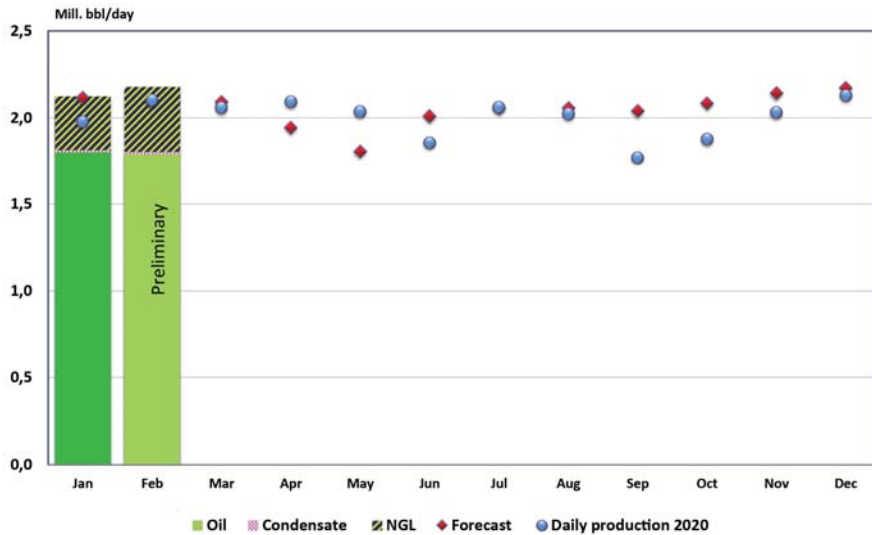
Production February 2021

		Oil	Sum liquid	Gas	Total
		mill bbl/d	mill bbl/d	MSm ³ /d	MSm ³ o.e/d
Production	February 2021	1,792	2,176	321,0	0,667
Forecast for	February 2021	1,785	2,097	321,2	0,655
Deviation from forecast		0,007	0,079	-0,2	0,012
Deviation from forecast in %		0,4 %	3,8 %	-0,1 %	1,8 %
Production	January 2021	1,802	2,122	330,2	0,668
Deviation from	January 2021	-0,010	0,054	-9,2	-0,001
Deviation in % from	January 2021	-0,6 %	2,5 %	-2,8 %	-0,1 %
Production	February 2020	1,761	2,102	340,7	0,675
Deviation from	February 2020	0,031	0,074	-19,7	-0,008
Deviation in % from	February 2020	1,8 %	3,5 %	-5,8 %	-1,2 %

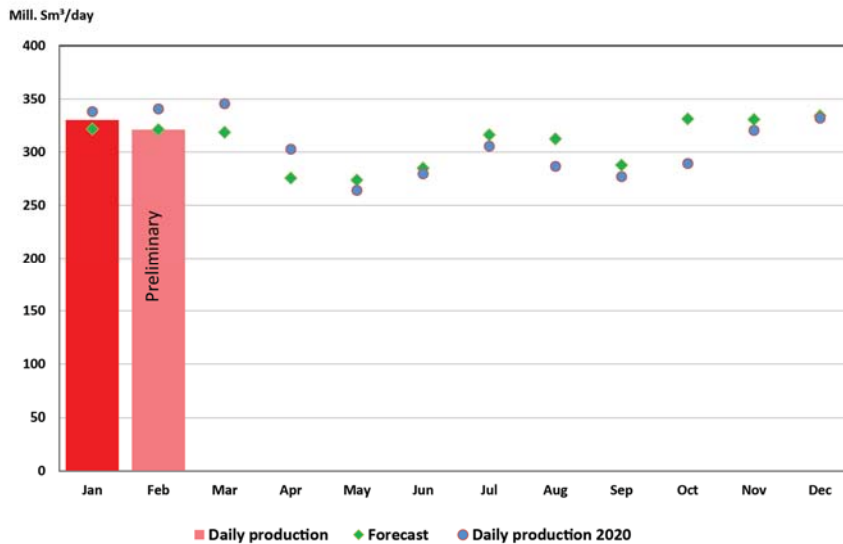
Oil production 2021



Liquid production 2021



Gas production 2021



The total petroleum production for the first two months in 2021 is about 39.4 million Sm³ oil equivalents (MSm³ o.e.), broken down as follows: about 16.9 MSm³ o.e. of oil, about 3.3 MSm³ o.e. of NGL and condensate and about 19.2 MSm³ o.e. of gas for sale.

The total volume is 0.4 MSm³ o.e. lower than in 2020.

Updated: 19/03/2021

Oil Market Report - March 2021

Flagship report — March 2021

About this report

The IEA Oil Market Report (OMR) is one of the world's most authoritative and timely sources of data, forecasts and analysis on the global oil market – including detailed statistics and commentary on oil supply, demand, inventories, prices and refining activity, as well as oil trade for IEA and selected non-IEA countries.

Highlights

- World oil demand is expected to rebound by 5.5 mb/d in 2021 after contracting by 8.7 mb/d in 2020. Consumption appears to be slightly higher than expected in 1Q21, supported by cold weather in northern Asia, Europe and the US. A stronger economy and vaccine deployment will support growth in 2H21, **reducing the oil demand gap vs 2019 from 4.8 mb/d in 1Q21 to 1.4 mb/d in 4Q21.**
- **Global oil supply fell 2 mb/d in February to 91.6 mb/d after a cold snap shut in US production and Saudi Arabia made an extra cut of 1 mb/d. OPEC+ agreed to extend most of its cuts through April, with Saudi keeping its extra cut in place. Non-OPEC+ will see output rise by 700 kb/d in 2021 after a 1.3 mb/d drop in 2020. US oil supply is set to decline by 180 kb/d, after a fall of 600 kb/d in 2020.**
- Global refinery throughput rose 440 kb/d in January but was 5 mb/d lower year-on-year. Arctic weather in the US caused a 1.9 mb/d m-o-m decline in February throughput and a 1 mb/d downward revision to the global 1Q21 estimate. **Chinese refinery runs were 2.2 mb/d higher than a year ago in January-February, and are estimated to have reached a new record high of 14.3 mb/d in February. Global throughput is set to resume growth from 2Q21.**
- OECD industry stocks fell for the sixth consecutive month in **January. A monthly decline of 14.2 mb left inventories at 3 023 mb, 63.2 mb above their 2016-2020 average.** Crude oil stocks led the fall with a counter-seasonal 23.7 mb draw. February data for the US, Europe and Japan show that total industry stocks fell by 52.6 mb (1.88 mb/d) in total, led by lower gasoline and middle distillate stocks in the US.
- Crude futures rose \$7/bbl in February to an average \$62/bbl and leapt to \$70/bbl in early March after OPEC+ rolled-over cuts and following an attack on the Saudi Ras Tanura terminal. Prices rose with cold weather in the northern hemisphere and were supported by growing confidence in vaccine rollouts and the economy. Forward price curves rose above \$50/bbl on NYMEX WTI, boosting producer hedging. At the time of writing, Brent was trading at \$68/bbl and WTI near \$65/bbl.

Plenty to spare

Oil's sharp rally to near \$70/bbl has spurred talk of a new super-cycle and a looming supply shortfall. Our data and analysis suggest otherwise. For a start, oil inventories still look ample compared with historical levels despite a steady decline from a massive overhang that piled up during 2Q20. By the end of January, OECD industry stocks, at 3 023 mb, were still 110 mb higher than a year ago – at the onset of the Covid crisis.

On top of the stock cushion, a hefty amount of spare production capacity has built up as a result of OPEC+ supply curbs. The group agreed a record 9.7 mb/d output cut last year and is still withholding roughly 8 mb/d from the market. In February, OPEC's spare capacity (excluding Iran) stood at 7.7 mb/d, with much of it in the Middle East. Non-OPEC countries taking part in the deal hold an additional 1.6 mb/d that could be brought on to the market in short order.

For now, OPEC+ continues to restrict supply. Lofty stock levels and a still fragile recovery in oil demand led the group to agree on 4 March to broadly extend cuts by one month into April. Saudi Arabia also rolled over its extra 1 mb/d cut and said it would gradually phase it out at the right time. The OPEC+ decision helped boost crude to its highest since May 2019, with Brent near \$70/bbl and WTI at around \$65/bbl. OPEC+ is to meet on 1 April to chart policy for May.

Producers not taking part in the deal will see output rise by 700 kb/d in 2021 after a decline of 1.3 mb/d in 2020. US production, hit hard by freezing temperatures in February, is expected to decline by 180 kb/d in 2021, despite a gradual improvement in activity from last year's slump.

As for demand, a return to growth lies ahead. Global oil demand was stronger than expected at the start of the year, boosted by colder weather and improved industrial activity in the US and elsewhere. Demand is set to rise by 5.3 mb/d from 1Q21 to 4Q21, as the economic recovery and vaccine programmes gather pace and containment measures ease. For 2021, global oil demand is forecast to grow by 5.5 mb/d to 96.5 mb/d, recovering around 60% of the volume lost in 2020. Oil demand will return to 2019 levels by 2023, as shown in our OIL 2021 report released today.

The prospect of stronger demand and continued OPEC+ production restraint point to a sharp decline in inventories during the second half of the year. For now, however, there is more than enough oil in tanks and under the ground to keep global oil markets adequately supplied.

IEA World Oil Supply and Demand Forecasts: Summary (Table)

2021-03-17 09:00:00.6 GMT

By Kristian Siedenburg

(Bloomberg) -- Following is a summary of world oil supply and demand forecasts from the International Energy Agency in Paris:

	4Q	3Q	2Q	1Q	4Q	3Q	2Q	1Q		
	2021	2021	2021	2021	2020	2020	2020	2020	2021	2020
Demand										
Total Demand	99.2	97.8	95.0	93.9	94.7	92.7	82.9	93.8	96.5	91.0
Total OECD	46.5	45.4	43.8	43.3	43.1	42.3	37.6	45.4	44.8	42.1
Americas	25.1	24.7	23.7	23.3	23.2	22.7	20.0	24.3	24.2	22.6
Europe	13.6	13.7	13.2	12.2	12.6	12.9	11.0	13.3	13.2	12.4
Asia Oceania	7.7	7.1	6.9	7.7	7.3	6.7	6.5	7.8	7.4	7.1
Non-OECD countries	52.7	52.3	51.2	50.7	51.7	50.4	45.3	48.3	51.7	48.9
FSU	4.9	4.9	4.5	4.5	4.8	4.8	4.0	4.6	4.7	4.6
Europe	0.8	0.8	0.7	0.7	0.8	0.8	0.6	0.7	0.8	0.7
China	15.1	14.9	14.7	14.3	14.9	14.7	14.2	11.8	14.8	13.9
Other Asia	13.9	13.3	13.7	13.6	13.5	12.4	11.2	13.4	13.6	12.6
Americas	6.0	6.1	5.8	5.8	5.9	5.8	4.9	5.8	5.9	5.6
Middle East	7.8	8.4	7.7	7.6	7.7	8.1	7.0	7.8	7.9	7.6
Africa	4.1	4.0	4.0	4.1	4.0	3.9	3.3	4.2	4.0	3.8
Supply										
Total Supply	n/a	n/a	n/a	n/a	92.4	91.1	92.1	100.2	n/a	93.9
Non-OPEC	64.6	64.5	63.9	62.5	62.4	61.9	61.3	66.7	63.9	63.1
Total OECD	28.7	28.3	28.1	27.8	27.8	27.1	26.9	29.9	28.2	27.9
Americas	24.4	24.1	24.0	23.6	23.7	23.1	22.8	25.7	24.0	23.8
Europe	3.8	3.6	3.6	3.6	3.5	3.4	3.6	3.7	3.6	3.5
Asia Oceania	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.5
Non-OECD	30.7	30.8	30.8	30.3	29.9	29.7	30.0	32.3	30.6	30.5
FSU	13.7	13.7	13.6	13.4	13.2	12.8	13.2	14.8	13.6	13.5
Europe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
China	3.9	3.9	4.0	4.0	3.9	4.0	4.0	4.0	3.9	4.0
Other Asia	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.2	3.0	3.0
Americas	5.6	5.6	5.6	5.4	5.2	5.4	5.1	5.6	5.6	5.3
Middle East	3.2	3.2	3.2	3.2	3.1	3.1	3.1	3.2	3.2	3.1
Africa	1.2	1.2	1.3	1.3	1.3	1.4	1.4	1.4	1.3	1.4
Processing Gains	2.3	2.3	2.2	2.1	2.1	2.1	2.0	2.3	2.2	2.1
Total OPEC	n/a	n/a	n/a	n/a	30.0	29.2	30.8	33.6	n/a	30.9
Crude	n/a	n/a	n/a	n/a	24.9	24.1	25.6	28.2	n/a	25.7
Natural gas liquids NGLs	5.3	5.3	5.3	5.2	5.2	5.1	5.2	5.4	5.3	5.2
Call on OPEC crude and stock change *	29.3	27.9	25.7	26.2	27.2	25.7	16.4	21.7	27.3	22.8

NOTE: Figures are in million of barrels per day. (*) equals total demand minus non-OPEC supply and OPEC natural gas liquids. IEA changed the way it measures OPEC supply, adopting the industry-standard approach of counting most of Venezuela's Orinoco heavy oil as "crude oil."

SOURCE: International Energy Agency

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IEA: February Crude Oil Production in OPEC Countries (Table)

2021-03-17 09:00:00.4 GMT

By Kristian Siedenburg

(Bloomberg) -- Following is a summary of oil production in OPEC countries from the International Energy Agency in Paris:

	Feb.	Jan.	Feb.
	2021	2021	MoM
Total OPEC	24.75	25.51	-0.76
Total OPEC10	20.96	21.73	-0.77
Algeria	0.88	0.87	0.01
Angola	1.14	1.13	0.01
Congo	0.26	0.28	-0.02
Equatorial Guinea	0.10	0.12	-0.02
Gabon	0.19	0.16	0.03
Iraq	3.89	3.83	0.06
Kuwait	2.35	2.33	0.02
Nigeria	1.40	1.30	0.10
Saudi Arabia	8.14	9.10	-0.96
UAE	2.61	2.61	0.00
Iran	2.14	2.17	-0.03
Libya	1.12	1.13	-0.01
Venezuela	0.53	0.48	0.05

NOTE: Figures are in million of barrels per day. Monthly level change calculated by Bloomberg.

OPEC10 excludes Iran, Libya and Venezuela.

SOURCE: International Energy Agency

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IEA REPORT WRAP: 2021 Oil Demand Revised Up Slightly on Cold 1Q

2021-03-17 09:31:39.275 GMT

By Stephen Voss

(Bloomberg) -- Summary including stories from IEA's monthly Oil Market Report and its medium-term "Oil 2021" report, both issued on Wednesday:

* IEA says global oil demand won't hit pre-virus level until 2023

** Global demand for 2021 revised up very slightly, to 96.49m b/d from 96.44m b/d

** Albeit small, this marks first 2021 upward revision in five monthly reports

** 1Q oil demand higher than previously expected, due to cold weather

- ** Biggest increases were in 1Q and 3Q
- ** World demand to gain 5.5m b/d this yr after 8.7m b/d slump in 2020
- ** From 1Q to 4Q, demand gap vs 2019 will shrink from 4.8m to 1.4m b/d
- ** In annual medium-term forecast, 2025 demand reduced by 2.5m b/d
- ** Click here for summary of key IEA supply/demand forecasts
- * OPEC output falls on Saudi cuts while allies' compliance slips: IEA
- ** See full table; OPEC total -760k b/d m/m in February, to 24.75m b/d
- ** Biggest individual change was -960k b/d m/m in Saudi, to 8.14m b/d
- ** Compliance with pledged cutbacks in February was:
 - *** OPEC 125%; non-OPEC 89%; combined OPEC+ 112%
- * Russian February compliance with OPEC+ at 93%
- * No supercycle seen by IEA as oil supplies remain plentiful
- * Gasoline demand unlikely to ever fully recover from Covid
- * Higher investments needed to meet oil demand rebound: IEA
- * To meet emissions targets, oil demand must be cut now: IEA
- * Petchems to dominate oil demand growth in medium term
- * New refineries dominate global capacity expansion
- * More refineries need to close through 2026
- * China to draw its oil stockpiles more slowly than other nations
- * Asia will need record amounts of Mideast, Atlantic crude
- * Jet fuel demand to reach global pre-pandemic level by 2024
- * OECD gasoil demand won't ever return to 2019 level
- * Table: IEA world oil supply and demand forecasts by quarter
- * NOTE: The OPEC+ alliance, including OPEC and non-members such as Russia, met on March 4 and decided to keep most official production targets unchanged through April, having already allowed more oil onto the market in January. The group meets next on April 1 to discuss levels for May
- * NOTE: OPEC published its own monthly report on March 11, cutting its 2Q demand outlook, and the U.S. EIA's monthly Short-Term Energy Outlook was published March 9

--With assistance from Julian Lee, Rakteem Katakey, Alaric Nightingale, Grant Smith, Amanda Jordan, Jack Wittels, Sherry Su, Bill Lehane, Dina Khrennikova, Rachel Graham, Kristian Siedenburg and Laura Hurst.

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IEA World Oil Supply/Demand Key Forecasts

2021-03-17 09:00:00.7 GMT

By Kristian Siedenburg

(Bloomberg) -- World oil demand 2021 fcast was revised to 96.5m b/d from 96.4m b/d in Paris-based Intl Energy Agency's latest monthly report.

- * 2020 world demand was unrevised at 91.0m b/d
- * Demand change in 2021 est. 6% y/y or 5.5m b/d
- * Non-OPEC supply 2021 was revised to 63.9m b/d from 64.0m b/d
- * Call on OPEC crude 2021 was revised to 27.3m b/d from 27.1m b/d
- * Call on OPEC crude 2020 was revised to 22.8 m b/d from 22.7m b/d
- ** OPEC crude production in Feb. fell by 760k b/d on the month to 24.8m b/d
- * Detailed table: FIFW NSN QQ3S0FDWLU6N <GO>
- * NOTE: Fcasts based off IEA's table providing one decimal point

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Global Oil Demand Won't Hit Pre-Virus Level Until 2023, IEA Says

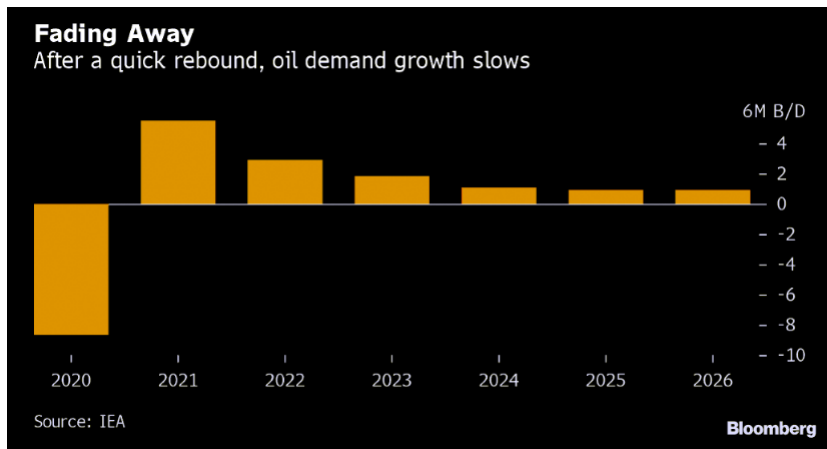
2021-03-17 09:00:00.1 GMT

By Grant Smith

(Bloomberg) -- Global oil demand won't return to pre-pandemic levels until 2023, and growth will be subdued thereafter amid new working habits and a shift away from fossil fuels, the International Energy Agency said. Fuel consumption will average just over 101 million barrels a day in 2023, fully recouping the 9 million a day lost last year when lockdowns emptied roads and grounded flights, the IEA said in a report.

But as trends like remote-working endure, and as governments seek to limit climate change, hydrocarbon use will falter. Oil demand in the middle of this decade will be about

2.5 million barrels lower than the agency projected last year. Gasoline consumption has probably peaked already.



“Oil demand will likely never catch up with its pre-pandemic trajectory,” the Paris-based IEA said Wednesday in its annual medium-term outlook. “There may be no return to ‘normal’ for the oil market in the post-Covid era.”

Crude prices have already reversed last year’s plunge, rising to almost \$70 a barrel in London. It’s partly because demand in Asia has held up, but mostly as a result of vast production cuts by the OPEC+ alliance led by Saudi Arabia.

Biggest Winners

The group’s member countries stand to be the biggest winners in the years ahead, reclaiming the market share they’re now sacrificing, the IEA said. For OPEC’s long-standing rivals in the U.S. shale industry, however, the agency’s outlook has dimmed significantly.

After a vigorous recovery in global demand this year and next in tandem with the wider economy, the IEA predicts that growth in consumption will slow, reaching 104.1 million barrels a day in 2026.

Asia will account for 90% of the growth, and much of it will be from petrochemicals and a gradual revival in aviation fuel, the IEA said. With electric vehicles becoming more widespread and internal combustion engines more efficient, demand for gasoline -- for decades the cornerstone of the petroleum industry -- will stagnate.

As consumption picks up, the Organization of Petroleum Exporting Countries and its allies will be able to reverse the massive production cuts they made in 2020. The need for OPEC’s crude will rise from 27.3 million barrels a day this year to reach 30.8 million a day in 2026.

Global crude markets could even begin to tighten around the middle of the decade if U.S. sanctions remain in place on OPEC

member Iran. Saudi Arabia, Iraq and other Gulf exporters would need to pump near record levels in this scenario, and the group's spare production capacity would dwindle to its lowest since 2016.

Falling Investments

For OPEC's competitors, it's a darker picture. Investment in new supplies tumbled by 30% last year as oil prices slumped, and will recover only "marginally" in 2021, the IEA predicted. The steepest reversal of fortune has come for the U.S. shale oil industry, which once seemed set to squeeze OPEC almost indefinitely.

With companies compelled to rein in spending and reward shareholders after years of burning through cash -- and many drillers increasingly mindful of investors' environmental concerns -- U.S. production will see only "modest growth."

The country will remain the single biggest contributor to new supply in the outlook. But while it was forecast last year to provide the bulk of new supplies by the middle of the decade, the U.S. is now expected to account for just 16% of the growth to 2026.

"The industry is consolidating and is taking a more conservative approach to investment," while "the availability of cheap capital is not as plentiful as it was in the boom years," the IEA said. "The slowdown in U.S. production growth clears the way for OPEC+ to fill much of the supply gap."

Lower Share

Still, any sense of victory for OPEC and its partners will be relative.

In five years OPEC+'s market share -- at about 52% -- will be lower than the 57% it controlled when the alliance formed in 2016. While OPEC nations stand to boost supply in coming years, this will largely consist of restoring output they halted, rather than deploying new capacity.

A further risk for OPEC+ and other producers is that the downside for demand could be deeper than anticipated, the IEA warned.

If governments act more swiftly on environmental reforms than expected, and consumers eschew business travel and embrace recycling, about 5.6 million barrels of daily oil demand could be eliminated by 2026.

"Demand could peak earlier than previously thought," said the agency, which posited a plateau around the turn of this decade in its latest long-term outlook. "Stronger policies and

behavior changes could bring a peak in demand soon.”

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Rakteem Katakey

OPEC Output Falls on Saudi Cuts; Allies' Compliance Slips: IEA

2021-03-17 09:00:00.9 GMT

By Amanda Jordan

(Bloomberg) -- OPEC's February output shrank by 3% m/m to 24.75m b/d as Saudi Arabia slashed supply, offsetting increases from other producers in the Middle East, the IEA said in its monthly market report.

* Saudi production sank to 8.14m b/d in February from 9.1m b/d in January after pledging an additional 1m b/d unilateral cut

* Iraqi output rose to 3.89m b/d from 3.83m b/d, while Kuwaiti supply expanded by 20k b/d to 2.35m b/d

* UAE held steady at 2.61m b/d

* In Africa, Nigeria boosted output to 1.4m b/d from 1.3m b/d, while Angola edged up 10k b/d to 1.14m b/d

* Iran and Libya -- both exempt from OPEC+ quotas -- saw output slip to 2.14m b/d and 1.12m b/d, respectively

* Quota compliance among participating OPEC producers was 125%, which compares with just 89% among the group's non-OPEC allies

** Russia increased output to 9.26m b/d from 9.23m b/d, while Kazakh supply jumped to 1.54m b/d from 1.42m b/d

** Azeri, Mexican and Omani production held steady

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Christopher Sell

IEA Sees Russian February Compliance With OPEC+ At 93%

2021-03-17 09:00:00.18 GMT

By Dina Khrennikova

(Bloomberg) -- Russia's compliance with the OPEC+ agreement in February was 93%, slightly below the average compliance level for the nation since the start of the deal, the IEA said in its

monthly market report.

* IEA estimates Russia's crude-only production in February was 9.26 million b/d vs the nation's February production quota of 9.18 million b/d

* NOTE: Russia's energy ministry estimated February compliance at 100.7%, according to Deputy Energy Minister Pavel Sorokin

* Russia's compliance with the current OPEC+ deal has averaged 95%, according to IEA estimates

* READ: OPEC+ Production Targets Extended Through April (Table)

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Rachel Graham

IEA Sees No Oil Supercycle as Supplies Remain Plentiful

2021-03-17 09:00:00.28 GMT

By Grant Smith

(Bloomberg) -- Oil markets aren't on the verge of a new price supercycle as plentiful supplies mean any concerns of a shortfall are misguided, the International Energy Agency said. Crude rallied to a 14-month high last week after Saudi Arabia and its allies stunned traders with plans to keep a tight grip on output. Wall Street banks such as Goldman Sachs Group Inc. have called the beginning of a bull market as demand outstrips supply.

"Our data and analysis suggest otherwise," the Paris-based IEA said in its monthly report. "There is more than enough oil in tanks and under the ground to keep global oil markets adequately supplied."

The Organization of Petroleum Exporting Countries and its allies held 9.3 million barrels-a-day of spare production capacity last month as a result of cutbacks made during the pandemic, which could be quickly deployed if markets become tight, the IEA said.

Furthermore, oil inventories in developed countries stood at a "lofty" 110 million barrels above last year's levels as of January, and can be readily tapped as needed, according to the agency.

"Oil inventories still look ample compared with historical levels," said the IEA, which advises most major economies. "On top of the stock cushion, a hefty amount of spare production capacity has built up as a result of OPEC+ supply curbs."

The 23-nation coalition had been widely expected to add

about 1.5 million barrels a day in April, but instead chose to keep production mostly steady.

The IEA's relaxed attitude to OPEC+'s shock decision may seem surprising. Even before the Saudis and their partners announced their move, the agency said that stockpiles were plunging "very, very sharply."

Oil Prices

Brent crude futures surpassed \$70 a barrel last week for the first time in more than a year, and were a little below \$69 on Wednesday. Citigroup Inc. has warned the international benchmark may exceed \$80 over the next few months because of the cartel's "aggressive" output strategy.

If OPEC+ doesn't go ahead with scheduled supply increases in coming months, the IEA's data indicate that inventory declines in the second half of the year will be steeper.

OPEC's 13 members pumped an average of 24.75 million barrels a day in February, the agency estimates. By the fourth quarter, they'll need to provide 29.3 million a day in order to keep world markets in balance.

"The prospect of stronger demand and continued OPEC+ production restraint point to a sharp decline in inventories during the second half of the year," it said.

World oil demand proved stronger than expected at the start of the year, "boosted by colder weather and improved industrial activity in the U.S. and elsewhere," according to the report. The longer-term picture isn't so robust.

In a separate report also released Wednesday, the IEA said that world oil demand won't fully recover to pre-virus levels of about 100 million barrels a day until 2023. And beyond that, growth in consumption will lack its previous vigor as remote-working becomes entrenched, and as governments shift away from fossil fuels.

--With assistance from Alex Longley.

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Rakteem Katakey

Gasoline Demand Unlikely to Ever Fully Recover from Covid: IEA

2021-03-17 09:00:00.10 GMT

By Jack Wittels

(Bloomberg) -- Global gasoline consumption is unlikely to ever return to its 2019 level, according to the International Energy Agency's Oil 2021 report.

* Gasoline demand fell by a record 2.9m b/d in 2020 and is expected to recover by 1.7m b/d y/y this year

** Consumption to rise by further 470k b/d y/y in 2022, but "beyond that, gasoline demand is likely to stagnate for several years"

* "Demand from OECD countries will fall by 200 kb/d on average from 2023 as a result of the continued reduction in car fuel consumption as well as displacement by EVs and biofuels"

** "Growth from non-OECD countries will average just over 200 kb/d per year between 2023 and 2026"

* Global gasoline use expected to stand at 25.9m b/d in 2026, down by 690k b/d vs 2019

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Higher Oil Investments Needed to Meet Demand Rebound, IEA Says

2021-03-17 09:00:00.2 GMT

By Laura Hurst

(Bloomberg) -- Sharp spending cuts and project delays caused by the coronavirus pandemic are constraining global oil supply growth, the IEA said in its annual medium-term report Wednesday.

* Global oil production capacity will increase by 5m b/d by 2026 after companies cut planned upstream spending by 30% y/y in 2020 and is expected to only raise it marginally this year

* "Global oil production would need to rise 10.2m b/d by 2026 to meet the expected rebound in demand"

* In the absence of new upstream investments, spare capacity -- excluding Iran -- will fall to 2.4m b/d, the lowest level since 2016

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Rakteem Katakey

Global Oil Demand Must Be Cut Now to Meet Emissions Targets: IEA

2021-03-17 09:00:00.16 GMT

By Julian Lee

(Bloomberg) -- Reducing global oil demand is crucial to reaching net-zero carbon emissions goals, but current government policies and industry plans “will have only a marginal impact on oil demand over the next six years,” according to the International Energy Agency’s Oil 2021 report.

* Although 127 countries have stated net-zero carbon emissions ambitions -- covering ~75% of global CO2 energy-related emissions -- by February 2021 only 12 had proposed or enacted legislation

* World liquid fuel demand will be 3.5m b/d above the 2019 level by 2025 under current policies, compared with a 3m b/d drop required over the same period to reach net-zero emissions by 2070; getting to net-zero by 2050 “would require even sharper falls”

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Helen Robertson, Julian Lee

Petchems to Dominate Oil Demand Growth in Medium Term: IEA

2021-03-17 09:00:00.27 GMT

By Jack Wittels

(Bloomberg) -- While the near-term oil demand recovery will mainly be driven by transport fuels, the petrochemical sector is set to be the biggest source of demand growth over the medium-term, according to the International Energy Agency’s Oil 2021 report.

* Total ethane, LPG and naphtha demand expected to grow by an average 430k b/d per year during 2019-2026

** Of that demand growth, more than two thirds will be for petrochemical feedstocks

** “With demand growth for all other products slowing overall, LPG and naphtha will account for nearly 70% of gains compared with 2019 levels”

* Use of LPG, ethane and naphtha as petrochemical feedstock will

increase in line with global economic growth and rising plastic demand

* During 2019-2026, LPG and ethane used as petrochemical feedstock will rise by 130k b/d per year

** China will increase its naphtha feedstock demand by a total 475k b/d over same period

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Fred Pals

New Refineries Dominate Global Capacity Expansion, IEA Says

2021-03-17 09:00:00.17 GMT

By Rachel Graham

(Bloomberg) -- New refineries in East of Suez nations will account for the bulk of capacity expansion through 2026, the IEA said in its Oil 2021 report.

* Between 2020 and 2026, 8.5m b/d of new refining capacity is expected to come online

** That's a net addition of 4.9m b/d, taking into account closures that have already been announced

** The net addition is almost double the forecast growth in demand for refined products

* About 6.2m b/d of new capacity stems from greenfield projects, of which one-third is in China

** Expansion projects account for a further 2.2m b/d

* On product demand, the IEA forecasts an increasing role for biofuels

* "A third of oil demand growth in 2019-2026 is now forecast to be met by products bypassing the refining sector, such as NGLs and biofuels"

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Amanda Jordan

More Oil Refineries Need to Close Through 2026, IEA Says

2021-03-17 09:00:00.12 GMT

By Rachel Graham

(Bloomberg) -- More oil refineries will need to close through 2026, partly due to the drop in demand for transport fuels, the International Energy Agency said in its Oil 2021 report.

* Closures will also be needed to offset the growth in capacity starting up in the next few years in East of Suez nations

* A total of 6m b/d of capacity needs to close through 2026 to push run rates above 80%

** That means announcements are needed on a further 2.4m b/d of capacity

** Planned shutdowns for 2020-2026 come to 3.6m b/d currently, of which 840k b/d is to be converted into biofuels

* For this year, the IEA expects an increase in runs globally in 2Q, both q/q and y/y

** European runs forecast at 11m b/d in 2021 vs 12.2m in 2019

** European runs forecast at 10.7m b/d in 2Q

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Helen Robertson

China to Draw Its Oil Stocks More Slowly Than Other Nations: IEA

2021-03-17 09:00:00.39 GMT

By Sherry Su

(Bloomberg) -- China's crude oil inventories are unlikely to be drawn down as fast as those in other countries because of a steady buildup of storage capacity expansion over the past few years, the International Energy Agency said in its Oil 2021 report.

* Nation accounted for more than 90% of global crude storage capacity built in 2017-2020. In 2020, its above-ground storage capacity increased by 74.7m barrels, IEA said, citing Kayrros

* China needs to have added 230m barrels of Phase 3 storage capacity by the end of this year

* An implied crude oil stock build was more than 360m barrels in 2020 would have been enough to fill Phase 3 SPR capacities if

these sites were already completed

* Total crude storage capacity in China rose to around 1.7 billion barrels at the end of 2020, including both above and underground facilities, IEA said

** Combined SPR storage capacity accounted for 37% of total capacity at the end of 2020 and commercial storage made up 63%

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Asia Will Need Record Amounts of Mideast, Atlantic Crude: IEA

2021-03-17 09:00:00.29 GMT

By Bill Lehane

(Bloomberg) -- Asian crude imports will recover from last year's decline and return to growth at pre-pandemic levels, the International Energy Agency says in its five-year outlook report Oil 2021 published Wednesday.

* Declining local output, growing demand to drive crude oil imports to 26.6m b/d by 2026, up 3.5m b/d from 2019

* Asia's net oil dependence to rise to 82% in 2026 from 77% in 2019

* "It will take record levels of Middle Eastern and Atlantic Basin crude oil exports to satisfy Asia's surging appetite"

* Quantity of available Middle East crude for export is expected to reach a record 20.2m b/d in 2026, but won't be sufficient to fill the gap in Asian supply

* Call on Atlantic basin crude to rise to 6.6m b/d, met by record levels of crude output at 50m b/d for first time

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Helen Robertson

Global Jet Fuel Demand to Reach Pre-Pandemic Level by 2024: IEA

2021-03-17 09:00:00.30 GMT

By Jack Wittels

(Bloomberg) -- Global demand for jet fuel will return to pre-pandemic levels by 2024, according to the IEA's Oil 2021 report.

* Jet fuel and kerosene demand to grow by 830k b/d in 2021, less than a quarter of the volume lost in 2020

** Demand for jet fuel and kerosene to increase by 1.4m b/d in 2022

* "The economic situation and the virus' persistence in some parts of the world will combine to hold travel below pre-pandemic levels of consumption until the second half of 2023, or the first half of 2024"

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Rachel Graham

OECD Gasoil Demand Won't Ever Return to 2019 Level: IEA

2021-03-17 09:03:28.17 GMT

By Jack Wittels

(Bloomberg) -- Gasoil demand in OECD countries won't ever return to the levels of 2019, according to the International Energy Agency's Oil 2021 report.

* OECD gasoil demand to rise through 2022 in line with strong recovery in economic activity

** It will "contract thereafter on low growth in industrial production, fuel efficiency gains, and due to a strong slowdown in diesel vehicle sales in Europe"

* European gasoil demand set to decline by 570k b/d between 2019-2026

** Over same period, OECD Asian demand to contract by 110k b/d and North American by 190k b/d

* Meanwhile, non-OECD gasoil demand "reaches its 2019 levels as early as 2021, and continues to post strong growth thereafter"

** Gasoil demand in non-OECD Asia to rise by 830k b/d from 2019 to 2026

* Globally, gasoil demand "expected to recover to the 2019 level by 2022"

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<https://www.spa.gov.sa/viewfullstory.php?lang=en&newsid=2204642#2204642>

An Official Spokesman at the Ministry of Energy Condemns the Terrorist Drone Attack on the Riyadh Refinery and Denounces these Acts of Sabotage that Target the Security of Energy Supply

Friday 1442/8/6 - 2021/03/19

Riyadh, March 19, 2021, SPA -- An official spokesman at the Ministry of Energy stated that today at 06:05 AM the Riyadh oil refinery was attacked by drones, resulting in a fire that has been brought under control. The attack did not result in any injury or death **nor was the supply of oil or its derivatives affected.**

In his statement, the spokesman stressed that the Kingdom strongly condemns this cowardly attack. The Kingdom asserts that such acts of terrorism and sabotage, repeatedly committed against vital installations and civilian facilities - the last of which was the attempt to target the Ras Tanura refinery and Saudi Aramco's residential area in Dhahran - do not target the Kingdom alone, but more broadly the security and stability of energy supply to the world, as well as the global economy. The spokesman renewed the call to all nations and organizations of the world to stand together against such acts of terrorism and sabotage, and to stop all groups carrying out or supporting these attacks.

--SPA

16:32 LOCAL TIME 13:32 GMT

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Press Release

Aramco announces full-year 2020 results

Positive performance characterized by operational excellence and financial discipline

- *Net income: \$49 billion*
- *Cash flow from operating activities: \$76 billion*
- *Free cash flow*: \$49 billion*
- *Full-year dividend of \$75 billion declared*
- *2021 capex expected to be around \$35 billion*
- *Progress on Downstream business strategy with ongoing integration of SABIC*

Dhahran, Saudi Arabia, March 21, 2021 – The Saudi Arabian Oil Company (“Aramco” or “the Company”) today announced its full-year 2020 results, demonstrating exceptional resilience despite the macroeconomic impact of COVID-19 and delivering on its intended dividend payments to shareholders.

Commenting on the results, Aramco President & CEO Amin H. Nasser, said:

“In one of the most challenging years in recent history, Aramco demonstrated its unique value proposition through its considerable financial and operational agility. Our exceptional performance during such testing times owed much to the unwavering spirit and resilience of our employees, who set operational records and continued to meet the world’s energy needs both safely and reliably.

“As the enormous impact of COVID-19 was felt throughout the global economy, we intensified our strong emphasis on capital and operational efficiencies. As a result, our financial position remained robust and we declared a dividend of \$75 billion for 2020.

“At the same time, the accelerated deployment of digital technologies across the company significantly enhanced our performance and we continued to make progress on breakthrough low-carbon solutions.

“Looking ahead, our long-term strategy to optimize our oil and gas portfolio is on track and, as the macro environment improves, we are seeing a pick-up in demand in Asia and also positive signs elsewhere. We remain confident that we will emerge on the other side of this pandemic in a position of strength.”

Financial Highlights

Aramco achieved a net income of \$49 billion in 2020, one of the highest earnings of any public company globally. The Company displayed strong financial resilience in one of the most challenging periods for the industry, during which revenues were impacted by lower crude oil prices and volumes sold, and weakened refining and chemicals margins.

Aramco declared a dividend of \$75 billion for the year, which reflects the outcome of the Company's strong performance. The Company continues to preserve a strong balance sheet and its gearing ratio at December 31, 2020, was among the lowest in its industry. Meanwhile, its ROACE of 13.2% was the highest in the industry.

Through its flexible capital program and prudent financial management, the Company was able to adjust spending and focus on high-return opportunities. Capital expenditure in 2020 was \$27 billion due to the implementation of optimization and efficiency programs, representing a significant saving on capital expenditure of \$33 billion in 2019.

The Company continues to assess its capital expenditure and efficiency programs, and expects capital expenditure for 2021 to be around \$35 billion, significantly lower than the previous guidance of \$40-\$45 billion.

Aramco's international bond issuance in the fourth quarter achieved record demand for a 50-year tranche and was 10 times oversubscribed compared to its initial offering size. This global investor interest demonstrated market confidence in the Company's long-term strategy and performance outlook.

Operational Highlights

In 2020, Aramco's average hydrocarbon production was 12.4 million barrels per day of oil equivalent, including 9.2 million barrels per day (mmbpd) of crude oil.

In April, Aramco achieved the highest single day crude oil production in its history of 12.1 million barrels per day. The Company achieved another milestone in August, producing a single-day record of 10.7 billion standard cubic feet per day (bscfd) of natural gas from its conventional and unconventional fields. Both records were achieved despite lower capital expenditure in 2020.

Aramco continued its strong track record of supply reliability, despite disruptions caused by COVID-19, by delivering crude oil and other products with 99.9% reliability in 2020.

Aramco's ambition to further expand its downstream business took a significant step forward with the acquisition of a majority stake in SABIC in June, transforming the Company into a major global petrochemical player with operations in more than 50 countries. In 2020, Aramco also announced a Downstream reorganization intended to maximize value from its global network of assets.

Technology and innovation are key to delivering more energy with fewer emissions. Aramco continued to make advances in cutting-edge technology and received a company record of 683 U.S. patents in 2020 - among the highest in its industry.

Aramco maintained one of the lowest upstream carbon footprints in the industry, achieving an estimated upstream carbon intensity of 10.5 Kg of CO₂ per barrel of oil equivalent in 2020. The Company's estimated upstream methane intensity was 0.06%. These accomplishments are the result of the Company's decades-long reservoir management and production approach, which includes leveraging advanced technologies and minimizing emissions and flaring.

The Company is well positioned to capitalize on developments in hydrogen, given the Company's scale, infrastructure, low costs and low upstream carbon intensity.

One promising area is the conversion of hydrocarbons to hydrogen and then to ammonia, while capturing the CO₂ created during the process. In August, Aramco exported the world's first shipment of high-grade blue ammonia to Japan for use in zero-carbon power generation, a significant step towards sustainable hydrogen usage.

In January 2020, Aramco joined the Hydrogen Council as a steering member. The organization promotes collaboration between governments, industry and investors to provide guidance on accelerating the deployment of hydrogen solutions globally.

COVID-19 Update

Throughout the COVID-19 pandemic, Aramco has remained committed to the safety of its people, establishing protocols to monitor and limit the spread of the virus. The Company has assisted its staff and communities around the world through measures such as employee resource programs, medical support services and monetary donations.

Beyond its own employees and operations, the Company has supported the healthcare sector, supplying ventilators, air purification devices and protective equipment for health practitioners and patients.

An employee donations campaign, "Stay Home, Stay Safe," directed help toward the most vulnerable, with employees' donations matched 100% by the Company. Aramco's regional affiliates donated cash and medical supplies to organizations in Asia, Europe and the United States.

Additional information on Aramco's support efforts and response to COVID-19 can be found in more detail on a dedicated webpage [here](#).

**Please refer to www.aramco.com/investors for reconciliation of non-IFRS measures*

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 [Aramco](#)

Disclaimer

The press release contains forward-looking statements. All statements other than statements relating to historical or current facts included in the press release are forward-looking statements. Forward-looking statements give the Company's current expectations and projections relating to its capital expenditures and investments, major projects, upstream performance, including relative to peers, and growth in downstream and chemicals. These statements may include, without limitation, any statements preceded by, followed by or including words such as "target," "believe," "expect," "aim," "intend," "may," "anticipate," "estimate," "plan," "project," "will," "can have," "likely," "should," "would," "could," "continue," "forward" and other words and terms of similar meaning or the negative thereof. Such forward-looking statements involve known and unknown risks, uncertainties and other factors beyond the Company's control that could cause the Company's actual results, performance or achievements to be materially different from the expected results, performance, or achievements expressed or implied by such forward-looking statements, including the following factors: international crude oil supply and demand and the prices at which Aramco sells crude oil; the impact of COVID-19 on business and economic conditions and on supply and demand for crude oil, gas and refined and petrochemical products; adverse economic or political developments that could impact the Company's results of operations; competitive pressures faced by the Company; any significant deviation or changes in existing economic and operating conditions that could affect the estimated quantity and value of proved reserves; operational risks and hazards in the oil and gas, refining and petrochemicals industries; the cyclical nature of the oil and gas, refining and petrochemical industries; weather conditions; political and social instability and unrest and actual or potential armed conflicts in the regions in which Aramco operates and other areas; losses from risks related to insufficient insurance; the Company's ability to deliver on current and future projects; litigation to which the Company is or may be subject; the Company's ability to realize benefits from recent and future acquisitions, including with respect to SABIC; risks related to international operations, including sanctions and trade restrictions, anti-bribery and anti-corruption laws and other laws and regulations; risks related to oil, gas, environmental, health and safety and other regulations that impact the industries in which Aramco operates; the Company's dependence on its senior management and key personnel; the reliability and security of the Company's IT systems; climate change concerns and impacts; risks related to Government-directed projects and other Government requirements, including those related to Government-set maximum level of crude oil production and target MSC; fluctuations in interest rates and foreign exchange rates; and other risks and uncertainties that could cause actual results to differ from the forward looking statements in this press release, as set forth in the Company's latest periodic reports filed with the Tadawul. For additional information on the potential risks and uncertainties that could cause actual results to differ from the results predicted please see the Company's latest periodic reports filed with the Tadawul. Such forward-looking statements are based on numerous assumptions regarding the Company's present and future business strategies and the environment in which it will operate in the future.

The information contained in the press release, including but not limited to forward-looking statements, applies only as of the date of this press release and is not intended to give any assurances as to future results. The Company expressly disclaims any obligation or undertaking to disseminate any updates or revisions to the press release, including any financial data or forward-looking statements, whether as a result of new information, future events or otherwise, unless required by applicable law or regulation. No person should construe the press release as financial, tax or investment advice.

Undue reliance should not be placed on the forward-looking statements.

Non-IFRS measures reconciliations and definitions for the year ended December 31, 2020

Aramco uses certain non-IFRS financial measures to make informed decisions about its financial position and operating performance or liquidity. These non-IFRS financial measures have been included below to facilitate a better understanding of Aramco's historical trends of operation and financial position.

Aramco uses non-IFRS financial measures as supplementary information to its IFRS based operating performance and financial position. The non-IFRS financial measures are not defined by, or presented in accordance with, IFRS. The non-IFRS financial measures are not measurements of Aramco's operating performance or liquidity under IFRS and should not be used instead of, or considered as alternatives to, any measures of performance or liquidity under IFRS. The non-IFRS financial measures relate to the reporting periods described below are not intended to be predictive of future results. In addition, other companies, including those in Aramco's industry, may calculate similarly titled non-IFRS financial measures differently from Aramco. Because companies do not necessarily calculate these non-IFRS financial measures in the same manner, Aramco's presentation of such non-IFRS financial measures may not be comparable to other similarly titled non-IFRS financial measures used by other companies.

Return on average capital employed (ROACE)

ROACE measures the efficiency of Aramco's utilization of capital. Aramco defines ROACE as net income before finance costs, net of income taxes and zakat, for a period as a percentage of average capital employed during that period. Average capital employed is the average of total borrowings plus total equity at the beginning and end of the applicable period. Aramco utilizes ROACE to evaluate management's performance and demonstrate to its shareholders that capital has been used effectively.

ROACE, calculated on a twelve-month rolling basis, was 13.2% in 2020, compared to 28.4% in 2019. This decrease was primarily attributable to lower net income, and to a lesser extent, higher borrowings as a result of the SABIC acquisition, the drawdown of a term loan facility and the issuance of Senior Unsecured Notes.

All amounts in millions unless otherwise stated	SAR		USD*	
	Twelve months ended December 31		Twelve months ended December 31	
	2020	2019	2020	2019
Net income	183,763	330,693	49,003	88,185
Finance costs, net of income taxes and zakat	5,282	3,013	1,409	804
Net income before finance costs, net of income taxes and zakat	189,045	333,706	50,412	88,989
As at period start:				
Non-current borrowings	150,690	71,329	40,184	19,021
Current borrowings	24,895	29,989	6,639	7,997
Total equity	1,046,235	1,028,435	278,996	274,249
Capital employed	1,221,820	1,129,753	325,819	301,267
As at period end:				
Non-current borrowings	436,920	150,690	116,512	40,184
Current borrowings	99,157	24,895	26,442	6,639
Total equity	1,101,094	1,046,235	293,625	278,996
Capital employed	1,637,171	1,221,820	436,579	325,819
Average capital employed	1,429,496	1,175,787	381,199	313,543
ROACE	13.2%	28.4%	13.2%	28.4%

* Supplementary information is converted at a fixed rate of U.S. dollar 1.00 = SAR 3.75 for convenience only.

Free cash flow

Aramco uses free cash flow to evaluate its cash available for financing activities, including dividend payments. Aramco defines free cash flow as net cash provided by operating activities less capital expenditures.

Free cash flow in 2020 was SAR 184,267 (\$49,137), compared to SAR 293,647 (\$78,305) in 2019, a decrease of SAR 109,380 (\$29,168), or 37%. This was principally due to lower earnings in 2020, resulting from lower crude oil prices, lower crude oil volumes sold and weaker refining and chemicals margins, partly offset by a decrease in settlement of income, zakat and other taxes and lower capital expenditures following the implementation of capital spending optimization and efficiency programs during the year.

All amounts in millions unless otherwise stated	SAR		USD*	
	Year ended December 31		Year ended December 31	
	2020	2019	2020	2019
Net cash provided by operating activities	285,297	416,529	76,079	111,074
Capital expenditures	(101,030)	(122,882)	(26,942)	(32,769)
Free cash flow	184,267	293,647	49,137	78,305

* Supplementary information is converted at a fixed rate of U.S. dollar 1.00 = SAR 3.75 for convenience only.

Oil markets face uncertain future after rebound from historic Covid-19 shock

17 March 2021

Based on today's policy settings, global oil demand is set to rise every year through 2026, IEA report says, but stronger policies and behaviour changes could bring a peak in demand soon

World oil markets have rebounded from the massive demand shock triggered by Covid-19 but still face a high degree of uncertainty that is testing the industry as never before, according to a [new IEA report](#).

The forecast for global oil demand has shifted lower, and demand could peak earlier than previously thought if a rising focus by governments on clean energy turns into stronger policies and behavioural changes induced by the pandemic become deeply rooted, according to *Oil 2021*, the IEA's latest annual medium-term market report. But in the report's base case, which reflects current policy settings, oil demand is set to rise to 104 million barrels a day (mb/d) by 2026, up 4% from 2019 levels.

"The Covid-19 crisis caused a historic decline in global oil demand – but not necessarily a lasting one. Achieving an orderly transition away from oil is essential to meet climate goals, but it will require major policy changes from governments as well as accelerated behavioural changes. Without that, global oil demand is set to increase every year between now and 2026," said Dr Fatih Birol, the IEA's Executive Director. "For the world's oil demand to peak anytime soon, significant action is needed immediately to improve fuel efficiency standards, boost electric vehicle sales and curb oil use in the power sector."

Those actions – combined with increased teleworking, greater recycling and reduced business travel – could reduce oil use by as much as 5.6 mb/d by 2026, which would mean that global oil demand never gets back to where it was before the pandemic.

Asia will continue to dominate growth in global oil demand, accounting for 90% of the increase between 2019 and 2026 in the IEA report's base case. By contrast, demand in many advanced economies, where vehicle ownership and oil use per capita are much higher, is not expected to return to pre-crisis levels.

On the supply side, the heightened uncertainty over the outlook has created a dilemma for producers. Investment decisions made today could either bring on too much capacity that is left unused or too little oil to meet demand. Only a marginal rise in global upstream investment is expected this year after operators spent one-third less in 2020 than planned at the start of the year.

[In the IEA report](#), the world's oil production capacity is projected to increase by 5 mb/d by 2026. At the same time, the historic collapse in demand has resulted in a spare production capacity cushion of a record 9 mb/d that could keep global markets comfortable in the near term.

To meet the growth in oil demand to 2026 in the IEA report's base case, supply needs to rise by 10 mb/d by 2026. The Middle East, led by Saudi Arabia, is expected to provide half that increase, largely from existing shut-in capacity. The region's expanding market share would mark a dramatic shift from recent years when the United States dominated growth. Based on today's policy settings, US supply growth is set to resume as investment and activity levels pick up, yet any increase is unlikely to match the lofty levels seen in recent years.

"No oil and gas company will be unaffected by clean energy transitions, so every part of the industry needs to consider how to respond as momentum builds behind the world's drive for net-zero emissions," said Dr Birol. "Minimising emissions from their core operations, notably methane, is an urgent priority. In addition, there are technologies vital to energy transitions that can be a match for oil and gas company capabilities, such as carbon capture, low-carbon hydrogen, biofuels and offshore wind. In many cases, these can help decarbonise sectors where emissions are hardest to tackle. It's encouraging to see some oil and gas companies scaling up their commitments in these areas, but much more needs to be done."

The global refining sector is struggling with excess capacity. Shutdowns of at least 6 mb/d will be required to allow utilisation rates to return to normal levels. Meanwhile, China, the Middle East and India continue to drive new capacity growth. As a result, Asian crude oil imports are forecast to surge to 27 mb/d by 2026, requiring record levels of Middle Eastern crude and Atlantic Basin production to fill the gap.

The petrochemical industry will continue to lead demand growth, with ethane, LPG and naphtha together accounting for 70% of the forecast increase in oil product demand to 2026. Gasoline demand may have peaked, though, as efficiency gains and the shift to electric vehicles offset mobility growth in emerging and developing economies.

Demand for aviation fuels, the area that was hardest hit by the pandemic, is forecast to gradually return to pre-crisis levels. But a shift to online meetings and conferences – along with persistent corporate efforts to cut costs and hesitation by some citizens to resume leisure travel – could permanently alter travel trends.

Tables

Table 1. World oil supply and demand

Table 1 WORLD OIL SUPPLY AND DEMAND (million barrels per day)																
	2019	1Q20	2Q20	3Q20	4Q20	2020	1Q21	2Q21	3Q21	4Q21	2021	2022	2023	2024	2025	2026
OECD DEMAND																
Americas	25.7	24.3	20.0	22.7	23.2	22.6	23.3	23.7	24.7	25.1	24.2	24.9	25.1	25.1	25.0	25.0
Europe	14.3	13.3	11.0	12.9	12.6	12.4	12.2	13.2	13.7	13.6	13.2	13.3	13.5	13.5	13.4	13.3
Asia Oceania	7.8	7.8	6.5	6.7	7.3	7.1	7.7	6.9	7.1	7.7	7.4	7.6	7.6	7.6	7.6	7.5
Total OECD	47.7	45.4	37.6	42.3	43.1	42.1	43.3	43.8	45.4	46.5	44.7	45.8	46.2	46.2	46.0	45.8
NON-OECD DEMAND																
FSU	4.8	4.6	4.0	4.8	4.8	4.6	4.5	4.5	4.9	4.9	4.7	4.8	4.9	5.0	5.1	5.2
Europe	0.8	0.7	0.6	0.8	0.8	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9
China	13.7	11.8	14.2	14.7	14.9	13.9	14.3	14.7	14.9	15.1	14.8	15.2	15.5	15.7	16.0	16.1
Other Asia	14.0	13.4	11.2	12.4	13.5	12.6	13.6	13.7	13.3	13.9	13.6	14.3	14.8	15.2	15.6	15.9
Latin America	6.2	5.8	4.9	5.8	5.9	5.6	5.8	5.8	6.1	6.0	5.9	6.2	6.3	6.4	6.5	6.5
Middle East	8.3	7.8	7.0	8.1	7.7	7.6	7.6	7.7	8.4	7.8	7.9	8.2	8.4	8.5	8.7	8.9
Africa	4.2	4.2	3.3	3.8	4.0	3.8	4.0	4.0	4.0	4.1	4.0	4.2	4.4	4.5	4.7	4.8
Total Non-OECD	52.0	48.3	45.3	50.4	51.7	48.9	50.7	51.1	52.3	52.7	51.7	53.7	55.0	56.1	57.2	58.3
Total Demand¹	99.7	93.8	82.9	92.7	94.7	91.0	93.9	94.9	97.7	99.2	96.5	99.4	101.2	102.3	103.2	104.1
OECD SUPPLY																
Americas	24.6	25.7	22.8	23.1	23.7	23.8	23.6	24.0	24.1	24.4	24.0	24.8	25.4	25.7	25.9	25.9
Europe	3.3	3.7	3.6	3.4	3.5	3.5	3.6	3.6	3.6	3.8	3.6	3.7	3.6	3.6	3.5	3.4
Asia Oceania	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.4
Total OECD	28.5	29.9	26.9	27.1	27.8	27.9	27.8	28.1	28.3	28.7	28.2	29.0	29.6	29.9	29.9	29.7
NON-OECD SUPPLY																
FSU	14.6	14.8	13.2	12.8	13.2	13.5	13.4	13.6	13.7	13.7	13.6	14.4	14.8	14.7	14.6	14.4
Europe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
China	3.9	4.0	4.0	4.0	3.9	4.0	4.0	4.0	3.9	3.9	3.9	3.8	3.8	3.8	3.7	3.7
Other Asia	3.3	3.2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.9	3.0	2.9	2.8	2.7	2.6	2.5
Latin America	5.3	5.6	5.1	5.4	5.2	5.3	5.4	5.6	5.6	5.6	5.6	5.7	5.9	6.0	6.4	6.7
Middle East	3.2	3.2	3.1	3.1	3.1	3.1	3.2	3.2	3.2	3.2	3.2	3.3	3.4	3.4	3.4	3.5
Africa	1.5	1.4	1.4	1.4	1.3	1.4	1.3	1.3	1.2	1.2	1.3	1.2	1.2	1.2	1.3	1.2
Total Non-OECD	32.0	32.3	30.0	29.7	29.9	30.5	30.3	30.8	30.8	30.7	30.6	31.5	32.0	32.0	32.1	32.1
Processing Gains ²	2.4	2.3	2.0	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.4	2.4	2.4	2.5	2.5
Global Biofuels	2.8	2.2	2.5	3.1	2.6	2.6	2.3	2.9	3.2	2.9	2.8	3.0	3.1	3.2	3.3	3.3
Total Non-OPEC³	65.6	66.7	61.3	61.9	62.4	63.1	62.5	63.9	64.5	64.6	63.9	66.0	67.1	67.5	67.7	67.6
OPEC																
Crude ³	29.5	28.2	25.6	24.1	24.9	25.7										
OPEC NGLs	5.4	5.4	5.2	5.1	5.2	5.2	5.2	5.3	5.3	5.3	5.3	5.5	5.5	5.6	5.6	5.7
Total OPEC³	34.9	33.6	30.8	29.2	30.0	30.9										
Total Supply	100.5	100.2	92.1	91.1	92.4	93.9										
Memo items:																
Call on OPEC crude + Stock ch. ⁴	28.7	21.7	16.4	25.7	27.2	22.8	26.2	25.7	27.9	29.3	27.3	28.0	28.6	29.2	29.9	30.8

¹ Measured as deliveries from refineries and primary stocks, comprises inland deliveries, international marine bunkers, refinery fuel, crude for direct burning, oil from non-conventional sources and other sources of supply.

² Net volumetric gains and losses in the refining process and marine transportation losses.

³ Total Non-OPEC excludes all countries that are currently members of OPEC.

Total OPEC comprises all countries which are current OPEC members.

⁴ Equals the arithmetic difference between total demand minus total non-OPEC supply minus OPEC NGLs.

Table 1a. World oil supply and demand: Changes from oil 2020

Table 1a WORLD OIL SUPPLY AND DEMAND: CHANGES FROM OIL 2020 (million barrels per day)															
	1Q19	2Q19	3Q19	4Q19	2019	1Q20	2Q20	3Q20	4Q20	2020	2021	2022	2023	2024	2025
OECD DEMAND															
Americas	-0.1	0.1	0.2	0.2	0.1	-0.8	-5.4	-3.5	-2.8	-3.1	-1.6	-0.9	-0.8	-0.7	-0.7
Europe	0.1	0.1	0.1	0.1	0.1	-0.3	-2.7	-1.6	-1.4	-1.5	-0.8	-0.8	-0.6	-0.5	-0.6
Asia Oceania	-0.1	-0.1	-0.1	-0.1	-0.1	-0.3	-0.7	-0.9	-0.7	-0.7	-0.5	-0.4	-0.3	-0.4	-0.4
Total OECD	-0.1	0.1	0.2	0.2	0.1	-1.4	-8.8	-6.0	-4.9	-5.3	-3.0	-2.1	-1.7	-1.6	-1.7
NON-OECD DEMAND															
FSU	0.0	0.0	0.1	0.1	0.1	0.0	-0.7	-0.2	-0.1	-0.2	-0.2	-0.1	0.0	0.1	0.1
Europe	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.0
China	0.1	-0.1	0.1	0.1	0.0	0.6	0.4	0.5	0.7	0.5	0.6	0.6	0.6	0.4	0.5
Other Asia	-0.3	-0.2	-0.3	-0.4	-0.3	-1.2	-3.3	-1.7	-1.3	-1.9	-1.3	-1.1	-1.0	-1.0	-1.0
Latin America	0.0	-0.1	0.0	-0.1	-0.1	-0.4	-1.4	-0.6	-0.4	-0.7	-0.4	-0.3	-0.2	-0.2	-0.1
Middle East	0.0	0.0	0.0	0.0	0.0	-0.2	-1.4	-0.9	-0.4	-0.7	-0.7	-0.5	-0.2	-0.1	0.0
Africa	-0.1	-0.1	0.0	-0.1	-0.1	-0.2	-1.1	-0.4	-0.4	-0.5	-0.4	-0.3	-0.3	-0.2	-0.2
Total Non-OECD	-0.3	-0.4	-0.3	-0.5	-0.4	-1.5	-7.6	-3.4	-2.1	-3.6	-2.5	-1.6	-1.2	-1.0	-0.8
Total Demand	-0.4	-0.3	-0.1	-0.3	-0.3	-2.9	-16.3	-9.4	-7.0	-8.9	-5.5	-3.7	-2.9	-2.6	-2.5
OECD SUPPLY															
Americas	0.0	-0.1	0.0	-0.1	-0.1	0.1	-2.9	-2.9	-2.8	-2.1	-2.9	-2.5	-2.1	-1.8	-1.6
Europe	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.3	-0.3	-0.2	-0.2	-0.1	-0.2	0.0	0.2
Asia Oceania	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total OECD	0.0	0.0	0.0	0.0	0.0	0.1	-3.0	-3.3	-3.2	-2.3	-3.1	-2.6	-2.3	-1.8	-1.5
NON-OECD SUPPLY															
FSU	0.0	0.0	0.0	0.0	0.0	0.0	-1.4	-1.8	-1.5	-1.2	-1.2	-0.5	0.1	0.1	0.1
Europe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
China	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	-0.1	-0.1	-0.1	-0.1
Other Asia	0.0	0.1	0.0	0.0	0.1	0.0	-0.2	-0.2	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0
Latin America	0.0	0.1	0.1	0.1	0.1	0.0	-0.3	-0.3	-0.5	-0.3	-0.2	0.0	-0.2	-0.4	-0.3
Middle East	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.0
Africa	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.2
Total Non-OECD	0.1	0.1	0.1	0.1	0.1	0.1	-1.9	-2.4	-2.2	-1.6	-1.6	-0.6	-0.3	-0.5	-0.6
Processing Gains	0.0	0.0	0.0	0.0	0.0	-0.1	-0.4	-0.3	-0.2	-0.3	-0.2	-0.1	-0.1	-0.1	-0.1
Global Biofuels	0.0	0.0	0.0	0.0	0.0	-0.2	-0.5	-0.2	-0.3	-0.3	-0.1	0.0	0.0	0.0	0.0
Total Non-OPEC	0.0	0.1	0.1	0.0	0.1	0.0	-5.8	-6.2	-6.0	-4.5	-5.0	-3.3	-2.6	-2.3	-2.2
OPEC															
Crude	0.0	0.0	0.0	0.0	0.0										
OPEC NGLs	0.0	-0.1	-0.1	-0.2	-0.1	-0.1	-0.4	-0.4	-0.4	-0.3	-0.3	-0.1	-0.1	-0.1	-0.1
Total OPEC	0.0	-0.1	-0.1	-0.2	-0.1										
Total Supply	0.0	0.0	0.1	-0.1	0.0										
Memo items:															
Call on OPEC crude + Stock ch.	-0.4	-0.4	-0.2	-0.2	-0.3	-2.8	-10.2	-2.7	-0.6	-4.1	-0.2	-0.3	-0.2	-0.2	-0.2

Table 1b. World oil supply and demand: WEO regions

Table 1b WORLD OIL SUPPLY AND DEMAND - WEO Regions (million barrels per day)																
	2019	1Q20	2Q20	3Q20	4Q20	2020	1Q21	2Q21	3Q21	4Q21	2021	2022	2023	2024	2025	2026
DEMAND																
North America	25.3	24.0	19.7	22.4	22.8	22.2	22.9	23.3	24.3	24.8	23.8	24.5	24.7	24.7	24.6	24.6
Central and South America	6.6	6.1	5.2	6.1	6.3	5.9	6.2	6.2	6.4	6.4	6.3	6.6	6.7	6.7	6.8	6.9
Europe	15.7	14.7	12.2	14.2	14.0	13.8	13.6	14.5	15.1	15.1	14.6	14.8	15.0	15.0	14.9	14.9
Africa	4.2	4.2	3.3	3.8	4.0	3.8	4.0	4.0	4.0	4.1	4.0	4.2	4.4	4.5	4.7	4.8
Middle East	8.3	7.8	7.0	8.1	7.7	7.6	7.6	7.7	8.4	7.8	7.9	8.2	8.4	8.5	8.7	8.9
Eurasia	4.4	4.2	3.7	4.4	4.4	4.2	4.2	4.1	4.5	4.4	4.3	4.4	4.5	4.6	4.6	4.7
Asia Pacific	35.2	32.8	31.8	33.6	35.5	33.4	35.5	35.1	35.1	36.5	35.6	36.9	37.7	38.2	38.9	39.3
Total Demand¹	99.7	93.8	82.9	92.7	94.7	91.0	93.9	94.9	97.7	99.2	96.5	99.4	101.2	102.3	103.2	104.1
NON-OPEC SUPPLY																
North America	24.6	25.7	22.8	23.1	23.7	23.8	23.5	23.9	24.1	24.4	24.0	24.8	25.4	25.7	25.9	25.9
Central and South America	5.3	5.6	5.1	5.4	5.2	5.3	5.4	5.6	5.6	5.6	5.6	5.7	5.9	6.0	6.4	6.7
Europe	3.5	3.9	3.8	3.6	3.7	3.7	3.8	3.7	3.8	3.9	3.8	3.8	3.8	3.8	3.7	3.5
Africa	1.5	1.4	1.4	1.4	1.3	1.4	1.3	1.3	1.2	1.2	1.3	1.2	1.2	1.2	1.3	1.2
Middle East	3.2	3.2	3.1	3.1	3.1	3.1	3.2	3.2	3.2	3.2	3.2	3.3	3.4	3.4	3.4	3.5
Eurasia	14.6	14.7	13.2	12.7	13.1	13.4	13.3	13.5	13.6	13.6	13.5	14.3	14.7	14.6	14.5	14.3
Asia Pacific	7.7	7.7	7.5	7.5	7.4	7.5	7.5	7.5	7.5	7.4	7.5	7.3	7.1	7.0	6.8	6.7
Total Non-OPEC	60.5	62.2	56.9	56.8	57.6	58.4	58.1	58.8	59.0	59.4	58.8	60.6	61.5	61.9	62.0	61.8
Processing Gains ²	2.4	2.3	2.0	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.4	2.4	2.4	2.5	2.5
Global Biofuels	2.8	2.2	2.5	3.1	2.6	2.6	2.3	2.9	3.2	2.9	2.8	3.0	3.1	3.2	3.3	3.3
Total Non-OPEC³	65.6	66.7	61.3	61.9	62.4	63.1	62.5	63.9	64.5	64.6	63.9	66.0	67.1	67.5	67.7	67.6
OPEC SUPPLY																
Crude ³	29.5	28.2	25.6	24.1	24.9	25.7										
OPEC NGLs	5.4	5.4	5.2	5.1	5.2	5.2	5.2	5.3	5.3	5.3	5.3	5.5	5.5	5.6	5.6	5.7
Total OPEC³	34.9	33.6	30.8	29.2	30.0	30.9										
Total Supply	100.5	100.2	92.1	91.1	92.4	93.9										
Memo items:																
Call on OPEC crude + Stock ch. ⁴	28.7	21.7	16.4	25.7	27.2	22.8	26.2	25.7	27.9	29.3	27.3	28.0	28.6	29.2	29.9	30.8

¹ Measured as deliveries from refineries and primary stocks, comprises inland deliveries, international marine bunkers, refinery fuel, crude for direct burning, oil from non-conventional sources and other sources of supply.

² Net volumetric gains and losses in the refining process and marine transportation losses.

³ Total Non-OPEC excludes all countries that are currently members of OPEC.

Total OPEC comprises all countries which are current OPEC members.

⁴ Equals the arithmetic difference between total demand minus total non-OPEC supply minus OPEC NGLs.

Table 2. Summary of global oil demand

Table 2 SUMMARY OF GLOBAL OIL DEMAND																
	2019	1Q20	2Q20	3Q20	4Q20	2020	1Q21	2Q21	3Q21	4Q21	2021	2022	2023	2024	2025	2026
Demand (mb/d)																
Americas	25.65	24.3	20.0	22.7	23.2	22.6	23.3	23.7	24.7	25.1	24.2	24.9	25.1	25.1	25.0	25.0
Europe	14.25	13.3	11.0	12.9	12.6	12.4	12.2	13.2	13.7	13.6	13.2	13.3	13.5	13.5	13.4	13.3
Asia Oceania	7.79	7.8	6.5	6.7	7.3	7.1	7.7	6.9	7.1	7.7	7.4	7.6	7.6	7.6	7.6	7.5
Total OECD	47.70	45.4	37.6	42.3	43.1	42.1	43.3	43.8	45.4	46.5	44.7	45.8	46.2	46.2	46.0	45.8
Asia	27.66	25.3	25.5	27.1	28.4	26.6	28.0	28.4	28.2	29.1	28.4	29.5	30.3	30.9	31.6	32.1
Middle East	8.32	7.8	7.0	8.1	7.7	7.6	7.6	7.7	8.4	7.8	7.9	8.2	8.4	8.5	8.7	8.9
Latin America	6.23	5.8	4.9	5.8	5.9	5.6	5.8	5.8	6.1	6.0	5.9	6.2	6.3	6.4	6.5	6.5
FSU	4.78	4.6	4.0	4.8	4.8	4.6	4.5	4.5	4.9	4.9	4.7	4.8	4.9	5.0	5.1	5.2
Africa	4.24	4.2	3.3	3.8	4.0	3.8	4.0	4.0	4.0	4.1	4.0	4.2	4.4	4.5	4.7	4.8
Europe	0.77	0.7	0.6	0.8	0.8	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9
Total Non-OECD	52.01	48.3	45.3	50.4	51.7	48.9	50.7	51.1	52.3	52.7	51.7	53.7	55.0	56.1	57.2	58.3
World	99.70	93.8	82.9	92.7	94.7	91.0	93.9	94.9	97.7	99.2	96.5	99.4	101.2	102.3	103.2	104.1
of which:																
USA	20.86	19.7	16.4	18.7	19.0	18.4	19.0	19.3	20.0	20.4	19.7	20.3	20.5	20.5	20.4	20.4
Euro5*	8.15	7.6	6.0	7.1	7.0	6.9	6.7	7.5	7.7	7.8	7.4	7.5	7.6	7.6	7.5	7.5
China	13.68	11.8	14.2	14.7	14.9	13.9	14.3	14.7	14.9	15.1	14.8	15.2	15.5	15.7	16.0	16.1
Japan	3.65	3.7	2.9	3.0	3.5	3.3	3.8	3.1	3.2	3.7	3.5	3.5	3.5	3.5	3.5	3.4
India	4.99	4.9	3.9	4.3	5.0	4.5	5.1	5.1	4.7	5.1	5.0	5.1	5.3	5.4	5.5	5.7
Russia	3.58	3.5	3.1	3.6	3.6	3.5	3.4	3.4	3.7	3.6	3.5	3.6	3.6	3.7	3.7	3.7
Brazil	3.08	2.9	2.6	3.0	3.1	2.9	2.9	2.9	3.0	3.1	3.0	3.1	3.1	3.2	3.2	3.2
Saudi Arabia	3.08	2.9	2.7	3.3	3.0	3.0	2.8	3.0	3.3	2.9	3.0	3.1	3.2	3.2	3.2	3.3
Korea	2.55	2.5	2.4	2.3	2.4	2.4	2.5	2.4	2.4	2.5	2.5	2.5	2.6	2.6	2.6	2.6
Canada	2.37	2.3	1.9	2.2	2.0	2.1	2.1	2.1	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3
Mexico	2.05	2.0	1.5	1.6	1.7	1.7	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Iran	1.98	1.9	1.7	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.9	1.9	2.0	2.0	2.0
Total	70.02	65.8	59.3	65.5	67.1	64.4	66.4	67.3	69.1	70.3	68.3	70.1	71.0	71.4	71.8	72.1
% of World	70.23	70.2	71.5	70.7	70.9	70.8	70.7	70.8	70.7	70.9	70.8	70.5	70.2	69.8	69.6	69.3
Annual Change (% per annum)																
Americas	-3.7	-21.4	-12.7	-10.3	-12.1		-4.3	18.4	8.5	8.5	7.2	2.8	0.8	0.0	-0.3	-0.2
Europe	-4.9	-22.3	-12.5	-10.9	-12.6		-8.3	19.5	6.2	8.7	5.9	0.9	1.2	0.1	-0.8	-0.6
Asia Oceania	-5.7	-11.7	-11.4	-8.1	-9.1		-0.2	5.9	6.5	4.7	4.1	2.9	0.4	-0.2	-0.5	-0.5
Total OECD	-4.4	-20.2	-12.4	-10.1	-11.8		-4.8	16.5	7.5	7.9	6.3	2.2	0.9	0.0	-0.5	-0.4
Asia	-7.7	-8.2	-1.1	0.9	-4.0		10.8	11.6	4.1	2.4	7.0	3.9	2.5	2.0	2.2	1.6
Middle East	-3.9	-14.4	-7.0	-7.3	-8.1		-2.5	10.4	3.1	1.1	2.9	3.6	2.7	1.7	1.6	2.7
Latin America	-6.1	-21.1	-8.2	-5.2	-10.1		0.7	18.5	4.7	1.8	5.9	4.3	1.7	1.3	1.4	1.1
FSU	1.4	-14.0	-3.7	-1.6	-4.5		-1.6	12.6	2.9	1.2	3.5	1.5	2.6	2.0	1.3	2.3
Africa	-2.6	-22.5	-7.1	-6.1	-9.6		-3.2	19.3	3.0	2.6	4.7	5.0	3.6	3.2	3.2	2.8
Europe	-0.9	-21.0	-3.0	-1.6	-6.7		0.0	18.4	3.0	1.5	5.1	5.2	2.4	2.1	1.9	1.8
Total Non-OECD	-5.6	-12.6	-3.7	-2.0	-5.9		4.9	12.9	3.8	2.0	5.7	3.8	2.5	2.0	2.0	1.9
World	-5.0	-16.2	-7.9	-5.8	-8.7		0.2	14.6	5.5	4.7	6.0	3.1	1.8	1.1	0.9	0.9
Annual Change (mb/d)																
Americas	-0.9	-5.5	-3.3	-2.7	-3.1		-1.1	3.7	1.9	2.0	1.6	0.7	0.2	0.0	-0.1	0.0
Europe	-0.7	-3.2	-1.8	-1.5	-1.8		-1.1	2.2	0.8	1.1	0.7	0.1	0.2	0.0	-0.1	-0.1
Asia Oceania	-0.5	-0.9	-0.9	-0.6	-0.7		0.0	0.4	0.4	0.3	0.3	0.2	0.0	0.0	0.0	0.0
Total OECD	-2.1	-9.5	-6.0	-4.8	-5.6		-2.2	6.2	3.2	3.4	2.7	1.0	0.4	0.0	-0.2	-0.2
Asia	-2.1	-2.3	-0.3	0.3	-1.1		2.7	3.0	1.1	0.7	1.9	1.1	0.7	0.6	0.7	0.5
Middle East	-0.3	-1.2	-0.6	-0.6	-0.7		-0.2	0.7	0.3	0.1	0.2	0.3	0.2	0.1	0.1	0.2
Latin America	-0.4	-1.3	-0.5	-0.3	-0.6		0.0	0.9	0.3	0.1	0.3	0.3	0.1	0.1	0.1	0.1
FSU	0.1	-0.7	-0.2	-0.1	-0.2		-0.1	0.5	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1
Africa	-0.1	-1.0	-0.3	-0.3	-0.4		-0.1	0.6	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1
Europe	0.0	-0.2	0.0	0.0	-0.1		0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Non-OECD	-2.8	-6.5	-1.9	-1.0	-3.1		2.4	5.9	1.9	1.0	2.8	2.0	1.4	1.1	1.1	1.1
World	-4.9	-16.0	-7.9	-5.9	-8.7		0.2	12.1	5.1	4.4	5.4	3.0	1.8	1.1	0.9	0.9
Revisions to Oil Demand from Last Medium Term Report (mb/d)																
Americas	-0.8	-5.4	-3.5	-2.8	-3.1		-2.5	-2.1	-1.1	-0.6	-1.6	-0.9	-0.8	-0.7	-0.7	
Europe	-0.3	-2.7	-1.6	-1.4	-1.5		-1.8	-0.8	-0.4	-0.4	-0.8	-0.8	-0.6	-0.5	-0.6	
Asia Oceania	-0.3	-0.7	-0.9	-0.7	-0.7		-0.2	-1.0	-0.8	-0.2	-0.5	-0.4	-0.3	-0.4	-0.4	
Total OECD	-1.4	-8.8	-6.0	-4.9	-5.3		-4.5	-3.9	-2.3	-1.3	-3.0	-2.1	-1.7	-1.6	-1.7	
Asia	-0.6	-2.9	-1.3	-0.7	-1.4		-1.2	-0.8	-1.0	-0.1	-0.8	-0.5	-0.4	-0.5	-0.5	
Middle East	-0.2	-1.4	-0.9	-0.4	-0.7		-1.0	-0.9	-0.2	-0.7	-0.7	-0.5	-0.2	-0.1	0.0	
Latin America	-0.4	-1.4	-0.6	-0.4	-0.7		-0.6	-0.6	-0.3	-0.3	-0.4	-0.3	-0.2	-0.2	-0.1	
FSU	0.0	-0.7	-0.2	-0.1	-0.2		-0.3	-0.4	0.0	0.0	-0.2	-0.1	0.0	0.1	0.1	
Africa	-0.2	-1.1	-0.4	-0.4	-0.5		-0.4	-0.5	-0.5	-0.3	-0.4	-0.3	-0.3	-0.2	-0.2	
Europe	0.0	-0.2	-0.1	-0.1	-0.1		-0.1	-0.1	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	
Total Non-OECD	-1.5	-7.6	-3.4	-2.1	-3.6		-3.6	-3.1	-1.9	-1.5	-2.5	-1.6	-1.2	-1.0	-0.8	
World	-2.9	-16.3	-9.4	-7.0	-8.9		-8.0	-7.0	-4.2	-2.8	-5.5	-3.7	-2.9	-2.6	-2.5	
Revisions to Oil Demand Growth from Last Medium Term Report (mb/d)																
World	-2.5	-16.0	-9.3	-6.7	-8.6		-5.1	9.3	5.1	4.2	3.4	1.8	0.8	0.2	0.1	

* France, Germany, Italy, Spain and UK

Table 3. World oil production

Table 3 WORLD OIL PRODUCTION (million barrels per day)																
	2019	1Q20	2Q20	3Q20	4Q20	2020	1Q21	2Q21	3Q21	4Q21	2021	2022	2023	2024	2025	2026
OPEC																
Crude Oil																
Saudi Arabia	9.80	9.77	9.31	8.78	8.99	9.21										
Iran	2.36	2.02	1.95	1.96	2.00	1.98										
Iraq	4.71	4.57	4.13	3.69	3.81	4.05										
UAE	3.18	3.23	2.87	2.84	2.51	2.86										
Kuwait	2.68	2.73	2.42	2.25	2.30	2.42										
Angola	1.39	1.39	1.26	1.24	1.18	1.27										
Nigeria	1.73	1.73	1.57	1.37	1.31	1.49										
Libya	1.09	0.33	0.08	0.11	0.89	0.35										
Algeria	1.02	1.02	0.87	0.84	0.86	0.90										
Congo	0.33	0.30	0.31	0.30	0.28	0.30										
Gabon	0.21	0.19	0.21	0.19	0.20	0.20										
Equatorial Guinea	0.11	0.12	0.11	0.11	0.11	0.11										
Venezuela	0.87	0.77	0.52	0.40	0.42	0.53										
Total Crude Oil	29.49	28.18	25.61	24.10	24.86	25.68										
Total NGLs¹	5.41	5.40	5.16	5.08	5.16	5.20	5.20	5.29	5.30	5.30	5.27	5.47	5.49	5.56	5.62	5.66
Total OPEC²	34.90	33.57	30.77	29.17	30.02	30.88										
NON-OPEC³																
OECD																
Americas	24.65	25.66	22.77	23.13	23.72	23.82	23.56	23.95	24.10	24.38	24.00	24.83	25.41	25.74	25.90	25.92
United States	17.16	17.96	15.87	16.25	16.20	16.57	15.88	16.54	16.52	16.61	16.39	17.01	17.56	17.89	18.12	18.20
Mexico	1.93	2.00	1.92	1.91	1.90	1.93	1.92	1.92	1.91	1.92	1.92	1.97	1.92	1.80	1.72	1.67
Canada	5.54	5.70	4.96	4.96	5.61	5.31	5.75	5.49	5.66	5.84	5.69	5.84	5.92	6.04	6.04	6.04
Chile	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Europe	3.33	3.69	3.57	3.40	3.51	3.54	3.65	3.55	3.62	3.75	3.64	3.66	3.64	3.64	3.54	3.38
UK	1.13	1.15	1.12	0.96	1.01	1.06	1.02	0.96	1.00	1.06	1.01	0.98	0.92	0.88	0.83	0.78
Norway	1.74	2.04	2.00	1.95	2.01	2.00	2.15	2.11	2.15	2.22	2.16	2.22	2.27	2.31	2.28	2.17
Others	0.46	0.50	0.45	0.49	0.49	0.48	0.48	0.48	0.48	0.47	0.48	0.46	0.45	0.44	0.43	0.42
Asia Oceania	0.53	0.53	0.54	0.54	0.52	0.53	0.55	0.56	0.56	0.56	0.56	0.54	0.51	0.48	0.45	0.43
Australia	0.46	0.46	0.47	0.47	0.46	0.46	0.48	0.49	0.49	0.49	0.49	0.48	0.45	0.42	0.40	0.37
Others	0.07	0.07	0.07	0.07	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06
Total OECD	28.51	29.89	26.88	27.06	27.76	27.89	27.75	28.07	28.28	28.69	28.20	29.04	29.57	29.87	29.89	29.72
NON-OECD																
Former USSR	14.64	14.79	13.24	12.78	13.19	13.50	13.41	13.61	13.71	13.73	13.62	14.42	14.76	14.72	14.61	14.39
Russia	11.58	11.64	10.35	10.08	10.37	10.61	10.52	10.75	10.81	10.82	10.72	11.42	11.70	11.56	11.43	11.28
Others	3.06	3.15	2.89	2.71	2.83	2.89	2.88	2.87	2.90	2.91	2.89	3.00	3.05	3.17	3.18	3.11
Asia	7.19	7.18	6.97	6.96	6.92	7.01	6.97	6.97	6.90	6.83	6.92	6.74	6.62	6.51	6.36	6.23
China	3.92	3.99	3.98	3.98	3.93	3.97	3.96	3.99	3.93	3.88	3.94	3.84	3.83	3.80	3.75	3.70
Malaysia	0.67	0.67	0.56	0.58	0.60	0.60	0.64	0.66	0.67	0.67	0.66	0.68	0.66	0.65	0.63	0.57
India	0.80	0.77	0.74	0.75	0.74	0.75	0.74	0.73	0.73	0.72	0.73	0.71	0.69	0.70	0.66	0.63
Indonesia	0.77	0.75	0.74	0.72	0.74	0.74	0.71	0.70	0.69	0.69	0.70	0.67	0.64	0.61	0.59	0.60
Others	1.03	0.99	0.95	0.92	0.92	0.95	0.92	0.90	0.88	0.88	0.89	0.85	0.79	0.75	0.74	0.73
Europe	0.12	0.12	0.11	0.11	0.11	0.11	0.11	0.11	0.10	0.10	0.11	0.10	0.09	0.08	0.08	0.07
Latin America²	5.34	5.62	5.11	5.40	5.20	5.33	5.37	5.61	5.60	5.63	5.55	5.70	5.88	6.03	6.35	6.73
Brazil	2.90	3.15	3.01	3.14	2.89	3.05	3.02	3.26	3.27	3.31	3.21	3.37	3.48	3.64	3.93	4.21
Argentina	0.65	0.65	0.58	0.60	0.60	0.61	0.61	0.62	0.62	0.62	0.62	0.63	0.65	0.67	0.69	0.71
Colombia	0.89	0.88	0.76	0.75	0.76	0.79	0.76	0.76	0.75	0.74	0.75	0.71	0.66	0.62	0.57	0.53
Ecuador	0.53	0.54	0.35	0.52	0.51	0.48	0.53	0.53	0.53	0.53	0.53	0.51	0.48	0.45	0.43	0.40
Others	0.37	0.41	0.40	0.40	0.43	0.41	0.45	0.44	0.44	0.43	0.44	0.48	0.61	0.65	0.74	0.87
Middle East²	3.18	3.17	3.13	3.08	3.13	3.13	3.16	3.18	3.20	3.21	3.19	3.31	3.38	3.39	3.40	3.46
Oman	0.98	1.01	0.95	0.92	0.95	0.96	0.96	0.98	1.00	1.00	0.98	1.08	1.14	1.14	1.14	1.14
Qatar	1.89	1.86	1.89	1.88	1.89	1.88	1.90	1.90	1.91	1.91	1.91	1.93	1.95	1.97	1.98	2.05
Syria	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Yemen	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Others	0.21	0.19	0.18	0.17	0.18	0.18	0.18	0.19	0.19	0.19	0.19	0.19	0.18	0.17	0.17	0.16
Africa²	1.48	1.43	1.41	1.37	1.33	1.38	1.32	1.27	1.22	1.23	1.26	1.25	1.24	1.24	1.26	1.24
Egypt	0.63	0.62	0.61	0.59	0.57	0.60	0.56	0.56	0.55	0.54	0.55	0.52	0.50	0.47	0.45	0.42
Sudan	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04
Others	0.78	0.75	0.75	0.71	0.70	0.73	0.70	0.65	0.61	0.63	0.65	0.66	0.69	0.72	0.76	0.77
Total Non-OECD	31.95	32.31	29.98	29.70	29.89	30.46	30.34	30.75	30.75	30.72	30.64	31.52	31.97	31.98	32.07	32.13
Processing Gains ⁴	2.35	2.26	1.98	2.10	2.13	2.12	2.11	2.20	2.30	2.29	2.22	2.38	2.41	2.44	2.46	2.49
Global Biofuels	2.78	2.20	2.49	3.06	2.58	2.58	2.32	2.93	3.21	2.86	2.83	3.03	3.14	3.23	3.28	3.30
TOTAL NON-OPEC²	65.60	66.65	61.33	61.92	62.35	63.06	62.52	63.94	64.54	64.56	63.90	65.96	67.07	67.52	67.70	67.64
TOTAL SUPPLY	100.50	100.23	92.09	91.09	92.37	93.93										

1 Includes condensates and oil from non-conventional sources.

2 Total OPEC comprises all countries which are currently OPEC members.

Total Non-OPEC excludes all countries that are current members of OPEC.

3 Comprises crude oil, condensates, NGLs and oil from non-conventional sources.

4 Net volumetric gains and losses in refining and marine transportation losses.

Table 3a. Selected upstream project start-ups

Table 3a SELECTED UPSTREAM PROJECT START-UPS							
Country	Project	Peak Capacity (kbd)	Start Year	Country	Project	Peak Capacity (kbd)	Start Year
NON-OPEC							
OECD Americas							
USA	Atlantis North	40	2020	China	Luda 05-2N (Bo) 2	20	2021
USA	Thunder Horse South ph 2	50	2021	China	Mahu	20	2021
USA	Mad Dog ph 2	120	2022	China	Penglai 9-1/15-2	90	2022
USA	Vito	100	2021	China	Caofeidian 06-4	30	2023
USA	Kings Quay	80	2022	China	Liuhua 21-2	20	2023
USA	Anchor	75	2024	China	Qinhuangdao 29-2/29-2E	50	2023
Mexico	Hokchi	35	2021	China	Shidong 1	20	2024
Mexico	Ixachi	80	2021	China	Laxi	20	2024
Mexico	Amoca	55	2021	China	Jinhuazhen	30	2025
Mexico	Tecoalli	10	2024	India	KG-DWN-98/2	50	2023
Mexico	Zama	150	2024	Vietnam	Lac Da Vang	55	2024
OECD Europe							
Italy	Tempa Rossa	50	2020	FSU			
Norway	Njord/Bauge	30	2021	Russia	Rospan	100	2020
Norway	Yme Redevelopment	35	2021	Russia	Lodochnoe	40	2021
Norway	Martin Linge	40	2021	Russia	Chonsky	50	2025
Norway	Snorre Expansion Project	80	2020	Azerbaijan	Azeri Central East (ACE)	100	2023
Norway	Ærifuyl ph 1 & ph 2	35	2020	Kazakhstan	Tengizchevroil FGP	260	2022
Norway	Fenja	25	2022	Latin America			
Norway	Johan Sverdrup ph 2	220	2022	Brazil	Atapu (P-70)	150	2020
Norway	Johan Castberg	170	2023	Brazil	Sepia	180	2021
Norway	Balder X	50	2022	Brazil	Mero 1 (Guanabara)	180	2021
UK	Seagull	50	2023	Brazil	Buzios 5 (Almirante Barroso)	150	2026
UK	Penguin	45	2022	Brazil	Marlim redevelopment (Module 1)	80	2023
Africa							
Ghana	Mahogany-Teak-Akasa (MTAB)	30	2023	Brazil	Parque das Baleeias	100	2024
Senegal	Sangomar ph 1 (SNE)	100	2024	Brazil	Mero 2 (Sepetiba)	180	2023
Mauritania	Greater Tortue Ahmeyim FLNG	10	2022	Brazil	Mero 3	70	2023
Mozambique	Inhassaro	10	2023	Brazil	Marlim redevelopment (Module 2)	120	2023
Mozambique	Coral FLNG	10	2024	Brazil	Itapu	180	2024
Asia							
China	Liuhua16-2/20-2/23-1	35	2020	Brazil	Mero 4	180	2025
China	Shunbei	25	2020	Guyana	Liza ph 2	220	2022
China	Luda 21-2/16-3	30	2020	Guyana	Paraya	220	2024
Middle East							
				Guyana	Other	190	2026
				Oman	Ghazeer	50	2020
				Qatar	North Field Expansion	100	2025
OPEC							
Angola	Kaomba (Phase 2)	115	2019	Saudi	Marjan Expansion	300	2025
Angola	Agogo (Phase 1)	20	2020	Saudi	Berri Expansion	250	2024
Angola	Zinia 2, Clov 2, Dalia 3	110	2021-22	Iran	South Pars 22-24 (condensate)	75	2019
Kuwait	Ratqa	270	2020	Iraq (KRG)	Sarta	20	2020
Neutral Zone	Khafji (restart)	260	2020	UAE	Nasr (Phase 2)	40	2019
Neutral Zone	Wafra (restart)	240	2020	UAE	Haliba	40	2019
Nigeria	Egina	200	2019	UAE	Bab Expansion	30	2020
Nigeria	Anyala	60	2020	UAE	Upper Zakum (Phase 2)	1000	2022

Table 3b. Non-OPEC supply – Oil Market report and WEO definitions

Table 3b									
NON-OPEC SUPPLY - OIL MARKET REPORT AND WEO DEFINITIONS									
(million barrels per day)									
Calculation	2019	2020	2021	2022	2023	2024	2025	2026	
Medium Term Oil Market Report definitions									
NON-OPEC SUPPLY	65.6	63.1	63.9	66.0	67.1	67.5	67.7	67.6	
Processing gains	2.4	2.1	2.2	2.4	2.4	2.4	2.5	2.5	
Global biofuels	2.8	2.6	2.8	3.0	3.1	3.2	3.3	3.3	
NON-OPEC PRODUCTION (excl. processing gains and biofuels)	1	60.5	58.4	58.8	60.6	61.5	61.9	62.0	61.8
Crude	2	50.2	47.8	48.2	49.7	50.5	50.7	50.7	50.4
of which: Condensate	3	4.0	4.0	4.2	4.3	4.3	4.3	4.3	4.4
Tight oil	4	8.2	7.9	7.8	8.0	8.5	8.8	9.0	9.2
Un-upgraded bitumen	5	3.7	3.4	4.0	4.4	4.5	4.7	4.7	4.7
NGLs	6	8.3	8.6	8.6	8.8	9.0	9.1	9.2	9.3
Syncrude (Canada)	7	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
CTL, GTL, kerogen oil and additives ¹	8	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8
World Energy Outlook definitions									
NON-OPEC PRODUCTION (excl. processing gains and biofuels)	=1	60.5	58.4	58.8	60.6	61.5	61.9	62.0	61.8
Conventional		46.6	45.0	45.0	46.1	46.5	46.2	46.1	45.8
Crude oil	=2-3-4-5	34.3	32.5	32.2	33.0	33.3	32.9	32.6	32.1
Natural gas liquids (total)	=3+6	12.3	12.5	12.8	13.1	13.2	13.4	13.5	13.7
Unconventional		13.8	13.3	13.8	14.5	15.0	15.6	15.9	16.0
EHOB (incl. syncrude) ²	=5+7	5.0	4.7	5.4	5.7	5.8	6.0	6.0	6.0
Tight oil	=4	8.2	7.9	7.8	8.0	8.5	8.8	9.0	9.2
CTL, GTL, kerogen oil and additives ¹	=8	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8

¹ CTL = coal to liquids; GTL = gas to liquids.

² Extra-heavy oil and bitumen

Table 4. World refinery capacity additions

Table 4 WORLD REFINERY CAPACITY ADDITIONS (thousand barrels per day)								
	2020	2021	2022	2023	2024	2025	2026	Total
Refining Capacity Additions and Expansions¹								
OECD Americas	-338	-203	50	250	340			99
OECD Europe	-234	-242	-120					-596
OECD Asia Oceania		-466	-120	-109				-694
FSU		50	30		30			110
Non-OECD Europe	-44							-44
China	204	266	190	500		400		1,560
Other Asia	14	225	-60	446	100	630	290	1,644
Latin America			33	15			-36	12
Middle East	520	230	610	340	140	-20	60	1,880
Africa		10	650	30	150		100	940
Total World	121	-129	1,263	1,472	760	1,010	414	4,911
Upgrading Capacity Additions²								
OECD Americas	-205	-308		32				-481
OECD Europe	-48	-75	-14	22		-1		-116
OECD Asia Oceania		-113		-36				-149
FSU	30	270	45	42	292	94	152	925
Non-OECD Europe	38			20				58
China	131	277	143	290				841
Other Asia	-8	160	80	264	66	35	182	779
Latin America			29					29
Middle East	253		100	275	108	45		781
Africa			10	240	25		70	345
Total World	191	212	393	1,149	491	172	404	2,821
Desulphurisation Capacity Additions³								
OECD Americas	-293	-357						-650
OECD Europe	-64	-168			38			-194
OECD Asia Oceania	37	-315		-43				-321
FSU	156	35			70	130		391
Non-OECD Europe								
China	292	344	18	290				944
Other Asia	159	112		100	150		342	863
Latin America			64				-37	27
Middle East	547	180	658	430	113	54		1,982
Africa				210				210
Total World	834	-169	740	987	371	184	306	2,418

¹ Comprises new refinery projects or expansions to existing facilities including condensate splitter additions. Assumes zero capacity creep.

² Comprises gross capacity additions to coking, hydrocracking, residue hydrocracking, visbreaking, FCC or RFCC capacity.

³ Comprises additions to hydrotreating and hydrodesulphurisation capacity.

Table 4a. World refinery capacity additions changes from oil 2020

Table 4a							
WORLD REFINERY CAPACITY ADDITIONS							
CHANGES FROM OIL 2020							
(thousand barrels per day)							
	2020	2021	2022	2023	2024	2025	Total
Refining Capacity Additions and Expansions¹							
OECD Americas	-318	-253		-35			-606
OECD Europe	-274	-242	-120				-636
OECD Asia Oceania		-351	-120	-109			-579
FSU		50	-70				-20
Non-OECD Europe							
China	-106	36	190	-300	-320	300	-200
Other Asia	-148	75	-180	-220	-60	630	97
Latin America				15			15
Middle East	-50	230	615		-615		180
Africa		10	-25	30	90	-100	5
Total World	-896	-444	290	-619	-905	830	-1,744
Upgrading Capacity Additions²							
OECD Americas	-205	-308		-26			-539
OECD Europe	-48	-75	-65	2		-1	-187
OECD Asia Oceania		-86		-36		36	-86
FSU	-120	50			70	36	36
Non-OECD Europe							
China	-96	170	143	-140	-227	-50	-200
Other Asia	-22		-50	-18			-90
Latin America							
Middle East			100		-100		
Africa							
Total World	-491	-248	128	-218	-257	21	-1,066
Desulphurisation Capacity Additions³							
OECD Americas	-310	-367					-677
OECD Europe	-64	-168					-232
OECD Asia Oceania		-226		-43		43	-226
FSU		15			70	50	135
Non-OECD Europe							
China	12	290	18	-210	-60	-80	-30
Other Asia	-78	-51		-26	-80		-235
Latin America							
Middle East	-60	60	658	93	-626	27	152
Africa				10			10
Total World	-500	-447	676	-176	-696	40	-1,102

¹ Comprises new refinery projects or expansions to existing facilities including condensate splitter additions. Assumes zero capacity creep.

² Comprises stand-alone additions to coking, hydrocracking or FCC capacity. Excludes upgrading additions counted under 'Refinery Capacity Additions and Expansions' category.

³ Comprises stand-alone additions to hydrotreating and hydrodesulphurisation capacity. Excludes desulphurisation additions counted under 'Refinery Capacity Additions and Expansions' category.

Table 4b. Selected refinery crude distillation project list

Table 4b SELECTED REFINERY CRUDE DISTILLATION PROJECT LIST							
Country	Project	Capacity (kbd)	Start Year	Country	Project	Capacity (kbd)	Start Year
OECD Americas				FSU			
United States	Delek - Krotz Springs	-80	2020	Russia	Ilsk Refinery - Krasnodarskiy Kray	50	2021
United States	Marathon - martinez	-166	2020	Africa			
United States	Meridian Resources - Davis North Dakota	50	2021	Nigeria	Dangote Oil Refining Company - Lekki Free Trade Zone (Lagos)	650	2022
United States	PBF Energy - Paulsboro	-80	2021	Egypt	MIDOR - Alexandria	60	2024
United States	ConocoPhillips - Rodeo & Santa Maria	-145	2021	Congo	Beijing Fortune Dingsheng - Pointe Noire	50	2024
United States	Shell - Convent	-228	2021	Algeria	Sonatrach - Hassi Messoud	100	2026
Virgin Islands	Archlight Capital - St. Croix	200	2021	Asia			
United States	GCC - Galveston	50	2022	China	Sinopec - Zhanjiang	200	2020
United States	ExxonMobil - Beaumont	250	2023	China	Zhuohai Huafeng - Zhuohai	100	2020
Mexico	Petroleos Mexicanos - Dos Bocas	340	2024	China	Sinochem - Quanzhou	60	2020
OECD Europe				China	Binyang Fuel Chemical - Binzhou	-50	2020
Belgium	Gurvor - Antwerp	-88	2020	China	Yuhuang Shengshi - Heze	-60	2020
Netherlands	Gurvor - Rotterdam	-81	2020	India	HPCL - Mahul, Mumbai	60	2020
United Kingdom	INEOS - Grangemouth	-65	2020	Philippines	Shell - Tabangao	-93	2020
Finland	Neste - Naantali	-52	2021	China	Rongsheng Petrochemical - Zhoushan island phase 2	400	2021
France	Total - Grandpuits	-99	2021	India	HPCL - Visakhapatnam	150	2021
Portugal	Galp Energia - Leca da Palmeira, Porto	-91	2021	China	Shenghong Petrochem - Lianyungang	320	2022
Italy	ENI - Livorno	-120	2022	China	Yongxin - Binzhou	-60	2022
OECD Asia Oceania				China	Hengyuan - Dezhou	-70	2022
New Zealand	New Zealand Refining Co. Ltd. - Marsden Point, Northland	-129	2021	Singapore	Shell - Pulau Bukom	-200	2022
Japan	JX Energy - Osaka	-115	2021	China	PetroChina - Jieyang	400	2023
Australia	Exxonmobil - Altona	-78	2021	China	Sinopec - Yangpu	100	2023
Australia	BP - Kwinana	-144	2021	India	Nagarjuna Oil Co - Cuddalore	120	2023
Japan	JX Energy - Negishi	-120	2022	India	Indian Oil - Koyali	100	2023
Australia	Caltex Australia - Lytton	-109	2023	India	Indian Oil - Barauni	60	2023
Middle East				Thailand	Thai Oil Co. - Sriracha	126	2023
Kuwait	Kuwait National Petroleum Co. - Mina Abdulla	200	2020	Indonesia	Pertamina - Balikpapan, Kalimantan	100	2024
Kuwait	Kuwait National Petroleum Co. - Mina al-Ahmadi	-115	2020	China	Yulong Petrochemical - Yantai	400	2025
Saudi Arabia	Saudi Aramco - Jizan	400	2020	Brunei	Zhejiang Hengyi Petrochemicals - Pulau Muara Besar	280	2025
Iraq	INOC-NOR - Baiji	70	2021	India	Indian Oil - Panipat	200	2025
Iraq	INOC-SOR - Basra	70	2021	Malaysia	ChemChina - Pengerang	150	2025
United Arab Emirates	ENOC - Jebel Ali	65	2021	Bangladesh	BPC - Chittagong	60	2026
Iran	National Iranian Oil Co. - Abadan	200	2022	India	HPCL - Barmer, Rajasthan	180	2026
Iran	National Iranian Oil Co. - Abadan	-235	2022	Indonesia	Pertamina - Cilacap, Central Java	50	2026
Kuwait	Kuwait National Petroleum Co. - Al-Zour	615	2022				
Bahrain	Bahrain Petroleum Co. - Sitra	355	2023				
Bahrain	Bahrain Petroleum Co. - Sitra	-265	2023				
Oman	Oman Refinery Co. - Duqm	230	2023				
Iraq	INOC-ORA - Karbala	140	2024				
United Arab Emirates	ADNOC - Umm-al-Nar	-85	2025				
Iran	National Iranian Oil Co. - Siraf (Assaluyeh)	60	2026				

Note: Only includes refinery capacity changes (additions or closures) above 50 kbd.

Bloomberg @TheTerminal

India's Oil Refining Capacity to Grow 77% by 2030: Oil Ministry

2021-03-18 07:51:41.486 GMT

By Debjit Chakraborty

(Bloomberg) -- India's crude oil refining capacity is expected to reach 443 million tons/year by 2030, which will boost the nation's oil demand going forward, Sunil Kumar, a senior official with the oil ministry, said at an industry event on Thursday.

* NOTE: India's current refining capacity is at 250.2 million tons/year, according to the Petroleum Planning & Analysis Cell

* The new capacity addition includes the proposed 60 million tons/year mega refinery on India's west coast

** India's oil demand is expected to rise to 8.7 million barrels/day or about 435 million tons/year by 2030 from 4.4 million barrels now, according to Kumar, who's the joint secretary of refinery at the Ministry of Petroleum and Natural Gas

** Most of the new refining capacity will include petrochemical plants to meet India's growing demand

*** Petrochemical intensity of Indian refineries to double to 7% by 2030, expanding petrochemicals exposure to 15%-20%

*** While demand for gasoline and diesel will continue until at least 2040, greater growth will come from petrochemical products

** India needs large-scale infrastructure for importing feedstock for petrochemicals as well as augment local production

* India's demand-supply gap for petrochemical products is expected to widen going ahead as requirement rises, Ajay Shah, president of polymer chain at Reliance Industries, said at the same event

** This will require India to build a world-scale cracker every year

* READ: Top India Refiner Betting on Plastics to Cushion Fuel Shocks (1)

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Crude Oil in Floating Storage Falls 3.3% in Past Week: Vortexa
2021-03-15 08:00:06.84 GMT

By Bloomberg Automation

(Bloomberg) -- The amount of crude oil held around the world on tankers that have been stationary for at least 7 days fell to 102.52m bbl as of March 12, Vortexa data show.

* That's down 3.3% from 105.98m bbl on March 5

* Asia Pacific down 16% w/w to 63.52m bbl

* Middle East up 77% w/w to 10.10m bbl; highest since August

* Europe down 12% w/w to 9.88m bbl

* U.S. Gulf Coast up 14% w/w to 6.44m bbl; highest since July

* North Sea down 36% w/w to 3.18m bbl

* West Africa up 118% w/w to 2.87m bbl

* Company Exposure:

** Asia: Cosco Shipping Energy Transportation Co., HMM Co. Ltd., Mitsui O.S.K. Lines Ltd., Nippon Yusen KK

** Europe: Euronav NV, Frontline, Vopak

** U.S.: DHT Holdings, International Seaways, Nordic American Tankers, Teekay Tankers, Tsakos Energy Navigation

* NOTE:

** Vortexa data exclude FPSO units, oil products and Iranian condensate

** Crude oil transferred by STS isn't included until that volume has been stationary on receiving vessel for 7 days

** Data don't include vessels booked for floating storage until they are actually stationary for the minimum period

** See VTXA or DATA FLOAT for more data, which is subject to revisions, and see NI TANTRA for all tanker-tracking stories

** See SPOT FREIGHT for freight rate assessments using shipbroker data

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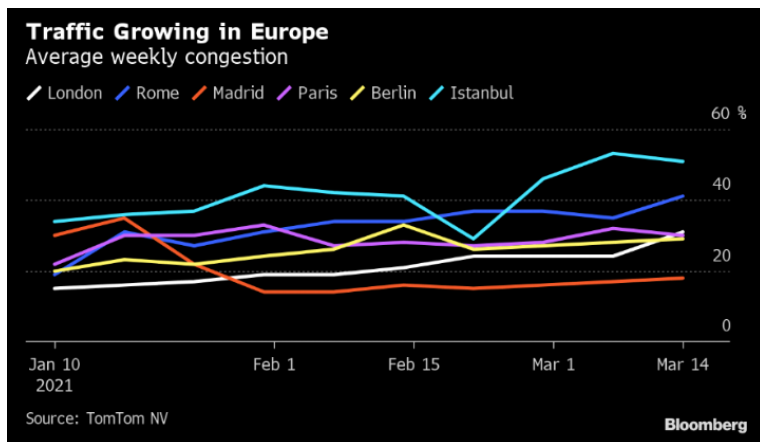
By Stephen Voss

(Bloomberg) -- Monday-morning traffic congestion in London nudged above 2019 levels for the first time since early December as the U.K. benefits from one of the fastest coronavirus vaccination rollouts in Europe and a staged relaxation in quarantine rules.

A road journey in the U.K. capital at 8 a.m. on Monday that would take an hour on empty roads had 40 extra minutes of congestion, 5% more than typical 2019 levels, according to location technology company TomTom NV. In doing so, London swapped places with Rome, which dropped from 9% above last Monday, to 73% below.

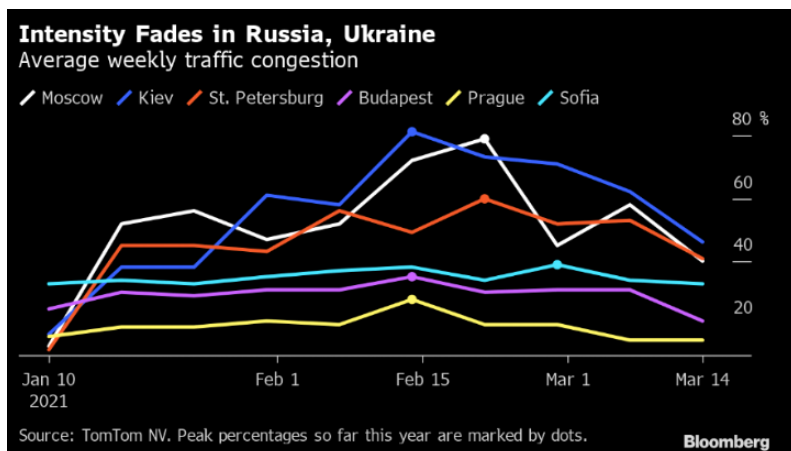
Traffic congestion has broadly been trending higher since the start of the year in Istanbul and five western European capitals, which together comprise six of Europe's nine largest cities. Stricter lockdowns in countries suffering from another surge in infections could slow that advance, while a faster delivery of inoculations may entice more commuters back onto the roads.

The weekly data in the graph below masks an even more recent decline in traffic intensity in Rome since Monday, when most of Italy returned to lockdown because infections are rising again.



On Europe's eastern edge, the weekly average TomTom data shows congestion in some major cities slipping back from a mid-February peak. That includes Moscow and St. Petersburg in Russia and the Ukrainian capital Kiev, which complete the list of the top nine European populations within city limits.

Ukraine locked down its largest ski resort, Bukovel, on the weekend, Interfax reported. World Health Organization data shows a second wave of confirmed coronavirus cases in the country with deaths close to matching an earlier peak in December.



Much farther east, daily data from TomTom shows congestion levels in Beijing and Shanghai are firmly above the 2019 norm by a comfortable margin.

Those two, plus London, were the only places to reach that threshold on Monday out of 13 cities regularly studied in this weekly monitor.

Diesel and gasoline sales by India’s biggest fuel retailers rose above year-earlier volumes in the first half of March. That’s the first time since October that the twice-monthly survey by Bloomberg News has shown both fuels above the 2020 level.

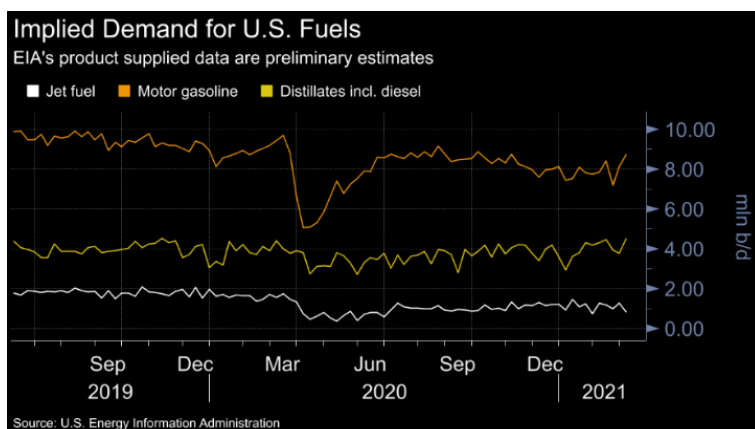
China began localized lockdowns in late January 2020, while most places in Europe and North America waited until mid-March last year and by the end of that month, virtually all nations were under strict lockdown, according to government response tracking by Oxford University.

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

Following are the latest indicators, in the five tables below. The first two show fuel demand and mobility, the next two show air travel globally and China specifically and the last is refinery activity:

Measure	Location	% y/y	% vs 2019	% m/m	Freq.	Latest as of Date	Latest Value	Source
Gasoline demand	U.S.	-7.7		+11	w	March 5	8.73m b/d	EIA
Distillates demand	U.S.	+2		+4.2	w	March 5	4.49m b/d	EIA
Jet fuel demand	U.S.	-46		-33	w	March 5	849,000 b/d	EIA
Total oil products demand	U.S.	-15		-7.5	w	March 5	18.7m b/d	EIA
All vehicles miles traveled	U.S.		-6		w	March 7	14.6b miles	DoT
Passenger car VMT	U.S.		-9		w	March 7	n/a	DoT
Truck VMT	U.S.		+12		w	March 7	n/a	DoT
Light vehicle traffic	France	-19	-12		m	February	n/a	Vinci
Heavy vehicle traffic	France	-2.8	+1.5		m	February	n/a	Vinci
Gasoline	India	+5.3		+1	2/m	March 1-15	1.05m tons	Bberg
Diesel	India	+7.4		unch	2/m	March 1-15	2.84m tons	Bberg
Jet fuel	India	-37		-2.6	2/m	March 1-15	204k tons	Bberg
Road fuels	Spain	-24		-20	m	January	1.7m tons	CORES
Gasoline (road)	Spain	-30		-24	m	January	293k tons	CORES
Diesel (road)	Spain	-23		-19	m	January	1.4m tons	CORES
Jet fuel	Spain	-73		-20	m	January	128k tons	CORES
All vehicles traffic	Italy	-18		+27	m	February	n/a	Anas
Heavy vehicle traffic	Italy	-2		+18	m	February	n/a	Anas
Gasoline	Portugal	-33	-34	-23	m	January	57k tons	ENSE
Diesel	Portugal	-21	-25	-14	m	January	315k tons	ENSE
Jet fuel	Portugal	-68	-67	-31	m	January	36k tons	ENSE
Gasoline	Colombia	-10			m	Feb. 20-26	n/a	Ministry
Diesel	Colombia	-9			m	Feb. 20-26	n/a	Ministry
Jet fuel	Colombia	-50			m	Feb. 20-26	n/a	Ministry

The frequency column shows d for data updated daily, w for weekly, 2/m for twice a month and m for monthly.

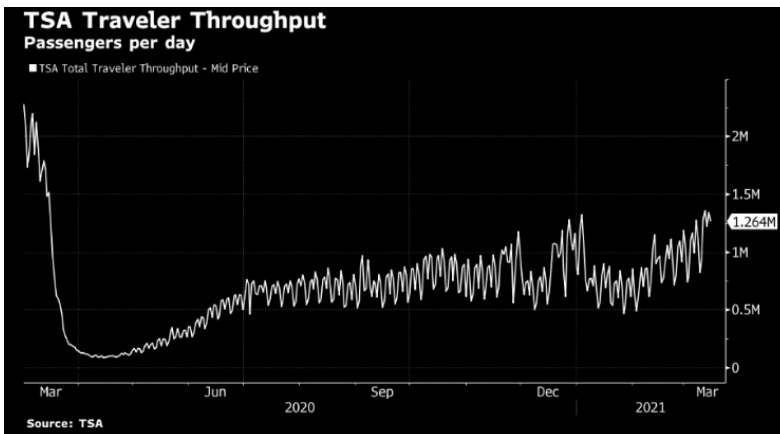


Measure	Location	% chg vs 2019	% chg m/m	Mar. 15	Mar. 8	Mar. 1	Feb. 22	Feb. 15	Feb. 8	Feb. 1	Jan. 25	Jan. 18
		for Mar. 15 (minutes of congestion at 8am local time)										
Congestion	Shanghai	+16	n/a	47	44	50	34	0	17	37	28	39
Congestion	Beijing	+15	n/a	49	43	51	27	0	20	29	26	34
Congestion	Tokyo	-8	+19	34	37	31	33	29	31	32	31	30
Congestion	Mumbai	-84	-33	6	7	8	8	9	8	9	9	10
Congestion	New York	-46	+367	17	16	19	16	4	17	25	10	3
Congestion	Los Angeles	-46	+256	19	15	16	17	5	11	11	8	5
Congestion	London	+5	+74	40	32	20	19	23	22	19	19	18
Congestion	Rome	-73	-63	13	53	38	32	36	34	33	37	37
Congestion	Madrid	-37	+42	22	19	19	8	16	18	15	19	22
Congestion	Paris	-11	+61	40	34	32	21	25	32	34	35	33
Congestion	Berlin	-30	+30	23	4	22	20	18	23	19	18	21
Congestion	Mexico City	-98	-91	1	19	19	17	14	14	0	13	13
Congestion	Sao Paulo	-67	+26	14	17	23	25	11	20	18	5	16

-Source: TomTom. Note: M/m comparison is March 15 vs Feb. 15. Beijing, Shanghai, New York and Los Angeles had zero or very little congestion on Feb. 15 because of public holidays, skewing the m/m comparison. Mexico City had a holiday on March 15.

Air Travel:

Measure	Location	% chg y/y	% chg vs 2019	% chg m/m	Freq.	Latest as of Date	Latest Value	Source
Airline passenger throughput	U.S.	-17		+31	d	March 15	1.26m people	TSA
Commercial flights	Worldwide	-24	-33	+26	d	March 16	73,247	FlightRadar24
Air traffic (flights)	Europe		-66	+14	d	March 16	9,158	Eurocontrol
Scheduled flights	Worldwide	-35			w	March 15	413,000	OAG
Seat capacity	Worldwide	-35	-44		w	March 15	58.97m	OAG
Seat cap.	Asia-Pac	-4	-28		w	March 15	29.46m	OAG
Seat cap.	North America	-37	-37		w	March 15	15.38m	OAG
Seat cap.	Europe	-70	-76		w	March 15	5.90m	OAG
Seat cap.	Latin America	-50	-48		w	March 15	4.50m	OAG
Seat cap.	China	+81	+8		w	March 15	16.29m	OAG
Seat cap.	U.S.	-33	-32		w	March 15	15.04m	OAG



China Air Travel Weekly View:

China (Scheduled amounts)	Jan. 25	Feb. 1	Feb. 8	Feb. 15	Feb. 22	Mar. 1	Mar. 8	Mar. 15
Seats (millions)	13.0	12.3	9.0	12.9	13.6	15.8	16.2	16.3
Seats (y/y % chg)	-23.2	-1.3	+46.8	+176	+126	+76	+86	+81
Seats (% vs 2019)							+5.7	+8.4

Source: OAG

Source: OAG

Refineries:

Measure	Location	y/y chg	m/m chg	Latest as of Date	Latest Value	Source
Crude intake	U.S.	-22%	-17%	March 5	12.3m b/d	EIA
Utilization	U.S.	-17 ppt	-14 ppt	March 5	69.0 %	EIA
Utilization	Gulf Coast U.S.	-29 ppt	-25 ppt	March 5	60.7 %	EIA
Utilization	East Coast U.S.	+13 ppt	+3.4 ppt	March 5	71.5 %	EIA
Utilization	Midwest U.S.	-7.8 ppt	-5.5 ppt	March 5	79.9 %	EIA
Independent refs run rate	Shandong province, China	+25 ppt	+0.8 ppt	March 12	73.1 %	SCI99
State refs run rate	East China	+3.9 ppt	-3.7 ppt	Feb. 25	76.6 %	SCI99
State refs run rate	South China	+31 ppt	+1.5 ppt	Feb. 25	87.3 %	SCI99

NOTE: All of the refinery data is weekly, except for SCI99 state refineries, which is twice per month.\

--With assistance from Julian Lee and Debjit Chakraborty.

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John Deane

<https://www.visitmysmokies.com/blog/smoky-mountains/great-smoky-mountains-half-million-visitors/#:~:text=More%20than%20Half%20a%20Million%20Visitors%20Just%20in%20January&text=In%20January%20of%202021%2C%20the,Great%20Smoky%20Mountains%20National%20Park.>

Great Smoky Mountains See Half a Million Visitors in January 2021

Visit My Smokies > Blog > Smoky Mountains > Great Smoky Mountains See Half a Million Visitors in January 2021

Posted on March 11, 2021

The traffic to the Great Smoky Mountains National Park isn't slowing down. **It just keeps breaking records! More than half a million visitors were reported by the National Park Service in January of 2021. This area doesn't see numbers like that until about March.** Keep reading to find out more about the Great Smoky Mountains getting half a million visitors in January 2021:

More than Half a Million Visitors Just in January

Typically traffic to the national park doesn't reach these numbers until March when spring is in the air. In January of 2021, the National Park Service reported that 525,801 recreational visits were made. This past January is the busiest on record for the Great Smoky Mountains National Park. This newest record comes right after other **monthly records being broken at the end of 2020.**

Most Popular Places in the Great Smoky Mountains

The Smokies have been a popular place to visit, and visitors keep coming for more. You're probably wondering where some of the most popular places are in the park. Here are the top popular places in the Smoky Mountains:

Cades Cove

The most popular destination in the entire national park is Cades Cove. This is an 11-mile looped road where you can drive and see incredible mountain views, meadows, and possibly even wildlife. You can stop your vehicle any time and explore throughout the area. You can walk inside historic buildings, such as cabins and churches. There are also several hiking trails throughout the loop, including Abrams Falls. People of all ages enjoy driving through Cades Cove.

Laurel Falls

The most popular hiking trail in the national park is Laurel Falls. This trail is considered easy and is 2.6 miles roundtrip. The trail is paved, making it easier to navigate for some people. Families and people of all ages love this trail. When you reach the top, you'll see Laurel Falls. It is 80 feet tall and splits into two sections. You walk across a footbridge so you can stand in front of the falls for pictures.

Clingmans Dome

Another popular destination in the Great Smoky Mountains is Clingmans Dome. This observation tower is one of the tallest elevations in the entire park. The hike to get there is considered easy, but it is steep. The trail is also paved, and there are several benches along the path in case you need to rest. On a clear day, you can see over 100 miles away at the top of the observation tower.

How to Avoid Crowds in the Smokies

We understand if you don't want to come in contact with a ton of people while you're exploring the Smokies. Here are a few tips on how to **avoid crowds in the Smokies:**

<https://www.rystadenergy.com/newsevents/news/press-releases/to-meet-its-2050-net-zero-target-the-us-needs-to-cover-land-50-times-the-size-of-austin-with-solar-pv/>

To meet its 2050 net-zero target, the US needs to cover land 50 times the size of Austin with solar PV

March 16, 2021

US President Joe Biden clinched the top role last November on the back of a campaign promise to launch the Clean Energy Revolution in the country, with a chief aim of achieving net-zero emissions by 2050. Rystad Energy estimates that the significant utility solar PV installed capacity required to meet the target would occupy around 13,412 square miles of land, **equivalent to 0.43% of the total land area in the lower 48 states**, or roughly 50 times the size of Austin, Texas.

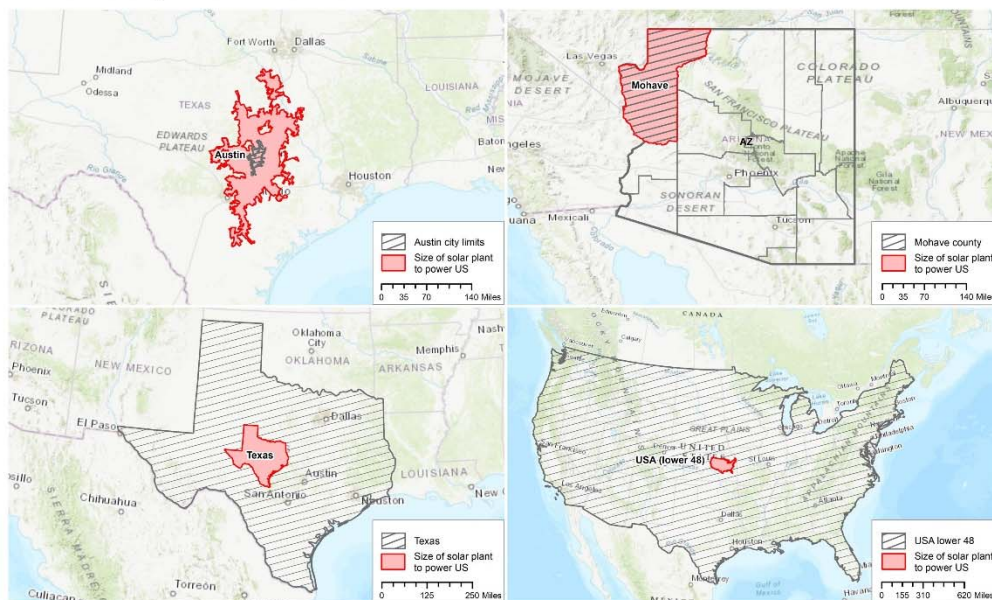
Land scarcity is often cited as a key barrier to ramping up solar and wind energy capacity in the US, thus undermining the country's revitalized decarbonization ambitions for the next 30 years. Solar farms, in particular, require a lot of real estate and, unlike wind farms, could take land away from agriculture or other uses.

"Although building all these solar farms is no easy task, with the right choice of unoccupied land and with sufficient investments in infrastructure, it can be done. Not every state is a good fit for large-scale solar plants, but certain southern states could take on larger gigawatts-scale projects than others," says Felix Tan, senior analyst at Rystad Energy.

Rystad Energy expects assumes a compound annual growth rate of 1.7% in power demand between now and 2050. **As such, to achieve Biden's decarbonization goal and displace all coal-fired plants and large amounts of gas demand, the US would need around 600 gigawatts (GW) of new wind capacity and 1,000 GW of new solar capacity. This could put at risk more than 56 billion cubic feet per day (Bcf) of future gas demand.**

The operational utility solar PV capacity in the US as of February 2021, according to Rystad Energy's RenewableCube, is only about 48.8 GW, which covers merely 654 square miles of land.

US land required for utility scale solar capacity roll-out to meet 2050 net-zero target Seen at different comparative scales



Source: Rystad Energy RenewableCube, research and analysis

While this analysis aims to give an idea about just how much land is required for solar PV development, the reality of ramping-up massive renewables capacity also poses additional challenges. Upgrading the current transmission network and building new lines will be crucial in order to deliver electricity from remote locations – where solar and wind plants are generally located – to centers of demand with high population density.

The intermittent nature of solar and wind will also require an unprecedented roll-out of storage infrastructure. Energy storage plays a key role in balancing the grid, shifting the peak load to ensure a lower cost of electricity for consumers, as well as providing ancillary services when demand rises to unexpected levels, and generally serving as power backup.

The ramp-up in storage and transmission will only lead to more and larger utility scale solar PV projects in the US. The 600 MW Topaz solar farm in California, which came online in 2013 and 2014, currently ranks as the largest plant in the country. The next four years could see the ceiling smashed as various phased projects become operational, including the Samson Solar Energy Center in Texas and the Edwards & Sanborn Solar project in California – both of which will breach the gigawatt mark.

“Bearing in mind that the Biden Administration is also planning a major expansion of transmission networks across the country, the scene is set for gigawatt-scale solar PV projects to be launched. We expect more gigawatt-scale solar PV projects to follow, including hybrid developments,” Tan concludes.

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

Biden To Put US On “Irreversible Path to Achieve Net-Zero Emissions, Economy-Wide” Is a Major Negative To US Natural Gas in 2020s

Posted Tuesday July 28, 2020. 11:15am MT

Oil and natural gas followers should know that Biden’s new clean energy plan is a major negative, in particular, to US natural gas in the 2020s. We know there is still 97 days to the US elections and a lot can change but, with Biden’s big polling lead nationally and even in some key battleground states, it’s the right time to start to look at what he means to oil and natural gas. Our concern is that Biden states he plans to put the US on an irreversible path to achieve net-zero emissions economy-wide by 2050 and, to do so, he will need to move quickly and strongly on new pro-climate change policies. This not an item that doesn’t impact for 30 years and shows up in 2050, rather, the impacts will be in 2020s. Biden’s new clean energy plan has multiple game changers to oil and natural gas. This blog focuses on one that will have a major impact on US natural gas in the 2020s – he plans to only have “*carbon-pollution free*” electricity by 2035. Not zero net emissions, “*carbon pollution-free*” ie. no fossil fuels. We don’t think this is attainable as fossil fuels provide 60% of US electricity. But if he puts the US on an irreversible path to this goal, even if he is only 25% or 50% successful, it would be a massive hit to future US natural gas consumption. Electricity currently represents ~40% or ~33.5 bcf/d of total US natural gas consumption. If Biden is 50% successful, it will knock of 16.8 bcf/d or 20% of total US natural gas consumption. If he is 25% successful, it will knock of 8.4 bcf/d or 10% of total US natural gas consumption. If markets see Biden is serious about making this happen, it will very quickly impact the long term value of US natural gas and that some investors will soon look to avoid US natural gas ie. not consider it investible for the mid/long term.. Its why we believe Biden’s carbon-pollution free electricity plan will be a major negative to US natural gas in the 2020s

Biden’s plan to put the US on “an irreversible path to achieve net-zero emissions, economy-wide, by no later than 2050”, but the impacts on oil and gas will be hitting right away. We know a lot can happen in the 97 days to the election but, given Biden’s current wide lead, the time is right to get energy investors on how he plans to turn the US energy mix upside down. The reason why this is part 1 of our blogs on Biden is that his clean energy plan (and his other potential policies) has multiple potential game changers to today’s energy mix. And there is too much in it to include in one blog. Two weeks ago, Biden released “*The Biden Plan to Build a Modern, Sustainable Infrastructure and an Equitable Clean Energy Future*”. [\[LINK\]](#) We believe the most important takeaway for energy markets to understand is that Biden wants to put the US on “an irreversible path to achieve net-zero emissions, economy-wide, by no later than 2050”. Our worry is that, to put the US on an “irreversible path”, he will have to move fast and big in his first four years. Biden’s plan, if implemented, will dramatically change the US energy mix to hugely reduce fossil fuels.

There will be an immediate impact on oil and natural gas as climate change will be a Day 1 priority and much more than recommitting to Paris. We have highlighted in the title Biden’s target for 2050, but his clean energy plan has many mid term targets that provide clear indicators for materially reduced oil and natural gas demand. Climate change is a Day 1 priority for Biden. Biden’s platform has made it clear that climate change is a priority and, not just for his first 100 days, rather his first day. Biden’s plan says the US “*Re-enter the Paris Agreement on day one of the Biden Administration and lead a major diplomatic push to raise the ambitions of countries’ climate targets*”. And it says “*He will not only recommit the United States to the Paris Agreement on climate change – he will go much further than that. He will lead an effort to get every major country to ramp up the ambition of their domestic climate targets. He will make sure those commitments are transparent and enforceable, and stop countries from cheating by using America’s economic leverage and power of example. He will fully integrate climate change into our foreign policy and national security strategies, as well as our approach to trade. Biden will rejoin the Paris Agreement, but simply rejoining is not enough. Biden will use every tool of American foreign policy to push the rest of the world to raise their ambitions alongside the United States*”. Biden has clearly listened to the Sanders/Warren side and has stepped up his ambitions on climate change. He wants to go beyond the Paris Agreement.

United Nations’ COP26 gives the perfect global forum for the world to join Biden’s push for the world to raise their climate change ambitions. We continue to believe one of the major global energy themes for 2021 will be the world is behind its targets to meet its climate change targets/ambitions. The IEA has just completed a series of reports that provide data on being behind target, which we included in our June 11, 2020 blog “*Will The Demise Of Oil Take Longer, Just Like Coal? IEA and Shell Highlight Delays/Gaps To A Smooth Clean Energy Transition.*” [\[LINK\]](#) There will be a global spotlight on

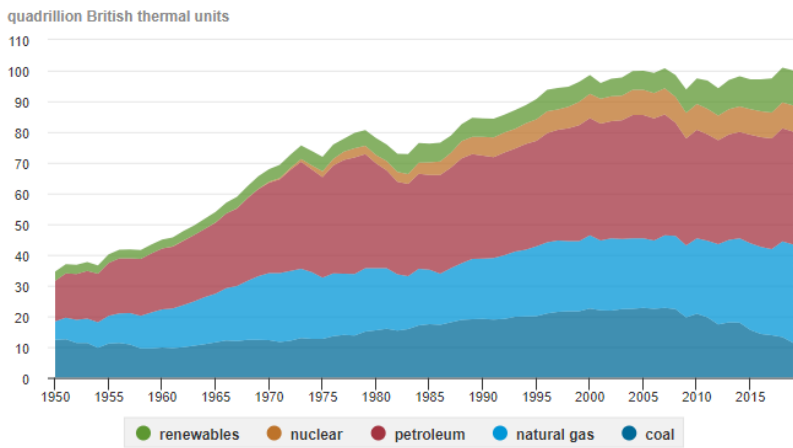
climate change in 2021 with COP26 (the UN Climate Change Conference UNFCCC CO26) being held Nov 1-12 in Glasgow, Scotland. The Paris Agreement on climate change was signed on April 22, 2016 in the last year of the Obama administration. Given Trump pulled the US out of the Paris Agreement, it provides Biden a global stage for the US to re-engage with the world and step back into a global leadership role on climate change. On June 1, 2017, Trump announced the US would cease all participation in the Paris Agreement and gave formal notice to withdraw on Nov 4, 2019. The withdraw takes 12 months to take effect ie. on Nov 4, 2020, which is one day after the Nov 3 presidential election. We don't expect Trump to change the US position whether he loses or wins the election. But as we have seen in all other UN climate change forums, there will be a focus on climate change in the months leading up to Glasgow as countries try to find a consensus position. Biden says he wants to push the rest of the world to raise their ambitions. Biden doesn't say it specifically, but his plan to push the world is consistent with the fact that the world is behind in meeting their climate goals. On July 11, we tweeted [\[LINK\]](#) "*Key 2021 energy theme: #CleanEnergy transition is not on track. UN Guterres 22:10 min 'nations must commit to net zero emissions by 2050 and submit more ambitious national climate plans before COP26 next year'. Can't make up for lost COVID19 time'*". UN Secretary General Guterres spoke at this week's IEA Clean Energy transitions summit and he reminded of why markets should see a great global focus on the clean energy transition and that is not on track to meet its timing. At the 22:10 min mark [\[LINK\]](#) Guterres said "*nations must commit to net zero emissions by 2050 and submit more ambitious national climate plans before COP26 next year'*". The world being behind its clean energy transition targets, Biden's climate change priority and COP26 provide the perfect scenario for Biden's return to US global leadership.

Biden's clean energy plan will dramatically change the future US energy mix away from fossil fuels. Our first blog in this Biden series is focused on Biden's target to "*achieve carbon-pollution free energy in electricity generation by 2035'*" because we see this as an item that will impact US natural gas right away. This is a huge target and it means that Biden plans to turn the US energy mix upside down. The other big headline is to push EVs by doing things like federal fleets, mandating all transit and other buses must be EV by 2030, etc. One item that seems to be mostly overlooked so far is one that can have a material impact on oil and natural gas – his focus on improving energy efficiency. Biden says he will "*Reform and extend the tax incentives we know generate energy efficiency and clean energy jobs'*". We have always viewed efficiency standards as low hanging fruit that can have a material impact. Its not just car fuel efficiency, but also commercial and residential buildings. Our concern is that efficiency gains end up taking away demand from coal, oil and natural gas as opposed to solar, wind, etc. We expect one of our likely follow on Biden blogs will be on efficiency. There are many other items in the Biden plan. One noticeable omission is no discussion on carbon tax or carbon price.

Biden looks like he is trying to skip over natural gas as the transition fuel to the clean energy world. Natural gas has been universally viewed as the key transition fuel to a world of clean energy. Biden doesn't specifically say so, but it seems like Biden's plan is trying to skip over, or dramatically lower, natural gas role as a transition fuel to a world of clean energy (in this case electricity) and in being the primary fuel source for a new hydrogen world. We will more on hydrogen in the future, but Biden also wants to skip over natural gas as the primary hydrogen source by "*using renewables to produce carbon-free hydrogen at a lower cost than hydrogen from shale gas through innovation in technologies like next generation electrolyzers'*". Today's blog focuses on the impact of Biden's "carbon pollution-free" electricity target by 2035, but he is trying to eliminate or ensure there are carbon offsets for all fossil fuels in the US energy mix by 2050.

US Energy Mix

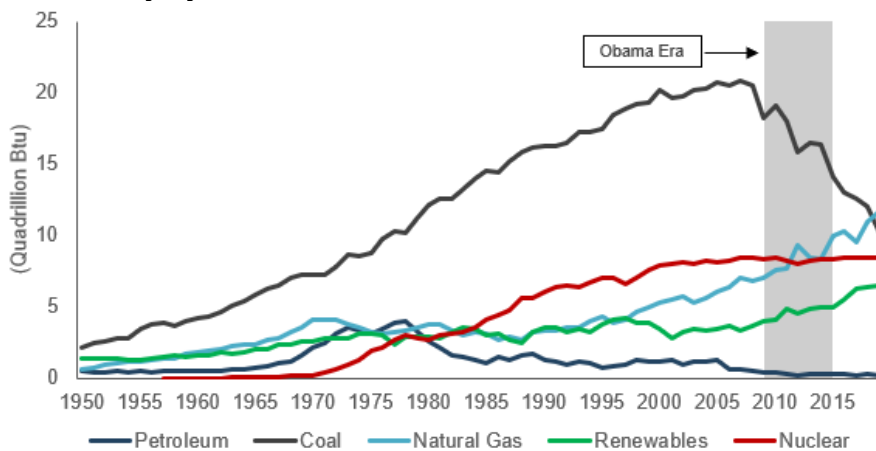
U.S. primary energy consumption by major sources, 1950-2019



Source: EIA

Biden plans means he has to replace 60% of today's fuel for electricity by "carbon pollution-free" electricity by 2035. Biden power sector plan is to "move ambitiously to generate clean, American-made electricity to achieve a carbon pollution-free power sector by 2035. This will enable us to meet the existential threat of climate change while creating millions of jobs with a choice to join a union." We are a little surprised that we haven't seen a huge market focus on this point. Biden says "carbon pollution-free" electricity. Biden doesn't say its "net zero emissions" for electricity but "carbon pollution free", which means no fossil fuels. We think this is impossible as it means that in less than 15 years, they will replace ~60% of fuel sources for US 2019 electric power and, perhaps even more difficult, have an integrated power system originally set up for fossil fuels to be able to deliver reliable 24/7 electricity. Its not just the fuel but having the integrated electricity grid to support all clean electricity. In 2019, carbon fuels (oil, natural gas, and coal) provided 60% of fuel for US electric power. But whether it is impossible or not isn't the point. Rather if Biden tends to put the US on an irreversible course, then he will be moving in the first four years to set in place programs, taxes, incentives, etc. And if they start moving to that 2035 target and make any significant progress, it should materially reduce US natural gas consumption over the 2020s.

US Electricity By Fuel Source



Source: EIA

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If Biden is successful in generating only “carbon pollution-free” electricity, he could eliminate ~40% (33.5 bcf/d) of current US natural gas consumption. We chose this for our first blog because we see it having a material impact on US natural gas consumption in the 2020s. The EIA estimates 37% (31.0 bcf/d) of US natural gas consumption is for the power sector. In addition, the EIA estimates 27% (23.0 bcf/d) is for industrial consumers, wherein the EIA includes natural gas used for generating power in the industrial consumption. The EIA doesn’t split out the % used for electric power, but we have just included 3% to round up natural gas for electric power to 40% or ~33.5 bcf/d of total US natural gas consumption. Note our US natural gas consumption excludes natural gas exports via pipeline or LNG.

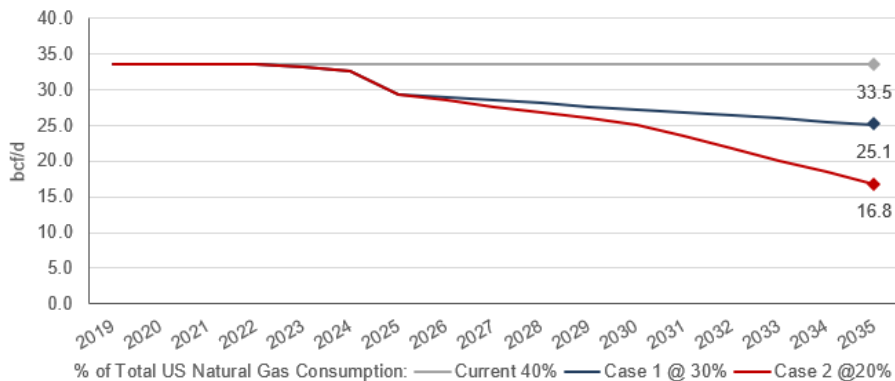
US 2019 Natural Gas Consumption by Sector/Grouping

bcf/d	Residential Consumers	Commercial Consumers	Industrial Consumers	Electric Power Consumers	Other	Total
2019	13.7	9.6	23.0	31.0	7.7	85.0
% of Total Consumption	16%	11%	27%	37%	9%	100%

Source: EIA

Even if Biden is only 25% successful by 2035, it will materially reduce US natural gas consumption. We just don’t see how Biden can replace all carbon sources for electricity and have an integrated power system based solely on clean energy by 2035. Regardless, if he puts the US irreversibly on this course in the first four years and is only 25% successful, it is a material reduction to US natural gas consumption. We ran two cases with both assuming no change to the natural gas supplied to electricity for 2021 and 2022, and then any new policies start to impact natural gas for electricity in 2023, consistently decrease until 2030 and then decrease faster to 2035. We ran two cases: natural gas consumption for electricity is reduced by 25% and 50% in 2035, which, by 2030 reduce natural gas consumption by 6.3 bcf/d and 8.4 bcf/d, and by 2035 by 8.4 bcf/d and 16.8 bcf/d. Note we have not included any increasing electricity consumption as we assume Biden’s move on efficiency are able to at least offset any estimated small annual growth ie. +0.5% or more.

Natural Gas Lost Consumption If Biden Is 25% or 50% Successful



Source: SAF Group

Once Biden shows he is serious about carbon pollution free electricity, it will inevitably impact the view of long term value of US natural gas. Our concern gets back to the title of our blog that Biden says he wants to put the US on an irreversible path and, to do so, this means he plans to take early actions on climate change. Once it becomes clear that he is taking action to move the US to carbon pollution free electricity by 2035 and that this will happen over the 2020’s, there will be the realization that it will materially reduce US natural gas consumption (even if only 25% successful) and this should reduce the long term value of US natural gas.

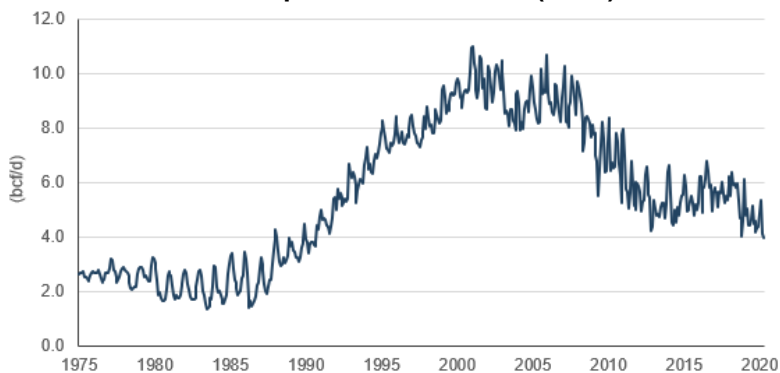
Moving to a hydrogen economy will not save US natural gas as Biden wants to produce “carbon-free” hydrogen. One of the big global energy themes for the 2020s is moving to a hydrogen world. Right now, the primary (and cheapest) fuel to generate hydrogen is natural gas. Normally, most would expect to that natural gas would be the big winner in the move to a hydrogen economy. And no question if Biden wants to move to hydrogen quickly, natural gas would be the proven (and cheapest) source. However, Biden’s clean energy plan notes his priority to produce “carbon-free” hydrogen. Biden wants to be “using renewables to produce carbon-free hydrogen at a lower cost than hydrogen from shale gas through

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innovation in technologies like next generation electrolyzers;” If Biden wants to add hydrogen quickly, we believe producing “carbon-free” hydrogen at a reasonable price will be another area where there will be a gap between the aspiration and reality.

It's a good thing Canada has LNG Canada and TMX under construction. If Biden moves quickly on the “carbon pollution-free” electricity and US natural gas demand drops, the reality is that it will cause a natural US gas supply correction. There will be less capital provided to a sector that will be viewed to be in decline. But it will also force more US natural gas to look for more export markets. It will also reduce, but not eliminate, US natural gas imports from Canada, which have been on the decline, down to 4.7 bcf/d in 2019 vs 5.4 bcf/d in 2018 and less than half the 10.2 bcf/d in 2007. In a declining US natural gas consumption market, we would not expect to see any capital provided for either new or increasing capacity in US natural gas pipelines to markets to currently served by imports of Cdn natural gas. We expect Cdn natural gas to do better than US natural gas with LNG Canada Phase 1 adding add 1.8 bcf/d of new demand around 2025 and LNG Canada Phase 2, if approved, would add another 1.8 bcf/d of demand. Any potential reduction in US natural gas demand is a reminder of the strategic importance of access to new export markets for Canada’s oil and natural gas via under construction LNG Canada and TMX.

US Net Natural Gas Imports From Canada (bcf/d)



Source: EIA

Stay tuned for futures blogs on the impact of a Biden win on oil and natural gas.

<https://www.newswire.ca/news-releases/air-canada-commits-to-ambitious-net-zero-emissions-goal-by-2050-853464854.html#:~:text=MONTREAL%2C%20March%2015%2C%202021%20%2F,its%20global%20operations%20by%202050>.

Air Canada Commits to Ambitious Net Zero Emissions Goal by 2050

[Français](#)

NEWS PROVIDED BY

Air Canada

Mar 15, 2021, 08:00 ET

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- 2030 absolute targets of 20 per cent GHG net reductions from flights plus 30 per cent GHG net reductions from ground operations compared to 2019 baseline
- Investment of \$50 Million in SAF and carbon reductions and removals
- 2050 goal of net zero GHG emissions from all operations globally

Editor's Note: A video showcasing highlights of the goals and targets is available [online here](#)

MONTREAL, March 15, 2021 /CNW/ - Air Canada today announced its long-term commitment to advancing climate change sustainability throughout its business. The airline has set ambitious climate targets to realize a goal of net-zero greenhouse gas emissions (GHG) throughout its global operations by 2050. To reach this, Air Canada has set absolute midterm GHG net reduction targets by 2030 in its air and ground operations compared to its 2019 baseline, and has committed to investing \$50 Million in Sustainable Aviation Fuel (SAF), and carbon reductions and removals.

"Economic growth and sustainability are equally important, and we have a strong track record for both. Despite the severe impact of the COVID-19 pandemic, we remain deeply committed to long-term sustainability. Climate change is critical, and we believe we can and must do more to address this for the future of our environment. This is why we are further embedding climate considerations into our strategic decision-making, and undertaking a very ambitious plan that is meaningful, will support Canada's leadership position on climate change, advance de-carbonization in the airline industry while keeping fares affordable for customers," said Michael Rousseau, President and Chief Executive Officer at Air Canada.

Air Canada is very focused on investing in innovative, long term, sustainable emission reduction solutions. Absolute 2030 midterm GHG reduction targets have been set to ensure meaningful progress towards Air Canada's ambitions net zero goal while the airline, technology and energy sectors are transitioning to low carbon alternatives.

Air Canada has identified the following key carbon reduction pillars:

Fleet and operations. Air Canada will continue deploying its newly modernized and energy efficient Airbus A220 and Boeing 737 MAX narrow-body fleets that are more efficient and expected to average approximately 20 per cent less fuel consumption per seat and emit approximately 20 per cent less CO₂ and 50 per cent less nitrogen oxides than aircraft they replace, continue to integrate climate factors in route and fleet planning, phase out carbon-intensive ground equipment, further advance electric vehicles and seek other electrification opportunities.

Innovation. Further evaluate the viability, safety and performance of new electric, hydrogen or hybrid operational technologies, and other innovations such as short-haul transportation opportunities and electric drones to complement and support Air Canada's global business network.

Sustainable Aviation Fuels and clean energy. To further its work on sustainable aviation fuels, Air Canada will invest \$50 Million in SAF and other low carbon aviation fuel (LCAF) development, evaluate the practical applications of renewable energy sources such as biogas and renewable electricity, and energy transition measures.

Carbon Reductions and Removals. Air Canada will explore carbon negative emission technologies and other direct emission reduction and removal strategies in addition to further developing its carbon offset strategy for CORSIA compliance, customer offerings and more.

Details and updates to Air Canada's ambitious climate plan will be posted on aircanada.com in the coming weeks.

Air Canada currently reports its carbon footprint, targets and climate protection strategy through the [CDP](#) and will also be reporting through the Task Force on Climate-related Financial Disclosures ("TCFD") framework as of 2022.

Air Canada has built a solid foundation in energy sustainability through numerous comprehensive initiatives to reduce its environment footprint. Since 1990, Air Canada has improved fuel efficiency by 43 per cent. From 2016 to 2019, the airline reduced more than 135,000 tonnes of GHG from its air operations through fuel efficiency initiatives, and its work in fuel sustainability includes:

- Participating in eight biofuel flights with ongoing, active support for the development of SAF in Canada including working with the Government of Canada on policy development to support a Canadian-based sustainable aviation fuel industry.
- Lead airline on Canada's Biojet Supply Chain Initiative (CBSCI), a project to identify and solve supply logistic barriers that arise when aviation biofuels are introduced at major Canadian airports.
- Contributing to the Civil Aviation Alternate Fuel Contrail and Emissions Research project (CAAF CER) to test the environmental benefits of biofuel use on contrail formation, benefiting all aviation stakeholders and climate science researchers.
- Implementing a technologically advanced livery paint and painting process resulting in significant weight and fuel savings, with no chrome, lead or other heavy metals and is expected to last longer when compared to standard paint.

- Operational improvements realized through more than 100 projects to optimize fuel consumption, including profile departure, RNP-AR (a type of performance-based navigation), single engine taxiing to aircraft weight reduction such as the use of lightweight crew luggage, iPads for pilots replacing paper manuals and lighter weight composite onboard carts.

In 2020 and 2019, Air Canada was recognized by Vancouver Airport Authority as the YVR Green Excellence winner for green initiatives on Sea Island including water and energy conservation, waste minimization and the Richmond Ocean Shoreline Cleanup.

In 2018, Air Canada was named *Eco-Airline of the Year* by *Air Transport World* for Air Canada's leadership in fuel efficiency and innovative sustainability, initiatives through a \$10 Billion fleet modernization, sustainable aviation fuel development and support in Canada, and fuel efficiency program and route improvements.

Since 2007, a long-standing program offering customer carbon neutral purchase options has resulted in more than 60,000 tCO₂e of emissions offset.

Additional information about Air Canada's ESG activities is detailed in the airline's Corporate Sustainability Report, [*Citizens of the World*](#).

From Wet Waste to Flight: Scientists Announce Fast-Track Solution for Net-Zero-Carbon Sustainable Aviation Fuel

A Novel Pathway for “Drop-In” Sustainable Aviation Fuel May Lift Net-Zero Flights Off the Runway **Sooner Than You Think**

March 15, 2021

3

Fueling aircraft with sustainable aviation fuel made from wet waste—such as food waste, wastewater sludge, and animal manure—could help large U.S. airline companies reduce emissions across their operations. *Photo from iStock*

Aircraft stand at a turning point in the race to reduce emissions to mitigate climate change. Although the aircraft sector only accounts for a sliver of transportation-related greenhouse gas (GHG) emissions in the United States—at 9%—it is difficult to decarbonize.

With jet fuel demand set to double pre-pandemic levels by 2050 and airlines ramping up pledges to reduce emissions, innovations in fuels, engines, and emerging technologies are critical to closing the gap to net zero.

That task just got a burst of energy with the publication of a [new paper on carbon-negative sustainable aviation fuel \(SAF\)](#) by scientists at the National Renewable Energy Laboratory (NREL), the University of Dayton, Yale University, and Oak Ridge National Laboratory.

Published in *Proceedings of the National Academy of Sciences*, the article outlines a biorefining process using the untapped energy of food waste and other wet waste to produce SAF both compatible with existing jet engines and capable of supporting net-zero-carbon flight. In practice, that means that GHG emissions created from jet fuel combustion are zeroed out by lifecycle GHG emissions removed or diverted from the atmosphere when producing the fuel.

Large aviation companies, including Southwest Airlines, are already collaborating with NREL and other organizations on the U.S. Department of Energy’s wet waste flight demonstration project. Beginning in 2019, Southwest began working with NREL as part of its increased commitment to incorporating commercially viable SAF into its operation, when available.

With this publication, moving such efforts from demonstration to commercial reality is closer than ever before.

“If our refining pathway is scaled up, it could take as little as a year or two for airlines like Southwest to get the fuel regulatory approvals they need to start using wet waste SAF in commercial flights,” said NREL scientist Derek Vardon, the corresponding author of the paper. “That means net-zero-carbon flights are on the horizon earlier than some might have thought.”

Identical to Fossil Jet Fuel, But With a Negative-Carbon Twist

The impressive emissions reductions of the researcher’s SAF—a 165% drop in net carbon emissions compared to fossil jet—are achievable by targeting the huge greenhouse gas footprint of food waste.

Every year, millions of tons of food waste is hauled to landfills across the country. Once there, it rots and produces methane, a greenhouse gas over 20 times more potent than carbon dioxide.

Eliminating food waste as a source of methane, then, can be a highly effective way at driving down landfill emissions.

It can also be effective at producing fuel. Previous research showed how to interrupt methane generation with fermenters that transform the carbon energy of food waste and other organic “wet waste” into volatile fatty acids (VFAs), which can be upgraded into jet fuel. But those studies, while proving that SAF from wet waste is possible, did not document how such fuel could meet ASTM International’s fuel property requirements.

“Meeting ASTM standards is mandatory for the use and deployment of new SAF by industry,” Vardon said. “Our paper shows we can make drop-in SAF that meets those standards, with analysis that reveals how to refine VFAs so airlines can utilize large amounts of VFA-SAF without sacrificing performance.”

Using a catalyst to add more carbon to VFA molecules, Vardon and the other scientists showed how to build long strings of energy-rich paraffin hydrocarbons that are essentially chemically identical to those in conventional jet fuel—except with a fraction of the carbon footprint.

“The NREL SAF pathway from food waste is a very promising candidate for ASTM International D4054 Fast Track evaluation,” said Josh Heyne, an associate professor of mechanical and aerospace engineering at the University of Dayton, who is a co-author of the paper and leading expert on SAF ASTM testing. “The fuel samples we tested have very promising compositions, and NREL’s ability to tailor these compositions is very favorable for approval.”



NREL's formula for SAF from wet waste is compatible with existing jet engines, making it a promising candidate for quickly getting approved by ASTM International. *Photo by Dennis Schroeder, NREL*

The Sky Is the Limit for Reducing GHG Emissions

Using higher amounts of SAF in jet engines requires more time to be approved, but doing so can also enable much larger reductions in net emissions. To provide a pathway for getting ASTM approval for higher blends, the paper outlines an extra step to produce more complex molecules called isoparaffins, which can have unique branched chemical structures.

With more testing, SAF made from a combination of renewable isoparaffins and straight-chain paraffins could be blended with conventional jet fuel in higher concentrations, up to 70%.

"Since the SAF blend would have a carbon footprint 165% lower than fossil jet, that blend is high enough to decarbonize flight," Vardon explained.

The result is a fuel refining process that offers airlines a quick win on reducing emissions in the short-term with smaller volumes of SAF, while also providing a long-term blueprint for higher SAF blends that enable deeper emissions reductions.

"Developing new SAF production technologies to convert feedstocks that expand beyond fats, oils, and grease is critical for the future growth of our industry," said Bryan Sherbacow, chief commercial officer of World Energy—a global biofuel company that operates the world's first SAF refinery, established in California in 2016. "This demonstration by NREL to produce SAF from wet waste demonstrates the technical potential for feedstock flexibility the industry needs to achieve fuel decarbonization at scale."

Piecing Together Commercial Flight

Achieving feedstock flexibility at scale is no small feat. It demands a multidisciplinary team of leading scientists, analysts, and industry experts, all working inward from their corner of the puzzle in support of a compelling outline for commercial flight with SAF. While some refine the catalyst chemistry for upgrading VFAs, others test fuel properties in the laboratory. Still others analyze the economics of ramping up industrial production.

But perhaps the most critical players at the table are commercial airlines themselves. Several large U.S. airlines are already committed to using SAF in their aircraft and are ramping up efforts to find new routes to low-carbon SAF to help meet their environmental goals.

Southwest Airlines, for example, is collaborating with NREL on scaling up SAF from wet waste and is providing industry insight on how the fuel might be used and supplied across key regions throughout the United States. By describing a pathway for producing SAF on a larger scale, this new research could make it easier for the airline to adopt the fuel more widely and reduce emissions from its operations.

"We're excited to partner with NREL as we continue our journey to make commercially-viable SAF a reality and a part of Southwest's future," said Michael AuBuchon, senior director of Fuel Supply Chain Management at Southwest. "It is undeniable that SAF's role in reducing emissions across the industry and at Southwest will be significant. NREL's research could provide a game-changing opportunity to make SAF cost-effective, leading to its larger-scale deployment."

"Our SAF route is not a silver bullet," Vardon added, "but as a piece of the puzzle it could make a significant dent in an industry notoriously hard to decarbonize."

Indeed, NREL's analysis team has shown U.S. wet waste, including food waste, has enough energy content to cover about 20% of U.S. jet fuel consumption. As fuel is a primary source of GHG emissions in the aviation industry—carbon-negative SAF from low-cost wet waste may just be what it needs for a wider push for decarbonization to take off.

This work was supported by the U.S. Department of Energy's Bioenergy Technologies Office "Opportunities in Biojet" program, as well as the [Chemical Catalysis for Bioenergy Consortium](#). For more information, explore NREL's [catalytical carbon transformation research](#)

https://www.reddit.com/r/IAmA/comments/m8n4vt/im_bill_gates_cochair_of_the_bill_and_melinda/

35.9k

Posted by [u/thisisbillgates](#)

6 hours ago

I'm Bill Gates, co-chair of the Bill and Melinda Gates Foundation and author of "How to Avoid a Climate Disaster." Ask Me Anything.

I'm excited to be here for my 9th AMA.

Since my last AMA, I've written a book called [How to Avoid a Climate Disaster](#). There's been exciting progress in the more than 15 years that I've been learning about energy and climate change. What we need now is a plan that turns all this momentum into practical steps to achieve our big goals.

My book lays out exactly what that plan could look like. I've also created an organization called [Breakthrough Energy](#) to accelerate innovation at every step and push for policies that will speed up the clean energy transition. If you want to help, there are [ways everyone can get involved](#).

When I wasn't working on my book, I spent a lot of time over the last year working with my colleagues at the [Gates Foundation](#) and around the world on [ways to stop COVID-19](#). The scientific advances made in the last year are stunning, but so far we've fallen short on the vision of equitable access to vaccines for people in low-and middle-income countries. As we start the recovery from COVID-19, we need to take the hard-earned lessons from this tragedy and make sure we're better prepared for the next pandemic.

I've already [answered a few questions](#) about two really important numbers. You can ask me some more about climate change, COVID-19, or anything else.

Proof: <https://twitter.com/BillGates/status/1372974769306443784>

Update: You've asked some great questions. Keep them coming. In the meantime, I [have a question for you](#).

Update: I'm afraid I need to wrap up. Thanks for all the meaty questions! I'll try to offset them by having an [Impossible burger](#) for lunch today.

[ItsColdWorld](#)

6 hours ago

Hey Bill! Why are you buying so much farmland?

3.9k

Reply

My investment group chose to do this. It is not connected to climate. The agriculture sector is important. With more productive seeds we can avoid deforestation and help Africa deal with the climate difficulty they already face. It is unclear how cheap biofuels can be but if they are cheap it can solve the aviation and truck emissions.

4.9k

level 1

[cardface2](#)

[5 hours ago](#)

Hi Bill,

What do you think is a reasonable percentage tax rate for the extremely-wealthy to pay? Either on their income, gains, or total wealth.

level 2

[thisisbillgates](#)

[5 hours ago](#) · edited [5 hours ago](#)

I have pushed for the Estate tax to be higher. I think it is an effective tool for revenue and avoiding dynastic wealth.

I have a piece on [Gates Notes](#) that talks about more progressive taxation.

You can tax income up to 50% but once you get much above that you have to worry that people waste a lot of time getting around the taxes. Each country has to consider what works for them. I only know the US system and it can be somewhat more progressive.

5.1k

level 1

[Western Situation138](#)

[6 hours ago](#)

Hello Mr. Gates! Do you still code on your computer? If so, how often? If not, have you gotten rusty? Thanks!

level 2

[thisisbillgates](#)

[5 hours ago](#)

My code no longer goes into shipping products so I am rusty. I do like to try the new tools to understand how they help. I just did a review of the low-code tools where there is a lot of great innovation.

1.0k

level 1

[HellsNoot](#)

[6 hours ago](#)

What niche technology do you believe could play a significant role in the future in the battle against climate change?

level 2

[thisisbillgates](#)

[6 hours ago](#) · edited [5 hours ago](#)

We need a lot of technologies - synthetic meat, energy storage, new ways of making building materials...

We want to be open to ideas that seem wild.

Fusion might come along but we can't count on it.

level 1

[weeds96](#)

[6 hours ago](#)

Any comment on the opinions of [r/conspiracy](#) about you and vaccines?

2.0k

level 2

[thisisbillgates](#)

[5 hours ago](#) · *edited 5 hours ago*

I am innocent! The whole thing about 5G and microchips is pretty crazy. Why would I want to do that?

I do believe in vaccines which have performed miracles.

My [2015 Ted talk](#) was more viewed after the pandemic than before which is too bad.

I hope my [2010 Ted Climate talk](#) is viewed more before the problem gets bad...

6.1k

level 1

[IFlippedTheTable](#)

[6 hours ago](#)

Hi Bill,

It's well established that you bring a large tote bag of books on trips and usually finish them all prior to returning home. How are you able to focus and absorb so much information, especially when (I assume) the main purpose of these trips isn't usually reading?

Is there a specific note-taking strategy you use? What exactly do you write as you're taking notes?

I've been trying to read more during the pandemic and sort of succeeding, but at times I find myself looking at words and not absorbing their content. This is partially due to ADHD, but I think learning to take notes will help.

Thank you!

1.5k

level 2

[thisisbillgates](#)

[6 hours ago](#)

On vacation I get to read about 3 hours a day so I get through a lot of books.

I only take notes on about 20% of the books I read. It takes me at least 2x as much time when I write notes but for a lot of books that is key to my learning.

1.9k

level 1

[sahilraza760](#)

[6 hours ago](#)

Hey Bill! How do you think Seawater Desalination will impact the issue of global water shortage in the coming years?

917

level 2

[thisisbillgates](#)

[6 hours ago](#)

Yes. We have lots of water. The problem is that it is expensive to desalinate it and move it to where it is needed. This is all about the cost of energy. The cost is prohibitive for agricultural use of water. New seeds can reduce water use but some areas won't be able to farm as much.

1.2k

level 1

[Icharliee](#)

[6 hours ago](#)

What one piece of advice you would give to a 19 year old?

543

level 2

[thisisbillgates](#)

[6 hours ago](#)

You should learn about climate change. It doesn't need to be a full time thing - you should pick the job you care about and feel you can contribute to but also have goals that aren't just about your own success.

1.3k

level 1

[uncle-woodbear](#)

[6 hours ago](#)

How do you think the PR-problem of nuclear energy can be solved?

1.1k

level 2

[thisisbillgates](#)

6 hours ago

I hope so. Nuclear has had real cost problems as the systems have gotten more complex. A new generation that starts over and gets rid of the high pressure is needed. Explaining how the new safety systems work will be very important. The actual record of nuclear isn't bad compared to coal or natural gas but we can do better with the new design which can be inherently safe.

1.6k

level 1

[Pleasedontfindme4040](#)

6 hours ago

I live in a mid sized city in Canada (Winnipeg). What are the most effective things I can get my local government to do that will have a positive impact on climate change while being cash positive or having a tiny green premium?

671

level 2

[thisisbillgates](#)

5 hours ago

Electric buses are becoming economic. There has been an issue with cold and hot temperatures but that is being solved as the demand scales up.

Cities are often involved in electricity generation so they can help drive demand for clean generation.

921

level 1

[moucheeze](#)

6 hours ago

What is your opinion on "engineering" a solution for the climate change problem? Economist Stephen Levitt has written on this topic [1], [2], [3], and has even bet that geoengineering is pretty much the only solution that will get us towards the goal of cooling the Earth by about 2°C pre-industrial levels [4] in time, before catastrophic, irreversible changes.

On a similar note, what is your opinion on large scale carbon sequestration projects and carbon offsets that corporations purchase? Stripe has a Climate division now that lets customers divert a fraction of their dollars to purchase carbon offsets [5]. Do you think such efforts are important in preventing large scale climate change and what are your views on it?

Also, did Vaclav get a chance to read this book? What did he think of it?

Thank you again for doing this AMA!

358

level 2

[thisisbillgates](#)

[6 hours ago](#) · *edited 5 hours ago*

Direct Air Capture will be important for things we can't solve directly. Today the cost is over \$600 per ton. I think it can come down to \$100 with companies like Carbon Engineering as they scale up over the next decade. We don't know if we can get it cheaper than that.

Companies that are buying offsets are fantastic. We need to work on rating different offset on how impactful they are. I even am putting together something called [Catalyst](#) which will direct offset money from companies to getting green products to be less expensive.

Geoengineering should be explored but only as a backup.

522

level 1

[Pipeadcr](#)

[6 hours ago](#)

How does it feel to know that a creation of yours - windows - completely changed the world?

825

level 2

[thisisbillgates](#)

[5 hours ago](#)

I am proud of Microsoft and the work we did on great software and helping the Digital revolution. It was fun to be part of it. I actually enjoy my current work on Global Health just as much but it is different.

1.5k

level 1

[martdnfjar](#)

[6 hours ago](#)

Hey Bill,

I will be doing my first internship this Summer as a Software Engineer for a well known bank. I am a little nervous and really want to perform well. As a successful figure in the tech industry, do you have advice or insight for a young intern going into the tech industry?

Thanks in advance and thank you for all the good you have done in the world.

171

level 2

[thisisbillgates](#)

[5 hours ago](#)

You can surprise people by learning a lot about the company and its competition and its systems. If you are helpful and friendly you will likely get good mentorship from the experienced employees. I think you can be open about your nervousness and a reasonable company will embrace your honesty.

368

level 1

[Western Situation138](#)

[6 hours ago](#)

Hello Mr. Gates! How long did it take you to write your new book (including researching, interviewing, and the general writing process)? Thanks for taking the time to do this!

level 2

[thisisbillgates](#)

[6 hours ago](#)

I had a lot of help from my staff including Josh Daniel and I was able to draw on all of my learning about climate from over a decade. I would say it was 2 months of full time work spread over a year including a big edit this last November.

430

level 1

[onlypinky](#)

[6 hours ago](#)

Do you see UBI as a sustainable way of economic?

294

level 2

[thisisbillgates](#)

[5 hours ago](#)

Today we provide income to people who are disabled in many countries. The question is can we afford to do this for everyone. We are getting richer as we innovate but I question if we are rich enough to discourage able people from working. Over time we have been more generous and we will be more generous. The discussion on this is very interesting but it does come down to numbers...

321

level 1

[Icharliee](#)

[6 hours ago](#)

How misinformation, disinformation, and fake news can do damage to society?

500

level 2

[thisisbillgates](#)

[6 hours ago](#)

This is a huge issue. Some false information is more interesting than the truth so digital channels seem to magnify echo chambers with bad facts. I haven't seen as much creativity on how we solve this as we need.

1.0k

level 1

[heidismiles](#)

Moderator

[6 hours ago](#)

Thanks for doing this AMA! What do you think are the most important things that regular citizens can do to decrease their carbon footprint?

439

level 2

[thisisbillgates](#)

[6 hours ago](#) · *edited 6 hours ago*

Your political voice is the most important thing. Getting educated and convincing people of all political parties to care will make a huge difference.

Then you can consume less and when you do consume buy green products like electric cars or synthetic meat.

You will also be able to give to a fund to help with this.

Another area is to make sure your company is paying for offsets and doing its part.

If you want to help, there are [ways everyone can get involved](#).

770

level 1

[Kalepsis](#)

[5 hours ago](#)

When Oxford University was working on a COVID-19 vaccine it announced that it would be made "open source", meaning that any pharmaceutical manufacturer would be able to produce it legally without infringement on any drug patent, which would make the vaccine more widely available and less expensive, enabling widespread vaccination of the economically destitute populations in developing countries. But after their announcement that they would make the vaccine free to produce, they received immense pressure from the Bill and Melinda Gates Foundation (wherein Oxford research staff were threatened with the reduction or elimination of all grants from the Foundation, not limited only to those for medical research) to patent the vaccine and partner with AstraZeneca to sell it. So, now, not only did AstraZeneca receive all the accolades for "developing" a vaccine (which the company did not do), it's also being produced in limited quantities and sold for \$4 per dose to the federal government, which is about 20 times more expensive than the estimated cost if the formula had been open source and allowed to be mass

produced by any manufacturer with the required equipment. In addition, because it is patented, it can only be produced by AstraZeneca, and poor countries have no or limited access to inexpensive vaccines.

Why did you do that, Bill?

2.7k

level 2

[thisisbillgates](#)

Scheduled AMA

[5 hours ago](#) · *edited 4 hours ago*

Our [foundation](#) has given over \$2B to help with this pandemic. I value anyone looking at what we have done and giving us suggestions. The problem with vaccine manufacturing quickly is not an IP problem. We sent funds to Serum and others early in the pandemic because of the lead time for factories including regulatory review to make sure the factory is high quality.

This vaccine is inexpensive - around \$3 to \$2 once you get into high high volume but there are fixed costs to get going.

1.1k

level 1

[Zenbeno8](#)

[6 hours ago](#)

Do you think lab grown meat will become widespread and replace livestock? Do you have experience with lab grown meat?

178

level 2

[thisisbillgates](#)

Scheduled AMA

[6 hours ago](#)

If the cost of making synthetic meat comes down it might be competitive even without considering climate or animal welfare. There are 2 approaches - one is growing the meat in the lab (cells), the other is using plant material to make the meat. Right now the plant approach used by Beyond and Impossible is cheaper.

I hope we can reduce emissions from cattle also since a lot of people depend on the value of their livestock. There is some research on this.

357

level 1

[mrgreen1](#)

[6 hours ago](#)

Is it possible to stop global warming without decreasing of the population growth number?

100

level 2

[thisisbillgates](#)

[5 hours ago](#)

Fortunately population growth stops when countries improve health and get to middle income levels. Population will peak around 10B if we are generous to the poorest countries particularly in Africa. Africa faces climate problems and population growth so having enough food and education and stability is a huge challenge. It was looking at African agriculture and how the climate is making it less productive that got me to study climate. So we should help moderate population growth with aid for health, education and good governance. The best book on this is Hans Rosling's [Factfulness](#). 10B is a lot especially as they consume more so the imperative for innovation in seeds and green approaches with low premiums is urgent.

235

level 1

[elephantologist](#)

[6 hours ago](#)

What's the best scenario if we do nothing about climate change?

93

level 2

[thisisbillgates](#)

[5 hours ago](#)

It gets worse over time and natural ecosystems go away. The migration away from the unlivable areas around the equator will be massive. We won't be able to support a large population if it gets a lot warmer.

199

level 1

[ForkPowerOutlet](#)

[6 hours ago](#)

Will climate change make future pandemics more common or more severe and how?

117

level 2

[thisisbillgates](#)

[6 hours ago](#)

I wouldn't tie them directly. Pandemic risk is hard to compute but with humans invading nature more and more it has gone up. Travel causes fast spread which makes respiratory diseases very scary. We can prepare for the next

pandemic with tens of billions in investments. I will be talking about this more this year to make sure we do the right things while people still remember how bad this pandemic was.

258

level 1

[Western Situation138](#)

[6 hours ago](#)

Hello Mr. Gates! What is something alarming about Climate Change that most people don't know about? (something that was not included in your new book). Thanks for doing this; it made my day!

97

level 2

[thisisbillgates](#)

[5 hours ago](#) · *edited 5 hours ago*

I didn't spend time going through all the bad things climate will do if we don't solve it. However the list is very long and some things could accelerate as we heat up. The damage to nature is going to be massive. David Attenborough has a [movie](#) that isn't really about climate but more about the beauty of nature and what we are losing that is very good.

231

level 1

[screwdriverimboca](#)

[6 hours ago](#)

Hi Bill,

How do you think misinformation plays a role in difficulting the battle against climate change? Do you think it has a meaningful impact or is it minimal?

141

level 2

[thisisbillgates](#)

Scheduled AMA

[5 hours ago](#)

The damage in the past was huge. Now the oil companies have stopped funding these things so I think climate denial will go down. There are issues about how we go about reducing emissions but I hope all young people agree that is a critical goal.

258

level 1

[simplecoreorg](#)

[6 hours ago](#)

Hi Mr. Gates,

I am a 16 year old at Wilson HS in Long Beach, California. My passion is education and I know that many students can share this desire, but it is hidden beneath distractions and social norms for so many people around the world. My school has a majority low-income and 81% minority enrollment and we have been doing remote learning since a year from this date. During this time, I decided to start a non-profit online platform that focuses on increasing the motivation and confidence that students have for education, keeping in mind the fact that students learn differently even among similar areas, cultures, and backgrounds. My goal with the platform is to be a place where students create their own instructional videos, which solidifies their learning and gives them motivation associated with the satisfaction that comes with creating the end-product of a video. The result is that students learn from teaching, also known as the protege effect, and gain opportunities to practice their presentation and technical skills in a world that embraces video presentation skills. On the platform, students can also learn from each other by interacting with the videos of their peers from around the world. I know that it is an ambitious and not mainstream concept to have students teach and make videos, but after personal experience and research that backs it up, I have conviction that this can improve motivation and outcomes for all students. To help foster the growth of this concept, and to make it mainstream, I plan to raise funds to hold quarterly scholarship competitions to encourage more participation in this opportunity throughout the world. What advice can you give me about my mission to introduce this idea to the mainstream of education?

62

level 2

[thisisbillgates](#)

Scheduled AMA

[5 hours ago](#)

I think people connecting across country boundaries is important. We should understand the perspective of the young generation in China, Nigeria, India, etc.. If we can use digital tools to connect like this that would be great. I also think on-line learning can improve a lot so it is great you are working on that.

92

[Dacrazyshot](#)

[6 hours ago](#)

Hey Bill,

How does it make you feel when you see these conspiracy theorists talking about how you are plotting to take over with the Covid-19 vaccine?

Also, GME?

101

level 2

[thisisbillgates](#)

[5 hours ago](#)

Vaccines are important and it is too bad they are so controversial.

I don't know why people think I want to track other people - it is unfortunate if this makes people not wear masks or consider getting the vaccine.

206

level 1

[quick20minadventure](#)

[6 hours ago](#) · edited 6 hours ago

Hello Mr Gates, do you think crypto mining should be banned globally due to the energy costs involved?

Edit : expanding on this, they contribute significantly on pure energy, let alone the carbon footprint of computer chips that are used to mine currencies.

They seem to be easiest to remove carbon emissions because they hardly serve value apart from investment.

Single transaction costs 700-800 kWh and that's just not acceptable.

102

level 2

[thisisbillgates](#)

[6 hours ago](#)

I have a lot of issues with anonymous money transfer compared to attributed systems where you can dispute and reverse transactions and make sure taxes are paid. The electricity use is just one issue. We do need digital money but without that overhead.

227

level 1

[HFAhasan](#)

[6 hours ago](#)

Are you familiar with Bjorn Lomborg's works, of so what do you think about his book False Alarm, and the idea that Climate Change, even though its a very serious problem we should solve, isn't the one we should prioritize?

21

level 2

[thisisbillgates](#)

Scheduled AMA

[5 hours ago](#)

Bjorn focuses on the need to innovate but he is far too narrow. He doesn't appreciate the need for demand for green products to scale up these markets. I enjoy talking to Bjorn - he has done a lot of good work but climate needs a lot more investment and policy work than he suggests.

46

level 1

[Eric Steinberger](#)

[6 hours ago](#) · *edited 6 hours ago*

Hi Bill,

Firstly, thank you for doing this AMA!

At what percentage would you say our chances of reaching (net-)0 emissions by ~2060 are at today?

12

level 2

[thisisbillgates](#)

Scheduled AMA

[5 hours ago](#) · *edited 4 hours ago*

It really depends on whether the younger generation worldwide adopts this as a moral cause they force us to pay attention to. If they do then I would say 75% chance of success. If there isn't that push then the investments may not get made. Innovation is hard to schedule but with lots of inventors some will succeed. We are seeing a lot of amazing companies which Breakthrough Ventures is funding. Now we need to create the demand and scaling of the successful products including in hard areas like steel and cement. Governments are engaged because they see the voters caring more and this year will have some key events like Glasgow.

26

level 1

[harigatoshirabira](#)

[6 hours ago](#)

Hello Mr. Gates! I am curious about this: How do you cope with hate, theories and conspiracies about you? Thanks for doing this!

level 2

[thisisbillgates](#)

Scheduled AMA

[5 hours ago](#)

I get both positive and negative feedback for my work. Intelligent criticism is helpful. If people have ideas about how to solve climate that are different from mine or better solutions for global health I want to hear about. Just personal attacks don't move things forward as much but I don't let it stop me.

114

Global Economy 2021: Prospects and Challenges

Geoffrey Okamoto, First Deputy Managing Director, IMF
China Development Forum (session V venue I)

March 20, 2021

Dear Director-General Yu, thank you very much for inviting me to speak at this year's China Development Forum. The topic of the country's role in the "New Journey of Modernization" is an important one for the world.

Let me start with the outlook for the global economy and for China and highlight key policy priorities for the period ahead.

Global Outlook

In January, we projected 2021 global growth at 5.5 percent, but **prospects of a stronger recovery** are emerging – because of additional fiscal stimulus, especially in the U.S., and the prospects of broader vaccination.

We will update our global forecasts in the new **World Economic Outlook** coming out in early April.

However, the global recovery has been **incomplete and unequal**.

It is **incomplete** because despite a stronger than expected recovery in the second half of 2020, GDP remains well below pre-pandemic trends in most countries.

The recovery paths have also been **different across countries**, as well as across sectors.

China, in many ways, has already completed its recovery, returning to its pre-pandemic growth levels ahead of all large economies. But growth still lacks balance, with private **consumption lagging investment**. We expect consumption will catch up, as investment growth normalizes. But there are significant risks which I will describe momentarily.

Growing gap

Outside of China, though, there are worrying signs that the **gap between advanced economies and emerging markets is growing**.

We project that cumulative income per capita in emerging and developing countries, excluding China, between 2020 and 2022 will be 22 percent lower than what it would have been without the pandemic.

That will translate into close to 90 million people falling below the **extreme** poverty threshold since the pandemic started.

China has been a bright spot in its continued fight against poverty, but even there the pandemic has hurt vulnerable people the most.

Exceptional Uncertainty

As I said, uncertainty about the recovery is **exceptionally large**.

We don't know how ***prolonged the health crisis will be***. ***Access to vaccines remains very uneven***, both across advanced and emerging economies.

Low-income countries might not see significant vaccination well into 2022, and that is a problem: this pandemic will only really be over when it is over for **everyone**.

Another risk is the ***spread of resistant mutations*** that threatens to reduce the efficacy of current vaccines and could undermine or delay the recovery.

Besides these bigger issues, there are also uncertainties about the ***effectiveness of policy actions and differences in what countries can do***. Some countries face ***limited fiscal space and higher debts***. While China still has some room for maneuver, many others, especially low-income countries, do not.

Tighter financial conditions could exacerbate vulnerabilities in countries with high public and private debt. We have seen recent increases in bond yields as the growth outlook of some advanced economies improves, leading markets to expect an earlier withdrawal of monetary stimulus.

In the medium-term, the crisis could leave deep scars. In the past, advanced economies have seen their output reduced almost 5 percent below pre-recession trends five years after the beginning of a recession. It could be worse in countries that cannot afford a strong macroeconomic response and/or have large services sectors more affected by the pandemic. ***Everywhere***, the crisis has had a ***disproportionate impact*** on the young, the low-skilled, and women.

In the long-term, rising carbon emission levels remind us that ***climate change*** is also a significant challenge, and Asia has a major role in addressing it.

The way forward

These challenges are daunting, but they can be overcome with concerted actions by all countries. Let me highlight three priorities.

First, end the pandemic swiftly. The international community must swiftly ramp up vaccine production. We must ensure that low-income countries have the financing to procure and distribute vaccines. This requires bolstering funding for the COVAX initiative and the logistics for delivery.

On this front, we ask that leading economies support vaccine production and provide finance to developing countries.

Second, countries should *maintain economic support* and *calibrate* it to the stage of their recovery and the pandemic. Where the pandemic continues, the priority is to protect lives and livelihoods. As it wanes, support should become more targeted, focusing on mitigating scarring, supporting the reallocation of resources, and ensuring that the post-pandemic economy is an inclusive and sustainable one.

The best policies will be those that support the recovery, help strengthen resilience, and tackle long-standing challenges. For example, foster the transition to green energy and digitalization.

In **China**, the policies announced during the “Two Sessions” meetings to strengthen high-quality growth, rein in carbon emissions, and improve energy efficiency should support China's quest to rebalance its growth model towards greener and more consumption-oriented growth.

Achieving faster and higher-quality growth requires mutually enhancing reforms: strengthening social safety nets and green investment; opening up of domestic markets; continuing to reform state companies; and ensuring that private and government-owned firms can compete on an equal basis. A strong effort in this direction will raise productivity and income, and lead to more balanced and consumption-driven growth.

Third, we must ***mitigate divergence across countries***. This includes providing access to liquidity for developing economies and preventing climate change from hampering their economic growth and convergence.

IMF support

We at the IMF have been active as never before in supporting our membership. We have expanded ***concessional financing*** and ***provided debt relief*** to many of our poorest members.

A ***new SDR allocation*** is under consideration to help address the global long-term need for reserves.

We have also worked with the G20 on bilateral debt service relief through the ***Debt Service Suspension Initiative*** and on a ***Common Framework*** to address unsustainable sovereign debt.

Lastly, we are incorporating ***climate change*** into our country and financial risk assessments, while scaling up ***capacity development***.

We appreciate China's continuing support to all these endeavors.

Let me conclude by saying that the international community must come together and help each other to end this pandemic and lay the foundation for a more balanced, inclusive, and sustained global recovery for all.

Thank you very much!

Financial world greenwashing the public with deadly distraction in sustainable investing practices

Wall Street is greenwashing the financial world, making sustainable investing merely PR, which is a distraction from the problem of climate change.

Tariq Fancy

Opinion contributor

0:26

1:16

The financial services industry is duping the American public with its pro-environment, sustainable investing practices. This multitrillion dollar arena of socially conscious investing is being presented as something it's not. In essence, Wall Street is greenwashing the economic system and, in the process, creating a deadly distraction. I should know; I was at the heart of it.

As the former chief investment officer of Sustainable Investing at BlackRock, the largest asset manager in the world with \$8.7 trillion in assets, I led the charge to incorporate environmental, social and governance (ESG) into our global investments. In fact, our messaging helped mainstream the concept that pursuing social good was also good for the bottom line. Sadly, that's all it is, a hopeful idea. In truth, sustainable investing boils down to little more than marketing hype, PR spin and disingenuous promises from the investment community.

SEC looking to 'proactively identify ESG-related misconduct'

In many instances across the industry, existing mutual funds are cynically rebranded as “green” — with no discernible change to the fund itself or its underlying strategies — simply for the sake of appearances and marketing purposes. In other cases, ESG products contain irresponsible companies such as petroleum majors and other large polluters like “fast fashion” manufacturing to boost the fund's performance. There are even portfolio managers who actively mine ESG data to bet against environmentally responsible companies in the name of profit, a short-selling strategy. Risk managers are focused on protecting their investment portfolios from potential damages done by a

worsening climate rather than helping prevent that damage from occurring in the first place.

As disheartening as this reality is, claiming to be environmentally responsible is profitable. Last year alone, ESG mutual funds and exchange-traded funds nearly doubled. The investment community understandably reacted to this with cheers. But those cheers were only for fund managers and their bottom lines. No matter what they tout as green investing, portfolio managers are legally bound (as well as financially incentivized) to do nothing that compromises profits. To advance real change in the environment simply doesn't yield the same return.

In early March, my sentiments were echoed by the U.S. Securities and Exchange Commission (SEC), which announced it was creating a Climate and ESG Task Force to “proactively identify ESG-related misconduct” such as inaccurate or incomplete disclosures by funds and companies — an unprecedented move that suggests there might be abuses that have gone unaddressed.

Ironically, the COVID-19 pandemic has forced us to learn some painful lessons. The initial response of rosy forecasts, loose half-measures and group denial boosted morale, but it also lulled the public into a false sense of security that prolonged and worsened the crisis.

We need to fix the system before disaster strikes

While how we fight a pandemic and climate change are very different, one aspect is clear. Both threats can only be won through the combined efforts of science and policy. In response to the pandemic, we've learned that only top-down government action, such as forcing the closure of high-risk venues and mandating masks indoors, makes a real difference. A “free market” will not correct itself or fix the problem by its own accord.

Imagine the planet is a cancer patient, and climate change is the cancer. Wall Street is prescribing wheatgrass: A well-marketed, profitable idea that has no chance of curing or even slowing down the cancer. In this scenario, wheatgrass is the deadly distraction, misleading the public and delaying lifesaving measures like chemotherapy. But like giving false hope to unproven cures in the midst of a pandemic, the consequences of such irresponsibility are all too obvious. And motivation for why the industry continues to greenwash is all too obvious.

COVID: Support frontline COVID troops. Even as restrictions lift, say yes to masks, vaccines and unity.

When I left the industry in late 2019, due to family business obligations following the passing of my father-in-law, I was frustrated by the lack of any real change. But I took some comfort in believing that if we weren't doing as much as we could, at least we weren't doing any harm. Since my departure, I have had a lot of time to think about this issue, and I've reassessed my opinion. I believe we are doing irreversible harm by stalling and greenwashing. And all in the name of profits.

We're running out of time and need to accept the truth: To fix our system and curb a growing disaster, we need government to fix the rules.

Tariq Fancy is the former chief investment officer for Sustainable Investing at BlackRock.

What I'm thinking about this New Year's Eve

As the year comes to an end, I reflect on how we can make our tax system more fair.

By Bill Gates

|

December 30, 2019 6 minute read

Where will you be when the ball drops at midnight on New Year's Eve?

I expect to spend midnight this year in the exact same place I spent midnight last year: asleep in bed. That doesn't mean I'll let the holiday go by without recognition, though. Melinda and I love to use this time of year to reflect. How did the last twelve months go? And what do we hope to accomplish in the years ahead?

I was fortunate to [travel](#) the [world](#) this year. I got to meet [some amazing people](#) and see [incredible innovations](#) that I'm hopeful will make life better for millions. As December comes to a close, I feel more optimistic than ever about the progress we are making. At the same time, I'm also aware that gross inequities continue to separate the lucky from the unlucky all over the world—and that I have immense privileges as a result of this inequality.

Instead of updating you on what I'm working on—as I did in last year's [end-of-year post](#)—I want to use this year's post to write about inequality. Specifically, I want to focus on one particular issue that came to the forefront in 2019 and will be top of mind for many in 2020: America's tax system. This isn't exactly the most festive topic to cover during the holidays, but it's one of the most important debates happening in our country right now.

Although I mostly spend my time talking about the issues I'm really focused on—global health, education, and climate change—I get asked about taxes a lot. I understand why it comes up so often; I'm a natural focal point for this debate.

The truth is, I've been pushing for a fairer tax system for years. It was nearly two decades ago that my dad and I started calling for [an increase in the federal estate tax](#) and for an estate tax in our home state of Washington, which has the most regressive tax system in the country. In 2010, he and

I also backed a [voter initiative](#) that—had it passed—would’ve created a state income tax. (My dad even wrote a [book](#) about why we need to tax accumulated fortunes.)

It isn’t always popular to stand up for higher taxes, so it’s great that many Americans are having this conversation. I want to be as clear as possible about my views.

I start with the understanding that the U.S. government simply does not bring in enough money to meet its obligations. This isn’t a value judgment; it’s just a fact. The government collects about 20 percent of GDP in taxes while spending about 24 percent. And the cost of commitments is going up.

Meanwhile, the wealth gap is growing. The distance between top and bottom incomes in the United States is much greater than it was 50 years ago. A few people end up with a great deal—I’ve been disproportionately rewarded for the work I’ve done—while many others who work just as hard struggle to get by.

“I think the rich should pay more than they currently do, and that includes Melinda and me.”

That’s why I’m for a tax system in which, if you have more money, you pay a higher percentage in taxes. And I think the rich should pay more than they currently do, and that includes Melinda and me.

Although I’m not an expert on the tax code, here are some steps I think America should take to make its tax system more fair.

We should shift more of the tax burden onto capital, including by **raising the capital gains tax**, probably to the same level as taxes on labor.

Today the U.S. government depends overwhelmingly on taxing labor—about three quarters of its revenue comes from taxes on wages and salaries. Most people get almost all of their income from salary and hourly work, which is taxed at a maximum of 37 percent. But the wealthiest generally get only a tiny percentage of their income from a salary; most of it comes from profits on investments, such as stock or real estate, taxed at 20 percent if they’re held for more than a year.

That’s the clearest evidence I’ve seen that the system isn’t fair. I don’t see any reason to favor wealth over work the way we do today.

I'm also in favor of **raising the estate tax and closing the loopholes in it that many wealthy people take advantage of**. A dynastic system where you can pass vast wealth along to your children is not good for anyone; the next generation doesn't end up with the same incentive to work hard and contribute to the economy. It's one of the many reasons that Melinda and I are giving almost all of our wealth back to society through our foundation, rather than passing all of it along to our children.

Other steps toward a fairer tax system include **removing the cap** on how much income is subject to Medicare taxes, **closing the carried-interest loophole** that allows investment-fund managers to pay the lower capital gains rate on their income, and **taxing large fortunes** that have been held for a long time (say, ten years or more). Very wealthy people often have large investments they've held for long periods, and if those investments aren't sold or traded, the money is never taxed. That doesn't make sense.

And fixing taxation at the federal level is only a part of the solution. We also need to **make state and local taxes fairer**, since they represent a large portion of Americans' tax bills. For example, I still think we should adopt a state income tax in Washington.

When I say the government needs to raise more money, some people ask why Melinda and I don't voluntarily pay more in taxes than the law requires. The answer is that simply leaving it up to people to give more than the government asks for is not a scalable solution. People pay taxes as an obligation of law and citizenship, not out of charity. Additional voluntary giving will never raise enough money for everything the government needs to do. If Melinda and I signed over our foundation's entire endowment to the state of California, it wouldn't be enough to fund their public schools for even one year. A vibrant economic system depends on setting expectations for who pays how much.

But in addition to fair taxes, Melinda and I think there's value to society in allowing the wealthy to put some money into private foundations, because foundations play an irreplaceable role that's distinct from what governments do well. In particular, philanthropy is good at managing high-risk projects that governments can't take on and corporations won't—for example, trying out new approaches to eradicating malaria, which is something our foundation is working on. If a government tries an idea for improving global health that fails, someone wasn't doing their job. Whereas if we don't try some ideas that fail, we're not doing our jobs.

“In the 1970s, when Paul Allen and I were starting Microsoft, marginal tax rates were almost twice the top rate today. It didn’t hurt our incentive to build a great company.”

The country does need to be thoughtful about how high taxes should be raised. One of the reasons that innovators flock to the United States is that this country makes it easy to start a business, invest capital, and earn a profit. We shouldn’t destroy those incentives, but we’re a long way from that point now. Americans in the top 1 percent can afford to pay a lot more before they stop going to work or creating jobs. In the 1970s, when Paul Allen and I were starting Microsoft, marginal tax rates were almost twice the top rate today. It didn’t hurt our incentive to build a great company.

It’s great that Americans are debating who should pay more in taxes and how. I’ll continue to focus on the issues our foundation works on as well as climate change, so I will not take a position on the proposals that are being debated during this campaign season. But I believe we can make our system fairer without sacrificing the incentive to innovate. We’ve updated our tax system before to keep up with changing times, and we need to do it again, starting with raising taxes on people like me.

At the beginning of this post, I mentioned two questions Melinda and I like to reflect on this time of year: How did the last twelve months go? And what do we hope to accomplish in the years ahead? As we end this decade and look forward to what the 2020s will bring, I hope to see progress not only in how taxes are collected but how they’re spent to build a healthier, more equitable world for all.

Melinda and I believe that driving progress is wealth’s highest purpose. Even before we were married, we decided that we would use the resources from Microsoft to make people’s lives better. Our wealth comes with an obligation to give back to society, and in 2020, we’re committed to continue living up to that obligation: through our taxes, through our foundation, and through our personal giving.

Melinda and I are currently writing a lot more about that commitment in our Annual Letter, which will come out at the beginning of February.

I wish you and your loved ones a wonderful year ahead.

B.1 Derivation of U.S. Net Wealth

Billions of dollars; amounts outstanding end of period, not seasonally adjusted

		2018	2019	2020	2019		2020					
					Q3	Q4	Q1	Q2	Q3		Q4	
1	FL892090005	U.S. net wealth (1)	93673.9	105236.7	114291.1	101766.0	105236.7	95434.6	102764.9	106872.2	114291.1	1
2	LM152010005	Households' direct holdings of nonfinancial assets	37837.8	39922.1	42641.9	39620.7	39922.1	40388.9	40912.1	41604.2	42641.9	2
3	LM155035005	Real estate	31693.5	33522.4	35789.2	33264.9	33522.4	33934.2	34433.0	34874.0	35789.2	3
4	LM165015205	Equipment (nonprofits)	438.6	457.0	467.7	453.0	457.0	461.6	462.8	465.7	467.7	4
5	LM165013765	Intellectual property products (nonprofits)	184.1	192.5	203.7	192.0	192.5	195.0	198.0	200.5	203.7	5
6	LM155111005	Consumer durable goods	5521.7	5750.1	6181.2	5710.9	5750.1	5798.2	5818.2	6064.0	6181.2	6
7	LM112010005	Nonfin. noncorporate businesses nonfinancial assets	14079.3	14907.4	15576.5	14845.9	14907.4	14977.6	15168.3	15382.3	15576.5	7
8	LM115035005	Real estate	12673.0	13209.5	13257.7	13195.9	13209.5	13182.0	13212.8	13248.0	13257.7	8
9	LM115015205	Equipment	863.5	884.2	910.7	880.8	884.2	893.0	896.8	905.3	910.7	9
10	LM115013765	Intellectual property products	273.9	289.9	289.8	286.4	289.9	290.6	292.2	289.9	289.8	10
11	LM115020005	Inventories	262.0	258.7	246.0	249.2	258.7	244.4	236.9	235.7	246.0	11
12	LM662090003	Fin. noncorporate businesses nonfinancial assets (2)	78.2	83.5	90.3	80.6	83.5	84.8	88.5	87.1	90.3	12
13	LM883164105	Market value of domestic corporations (3)	35816.1	45165.0	53989.5	42049.2	45165.0	35657.8	43412.1	47286.2	53989.5	13
14	LM103164103	Nonfinancial corporate equity	26543.9	33676.5	41553.2	31324.0	33676.5	27003.0	33391.3	36712.0	41553.2	14
15	LM793164105	Financial corporate equity	9272.1	11488.5	12436.4	10725.2	11488.5	8654.8	10020.8	10574.2	12436.4	15
16	LM315015005	Federal government nonfinancial assets (4)	3522.1	3604.2	3707.5	3587.1	3604.2	3624.4	3639.5	3669.6	3707.5	16
17	LM315015605	Structures	1638.1	1662.5	1694.1	1660.8	1662.5	1669.1	1665.2	1683.1	1694.1	17
18	LM315013265	Equipment	790.2	811.6	828.8	802.3	811.6	815.6	819.9	818.3	828.8	18
19	LM315013765	Intellectual property products	1093.8	1130.1	1184.6	1124.0	1130.1	1139.7	1154.4	1168.2	1184.6	19
20	LM212010095	State and local governments nonfinancial assets (4)	11606.1	12078.0	12398.4	12013.6	12078.0	12175.7	12153.5	12323.9	12398.4	20
21	LM215015605	Structures	11201.9	11661.5	11968.1	11598.6	11661.5	11757.8	11730.5	11897.0	11968.1	21
22	LM215013265	Equipment	264.9	270.6	276.5	270.1	270.6	270.8	273.4	275.8	276.5	22
23	LM215013765	Intellectual property products	139.3	145.9	153.8	144.9	145.9	147.1	149.6	151.1	153.8	23
24	FL882090265	Net U.S. financial claims on the rest of the world	-9265.7	-10523.5	-14113.0	-10431.1	-10523.5	-11474.6	-12609.1	-13481.2	-14113.0	24
25	FL264194005	U.S. financial claims on the rest of the world	20701.6	24244.1	26239.0	23016.7	24244.1	20764.2	22772.4	23554.1	26239.0	25
26	LM263164100	U.S. holdings of foreign corporate equities	7899.6	9459.1	10513.1	8720.9	9459.1	7370.8	8552.7	9124.8	10513.1	26
27	FL264190005	Other U.S. financial claims	12802.1	14785.0	15726.0	14295.8	14785.0	13393.3	14219.7	14429.4	15726.0	27
28	FL264090005	Less: Foreign financial claims on U.S.	29967.3	34767.6	40352.0	33447.9	34767.6	32238.7	35381.4	37035.3	40352.0	28
29	LM263064105	Foreign holdings of U.S. corporate equities	6629.5	8199.0	10603.6	7619.8	8199.0	6723.9	8188.9	9069.6	10603.6	29
30	FL264090035	Other foreign financial claims	23337.8	26568.6	29748.4	25828.0	26568.6	25514.8	27192.6	27965.7	29748.4	30
Memo:												
31	FL892090005	A. U.S. net wealth (line 1)	93673.9	105236.7	114291.1	101766.0	105236.7	95434.6	102764.9	106872.2	114291.1	31
32	FC892090005	Change in U.S. net wealth	-1677.7	11562.8	9054.4	536.7	3470.7	-9802.1	7330.2	4107.3	7418.9	32
33	PC892090005	Percent change in U.S. net wealth	-1.76	12.34	8.60	0.53	3.41	-9.31	7.68	4.00	6.94	33
34	FL152090005	B. Household net worth (5)	105518.1	118219.8	130154.6	114628.9	118219.8	111445.5	119589.1	123229.4	130154.6	34
35	FC152090005	Change in household net worth	648.9	12701.7	11934.8	817.5	3590.9	-6774.2	8143.5	3640.4	6925.2	35
36	PC152090005	Percent change in household net worth	0.62	12.04	10.10	0.72	3.13	-5.73	7.31	3.04	5.62	36

(1) U.S. net wealth measures the value of tangible assets controlled by the household and nonprofit organizations, noncorporate business, and government sectors of the U.S. economy and the market value of domestic nonfinancial and financial corporations, net of U.S. financial obligations to the rest of the world (sum of lines 2+7+12+13+16+20+24).

(2) Assumed to be equal to proprietors' equity in noncorporate brokers and dealers.

(3) This measure does not equal the net worth of the nonfinancial corporate business and financial business sectors reported in the Integrated Macroeconomic Accounts (tables S.2.a and S.2.q) because of differences in the valuation of assets.

(4) Excludes land and nonproduced nonfinancial assets.

(5) Household net worth is calculated as the difference between total assets and liabilities of the household and nonprofit organizations sector. See table B.101.

Working Conditions Survey

Goldman Sachs & Co. LLC

February 2021

On average, first year analysts are working over 95 hours per week and sleeping 5 hours per night

Question	Mean
How many hours have you worked this week (ending 2.13.21)?	105 hours
How many hours have you worked per week on average since January?	98 hours
How many hours do you sleep on average per night?	5 hours
On average, what time do you sleep?	3am

Source: Survey of first-year analysts, 13 respondents

If working conditions do not change in the next 6 months, most 1st year analysts say they are unlikely to stay at GS

Question	Mean
If working conditions stay the same, what is the likelihood you'll still be working at GS in <u>1</u> month? (1-10, with 10 being most likely)	8.1
If working conditions stay the same, what is the likelihood you'll still be working at GS in <u>3</u> months? (1-10, with 10 being most likely)	5.2
If working conditions stay the same, what is the likelihood you'll still be working at GS in <u>6</u> months? (1-10, with 10 being most likely)	3.5

Source: Survey of first-year analysts, 13 respondents

“The sleep deprivation, the treatment by senior bankers, the mental and physical stress...***I’ve been through foster care and this is arguably worse***”

“I can’t sleep anymore because my ***anxiety levels are through the roof***”

“My body ***physically hurts all the time*** and ***mentally I’m in a really dark place***”

“Being unemployed is less frightening to me ***than what my body might succumb to*** if I keep up this lifestyle”

“There was a point where I was ***not eating, showering or doing anything else*** other than working from morning until after midnight”

“I didn’t come into this job expecting a 9am-5pm’s, but I also didn’t expect ***consistent 9am-5am’s*** either”

“What is not ok to me is 110-120 hours over the course of a week! The math is simple, that leaves 4 hours a day for eating, sleeping, showering, bathroom and general transition time. This is beyond the level of ‘hard-working’, ***this is inhumane / abuse***”

- **80 hours per week should be considered max capacity**

- In order to do our best work and deliver for the firm's clients we need to be rested and free from juggling an insurmountable amount of conflicting work streams

- **CS work should be appropriately de-prioritized versus live deal work**

- Although CS work is important, completing CS work should not come at the detriment of live deals
- CS work should not be completed after an appropriate time of night (midnight) so that analysts can get sleep when they are not working on something that is not truly urgent

- **Client meetings requiring materials should be scheduled at least 1 week in advance of the meeting date**

- In order to avoid unnecessary time crunches teams need ample time to prepare for meetings
- Doing so should lighten stress levels and give teams time to be thoughtful and produce their best materials

- **Teams should be required to meet ASAP when a meeting is set to align on content, timing, and capacity**

- Often times, VPs create shells for decks that do not align with what senior team members want to show, which results in junior teams creating the wrong materials. Ultimately, senior team members see these materials and junior team members often have to start from scratch on incredibly short timelines (less than 24 hours) – resulting in unnecessary stress, subpar work, and lack of sleep

- **For client meetings, teams should be pencils down 12 hours before the meeting**

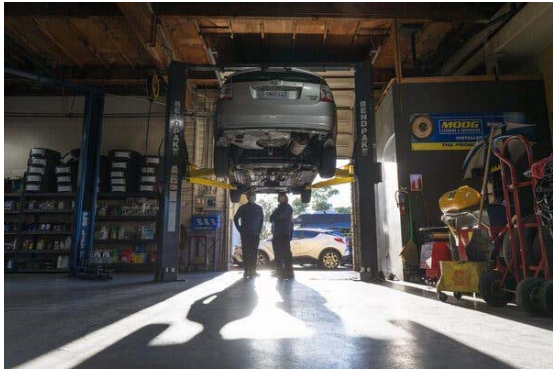
- Junior team members often receive many comments right before meetings with the assumption that they can incorporate comments at a moment's notice. This adds undue stress and is unreasonable as senior folks are essentially asking them to put everything else to the side immediately, when instead these comments could have been given and addressed at a more reasonable time

- **The Friday night 9pm policy, and Saturday policy need to be respected**

- Junior bankers should not be expected to do **any work** after 9pm Friday or all day Saturday without a **pre-approved exception**, as that is the only safe-guarded personal time that we get
- Often times, junior people are asked to do “quick” work without an exception and it is incredibly hard to push back

Thieves Nationwide Are Slithering Under Cars, Swiping Catalytic Converters

The pollution-control gadgets are full of precious metals like palladium, and prices are soaring as regulators try to tame emissions. Crooks with hacksaws have noticed.



Michael Kevane's Prius received a new catalytic converter in San Jose this month after someone stole the old one. Credit...James Tensuan for The New York Times

By **Hiroko Tabuchi**

- Published Feb. 9, 2021 Updated Feb. 20, 2021

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Michael Kevane, an economics professor in San Jose, Calif., didn't give a second thought to parking his 2005 Prius in his driveway one rainy evening last month. But the next morning, when his son Elliot went to start up the car, "it sounded like a jackhammer," Mr. Kevane said. "The whole block could hear the noise."

The reason for the ruckus: A thief in the night had made off with the car's catalytic converter, a critical emissions-control device that contains precious metals more valuable than gold.

Two days later, Mr. Kevane's sister, Jean, who lives in Los Angeles, had the catalytic converter stolen from her 2003 Honda Accord LX. "I thought, 'This can't be a coincidence,'" Mr. Kevane said.

It wasn't.

Stricter car emissions rules around the world — particularly in China, which has scrambled in recent years to get its dire [air pollution problem](#) under control — have sent demand for the precious metals in catalytic converters surging. That has pushed up the asking price for some of the precious metals used in the device — like palladium and rhodium — to record highs.

From about \$500 an ounce five years ago, the price of palladium quintupled to hit a record of \$2,875 an ounce last year, and is now hovering between \$2,000 and \$2,500 an ounce, above the price of gold. Rhodium prices have skyrocketed more than 3,000 percent from about \$640 an ounce five years ago to a record \$21,900 an ounce this year, roughly 12 times the price of gold.

The soaring prices may be accelerating the shift to electric cars, analysts said, noting that catalytic converters now make up a much larger proportion of a gasoline-powered vehicle's cost than they did even just a year ago.

The metals prices, in turn, are fueling a black market in stolen catalytic converters, which can be sawed off from the belly of a car in minutes, and fetch several hundred dollars at a scrapyard, which then sells it to recyclers who extract the metals. These global trends in emissions regulations, metals markets and larceny appear to have converged that rainy night in Mr. Kevane's driveway.

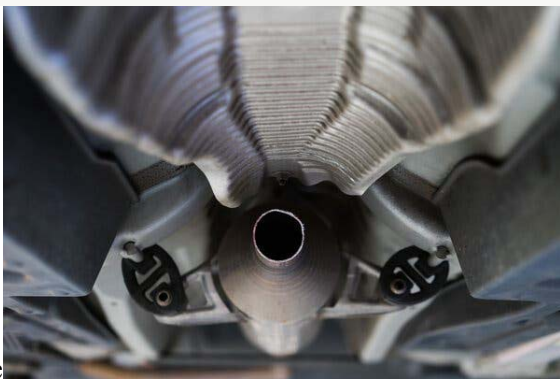
Nationwide, police are reporting a surge in cases.

In St. Louis, catalytic converter thefts jumped more than eightfold, from 50 in 2019 to 420 last year, with the trend gaining speed near the end of the year into early 2021. In Lexington, S.C., sheriffs deputies responded to 144 catalytic converter thefts between July and December, nearly triple the number of cases over the year-earlier period.

Converter thefts in Wichita, Kan., also almost tripled in 2020 compared to the previous year, to 547 cases from 191, and the pace picked up in January, with 102 reported cases just that month. (Other police departments, including those in San Jose and New York, said such detailed data was not available.)

"People are just trying to make ends meet. Then, all of a sudden, they have a thousand-dollar repair bill they didn't expect," said Sgt. Trevor McDonald of the Wichita Police. "We've also seen this increase at a time we've seen a lot of job loss in the U.S.," he added.

The bottom line: "We have a finite number of detectives, and it appears right now we have an infinite number of cases," Sergeant McDonald said.



Image

The spot where Mr. Kevane's converter was cut out from under his car. Credit...James Tensuan for The New York Times

Catalytic converters, the shiny bulbous contraptions found between a car's engine and the muffler, might seem like an unlikely target of a national crime wave. Installed in almost all gasoline cars and trucks sold in the United States since 1975, the converters have a honeycomb-like interior — coated with precious metals like palladium, rhodium and platinum — that scrubs the worst toxic pollutants from the car's exhaust.

The presence of those metals has always made catalytic converters a target, and incidents of theft — which can set owners back \$2,000 in repairs — go back years. But a global trend toward stricter tailpipe emissions rules, as well as more rigorous enforcement after the [Volkswagen emissions scandal](#), in which the automaker illicitly modified its vehicles' pollution controls to seem cleaner than

they really were, has led to a surge in demand for higher-performance catalytic converters and the valuable metals that make them work.

Rhodium, in particular, is effective in reducing levels of nitrogen oxide from a gasoline car's tailpipe emissions. And "we've had a very steep step-up" in nitrogen oxide rules around the world, said Wilma Swarts, director of platinum group metals at the London-based precious metals research consulting firm Metals Focus.

About 80 percent of demand for palladium and rhodium now comes from the automotive sector. At the same time, the effects of the pandemic on mining in South Africa, a major producer of rhodium, has kept supply limited. "This is why you've seen this very dramatic rise" in demand and prices, she said.

For automakers, the metals boom has jacked up the cost of producing gasoline vehicles. Max Layton, a London-based commodity analyst at Citi, estimates that soaring metal prices added \$18 billion to the global auto industry's production costs in 2019, gobbling up 15 percent of their total cash flow, and that those costs surged further in 2020.

At current prices, he said, the industry as a whole was set to spend more than \$40 billion this year just on metals for catalytic converters. The escalating costs, Mr. Layton said, were "putting pressure on automakers to shift to battery electric vehicles as quickly as possible."

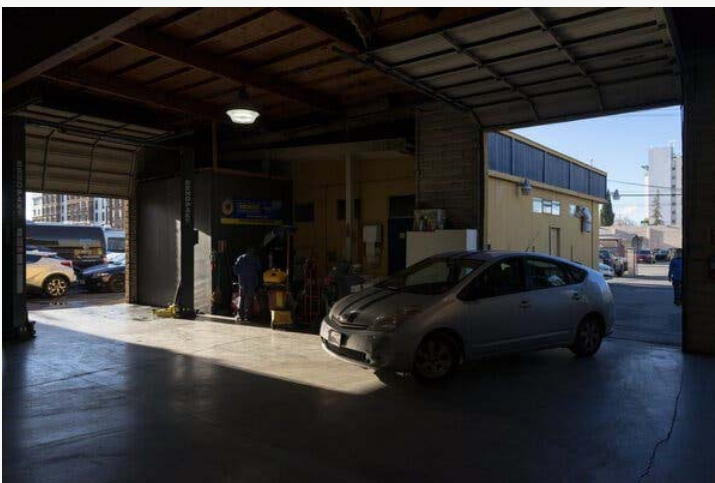
Some owners are going to extremes to protect their vehicles.

After being hit with three converter thefts in quick succession last year, Jerry Turriff, proprietor of Jerry's Certified Service and Towing in Milwaukee, has resorted to deflating the tires of some of his customers' most at-risk vehicles to deter thieves from crawling underneath.

"It's unbelievable," Mr. Turriff said. "Now if I have a vehicle I think's going to be targeted, I take the air out the tires, so they can't slither underneath."

He's spotted the thieves on his security-camera footage — usually alone, entering his property in the dead of night, with "a big duffel bag carrying all his junk," he said. (Stealing the converters can be treacherous for the thieves, too. Last year, a Kansas City man died after the Prius he was stealing the converter from [crushed him to death](#).)

The last vehicle targeted, in November, was a Toyota Tundra pickup truck. Mr. Turriff replaced the stolen part, but the owner had the part stolen again several weeks later, he said.



Thieves target the Prius because, as a hybrid vehicle, its gasoline engine is used less than in regular cars, so the catalytic converter tends to retain more of the valuable metals. Credit...James Tensuan for The New York Times

Some states have started to require scrapyards and other recyclers to check photo IDs before buying used catalytic converters. California even requires businesses to take a photograph or video clip of the seller, and retain those records for two years. But different rules between states makes tracking and enforcement almost impossible, law enforcement officials say.

Online, ads abound of scrapyards willing to pay quick cash for catalytic converters. One site advertised payouts of up to \$500 for certain foreign models. Older foreign models tend to contain more of the precious metals than newer ones.

Toyota Prius converters also fetch a higher price because their gasoline engines aren't in as much use, and so it can take longer for the car to burn out the precious metals.

Some Toyota owners, in fact, are demanding that the automaker add anti-theft protections like metal shields to converters to make stealing them more difficult.

Ed Hellwig, a spokesman for Toyota, called catalytic converter theft "an industry-wide challenge" and said the Prius was no more at risk than any other vehicle. He urged owners to "follow the basics to protect their vehicles," including parking in well-lit areas.

Many buyers accept old catalytic converters by mail, with free shipping. And YouTube tutorials are available for would-be sellers.

J. C. Fontanive, a sculptor in Brooklyn, bought a used 2008 Prius in the summer, spurred by concerns over taking public transportation during the pandemic. Then last month, he went to drive it to a friend's, and "it sounds like NASCAR," he said.

Mr. Fontanive didn't have full auto insurance coverage, so he had to pay \$3,200 out of pocket for a replacement and repairs — half the price he'd paid for the car itself.

Determined to deter future thieves, Mr. Fontanive, who often uses metal in his artworks, drew on his metalworking skills. He bought an aftermarket metal guard for his catalytic converter, then made his own modifications, with security screws and hardened steel bell pins that would be hard to saw through.

"I really went overboard," he said. "If they look under my Prius now, they're just going to be like: 'No way.'"

For car owners who aren't trained in metalworking, or don't want to dole out money for a metal guard, the [police advise](#) parking in secure garages or well-lit areas. Etching a vehicle identification number or license plate ID on the converter could also help track it down if it does get stolen.

The Kevanes are still dealing with the aftermath. The younger Mr. Kevane, who works at a Whole Foods and at an immigration law firm, recently had to drive his Prius — its exhaust blaring — to a nearby repair shop.

"God, it's embarrassing," he said. "People probably will think I tricked out my Prius."

He brought the car to Tony Nguyen at Bayshore Automotive. It was the second catalytic converter theft that day Mr. Nguyen had gotten a call about — a first in his 25 years in business. A used car lot across the street had eight converters stolen last week, he said.

Reached by phone, an exasperated Mr. Nguyen asked a reporter optimistically, “Are you going to try to solve it?” He sounded disappointed when the reporter said that only a news article would ensue.

“It’s getting worse every day,” Mr. Nguyen said. “Someone has to do something.”

Correction: Feb. 20, 2021

An earlier version of this article mischaracterized federal rules on pollution control. Tighter standards introduced in 1975 meant that the vast majority of new vehicles would, in practice, need catalytic converters. Those standards did not explicitly require catalytic converters.

Hiroko Tabuchi is an investigative reporter on the climate desk. She was part of the Times team that received the 2013 Pulitzer for explanatory reporting. [@HirokoTabuchi](#) · [Facebook](#)



Dan Tsubouchi @Energy_Tidbits · 3h

Re just announced [\\$CP](#) [\\$KSU](#) combination. Excellent fit for US/Can rail networks. Good interactive rail mapping system to bookmark. priceofoil.org/rail-map/



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Dan Tsubouchi @Energy_Tidbits · 4h

See why [#SaudiAramco](#) is cutting 2021 capex to \$35b vs previous guidance \$40-45b. if maintain Q4/20 \$28.9b operating cash flow, could fund \$75b dividend + \$35b capex with \$5b cushion. Saudi wants/needs >\$60 Brent [#OOTT](#)

aramco.com/-/media/public...

Excerpt Saudi Aramco "Non-IFRS measures reconciliations and definitions for the year ended December 31, 2020 [\[LINK\]](#)

"Aramco uses free cash flow to evaluate its cash available for financing activities, including dividend payments. Aramco defines free cash flow as net cash provided by operating activities less capital expenditures."

Saudi Aramco Free Cash Flow After Dividends						
US\$ in million	Q1/20	Q2/20	Q3/20	Q4/20	2020	2019
Net cash provided by operating activities	22,418	12,349	12,411	28,901	76,079	111,074
Capital expenditures	7,397	6,248	6,383	6,914	26,942	32,769
Free cash flow	15,021	6,101	6,028	21,987	49,137	78,305
Dividends	13,394	18,751	18,752	18,752	69,649	73,200
Free cash flow after dividends	1,627	-12,650	-12,724	3,235	-20,512	5,105

Source: Saudi Aramco
Prepared by SAF Group

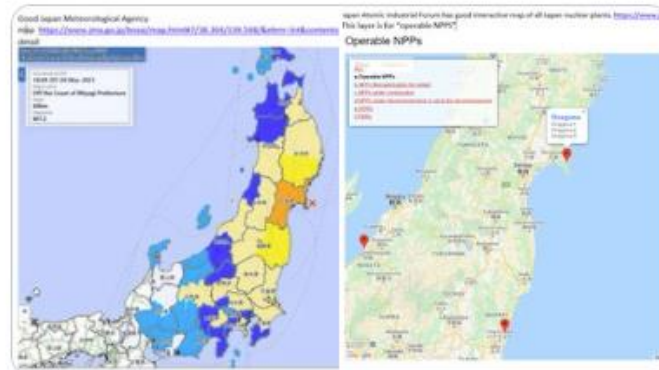
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Dan Tsubouchi @Energy_Tidbits · Mar 20

Japan 7.2 earthquake. [@Reuters](#) reports "no irregularities" at Onagawa [#nuclear](#) plant. its early but good to hear no injuries reported. Good interactive maps to bookmark: JMA excellent zoom for earthquake intensity, JAIF for all nuclear plants.

reuters.com/article/us-jap...



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Dan Tsubouchi @Energy_Tidbits · Mar 20

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No word yet what was damaged in #SaudiAramco Riyadh refinery drone attack. KSA has confirmed: a fire was brought under control, supply of oil or its derivatives was not affected by the attack. Doesn't mean there wasn't damage. Glad no one injured #OOTT

spa.gov.sa/viewfullstory...

<https://www.spa.gov.sa/viewfullstory.php?lang=english&id=2019032000001>

An Official Spokesman at the Ministry of Energy Condemns the Terrorist Drone Attack on the Riyadh Refinery and Denounces these Acts of Sabotage that Target the Security of Energy Supply

Riyadh, March 20, 2021, SPA — An official spokesman at the Ministry of Energy stated that today at 06:05 AM the Riyadh oil refinery was attacked by drones, resulting in a fire that has been brought under control. The attack did not result in any injury or death. In his statement, the spokesman stressed that the Kingdom strongly condemns this cowardly attack. The Kingdom asserts that such acts of terrorism and sabotage, repeatedly committed against vital installations and civilian facilities — the list of which was the attempt to target the Ras Tanura refinery and Saudi Aramco's residential area in Dhahran — do not target the Kingdom alone, but more broadly the security and stability of energy supply to the world, as well as the global economy. The spokesman renewed the call to all nations and organizations of the world to stand together against such acts of terrorism and sabotage, and to stop all groups carrying out or supporting these attacks.

—SPA
16:32 LOCAL TIME 03:02 GMT
0011



Dan Tsubouchi @Energy_Tidbits · Mar 19



No KSA word on Houthis claim 6 drones at #SaudiAramco 124,000 b/d refinery in Riyadh. Not 1st drone here ie. July 18, 2018, Houthis said drone hit Riyadh refinery, Saudi said fire from "operational incident". Major pipelines also pass by Riyadh #OOTT...



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Dan Tsubouchi @Energy_Tidbits · Mar 19

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the local coyotes are pretty excited tonight about something. although one standing in the snow along the path seems to be wondering why the rest of them are howling. snow only lasted 30 min and it's a beautiful evening in #Canmore



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Dan Tsubouchi @Energy_Tidbits · Mar 19



India oil consumption to double by 2030, an additional 4.3 mmb/d to 8.7 mmb/d says India Ministry of Petroleum and Natural Gas. What does India know that others don't? Demise of #Oil won't be as quick as aspirations of #EnergyTransition #OOTT #PeakOil demand

Dan Tsubouchi @Energy_Tidbits · Mar 18

#PeakOil demand. Hard to see the case it is already here. India reminds it is THE growth market for #Oil, forecasts its #Oil demand doubles from 4.4 mmb/d to 8.7 mmb/d in 2030. Double the growth in @IEA Oil 2021 & \$BP Sept outlook. Great report by Bloomberg @JournoDebit #OOTT twitter.com/Energy_Tidbits...

Energy @TheEconomist

India's oil demand is expected to double by 2030, says the country's oil ministry. The country's oil demand is expected to double by 2030, says the country's oil ministry. The country's oil demand is expected to double by 2030, says the country's oil ministry.

Table 2. Summary of global oil demand

Region	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Asia	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Europe	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
North America	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
South America	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Africa	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Middle East	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Other	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Total	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0

Interact the reporter on this story:
 0 Characters or less (link or @handle) @bloomberg/ret
 Select the address responsible for this story:
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Dan Tsubouchi @Energy_Tidbits · Mar 19



first grey day and snow in #Canmore in awhile. hard to complain as we have had such a mild winter in the Cdn Rockies. little bit of grey and snow is always easier to take with oil +\$1.50 today.



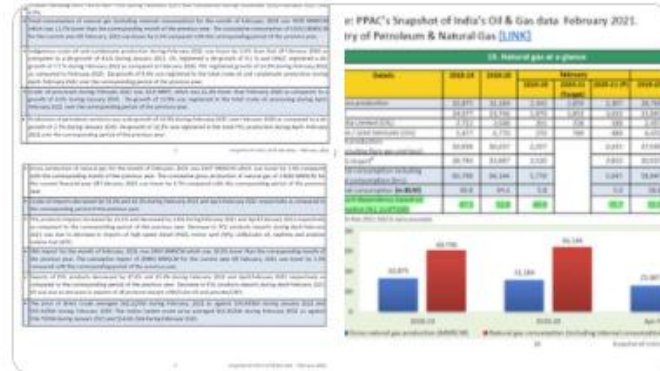
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SAF

Dan Tsubouchi @Energy_Tidbits · Mar 19

Must read is just posted PPAC's snapshot of India's Oil & Gas data for Feb. Not just for basic production/consumption but lots of added insights ie. India's increasing reliance on imported #LNG because its #NatGas production isn't growing #OOTT

ppac.gov.in/WriteReadData/...



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SAF

Dan Tsubouchi @Energy_Tidbits · Mar 19

No KSA word on Houthis claim 6 drones at #SaudiAramco 124,000 b/d refinery in Riyadh. Not 1st drone here ie. July 18, 2018, Houthis said drone hit Riyadh refinery, Saudi said fire from "operational incident". Major pipelines also pass by Riyadh #OOTT

bloomberg.com/news/articles/...



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SAF

Dan Tsubouchi @Energy_Tidbits · Mar 18

Positive for #Gasoline #Oil demand. Best indicator pent up demand/cabin fever should see record levels for US summer driving season unless a Covid backtrack. @GreatSmokyNPS saw 525,000 visitors in Jan, another monthly record, levels not normally seen until March. #OOTT

Great Smoky Mountains See Half a Million Visitors in January 2021

Posted on March 11, 2021

The traffic to the Great Smoky Mountains National Park isn't slowing down. **Just keeps breaking records!** More than half a million visitors were reported by the National Park Service in January of 2021. This year doesn't see numbers like that until about March. Keep reading to find out more about the Great Smoky Mountains getting half a million visitors in January 2021.

More than Half a Million Visitors Just in January

Typically traffic to the national park doesn't reach these numbers until March when spring is in the air. In January of 2021, the National Park Service reported that 525,801 recreational visits were made. This past January is the busiest on record for the Great Smoky Mountains National Park. This newest record comes right after other monthly records being broken at the end of 2020.

Most Popular Places in the Great Smoky Mountains

The Smokies have been a popular place to visit, and visitors keep coming for more. You're probably wondering where some of the most popular places are in the park. Here are the top popular places in the Smoky Mountains:

Cades Cove

The most popular destination in the entire national park is Cades Cove. This is an 11-mile looped road where you can drive and see incredible mountain views, meadows, and possibly even wildlife. You can stop your vehicle any time and explore throughout the area. You can walk inside historic buildings, such as cabins and churches. There are also several

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Dan Tsubouchi @Energy_Tidbits · Mar 18



Won't see Japan #LNG import data for March until late April. But there is a pretty good indicator that tells markets any significant winter Japan #NatGas #LNG demand was over in Feb - there were record early cherry blossoms in Tokyo and Kyoto.

japan-guide.com/sakura/



5



Dan Tsubouchi @Energy_Tidbits · Mar 18



a typical sunny day in #Calgary. the only work distraction when remote working is the loud canada geese hanging around our patio



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14



SAF

Dan Tsubouchi @Energy_Tidbits · Mar 18

#PeakOil demand. Hard to see the case it is already here. India reminds it is THE growth market for #Oil, forecasts its #Oil demand doubles from 4.4 mmb/d to 8.7 mmb/d in 2030. Double the growth in @IEA Oil 2021 & \$BP Sept outlook. Great report by Bloomberg @JournoDebjit #OOTT

The image shows a snippet of a Bloomberg article on the left and a table on the right. The article text is partially obscured by redaction boxes. The table, titled 'Table 2. Summary of global oil demand', shows oil demand in million barrels per day (mmb/d) for various regions from 2018 to 2030. The regions listed include Africa, Asia, Europe, Latin America, Middle East, North America, and Oceania. The table shows a significant increase in demand for Asia, particularly India, which is projected to reach 8.7 mmb/d by 2030.

Dan Tsubouchi @Energy_Tidbits · Oct 1, 2020

CNPC's view for China peak #Oil demand around 2025. See below SAF Group graph showing BP's Sept Energy Outlook 2020 forecast also calls for 2025 China peak demand and reminds that the key oil demand growth region for 2020s/30s/40s is India. #OOTT ...

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Dan Tsubouchi @Energy_Tidbits · Mar 17

Key for KSA, make sure US #Oil production isn't about to take off. Can add back some bpd and keep oil > \$60. #MBS (#Putin also) won't mind US gasoline prices about to break thru \$3 before the traditional price rise going into start of US driving season Memorial Day weekend. #OOTT



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SAF

Dan Tsubouchi @Energy_Tidbits · Mar 17

congrats @TaraNWeber . didn't realize you were now @BNNBloomberg western bureau chief until i heard @AndrewBellBNN introduce you earlier. keep up the great work reporting on the west. we need to make sure western issues aren't overlooked.

2 1 15



Dan Tsubouchi @Energy_Tidbits · Mar 17

for those not near their laptop. EIA weekly #Oil #Gasoline #Distillates inventory just released. Prior to release, WTI \$64.44 #OOTT

ir.eia.gov/wpsr/overview...

Oil/Products Inventory March 12: EIA, Bloomberg Survey Expectations, API (million barrels)	EIA	Expectations	API
Oil	2.40	2.70	-1.00
Gasoline	0.47	-3.50	-0.93
Distillates	0.26	-2.60	0.90
	3.13	-3.40	-1.02

Note: SPR had no change for March 12 week
 Note: Cushing declined 0.624 mmb for March 12 week
 Source EIA, Bloomberg

1 2



Dan Tsubouchi @Energy_Tidbits · Mar 17

Demise of #Oil will be like coal, it will take longer than #EnergyTransition aspirations. Too many major policy changes & accelerated behavioral changes needed to see peak oil demand before 2026. rather @IEA sees oil demand 104 mmb/d in 2026. #OOTT

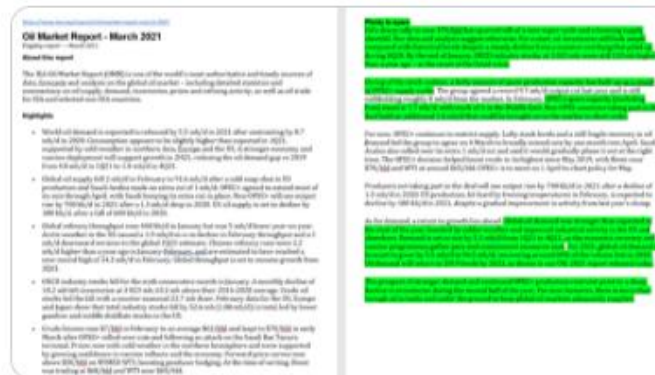


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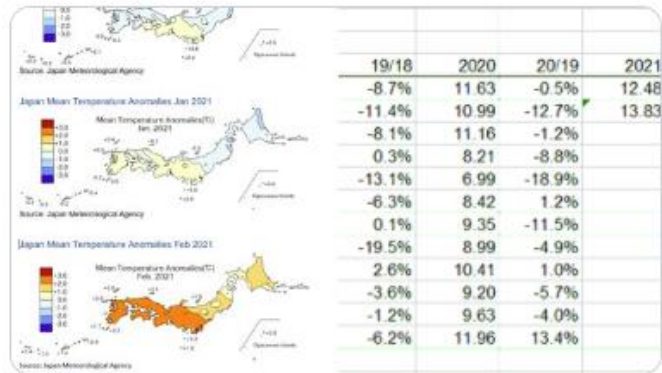
Dan Tsubouchi @Energy_Tidbits · Mar 17

#OOTT @IEA reminds 2021 oil call is all about #OPEC+ production restraint. No supercycle as enough oil in tanks and OPEC+ still holding back ~8 mmb/d, but demand recovering and "continued OPEC+ production restraint point to a sharp decline in inventories" during H2/21.



4

SAF Dan Tsubouchi @Energy_Tidbits · Mar 17 ...
 #LNG. Japan LNG imports Feb 13.83 bcf/d, +25.8% YoY, highest since Feb 2018. +10.8% MoM vs 12.48 bcf/d in Jan. Expect due to LNG restocking as Japan was very cold in Dec, cold in Jan before turning warm in Feb. Also thermal coal only +7.3% YoY in Feb. customs.go.jp/toukei/shinbun...



SAF Dan Tsubouchi @Energy_Tidbits · Mar 16 ...
 Good @RystadEnergy perspective #RenewableEnergy reality check, need to add 20x existing solar & 5x existing wind capacity to hit #NetZero. Challenge is actually worse, @POTUS target is carbon pollution free electricity by 2035. See SAF July 28/20 blog

rystadenergy.com/newsevents/new...

SAF GROUP

Blog Summary


Biden To Put US On "Irreversible Path to Achieve Net-Zero Emissions, Economy-Wide" Is a Major Negative To US Natural Gas in 2020s

Posted Tuesday July 28, 2020, 11:15am MT

Oil and natural gas followers should know that Biden's new clean energy plan is a major negative, in particular, to US natural gas in the 2020s. We know there is still 97 days to the US elections and a lot can change but, with Biden's big polling lead nationally and even in some key battleground states, it's the right time to start to look at what he means to oil and natural gas. Our concern is that Biden states he plans to put the US on an irreversible path to achieve net-zero emissions economy-wide by 2050 and, to do so, he will need to move quickly and strongly on new pro-climate change policies. This not an item that doesn't impact for 30 years and shows up in 2050; rather, the impacts will be in 2020s. Biden's new clean energy plan has multiple game changers to oil and natural gas. This blog focuses on one that will have a major impact on US natural gas in the 2020s - he plans to only have "carbon-pollution free" electricity by 2035. Not zero net emissions, "carbon pollution-free" is, no fossil fuels. We don't think this is attainable as fossil fuels provide 65% of US electricity. But if he puts the US on an irreversible path to this goal, even if he is only 25% or 50% successful, it would be a massive hit to future US natural gas consumption. Electricity currently represents ~40% or ~33.5 bcf/d of total US natural gas consumption. If Biden is 50% successful, it will knock of 16.8 bcf/d or 20% of total US natural gas consumption. If he is 25% successful, it will knock of 8.4 bcf/d or 10% of total US natural gas consumption. If markets see

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SAF Dan Tsubouchi @Energy_Tidbits · Mar 16 ...
 2/2. Reminds of 1989 when waste food to jet fuel first got on screens. Doc Brown showed it could be done with Mr. Fusion in Back to the Future II



Mr Fusion - Back to the Future II
 Mr. Fusion scene from Back to the Future Part 2
youtube.com

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[Show this thread](#)

SAF Dan Tsubouchi @Energy_Tidbits · Mar 16 ...
 1/2. A must have #NetZero breakthrough to have any real impact to reduce plane emissions by 2030 will be Sustainable Aviation Fuel to blend w/ conventional jet fuel. @NREL notes advancements are being made. #OOT

nrel.gov/news/program/2...

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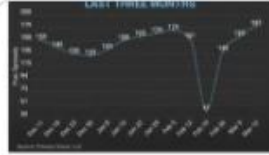


Dan Tsubouchi @Energy_Tidbits · Mar 15

No surprise, @EIAgov forecasts US shale/tight #Oil #NatGas declining in March/April. Frac spreads (thx @markfny) crashed in Texas freeze, pushing back when shale/tight would find bottom. frac spreads now above pre freeze #OOTT

eia.gov/petroleum/drill...

youtube.com/watch?v=2Vtj06...



Data from EIA Drilling Productivity Report March 2021 <https://www.eia.gov/petroleum/drilling/pdf/dr-hul.pdf>

Region	2020												2021											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Horizontal	7,400	7,000	6,500	6,000	5,500	5,000	4,500	4,000	3,500	3,000	2,500	2,000	2,500	2,000	1,500	1,000	500	500	500	500	500	500	500	500
Nonhorizontal	10,100	10,500	11,000	11,500	12,000	12,500	13,000	13,500	14,000	14,500	15,000	15,500	16,000	16,500	17,000	17,500	18,000	18,500	19,000	19,500	20,000	20,500	21,000	
Total	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	18,500	18,500	18,500	18,500	18,500	19,000	19,500	20,000	20,500	21,000	21,500	

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Dan Tsubouchi @Energy_Tidbits · Mar 15

Very proud to work for SAF Group safgroup.ca. we almost never put our name in a release, but this is just one example of how our leadership was early and for the past few years, set up 2020s growth in multiple buckets in addition to energy.



Sundial and SAF Group Announce Strategic Capital Partnership /PRNewswire/ - Sundial Growers Inc. (NASDAQ: SNDL) ("Sundial" or the "Company") and SAF Opportunities LP, a member of the SAF Group ... prnewswire.com

6 20

SAF Dan Tsubouchi @Energy_Tidbits · Mar 14 ...
local #Canmore elk haven't left all day, just eating and resting by the Bow River, but are watchful as the coyotes have been howling for the last 30 min. advantage of daylight savings, just turned dark in the last 15 min



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SAF Dan Tsubouchi @Energy_Tidbits · Mar 14 ...
Putts just weren't dropping the last 5 holes otherwise @coreconn could have pulled it off, right there at @APinv last week, again at @TPCSawgrass this week. feel like he is on the cusp of a major, congrats @coreconn

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SAF Dan Tsubouchi @Energy_Tidbits · Mar 14 ...
Attention Cdn #Golf fans. just turned on TPC, @coreconn just birdied 13, he is on fire today at 6 under on the day thru 13, and just moved into tie for 2nd at -10, only 2 behind Lee Westwood.

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SAF Dan Tsubouchi @Energy_Tidbits · Mar 14 ...
Our weekly SAF March 14, 2021 Energy Tidbits memo was just posted our SAF Group website. This 35-pg energy research piece expands upon and covers many more items than tweeted this week. See the research section of the SAF website. #Oil #OOTT #OPEC #LNG safgroup.ca/research/trend...

SAF GROUP

Energy Tidbits

March 14, 2021

Prepared by: Dan Tsubouchi

US Iran Sanctions Not Going Quickly? Blinken Commits To Consult With Congress Before Any Lifting

Welcome to new Energy Tidbits memo readers. We are continuing to add new readers to our Energy Tidbits memo, energy blogs and tweets. The focus and concept for the memo was set in 1999 with input from PMs, who were looking for research (both positive and negative items) that helped them shape their investment thesis to the energy space, and not just focusing on daily trading. Our priority was and still is to not just report on events, but also try to interpret and point out implications therefrom. The best example is our review of investor days, conferences and earnings calls focusing on sector developments that are relevant to the sector and not just a specific company results. Our target is to write on 48 to 50 weekends per year and to post by noon mountain time on Sunday.

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