Energy Tidbits

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LNG Canada, TC Energy disagree on cost overruns for $6.6-billion Coastal GasLink pipeline
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LNG Canada, TC Energy disagree on cost overruns for $6.6-billion Coastal GasLink pipeline

March 1 (National Post) -- CALGARY - The top executive at LNG Canada says the company is disappointed with its pipeline contractor TC Energy Corp. over announced delays and cost overruns for the Coastal GasLink pipeline, as construction ramps up on its massive export project.

"Like any other relationship or friendship, sometimes you disagree on certain issues," LNG Canada CEO Peter Zebedee said of Calgary-based TC Energy Corp., which is building a pipeline to connect northeast British Columbia's gas fields with his company's $30-billion liquefied natural gas (LNG) export terminal in Kitimat, B.C.

"To be frank, I was disappointed with the comments that were made," Zebedee said, referring to Calgary-based pipeline giant TC Energy announcing on an earnings call on Feb. 18 that work had temporarily stopped on the 2.1-billion-cubic-feet-per-day Coastal GasLink pipeline due to COVID-19 protocols and the project would likely be delayed and would likely be finished over its $6.6-billion budget.

"We do expect Coastal GasLink to live up to their commitments around costs and schedule," Zebedee said in an interview with the Financial Post.

TC Energy has been building the pipeline to connect natural gas fields in northeast B.C. with the LNG Canada project in Kitimat, and is now signalling that it intends to negotiate higher tolls on the pipeline.

"We are working with LNG Canada on establishing a revised project plan for Coastal GasLink," TC Energy president and CEO Francois Poirier said Feb. 18. "We expect that project costs will increase and the schedule will be delayed due to scope increases, permit delays and the impact of Covid-19, including the provincial health order."

British Columbia's chief medical officer issued an order at the end of December, requiring all major project work in the province's north to submit new plans on COVID-19 mitigation. The order caused a work pause for both Coastal GasLink and LNG Canada, though work is now scaling back up on the export project and the workforce is expected to rise from 1,200 people to 3,000 people by the end of the month.

TC Energy has been building the pipeline to connect natural gas fields in northeast B.C. with the LNG Canada project in Kitimat.

Construction is ramping up on LNG Canada and the first pre-fabricated steel modules are expected to arrive on site later this year from Asian construction yards, at which point the workforce will expand further until it ultimately reaches 7,000 people.

As work progresses, the two companies are working to

contain costs.
"Coastal GasLink will continue to mitigate these impacts to the extent possible and these incremental costs will be included in final pipeline tolls, subject to certain conditions," Poirier said.
LNG Canada's Zebedee said the company was in "ongoing discussions" with TC Energy over the costs related to Coastal GasLink and said higher pipeline tolls would only be acceptable if higher costs were incurred prudently.
Higher pipeline tolls would affect economics of shipping gas from Canada to Asia, and would likely be resisted by LNG Canada's joint-venture partners, which includes Shell Canada Ltd., Malaysia's Petroliam Berhad Nasional (Petronas), PetroChina Canada, Mitsubishi Canada Ltd. and Korea Gas Corp. (Kogas).
In addition to disagreements over timelines and costs for the pipeline, the export project in Kitimat has faced similar pressures as a result of COVID-19, which has limited work at the project site.
"Have we seen pressures, yep, absolutely," Zebedee said of how COVID-19 has affected the timeline and budget for the mega project. He said the costs for the project are "within range" of the company's cost target and LNG Canada still expects to be shipping gas from Kitimat to Asia by the "middle of the decade."
That timeline could coincide with a boom period for the energy source with LNG demand expected to outstrip supply.
Royal Dutch Shell Plc. released its annual LNG outlook report on Feb. 25, which forecasts LNG demand to almost double from 360 million tonnes in 2020 to over 700 million tonnes by 2040, driven primarily by increasing gas demand in Asian countries.
"As demand grows, a supply-demand gas is expected to open in the middle of the current decade with less new production coming on-stream than previously projected," the outlook states.
Shell noted that LNG proponents were expected to approve projects capable of delivering 60 million tonnes of LNG in 2020. But given market volatility last year, significantly fewer projects have started to date with a combined capacity of producing only three million tonnes per year.
TC Energy sending record natural gas shipments to freezing Texas
LNG prices skyrocket, but fresh delays mean Canadian projects will miss the boom
Canada's LNG dreams frustrated as global demand shrinks for first time in eight years
LNG Canada says it's cutting its workforce in half to protect local communities from COVID-19
Similarly, the Doha, Qatar-based Gas Exporting Countries Forum, a group of LNG exporting nations, released a market outlook last month predicting that global natural gas demand will increase by 50 per cent to reach 5.9 billion cubic meters per day, or roughly 209 billion cubic feet per day, by 2050.
The LNG Canada project is being built in two phases, each

capable of producing 14 million tonnes of LNG for export. The second phase has yet to be approved for construction by the joint-venture partners and Zebedee said the company doesn't have a timeline for when a final investment decision would be made.

"Phase 2 remains a key part of LNG Canada's future," Zebedee said, noting that some costs have been mitigated in the first phase due in part to the fact that the export terminal is the only LNG project currently under construction in Canada. Other LNG projects on the West Coast have been delayed in recent years or cancelled altogether.

The smaller Woodfibre LNG export project in Squamish, B.C. is targeting a final investment decision for the project this year, spokesperson Rebecca Scott said in an email.

Financial Post
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-0- Mar/01/2021 21:58 GMT

Shell's Prelude LNG Export Facility Plans Maintenance for March
2021-03-05 03:55:15.694 GMT

By Ann Koh
(Bloomberg) -- Shell plans maintenance at its Prelude FLNG facility in Australia for March, after undergoing some work last month, said people familiar with operations.
* "Prelude remains at the early stages of start-up and it is expected to take some time to get to steady state operations," a company spokeswoman said in an emailed reply to queries without giving details
* NOTE: Prelude, which has a capacity of 3.6 million tons of LNG a year, resumed operations in January after technical issues knocked it offline for 11-months

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Finally, Some Visibility That India Is Moving Towards Its Target For Natural Gas To Be 15% Of Its Energy Mix By 2030

Posted: Wednesday October 23, 2019. 3:45pm MT

It's taking longer than expected, but we are finally getting visibility that India is investing significantly towards its goal to have natural gas be 15% of its energy mix by 2030. Earlier in Oct, India Oil Minister Dharmendra Pradhan said that there are $60 billion of natural gas infrastructure and LNG import terminals that are "under execution". He said "*I am not talking about potential investment. This number relates to the project that are under execution".* Natural gas consumption in India is only now back to 2011 levels at 5.6 bcf/d and represents only 6.2% of its energy mix. If India hits its 15% target of its energy mix by 2030, it would add natural gas demand, on average, of >1.5 bcf/d per year. At the same time India's domestic natural gas production peaked in 2010 at 4.6 bcf/d, but has been flat from 2014 thru 2018 at ~2.7 bcf/d, which means the big winner will be LNG. The most important factor driving this expectation for natural gas consumption growth is likely price. Asian LNG landed prices are down about 50% YoY and, more significantly, the expectation is for future Asian LNG prices to be at lower levels than prior cycles. India, by itself, may not be a LNG global game changer, but it is another positive support for why we believe LNG markets will rebalance sooner than expected ie. in 2022/2023. We see mid term Asian LNG landed prices lower than prior cycles in a rebalanced market (ie. +/- $8), which means that low capital costs will be critical for future LNG projects. We believe that BC's LNG key potential projects (LNG Canada Phase 2 and Chevron Kitimat LNG) can compete in this price environment as they have the potential for brownfield capital costs if they move to a continuous construction cycle following in lockstep to LNG Canada Phase 1, much like Cheniere does for its LNG projects in the Gulf Coast.

India has a pollution crisis. We don't think it is unfair to say India has a pollution crisis. In every pollution ranking, India has several cities among the most polluted cities. The 2018 World Air Quality Report (AirVisual) list of the World's Most Polluted Cities 2018 has 20 of the world's 25 most polluted cities being in India. India has all of the top 25 most polluted cities other than #3 Faisalabad (Pakistan), #7 Hotan (China), #10 Lahore (Pakistan), #17 Dhaka (Bangladesh), and #19 Kashgar (China). Like us, many people have been to Beijing on business and believe Beijing's reputation as a very polluted city is deserved. But to put in perspective, Beijing's ranking isn't even close to the 15 most polluted cities in China, let alone the world. Beijing's score on their scale is 50.9 vs the other Chinese cities #7in the world, Hotan at 116.0, and #19 Kashgar at 95.7, and the world's most polluted city #1 Gurugram (India) at 135.8 .

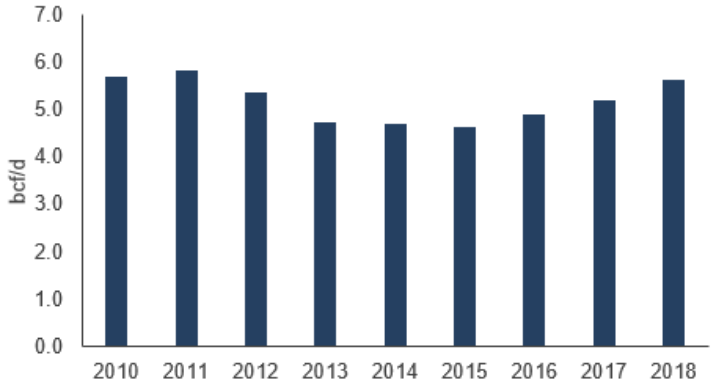
World's Most Polluted Cities 2018

Rank	City	Country	Rank	City	Country
1	Gurugram	India	14	Varanasi	India
2	Ghaziabad	India	15	Moradabad	India
3	Faisalabad	Pakistan	16	Agra	India
4	Faridabad	India	17	Dhaka	Bangladesh
5	Bhiwadi	India	18	Gaya	India
6	Noida	India	19	Kashgar	China
7	Patna	India	20	Jind	India
8	Hotan	China	21	Kanpur	India
9	Lucknow	India	22	Singrauli	India
10	Lahore	Pakistan	23	Kolkata	India
11	Delhi	India	24	Pali	India
12	Jodhpur	India	25	Rohtak	India
13	Muzaffarpur	India	26	Mandi Gobindgarh	India

Source: Airvisual

India natural gas consumption is only now back to 2011 levels. For the past couple years, we have been highlighting that the growth in India's natural gas consumption (and linked LNG imports) has been very low due to the slow buildout of domestic natural gas infrastructure and LNG import facilities. BP data shows India's natural gas consumption was 5.6 bcf/d in 2018, and this compares to its peak of 5.8 bcf/d in 2011. To put in perspective, China's natural gas consumption in 2011 was 13.1 bcf/d and reached 27.4 bcf/d in 2018.

India's Natural Gas Consumption (bcf/d)



Source: BP

Perhaps the best reason why there is better visibility – LNG prices are expected lower than prior cycles. A key reason for this lack of growth has been the price of LNG relative to coal. Our June 17, 2018 Energy Tidbits [LINK] highlighted comments from the Q&A from BP's Chief Economist speech "*Energy in 2017: two steps forward, one step back*" on this relative cost concept. We then wrote on the BP Chief Economist comments from an India company on why there isn't more natural gas and why coal is still going up. He said that the Indian executive said it was because the cost of natural gas was significantly more expensive than domestic coal and that the push in India is to get more power to more poorer people, but if natural gas is significantly higher, it can't be done, they have to rely on coal. What has happened since the BP Chief Economist June 2018 comment is that Asian LNG prices are down 50% and the expectation going forward is that future LNG prices are not expected to be at prior cycle highs. But the other question is what does it mean for LNG prices. There is an increasing supply of reasonable priced LNG around the world, whether it from Qatar, Papua New Guinea, the Gulf of Mexico and even Canada. And each of these areas has anchor projects to support future brownfield development. Couple that with increasing linkage of LNG prices away from oil indexed contracts, we believe this means that a balanced LNG market going forward is going is not going to see sustained high Asian LNG prices from prior cycles, but around more costs related more to lower LNG supply basins ie. LNG prices around mid to long term +/- $8 landed Asian LNG prices, and not the prior $10 - $12 range. As the BP Chief Economist highlights, price is a huge issue for India and it is likely that the expectation for lower LNG prices than prior cycles is the most important reason to push India to increased natural gas consumption.

Japan/Korea Marker (JKM) LNG Price

Source: Bloomberg

India is now getting serious about increasing natural gas consumption, has $60b of projects under execution. We follow the key India news as part of our weekly news scan for our Energy Tidbits memos and there is no question that the India government and its people realize they have to deal with this increasing pollution problem. And perhaps most of all, India is now taking specific, significant action to set the stage for increasing natural gas consumption and LNG imports. Earlier in Oct, Japan Times picked up a Reuters story "*India investing $60 billion on gas grid to link up nation by 2024*" [LINK]. The story notes "*India, one of the world's largest consumers of oil and coal, is investing $60 billion to build a national gas grid and import terminals by 2024 in a bid to cut its carbon emissions, the oil minister said on Sunday. India has struggled to boost its use of gas, which produces less greenhouse gas emissions than coal and oil, because many industries and towns are not linked to the gas pipeline network. Gas consumption growth was running at 11 percent in 2010 but growth slid to just 2.5 percent in the financial year 2018/19*." The most significant part of this story is that this is $60 billion of projects under execution, not planned or potential projects. The story quotes Oil Minister Dharmendra Pradhan "*I am not talking about potential investment. This number relates to the project that are under execution*". The critical natural gas infrastructure requirement is a domestic natural gas pipeline network to deliver gas throughout India. The India Ministry of Petroleum & Natural Gas Oct 3, 2019 release [LINK] said "*On the issue of moving towards the gas economy, Shri Pradhan said that over 16,000 km of gas pipeline has been built and an additional 11,000 km is under construction. With the tenth bid round for City Gas Distribution completed, it will cover over 400 districts and will extend coverage to 70 percent of our population".* Progress is being made. Plus LNG regasification projects continue to be completed. Below is our updated table of India LNG projects that are estimated to come on stream in 2019 and 2020. We haven't included the projects beyond 2020, but there are several planned projects already on the books.

India Current/Planned LNG Regasification Projects Est. In Service In 2019/2020

	State	Coast	Operator	Capacity (mtpa)	Capacity (bcf/d)	Expected Timelines
Existing Terminals						
Dahej	Gujarat	West	Petronet LNG	10.00	1.32	Operating
Dahej Phase 2	Gujarat	West	Petronet LNG	5.00	0.66	Operating
Hazira	Gujarat	West	Shell	5.00	0.66	Operating
Dabhol RGPPL	Maharashtra	West	GAIL & NTPC JV	5.00	0.66	Operating
Kochi	Kerela	West	Petronet LNG	5.00	0.66	Operating
Ennore Phase 1	Tamil Nadu	East	IOCL	5.00	0.66	Operating
Total Existing				**35.00**	**4.61**	
Upcoming Terminals						
Mundra	Gujarat	West	Adani & GSPC	5.00	0.66	2019
Jaigarh	Maharashtra	West	H-Energy Gateway Pvt. Limited	4.00	0.53	2019
Dahej Phase 3	Gujarat	West	PLL	2.50	0.33	2019
Mundra	Gujarat	West	Adani	5.00	0.66	2020
Digha FSRU	Odisha	East	H-Energy	4.00	0.53	2020
Ennore Phase 2	Tamil Nadu	East	IOCL	1.75	0.23	2020
Jafrabad	Gujarat	West	Swan Energy	5.00	0.66	2020
Total Upcoming				**27.25**	**3.59**	

Source: Bloomberg, Company Reports, Street Reports

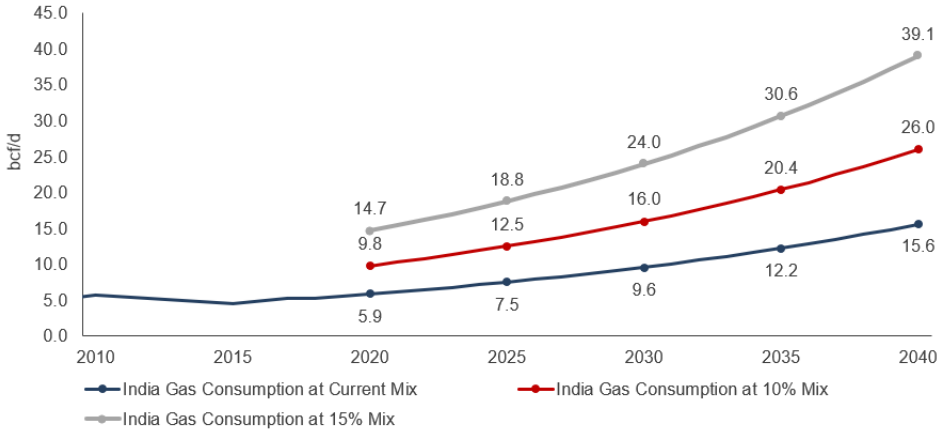
It reminds us of when China got really serious about natural gas in 2018. We should be clear that we do not consider India anywhere near as significant to global LNG markets as China. But conceptually, India getting serious about increasing natural gas consumption reminds us of what we were seeing in China in 2016/2017. India is probably more like China in 2016 as opposed to the summer of 2017, when it seemed clear that China was on the cusp of a major push in natural gas consumption and LNG would be the winner in 2018. India's impact should start to play out by year end 2020 as opposed to this winter. We first outlined the China LNG thesis in our Sept 20, 2017 blog "*China's Plan To Increase Natural Gas To 10% Of Its Energy Mix Is A Global Game Changer Including For BC LNG*" [LINK]. Our Sept 20, 2017 blog wrote "*The news flow from China this summer on its increasing fight and urgency to fight pollution supports China's plan to increase natural gas to 10% of its energy mix in 2020 and 15% of its energy mix in 2030. This is a game changer to global natural gas markets and, by itself, can bring LNG to undersupply 2 to 3 years earlier than expected. China's natural gas consumption increased by ~15% per year from 2005 thru 2016 and ~1.5 bcf/d per year vs China's 8.5%*

growth rate in energy in total. Yet natural gas only got to 5.9% of China's energy mix. If China is to hit 10% by 2020, it will need to increase natural gas consumption by 4 to 5 bcf/d per year. Assuming China continues to grow its domestic natural gas production by 0.6 bcf/d per year (its growth rate for last five years), China will need to import an additional ~3.5 to ~4.5 bcf/d per year. This is "per year"! And if so, we believe BC LNG will be back and there is a higher probability than ever before for a Shell FID on its BC LNG project in 2018." As it turned out, Shell did FID its LNG Canada project on Oct 1, 2018.

Natural gas is only 6.2% of India's energy mix vs its target of 15% in 2030. India, similar to China, has a target to have natural gas to be 15% of its total energy mix by 2030. This is not a new target, rather it has been in place and we first highlighted India's 15% target of its energy mix in our Nov 23, 2018 blog "*"India's Natural Gas Consumption Would Be Up ~1.3 Bcf/D Per Year If Its To Reach Its Target Of 15% Of Its Energy Mix By 2030*" [LINK] At that time, we noted some specific steps that were happening in 2019 and 2020 to put them on that long term plan. The impact to get to 15% of energy mix is significant to world LNG markets. This is a big increase from natural gas being 6.2% of India's energy mix in 2018. To put in perspective, in 2018, natural gas was 30.5% of US energy mix, 21.9% of Japan's energy mix, 16.0% of South Korea's energy mix, and 7.4% of China's energy. Note, China is up from 6.6% in 2017.

Hitting 15% of its energy mix would increase India's natural gas consumption by >1.5 bcf/d per year. We projected how much India's natural gas consumption would increase if it can hit its target of 15% of total energy mix in 2030. BP data shows India's natural gas consumption in 2018 was 5.6 bcf/d and natural gas was only 6.2% of total energy mix. BP also estimates India's total energy consumption grew at a rate of 5.2% per year for the 2007 – 2017 period, but energy consumption growth increased to +7.9% in 2018 YoY vs 2017 But if we only assume a 5% growth in total energy mix to 2030, then if natural gas is 15% of India's energy mix, it would be 18.8 bcf/d in 2025 and 24.0 bcf/d in 2030 ie. growth of +13.2 bcf/d to 2025 and +18.4 bcf/d to 2030. India's domestic natural gas production peaked in 2010 at 4.6 bcf/d, but has been flat from 2014 thru 2018 at +/- 2.7 bcf/d. We expect there to be some increased focus to at least return India to modest domestic natural gas production. But, until then, any growth in natural gas consumption will be met with LNG. Our model forecasts of >1.5 bcf/d per year, on average, in consumption is the equivalent of 2.5 Cheniere LNG trains per year.

India's Projected Natural Gas Consumption @15% Of Energy Mix (bcf/d)

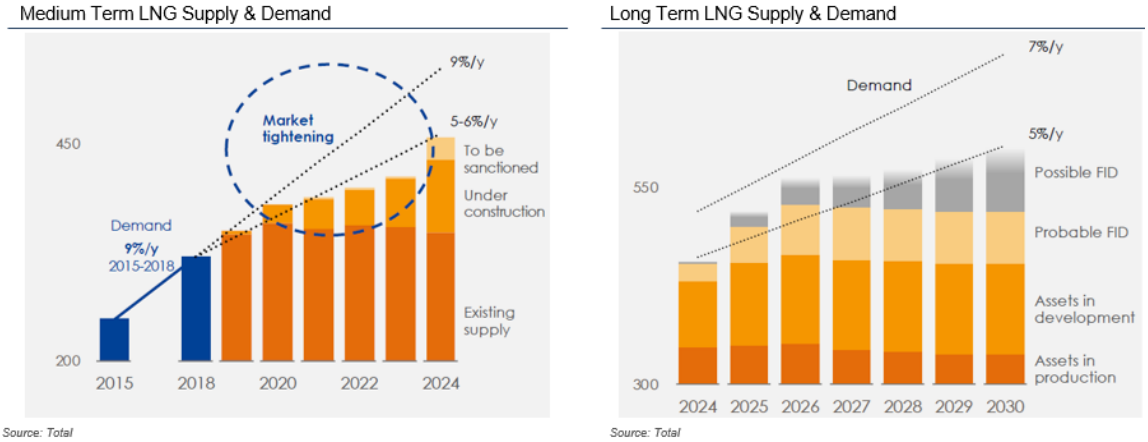


Source: BP, SAF

India may not be a LNG global game changer by itself like China, but does support the call that LNG markets rebalance sooner than expected. We had our SAF Group 2020 Energy Market Outlook on Monday Oct 7. A replay of the call and the supporting slide presentation are available on our website at [LINK]. Two of our key off consensus calls were on LNG including our view LNG market would balance earlier than expected ie. 2022/2023. We noted that we agree with markets that LNG will be oversupplied thru 2021, but where we disagree is that we see LNG markets balancing in 2022 or 2023. Our presentation reminded that LNG supply capacity needs to be in excess of demand to provide for turnarounds and

allowance such that suppliers can deliver contract volumes. We also expect the required over capacity of supply is increasing as contract mix shifts away from historical oil indexed take or pay contracts with destination clauses to an increase share of portfolio contracts. There is no firm number, but we believe the required excess supply capacity relative to demand has increased from approx. 5% to 10% to +/-15% ie. LNG markets are effectively balanced when LNG supply capacity is >10% of demand. As a result, we believe that LNG markets rebalance in 2022/2023, a view which is similar to Total's Sept 25, 2019 Investor Day [LINK] (see below graphs). We should note that our view of balanced LNG markets doesn't mean a return to $12 or more Asian landed LNG prices, rather, we see the emergence of anchor LNG projects in areas with brownfield expansion potential means that a planning case for mid term Asian LNG price is in the $8 range. Our outlook presentation also includes our view that BC's LNG key potential projects (LNG Canada Phase 2 and Chevron Kitimat LNG) can compete in this price environment as they have the potential for brownfield capital costs if they move to a continuous construction cycle following in lockstep to LNG Canada Phase 1, much like Cheniere does for its LNG projects in the Gulf Coast. Our outlook call did not specifically work in the India Energy Minister's comment on in execution projects, but, if anything, it provides us with more confidence for the call for LNG markets to rebalance in 2022/2023.

Total's Medium And Long Term LNG Supply & Demand

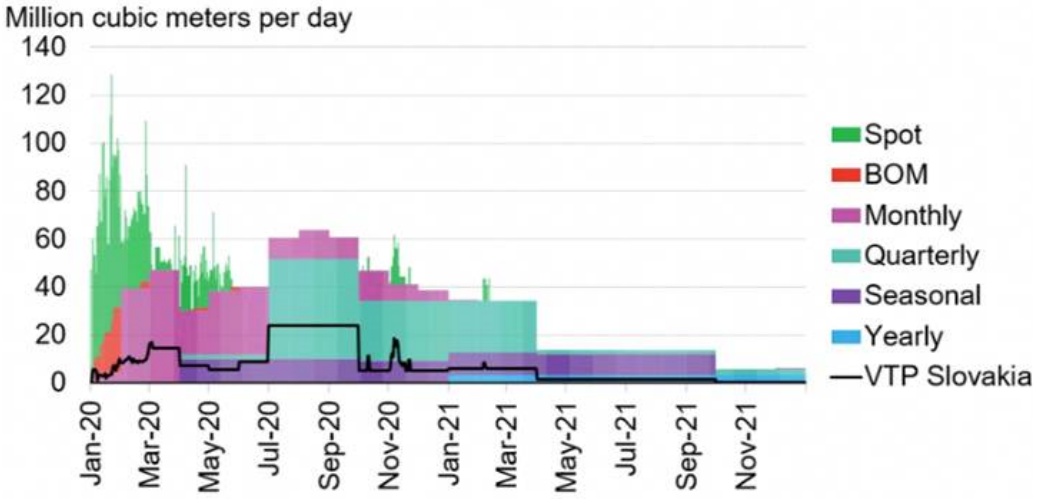


Source: Total Sept 25, 2019 Investor Day

Gazprom May Curb Exports, Stresses Case for Nord Stream 2: BNEF
2021-03-02 10:35:00.0 GMT

By Kornelija Dauksaite
(BloombergNEF) -- Gazprom's short-term sales of natural gas to Northwest Europe and Slovakia, marketed on its Electronic Sales Platform launched in 2018, could fall to an all-time low in 2021. This would suggest that flows of Russian gas to Western Europe will remain low this summer, tightening the European gas market.
Gazprom uses three main routes to deliver gas to Northwest Europe, via Germany, Poland and Ukraine. To boost summer flows to Northwest Europe, Gazprom would have to book additional capacity via Ukraine.
Gazprom might delay booking extra capacity via Ukraine to have a stronger hand in advocating for its Nord Stream 2 project, which has long been delayed by U.S. sanctions.
Volumes sold for 2021 delivery so far are 1.5 billion cubic meters higher than sales for 2020 delivery before mid-February 2020. However, BloombergNEF does not expect Gazprom to significantly boost ESP sales due to a change in its sales patterns in the latter part of 2020 whereby it prioritized more lucrative longer-term contracts over shorter-term prompt ones.

Gazprom's ESP sales to Northwest Europe and Slovakia, by contract type (Note: Sales ordered by delivery date on the X-axis. BOM is balance of month. Deliveries to VTP Slovakia (virtual trading point via Ukraine) aggregates all types of contracts.)



For more BNEF analysis on this topic, see here

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https://www.dallasfed.org/research/economics/2021/0304.aspx

Anticipated Federal Restrictions Would Slow Permian Basin Production

Garrett Golding and Kunal Patel

March 04, 2021

Possible changes to oil leasing and permitting requirements governing federal lands could shift oil production, prompting a realignment of Permian Basin activity between Texas and New Mexico. Half of New Mexico's production comes from federal acreage in the Permian Basin, and the anticipated actions would slow economic growth, adversely affecting that state's employment and tax collections.

In January, federal agencies temporarily halted new leasing and permitting for oil and gas activity on federal lands and began a concurrent government-wide review of policies on fossil fuel development.

Although the timing and outcome of this process are uncertain, we consider two possible regulatory scenarios and their impact on Permian Basin oil production.

Taking both into account, we estimate that by the end of 2025, the Permian will produce between 230,000 and 490,000 barrels per day less than if drilling activity continued at its current pace. As a result, production and employment across the basin will gradually shift from federal lands in New Mexico to private and state lands in New Mexico and Texas, with wide-ranging economic implications for the region.

Federal Lands Critical to New Mexico's Oil Production

The Permian Basin is the world's largest shale oil and gas field, straddling the Texas–New Mexico border (Chart 1). The Texas side produced 3.3 million barrels per day (mb/d) of oil on average in 2020, while the New Mexico portion pumped 1.0 mb/d. In New Mexico, half of Permian production in 2020 came from wells on federal lands. All production in Texas is on private and state-owned land. Wells on federal leases are, on average, higher performing than those in other parts of the basin.

Chart 1
New Mexico, Texas Straddle Permian Basin

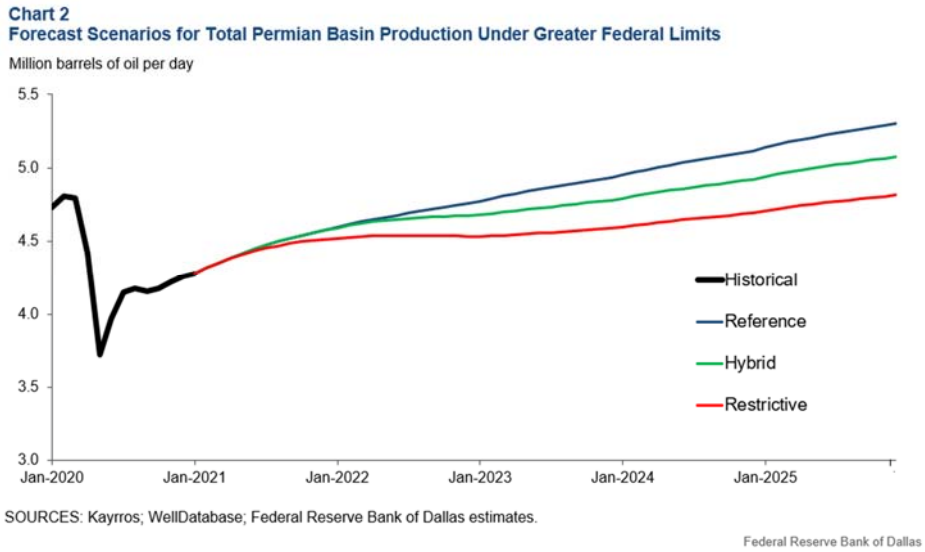
SOURCE: Railroad Commission of Texas.

Federal Reserve Bank of Dallas

Energy companies historically have leased acreage for 10-year periods and applied for permits from the federal government to drill wells. Permits are valid for two years; if a permit goes unused during the period, leaseholders have historically been able to obtain a two-year extension.

Restrictions on Leasing, Permitting Examined

Based on media reports and discussions with stakeholders, we consider two scenarios and a reference scenario to evaluate the impacts of potential policies in the Permian Basin. An average price of $50 for benchmark West Texas Intermediate is assumed (Chart 2).



- Reference Case: This serves as the benchmark and assumes little-changed leasing, permitting and drilling from first-quarter 2021 levels.

  Under this scenario, Permian Basin production grows from 4.3 mb/d today to 5.3 mb/d in December 2025. New Mexico's production expands from 1.0 mb/d to 1.5 mb/d.

- Hybrid Case: It assumes no new federal leasing, but existing leaseholders continue receiving drilling permits. Permit reviews are more rigorous, leading to slower approvals and a costlier operating environment beginning in 2022. Based on companies' public statements, firms that hold acreage across the basin gradually relocate drilling rigs and completion crews to their nonfederal locations.

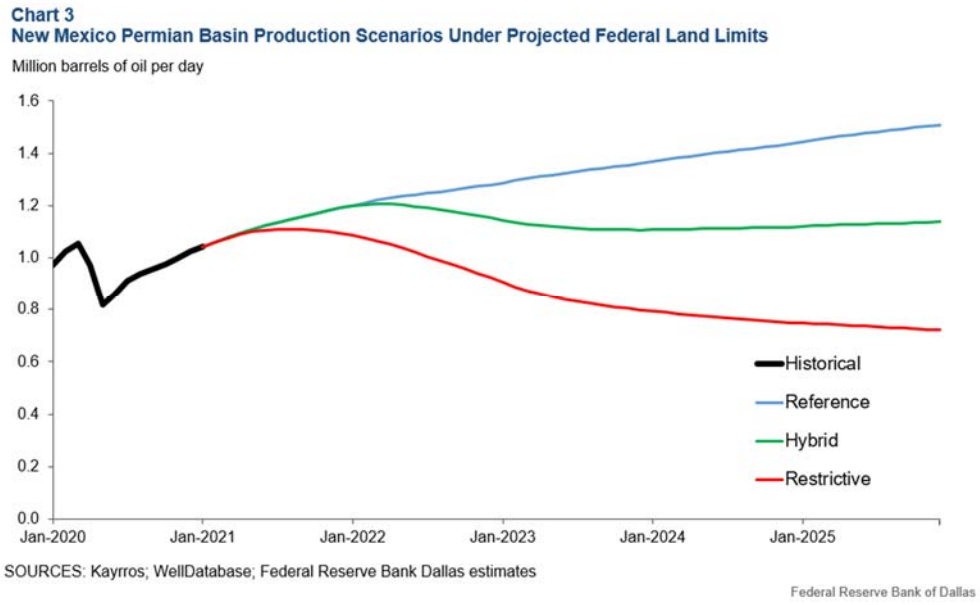
  Permian Basin production increases to 5.1 mb/d in 2025, or 0.2 mb/d below the Reference Case. New Mexico's oil output is 1.1 mb/d, or 0.4 mb/d below the Reference Case in 2025.

- Restrictive Case: No new federal permits or extensions are granted starting in 2023. This is when the most-recently issued permits will expire. The existing permitting freeze adversely affects production in the near-term due to a lack of approvals of permit modifications and pipeline rights-of-way. As in the Hybrid Case, companies shift their focus to nonfederal acreage.

  Permian production climbs to 4.8 mb/d in 2025, or 0.5 mb/d below the Reference Case. New Mexico's output drops to 0.7 mb/d, or 0.8 mb/d less than the Reference Case.

New Mexico More Vulnerable than Texas

These production forecasts have notable impacts across the region, notably in New Mexico (Chart 3).



With an expected shift in drilling from federal acreage, employment moves across state borders from New Mexico to Texas.

We assume that a standard three-well pad on average requires 240 workers. In the Hybrid and Restrictive cases, between 3,500 and 6,600 drilling and completions workers will not be needed in New Mexico from now through year-end 2025, while Texas will require between 5,400 and 7,400 more workers. The ramifications of the shift extend to support and corporate jobs, with secondary effects on local retail and hospitality sectors.

The fiscal impact will also be large. New Mexico received $2.6 billion from oil and gas industry taxes, royalties and fees during fiscal 2020 ended June 30, 2020—one-third of the state's general fund. A total of $809 million came from the state's share of minerals revenue on federal properties.

The slowdown in activity and production levels in the Restrictive Case puts a large and growing portion of state revenue at risk after this year. Under the Hybrid Case, production stabilizes and preserves state royalty and tax revenue closer to current levels.

At the same time, oil refineries and chemical facilities on the Gulf Coast would need to adapt to losing barrels from the Permian Basin. These industries expanded capacity in recent years to consume the specific variety of light and super-light crude oil produced in the Permian. Similar oil from West Africa and the Arabian Gulf could most easily substitute for the lost inputs. Suppliers in those regions could also replace Permian volumes previously destined for the export market—primarily to East Asia and South America.

Wide-Ranging Policy Implications

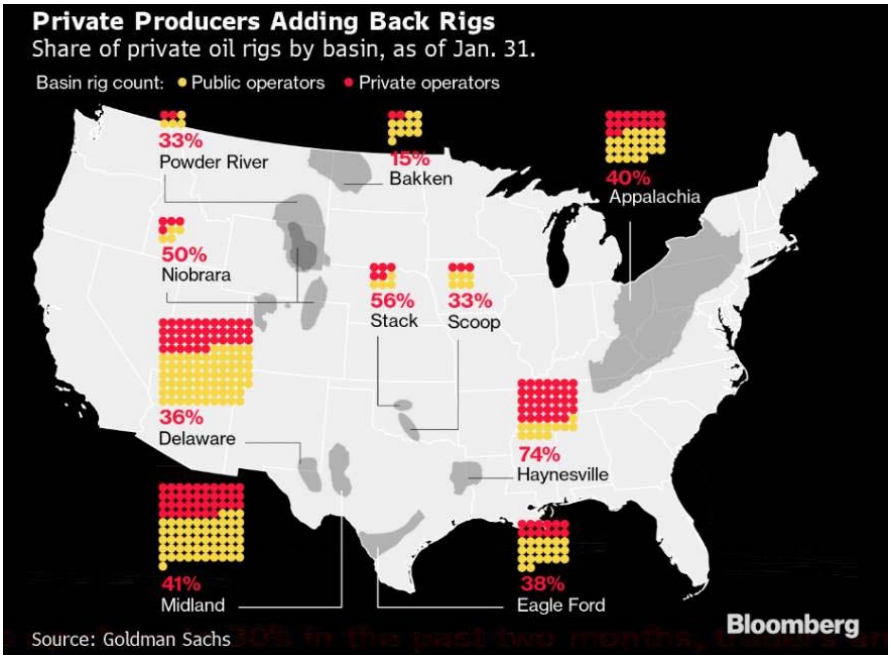
New policies are likely months away, but oil companies, state governments and municipalities are in the process of examining the potential outcomes. Our analysis focuses on the Permian Basin given its location and economic significance to the Dallas Fed's Eleventh District service area.

We expect production from other basins to decline against business-as-usual forecasts as well, especially in the Gulf of Mexico, where the federal government manages nearly all oil and gas activity.

About

Shale's Private Army Ramping Up Means Supply Wild Card for OPEC
2021-03-01 09:00:03.547 GMT

By David Wethe, Kevin Crowley and Sheela Tobben
(Bloomberg) -- The battered and bruised U.S. shale industry is finding a resurgence in one of the most unlikely places: private operators most investors have never heard of.
Take the case of little known, closely held DoublePoint Energy. It's now running more rigs in the Permian Basin than giant Chevron Corp. Meanwhile, family-owned Mewbourne Oil Co. has about the same number of rigs as Exxon Mobil Corp.
That's emblematic of what's happening across the industry. Once minor players, private drillers held half the share of the horizontal rig count as of December. It's the first time in the modern shale era that they have risen to the level of the supermajors.
That's happening when, after years of unwieldy supply growth, the big guys are finally starting to show restraint. They've dialed back drilling after the pandemic sent oil prices into collapse. Now that the market is on the rise again, the majors and publicly-traded counterparts are mostly sticking to the mantra of discipline, all but ending shale's decade-long assault on OPEC for market share.
But private operators' ambitious growth plans present the cartel with a wild card as prices rebound and it attempts to lift its own production.
"It's amazing on both fronts: private companies are getting so much bigger than we ever thought they would and the publics are drilling so much less than we ever thought they would," said Wil Vanloh, co-founder of the private equity firm Quantum Energy Partners, whose portfolio companies have combined for 18 rigs, trailing only EOG Resources Inc. for most in the nation.



With oil prices up close to 30% in the past two months, traders and analysts are watching shale producers closely for signs that they're opening the spigots. Most big publicly traded explorers are listening to investors' pleas and planning to keep production flat. But the contrast in output strategy from the private companies underscores just how anarchic the oil market is.

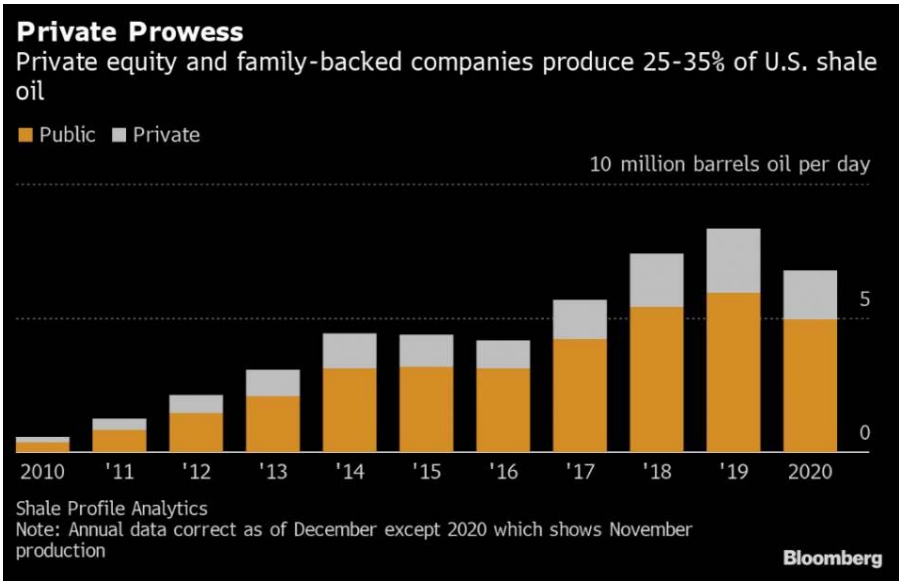
America's oil production currently stands at about 9.7 million barrels a day, about 3 million barrels a day less than a year ago before prices collapsed, according to the Department of Energy. That means the U.S. lost production equivalent to Iran and Angola combined, or two Gulf of Mexicos, in just 12 months. The question is where does it go from here. A Bloomberg survey of major forecasters including Enverus and Rystad Energy showed a variance of 700,000 barrels a day, more than half of Nigeria's production, indicating how much uncertainty surrounds large, private producers whose plans are mostly shielded from public view.

If private drillers keep expanding at their current pace, it could eventually mean that U.S. production ends up on the higher end of analyst forecasts. And that, of course, could weigh on prices.

"In a few months, a lot of private operators will return in an aggressive manner to add wells and rigs because they are able to realize returns faster as oil prices are improving," said Artem Abramov, head of shale research at Rystad.

The private drillers are on pace to spend $3 billion in just the first three months of this year, doubling from their lowest levels of 2020, according to industry data provider Lium. The spending spree is leading to a rig resurgence. The number of U.S. drilling rigs that can bore a hole a mile deep and turn sideways for another two miles has steadily improved since history's worst crude-price crash forced a 15-year low in August. Most of that growth has come from the private companies. The private drillers reached a record 50% share of the horizontal rig count in December, up from 40% a year earlier.

"We are expecting output to start growing from the second half of this year, and that will likely come more from drilling by private companies than public ones," said Bernadette Johnson, vice president for strategy and analytics at Enverus.



DoublePoint Energy, backed by investors including Quantum, has doubled production to about 80,000 barrels a day in the past year and expects to increase to more than 100,000 barrels a day over the next few months, according to Co-Chief Executive Officer Cody Campbell.

"The publics are under a lot pressure to be disciplined with the capital they spend," Campbell said in an interview. "They don't have the freedom to go after returns like we can."

That freedom means the private operators could also become more of a thorn in the side of OPEC+ if they keep expanding over the next six months to a year, said Daniel Cruise, a partner at Lium. The producer group, which meets on March 4 to discuss strategy, has been withholding barrels to support the market even as some key members disagree on the path forward.

"If these guys stay out in the field and keep pumping and shale goes up, then that presents a whole other thing for OPEC," Cruise said.

Saudis, Russia Differ Again on Oil Strategy Before OPEC+ Meeting

Some of the discipline on the part of the publicly-traded independents comes from experience.

For years, companies pledged sky-high returns even when oil was as low as $50 a barrel. But those promises were never kept. Over the past decade, shale oil and gas producers burned through more than $300 billion in capital spending above the cash generated from oil revenues, according to Deloitte LLP. That resulted in massive flows of oil but little in the way of financial returns to investors.

Indeed, oil's dizzying collapse last year is still fresh in the minds of many, and shareholders are quick to punish the producers they think are getting too aggressive. Matador Resources Co. was widely questioned when it recently announced plans to add one rig to its Permian Basin holdings. The stock fell as much as 10% after the announcement.

Meanwhile, private equity-backed companies are being driven to pump harder than ever before because of a more complicated

exit strategy.

Many of these suppliers started up around 2014 to 2017. At the time, it was enough for a private driller to acquire some land, put in a few wells, and they'd quickly get bought up in a lucrative sale as the public producers tried to increase reserves.

But with the decline in prices, it takes a lot more for a private driller to look attractive enough to tempt the now more-disciplined majors. Many private companies have little choice but to expand output and increase cash flow in the hope that they can lure public companies down the line when oil markets and valuations improve.

"You've got Major League Baseball and you've got the minor leagues, and the private equity backed companies were kind of like the minors," Vanloh of Quantum said. "They were serving up opportunity, aggregating land, drilling some wells, proving some things up, but they didn't really want to run a large-scale drilling program."

The private companies insist they won't fall victim to shale's past losses because all the operational difficulties have now been worked out of the major basins, making it easier to run large rig programs.

"The guesswork just isn't there anymore, everything is just extremely repeatable," DoublePoint's Campbell said. "That's a hard story to tell if you're a public company and dealing with investors who have been burned."

--With assistance from Dave Merrill.

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https://rbnenergy.com/dont-wanna-lose-you-how-closing-dapl-would-impact-bakken-crude-oil-producers

Don't Wanna Lose You - How Closing DAPL Would Impact Bakken Crude Oil Producers

PLAY THIS BLOGCAST

Sunday, 02/28/2021 Published by: Housley Carr

When it finally came online in mid-2017, the Dakota Access Pipeline was a lifesaver for Bakken crude oil producers. For years, they had suffered from takeaway-capacity shortfalls that forced many shippers to rely on higher-cost crude-by-rail, sapping producer profits in the process. Then came DAPL, which provides straight-shot pipeline access to a key Midwest oil hub, and its sister pipe — the Energy Transfer Crude Oil Pipeline (ETCOP) — which takes crude from there to the Gulf Coast. Problem solved, right? Not exactly. Now, there's at least an outside chance that a shutdown order is issued as soon as early April in connection with the ongoing federal district court process, with the timeline for a physical closure of the pipe still to be determined. A shutdown may last for only a few months but could potentially last much longer. Where does this uncertainty leave Bakken producers, many of whom have been hoping to benefit from the recent run-up in crude oil prices by ramping up their output this spring? Today, we discuss recent upstream and midstream developments in the U.S.'s second-largest shale/tight-oil play.

The title of the blog we posted in the weeks leading up to the Dakota Access Pipeline's commercial start-up three-plus years ago said it all: What a Difference a DAPL Makes. As we noted then, the Bakken was one of the earliest — and biggest — successes of the Shale Era. Forecasters routinely underestimated how quickly crude oil production in western North Dakota would grow. For one thing, many failed to appreciate the ability of producers to increase their drilling and completion efficiencies; for another, it was remarkable how rapidly the midstream sector responded to the Bakken's serious (and growing) pipeline takeaway shortfalls in the first half of the 2010s by building more than 20 terminals where oil could be loaded into rail tank cars for delivery via existing rail networks. In Slow Train Coming, our 2016 Drill Down Report on crude-by-rail, we discussed the fact that railroads by late 2014 were transporting more than two-thirds of the 1.2-MMb/d of oil then being produced in North Dakota, and that while incremental new pipeline capacity came online in 2015-16, DAPL would be the real game-changer. When the new pipe started up, crude-by-rail volumes plummeted to less than 150 Mb/d, mostly to serve refinery customers on the East and West coasts.

Initially built to transport up to 470 Mb/d and most recently increased to a capacity of 570 Mb/d (with an expansion to approximately 750 Mb/d being planned), the 1,172-mile, mostly 30-inch-diameter pipeline begins with a hairpin turn through the core of the Bakken production area then makes a bee-line to the crude oil hub in Patoka, IL. There, most of the oil is either distributed to refineries in the Midwest or sent south to Nederland, TX, on the 744-mile ETCOP, which also started up in mid-2017. The two pipes, collectively known as the Bakken Pipeline System, are co-owned by Energy Transfer (with a ~36% share), Enbridge (~28%), Phillips 66 Partners (25%), MPLX (~9%), and ExxonMobil (~2%).

Figure 1. DAPL's Crossing Under Lake Oahe. Source: Energy Transfer

While it was being developed, DAPL was among the most controversial pipeline projects in the U.S., second only perhaps to TC Energy's Keystone XL, which remains in limbo (and only partially built) after President Biden canceled KXL's Presidential Permit his first day in office. Opposition to DAPL didn't stop when it began commercial operation 45 months ago today. On March 25, 2020, U.S. District Court Judge James Boasberg ruled in a lawsuit filed by the Standing Rock Sioux tribe that the U.S. Army Corps of Engineers violated the National Environmental Policy Act (NEPA) when, in February 2017, it issued DAPL's developers an easement under Lake Oahe — a large reservoir near the tribe's reservation in central South Dakota (see Figure 1) — without preparing an environmental impact statement (EIS). Three-plus months, later, on July 6, Boasberg ordered that the Corps's easement be

vacated and that DAPL be taken out of service until the Corps completed the EIS, a process expected to take a year or more. The U.S. Court of Appeals on August 5 stayed the District Court judge's order that the pipeline be shut down during the preparation of the EIS, and the Corps announced on September 10 that it had formally started the process of preparing the environmental report. On January 27, 2021, the Court of Appeals affirmed the parts of Boasberg's ruling vacating the Corps's Lake Oahe easement and directing the Corps to finish the EIS but reversed the parts of Boasberg's ruling requiring the pipeline to be shut down.

Separately, Judge Boasberg is considering a second motion filed by the Standing Rock Tribe for an injunction to shut down DAPL. After the Court of Appeals' late-January ruling, Boasberg scheduled a February 10 status conference to discuss the tribe's injunction motion and how the Corps expects to proceed now that the appellate court has confirmed that its easement is vacated. A day before the planned meeting, the Corps asked that it be delayed to April 9, and Boasberg agreed. For its part, the Standing Rock Tribe has been arguing that, with the easement for DAPL's crossing under Lake Oahe vacated, the pipeline should be shut down immediately and shouldn't be allowed to be restarted unless and until an EIS has been approved. Energy Transfer, which owns the largest share of DAPL and operates the pipeline, said during its quarterly earnings call on February 17 that the pipeline has been operating safely for almost four years now and that it does not see a scenario under which the pipeline will be ordered offline.

Neither DraftKings nor FanDuel is taking bets on whether DAPL will remain in operation, and we're not about to predict what a judge — or the Corps of Engineers — might decide. What we can do, though, is (1) note that there is a new administration in charge in Washington, DC, and that the Corps under President Biden may take a different view than it did under President Trump, and (2) consider what the market impacts might be if DAPL were shut down for a few months (until a favorable EIS is completed), shut down permanently (if the Corps ultimately fails to issue an EIS), or is ordered to operate at a reduced level if and until an EIS is in hand.

Regarding the Corps, while the agency is staffed almost entirely by career professionals, its stance on environment-related issues such as wetlands protection has frequently shifted with the political tides. In fact, in the waning days of the Obama administration the Corps determined that an EIS would be required before it could grant an easement for DAPL's crossing under Lake Oahe, a decision that was quickly undone by the Corps under President Trump. While President Biden didn't take an official position on DAPL's future during last year's campaign, Vice President Harris last May was among a group of senators that filed a friend-of-the-court brief supporting the Standing Rock Tribe's effort to shut the pipeline.

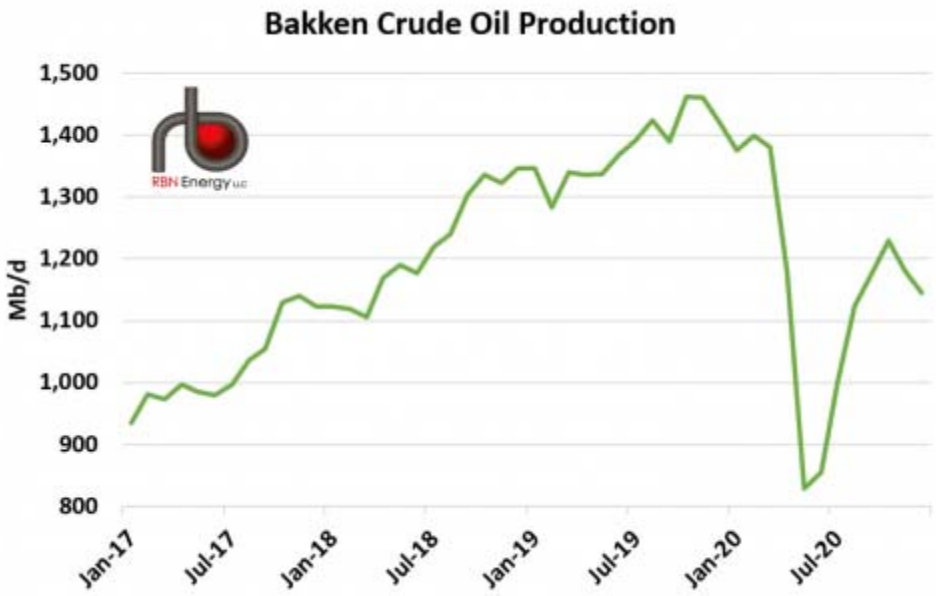


Figure 2. Bakken Crude Oil Production (North Dakota). Source: North Dakota Oil & Gas Division

If DAPL is shut down this spring, how would Bakken producers and shippers make do without the pipeline's 570 Mb/d of takeaway capacity? Back in July, when Judge Boasberg first ordered that the DAPL be taken offline, Bakken crude oil production in North Dakota was only beginning to recover from a sharp slowdown in the spring of 2020, when plummeting oil demand and prices resulted in drilling cutbacks, well shut-ins, and a decline in Bakken output to less than 900 Mb/d in both May and June (from over 1.4 MMb/d in the second half of 2019 and the first three months of 2020; see Figure 2 above). Production rebounded to 1 MMb/d in July, and generally hovered

between 1.1 MMb/d and 1.2 MMb/d from August through December. The North Dakota Oil & Gas Division indicated in a February 12 presentation that it expects Bakken production to sag somewhat in both January and February due to the impacts of frigid, snowy weather, but to recover quickly this spring, assuming crude prices remain north of $55/bbl, which looks likely since Bakken oil was trading above $62/bbl on Friday.

According to the North Dakota Pipeline Authority, an estimated 78%, or ~930 Mb/d, of the nearly 1.2 MMb/d produced in the North Dakota Bakken in December 2020 was transported out of the basin by pipeline (blue slice in Figure 3 pie chart), while 14%, or ~170 Mb/d, was shipped to other points in the U.S. by rail (purple slice); and 3%, or ~35 Mb/d, was trucked or railed to Canada (green slice). The other 5%, or ~60 Mb/d, was refined within the Bakken region (red slice).

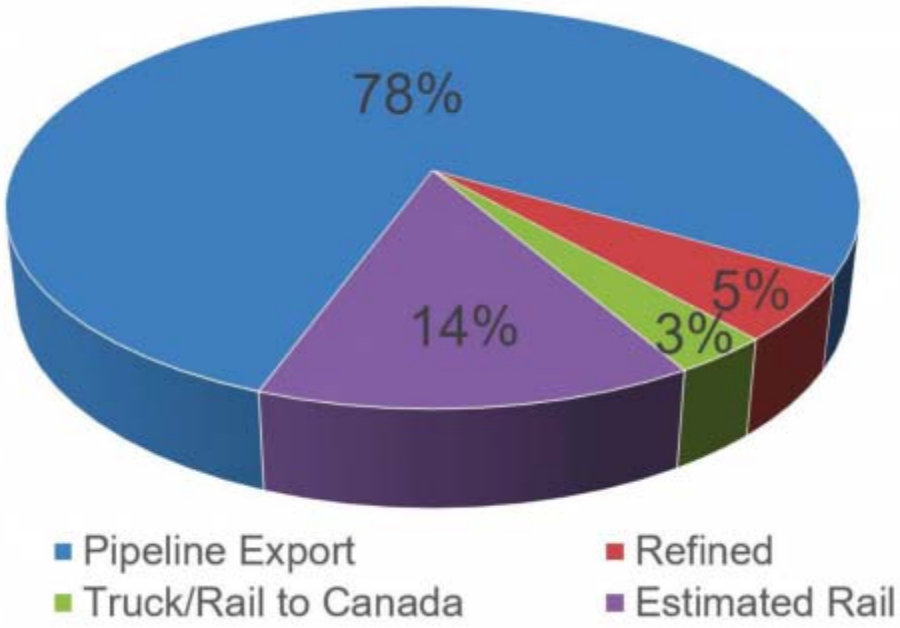


Figure 3. Shares of Bakken Crude Oil Production Shipped by Pipe, Rail and Truck or Refined In-Region. Source: North Dakota Pipeline Authority

To assess the potential impacts of a possible DAPL closure, we need to examine the capacities of the various crude oil pipelines out of the Bakken as well as the capacities of the crude-by-rail terminals in western North Dakota that have continued to play important roles in providing egress for Bakken crude. In addition to DAPL (red line in Figure 3), there are three primary pipeline networks that move crude out of the Bakken: Enbridge's 355-Mb/d system (blue, light-green and olive-green lines); True Companies' 240-Mb/d Bakken-area system (dark-green lines), which includes the Four Bears and Belle Fourche pipelines; and Kinder Morgan's 88-Mb/d Double H Pipeline (purple line). Also, True Companies previously announced plans to complete a new 150-Mb/d South Bend Pipeline out of the Bakken by mid-2021, but we understand that those plans have been shelved.

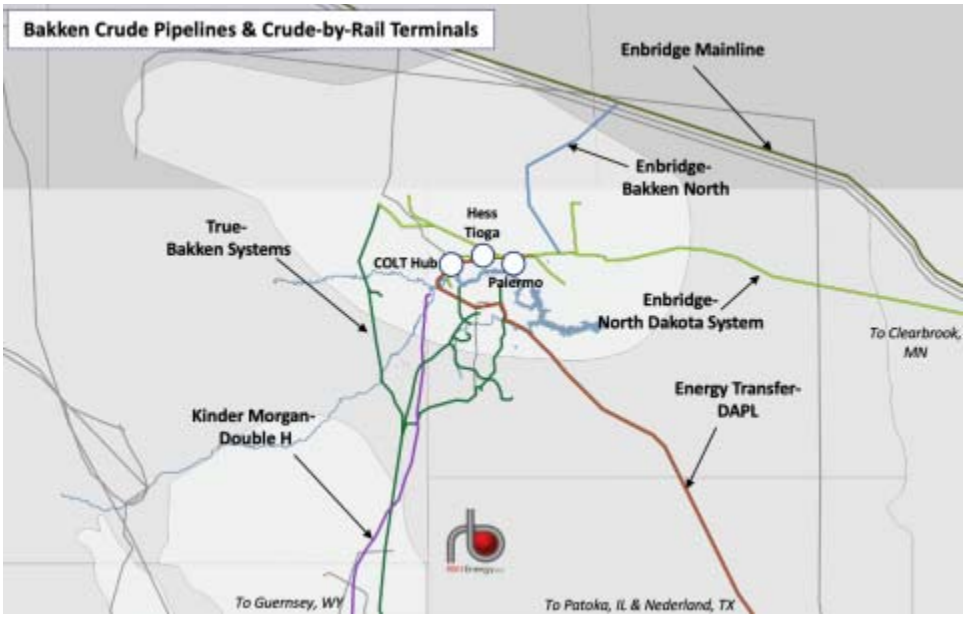


Figure 4. Bakken Takeaway Pipelines and Crude-by-Rail Terminals. Source: RBN

Many gathering systems in western North Dakota provide producers and shippers with some degree of optionality — that is, their crude can flow either to takeaway pipelines like DAPL or to nearby crude-by-rail terminals (white circles in Figure 4). These include Hess Midstream's Tioga Rail Terminal, which has the capacity to handle about 140 Mb/d of crude; Crestwood Equity Partners' Crude Oil Loading Terminal (COLT) Hub, which has about 1.2 MMbbl of storage capacity and the ability to load up to 160 Mb/d; and Paradigm Midstream and Phillips 66 Partners' jointly owned Palermo Rail Terminal, which has 440 Mbbl of crude storage capacity — half of it for rail operations and half for pipeline operations — and the ability to load up to 100 Mb/d onto unit trains.

As we said, crude-by-rail isn't something Bakken producers and shippers only turn to when pipeline takeaway capacity is constrained, it's a takeaway option that is constantly employed, mostly due to the regular, generally steady demand for Bakken-sourced crude by refineries in PADD 5 (West Coast) and, to a lesser degree, in PADD 1 (East Coast). Simply put, when Bakken production was running at about 1.4 MMb/d pre-pandemic, a total of about 300 Mb/d was being railed to PADDs 1 and 5, and when production sagged to between 900 Mb/d and 1.2 MMb/d, railed volumes declined to about 200 Mb/d.

The fact that DAPL's co-owners are in the process of expanding the pipeline's capacity to approximately 750 Mb/d indicates to us that the pipeline has likely been running close to its existing capacity of 570 Mb/d, especially since Bakken production has rebounded to near 1.2 MMb/d in recent months. To find an alternative way out of western North Dakota for more than 500 Mb/d of crude now estimated to be flowing on DAPL, we would anticipate that producers and shippers would first try to turn to the other pipelines out of the Bakken (the Enbridge and True Companies systems, and Kinder Morgan's Double H), which have a combined capacity of about 680 Mb/d (355 + 240 + 88). (Kinder has said that Double H was running close to full in January; neither Enbridge nor True Companies has said anything.). Switching from DAPL to another pipeline would only be possible, of course, if the gathering system involved is connected to the pipe and if there is capacity available not only on it but on linked pipelines further downstream.

It would be totally understandable for Bakken producers, shippers, and midstreamers to be considering what-if scenarios and making contingency plans just in case DAPL is shut down. We know of at least one example: Crestwood, which owns the 150-Mb/d Arrow gathering system and has been transporting most of crude oil gathered on the system to market via DAPL, said during its February 23 earnings call that to provide more takeaway options in the event of a DAPL closure it recently completed a new interconnection with True Companies' Four Bears pipe. As we noted, many gathering systems that feed DAPL also have access to one or more crude-by-rail terminals — for instance, Crestwood's Arrow system can access the company's COLT Hub. In many cases, crude-by-rail would be at least an option for many producers and shippers now using DAPL, though transporting crude by rail typically adds $5/bbl or more to shipping costs, depending on the destination.

The bottom line is that while there is at least some ability for other pipelines and crude-by-rail terminals to absorb the oil now flowing out of the Bakken on DAPL, shutting down the largest pipeline out of the basin for a few months or more would force producers and shippers to find alternatives, increase takeaway costs for many, and reduce the

price many Bakken producers would receive for their oil. Depending on the producer and its takeaway plans — and whether crude oil prices remain at elevated levels — a scenario with a shut-down DAPL may well lead some to rein in their output until the pipeline is back online.

One final point to note on what-if scenarios. In a recent regulatory filing, Phillips 66 said that it would be exploring “extraordinary corporate transactions" regarding its ownership position in Phillips 66 Partners, the entity that owns a piece of DAPL. They indicated that such transactions might include reorganization, consolidation, other take-private transactions, or even sale. In further statements, they said that they might not do anything, but were covering all possibilities to give the company the option to implement the best possible strategies, given current circumstances.

"Don't Wanna Lose You" was written by Gloria Estefan, and appears as the seventh song on Estefan's debut solo album, *Cuts Both Ways.* Released as a single in June 1989, the song went to #1 on the Billboard Hot 100 Singles chart and the Hot Latin Songs Singles chart. It has been certified Gold by the Recording Industry Association of America (RIAA). Personnel on the record were: Gloria Estefan (lead, backing vocals), Randy Barlow, Teddy Mulet (trumpet, backing vocals), Jorge Casas (bass, programming, backing vocals), Mike Scaglione (sax), Olay Ostwald (keyboards, programming); John DeFaria, Paco Fonta, and Michael Thompson (guitar); Robert Rodriguez (drums), Rafael Padilla (percussion), Emilio Estefan Jr. (congas), Paquito Hechavarria (piano), and John Slick (programming).

https://rbnenergy.com/i-want-you-to-refine-me-part-4-refiners-crude-slates-exports-show-canadas-self-sufficiency

I Want You To (Refine) Me, Part 4 - Refiners' Crude Slates, Exports Show Canada's Self-Sufficiency

Wednesday, 03/03/2021
Published by: Martin King

Many countries like to talk about energy independence, but Canada is one of the few to come close to that elusive goal. For many years, Western Canada has produced more than enough crude oil to satisfy the demand of refineries in the region. More recently, a combination of rising Western Canadian oil production, and new and reworked pipelines, has enabled many of Canada's eastern refineries to increase their intake of Western Canadian barrels. In the few remaining cases where they can't, imported barrels from the U.S. have filled the gap, leaving crude imports from overseas accounting for just 1% of the market. Not surprisingly, Canada is also a net exporter of refined products, with refiners in Western Canada, and especially Atlantic Canada, producing far more than the country's demand. Today, we conclude our series on Canada's refining sector with a look at its growing reliance on Western Canadian crude oil and its ability to meet most of Canada's need for gasoline and distillates.

As we discussed in Part 1 of this series, development of immense conventional oil reserves and unconventional bitumen reserves from the oil sands has enabled Canada's 17 refineries to steadily reduce their dependence on imported crude. In fact, the U.S. is now almost the exclusive provider of Canada's remaining import needs. In Part 2, we delved into the nine refineries in Western Canada, which are supplied entirely by in-region crude oil production. In Part 3, we discussed the eight refineries in the eastern half of Canada: four in Ontario, two in Quebec, and one each in New Brunswick and Newfoundland — so that blog will be a useful reference as we continue the discussion of those refineries. Today, we conclude the series with a look at how many refineries in Eastern Canada gained increasing access to Western Canadian and U.S. crude oil — displacing imports from other overseas sources in the process — and at how important exports of refined products are to some of these same refineries.

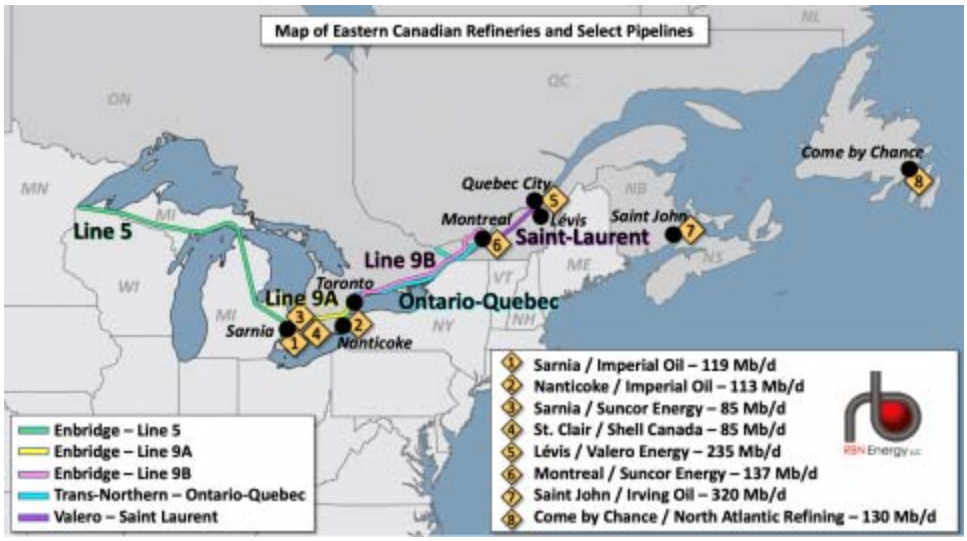


Figure 1. Eastern Canadian Refineries and Select Pipelines. Source: RBN

Crude Sourcing

As Western Canada's crude oil production increased over the last 10-plus years, pipelines and other infrastructure needed to be developed or reworked to allow more of that crude to flow east. Let's begin with Ontario, which receives Western Canadian crude primarily via Enbridge's Line 5 conduit (green line in Figure 1 above). Ontario's refining sector has seen a steady rise in the use of Canadian crude (green bar segments in graph to far left in Figure 2 below) — from less than 80% in 2010 to an all-time high of 99% in 2015, before falling back to the 85-90% range in the past few years as crude imported from the U.S. (purple bar segments) gained a foothold. The primary conduit for transporting Western Canadian crude to Ontario is Enbridge's Line 5. As more crude was piped in from Western Canada in the early 2010s, imports from overseas (teal bar segments) were squeezed out. The 2013 reversal of the portion of Enbridge Line 9 between Sarnia, ON, and the Westover pumping station west of Toronto (now known as Line 9A; yellow line in Figure 1) allowed Western Canadian crude to flow further east and reach Imperial Oil's

refining complex in Nanticoke, ON, starting in August 2013. The reversal of the remainder of Line 9 between the Westover pumping station and Montreal, now known as Line 9B (capacity 300 Mb/d; pink line in Figure 1) was completed in December 2015; it enabled Western Canadian crude to make the full run eastward from Sarnia into Montreal.

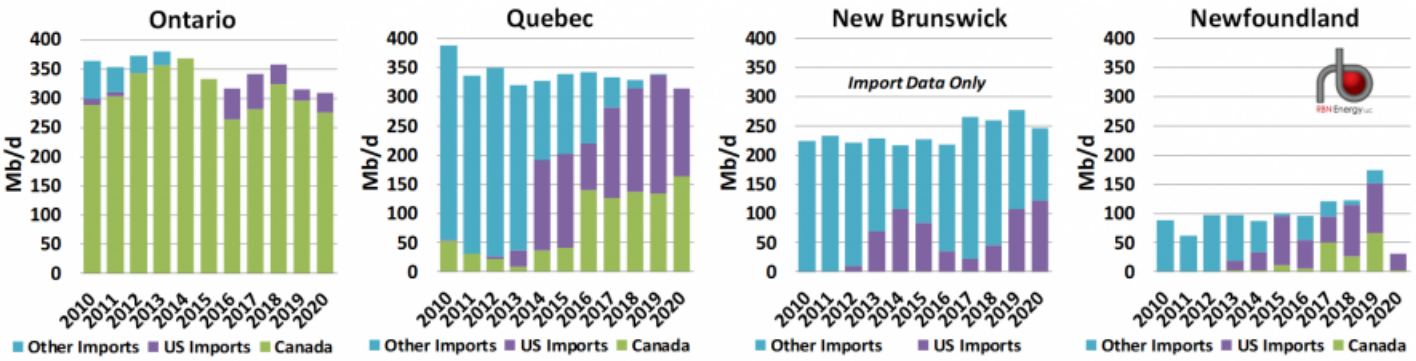


Figure 2. Eastern Canada Domestic and Imported Crude Oil. Source: Statistics Canada

As you can see in the second graph in Figure 2, imports (teal bar segments) accounted for nearly 90% of crude supplies to Quebec refineries until 2014, but their share fell to near zero by 2020. Canadian barrels (green bar segments) and imports from the U.S. (purple bar segments) have effectively shut out imports from elsewhere. With Canadian crude now able to reach Montreal, Suncor Energy's refinery there is able to access more of this crude, while Valero Energy can rail or barge Canadian (or U.S.) crude up the St. Lawrence River from its dock in Montreal to its refinery in Lévis, QC, also reducing its dependence on overseas crude.

As for Irving Oil's refinery in Saint John, NB (third graph in Figure 2), hard data for its use of Canadian crude is lacking, although it is believed that about 15% to 20% of its crude slate comes from Western Canada via rail or tanker. The Irving refinery's use of imported crude has varied widely, likely reflecting purchasing opportunities. What's worth pointing out, though, is that U.S.-sourced crude (purple bar segments) accounted for almost 50% of imports in 2020 from near zero a few years earlier.

The shift in crude use for North Atlantic Refining's Come by Chance refinery in Newfoundland (graph to far right in Figure 2) is a unique case. Imports of U.S. crude by tanker (purple bar segments) rose from zero in 2010 to more than half of the total throughput in 2018 and 2019. Canadian crude (green bar segments) had also been making inroads, partly from production off Canada's East Coast. The shutdown of the Come by Chance refinery in April 2020, however, resulted in an end to crude purchases from all sources, at least for now.

Refined Products

As we said in Part 2, the province of Alberta — Western Canada's refining powerhouse — has more than enough refining capacity to meet not only its own needs for gasoline, diesel, and jet fuel, but to supply large volumes of refined products to other Canadian provinces and territories, as well as to several U.S. states. Eastern Canada has more of a split personality.

Ontario and Quebec's combined demand for refined products (stacked red and blue bar segments in left graph in Figure 3) and their refining capacity (green line with green diamonds) have been relatively well balanced in recent years. While Statistics Canada (StatCan) no longer publishes a break-out of individual provincial demand after 2018, the situation for 2019 and 2020 has likely changed very little, except for overall demand in 2020 probably softening due to COVID. Remember that the refineries in Quebec have access to the Ontario market via the Saint-Laurent and Ontario-Quebec refined products pipelines (purple and aqua lines, respectively, in Figure 1), effectively creating a largely self-contained region for demand and refining capacity. The rest of Ontario and Quebec's need for refined products can be met by supplies from nearby provinces and states.

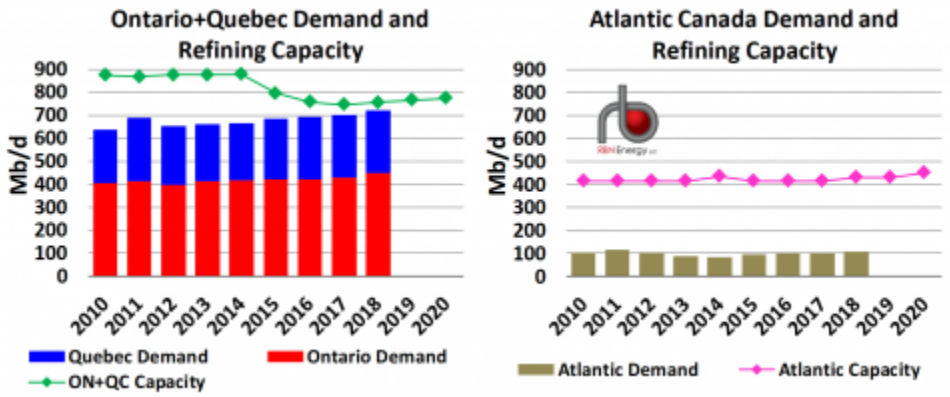


Figure 3. Eastern Canadian Fuel Demand versus Refining Capacity. Sources: CAPP, StatCan.

In sharp contrast, demand for refined products in Canada's Atlantic provinces (New Brunswick, Prince Edward Island, Nova Scotia, and Newfoundland & Labrador; olive-green bars) adds up to only about a quarter of the region's refining capacity (Irving + Come by Chance; pink line with pink diamonds). Although some gasoline and distillates produced at the Irving Oil refinery (Come by Chance was idled last spring) can be shipped into the Ontario and Quebec markets, the primary target for refined products not consumed within the region is the U.S. Northeast.

For the past few years, the Atlantic refineries (stacked blue and red bar segments in left graph in Figure 3) have accounted for 80% or more of Canada's exports of finished gasoline and gasoline blending components (stacked blue and red bar segments in left graph in Figure 4) and nearly half of distillate exports (jet fuel + diesel; right graph). Of Canada's remaining distillate exports (green bar segments in right graph), about half are exported from Ontario and Quebec, and the rest from Alberta. (Note the red bar segments for 2020 for Newfoundland reflect only a few months of exports owing to the idling of the Come by Chance refinery.)

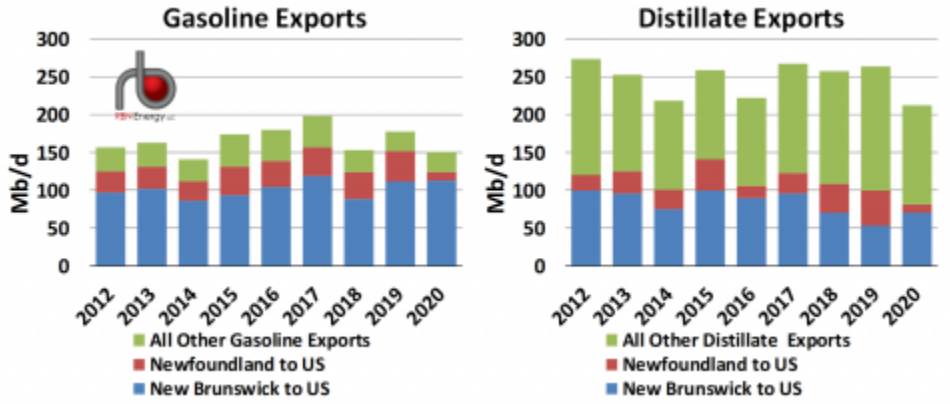


Figure 4. Atlantic Canada Exports of Gasoline and Distillates. Source: StatCan

Our review of Canada's refining sector makes clear that the U.S.'s northern neighbor has been becoming more and more self-sufficient. Refineries in the Canadian West secure all of their crude needs from within the region, while Western Canadian crude supplies now account for more than 80% of the crude feeding Ontario refineries; about 50% of the crude supplied to refineries in Quebec; and 20% of the oil feeding Atlantic refineries. Whatever remaining barrels needed by refiners from outside Canada are almost exclusively sourced from the U.S. Imported barrels represented just 1% of the crude run through Canadian refineries in 2020, compared to about one-third in 2010.

In the case of refined products, Canada has an overabundance of refining capacity in its Western and Atlantic provinces, allowing those regions to ship excess supplies of products to other provinces, or in the case of the Atlantic refiners, to the U.S. Only the combined markets of Ontario and Quebec are relatively balanced from a self-sufficiency perspective, but even they make some contribution to product exports to the U.S.

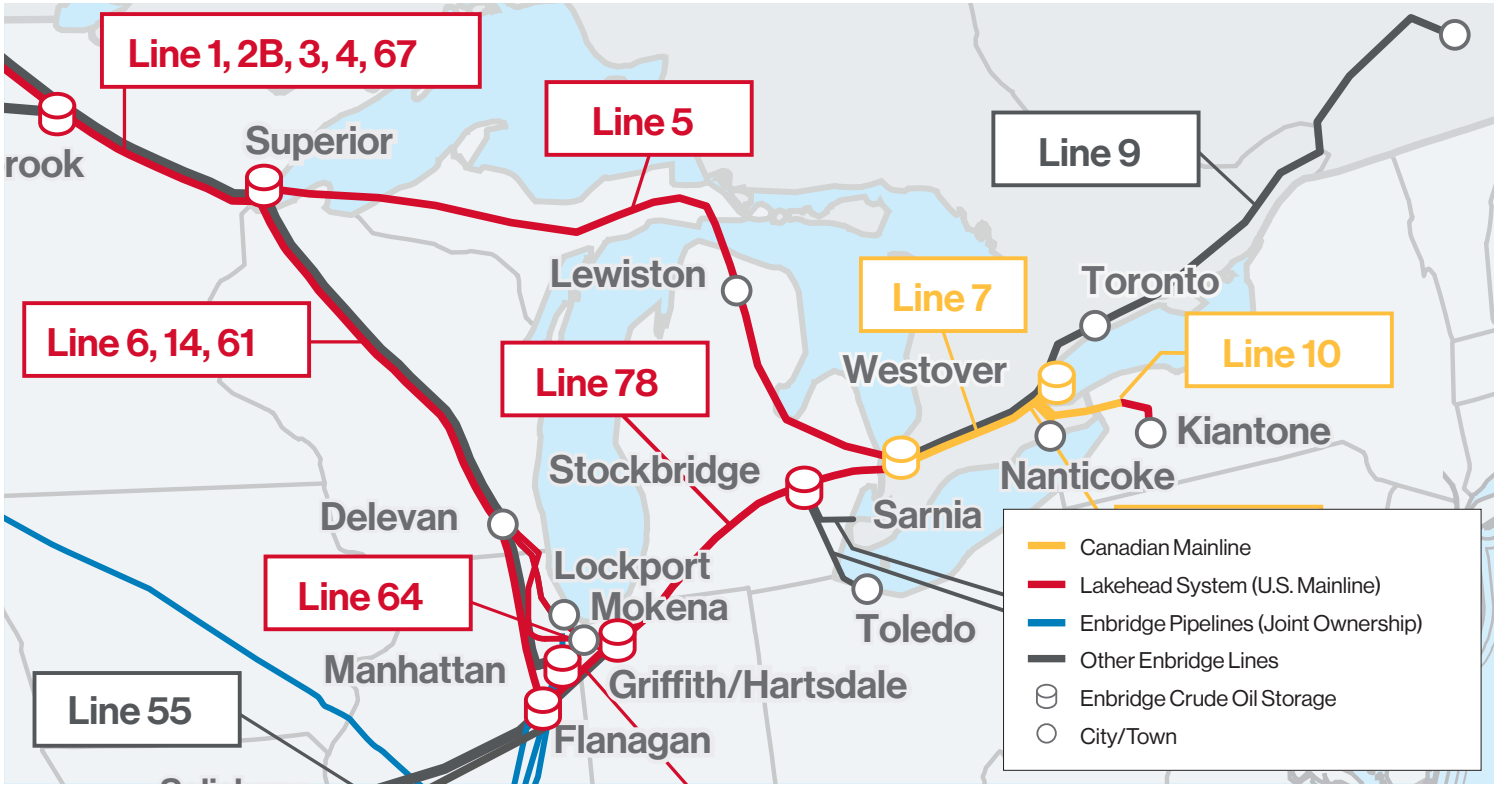
As more data comes in for 2021 and the impact on demand from COVID begins to dissipate (hopefully), we will provide another shorter update on refining, product demand, and export trends later.

"I Want You to Want Me" was written by Rick Nielsen and appeared originally as the fourth song on side one of Cheap Trick's second album, *In Color.* Released as the first single from the album in September 1977, it failed to

chart in the U.S. However, when the song was released as a single in Japan, it went to #1 there, and paved the way for CBS to release the live album *Cheap Trick at Budokan* in 1979 in the U.S. When the live version of the song from that album was released as a single in April 1979, it went to #7 on the Billboard Hot 100 Singles chart and has been certified Gold by the Recording Industry Association of America (RIAA). Personnel on the record were: Robin Zander (lead vocals, rhythm guitar), Rick Nielsen (lead guitar, backing vocals), Tom Petersson (bass, backing vocals), and Bun E. Carlos (drums).

Cheap Trick at Budokan was recorded live in Japan in April 1978. The album was produced by Cheap Trick. Released in the U.S. in February 1979, the LP went to #4 on the Billboard Top 200 Albums chart. It has been certified 3X Platinum by the RIAA. Two singles were released from the album.

Cheap Trick are an American rock band formed in Rockford, IL, in 1973. Eight members have passed through the band since its inception, with Robin Zander and Rick Nielsen being in the fold from the start. The band has released 19 studio albums, six live albums, 17 compilation albums, four EPs, and 64 singles. Cheap Trick has sold more than 20 million records worldwide and was inducted into the Rock and Roll Hall of Fame in 2016. The band continues to record and tour, with a North American tour scheduled to begin in July.



The impact of a Line 5 shutdown

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

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

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

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

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

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

If Line 5 were shut down*:

- Refineries served by Enbridge in Michigan, Ohio, Pennsylvania, Ontario and Quebec **would receive approximately 45% less crude from Enbridge** than their current demand.
- Michigan would face a **756,000-US-gallons-a-day propane supply shortage**, since there are no short-term alternatives for transporting NGL to market.
- The region (Michigan, Ohio, Pennsylvania, Ontario and Quebec) would see a **14.7-million-US-gallons-a-day supply shortage of gas, diesel and jet fuel** (about 45% of current supply).
- Michigan would need to f**ind an alternative supply for anywhere from 4.2 million to 7.77 million US gallons of refined products** (gas, diesel, jet fuel and propane).

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

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

ENBRIDGE
Life Takes Energy

Toll-free: **1-855-869-8209**
E-mail: **line5info@enbridge.com**

The effects of a Line 5 shutdown

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

Crude oil impacts

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

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

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

Refined products impacts

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

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

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

The effect on regional refineries

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

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

Demand on Enbridge pipelines (approximate)

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

Capacity of Enbridge pipelines

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

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https://ca.sports.yahoo.com/news/mexico-sees-no-drastic-oil-164430624.html

Reuters

Mexico sees no need for drastic oil exports cuts as sales remain firm: PMI

Marianna Parraga
Tue., March 2, 2021, 9:44 a.m.·2 min read
By Marianna Parraga

(Reuters) - Mexico does not see the need to reduce its oil exports, as many Latin American producers did last year, because demand and pricing for its flagship crude remains firm, the head of state oil company Pemex's commercial arm said on Tuesday.

Mexico briefly joined an effort by the Organization of the Petroleum Exporting Countries and its allies last year to reduce production to revive crude prices but it limited its contribution to the cuts to 100,000 barrels per day (bpd) for a couple of months through June. The nation had to curb fuel imports amid lower demand.

"I'm looking beyond the crisis," Ulises Hernandez, general director of PMI which is in charge of most of Pemex' trading deals, said at IHS Markit's CERAWeek virtual energy conference.

"Because of the low (production) costs and, of course, the blend of heavy and light oil that we produce has good demand in the international market, we have not had the need to reduce exports."

Mexico's flagship crude grade, the heavy Maya, has also benefited from a narrower price differential against light crude in recent months, Hernandez added.

Pemex's crude output averaged 1.651 million bpd in January, slightly below the 1.724 million bpd produced a year earlier. Oil exports fell to 979,000 bpd in January versus 1.26 million bpd year-on-year.

A portion of the fuel oil that Mexico would have exported was supplied last month to domestic power plants following an interruption in U.S. natural gas exports to Mexico, which forced the Latin American nation to import liquefied natural gas (LNG) and restart old thermoelectric plants fueled by oil and coal.

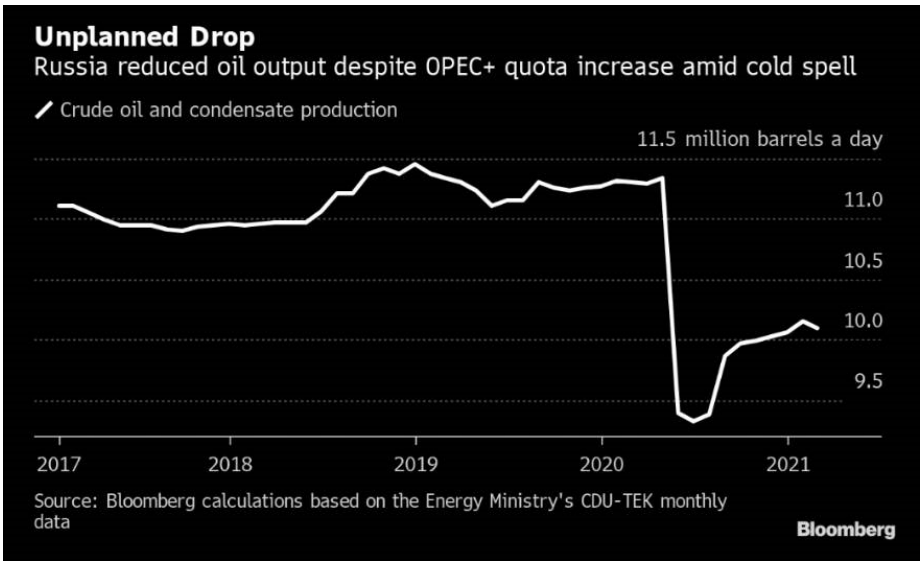
Hernandez said that current lifting costs at Mexico's main oil production areas in shallow waters are below $12 per barrel, a reason why the company has not pushed harder to make unconventional resources available.

"From the beginning of this administration, Pemex has focused on the most profitable onshore and shallow water basins... This is one of the main reasons why this downturn has not driven a major shift in strategy," Hernandez said.

(Reporting by Marianna Parraga; Editing by Marguerita Choy)

Russia's February Oil Output Fell Despite OPEC+ Higher Quota (1)
2021-03-02 08:20:05.741 GMT

By Olga Tanas and Dina Khrennikova
(Bloomberg) -- Russia last month pumped below its OPEC+ oil-output target for the first time since the historic curbs began last May, failing to take full advantage of a more generous quota.
The nation produced 38.56 million tons of crude and condensate in February, according to preliminary data from the Energy Ministry's CDU-TEK unit. That equates to 10.095 million barrels a day, based on a 7.33 barrel-per-ton conversion ratio. Output of condensate -- a light oil extracted from natural gas -- is excluded from the OPEC+ deal. As the CDU-TEK doesn't provide a breakdown between crude and condensate, it's difficult to assess the nation's compliance, but if February's condensate production was in line with January's, then daily crude output would be around 9.155 million barrels, some 30,000 barrels lower than its OPEC+ quota.



Russia and close oil ally Kazakhstan were allowed to produce more in February and March under the deal reached between the Organization of Petroleum Exporting Countries and its partners. Russia's quota rose by 65,000 barrels a day in February, and will do so again this month. Other OPEC+ members kept output flat, while Saudi Arabia voluntarily slashed an extra 1 million barrels a day. OPEC+meets again this week to discuss production levels beyond March.
The cartel and its partners kicked off unprecedented cuts in supply last May as the coronavirus crisis caused fuel demand to collapse.
February, Russia's first month of over-compliance with the deal, brought abnormally cold temperatures. The nation's crude pipeline operator, Transneft PJSC, regularly recorded lower crude flows at some Siberian intake points over the month, citing frigid weather as one of the reasons.

The last time a severe winter led to cuts in Russian oil production was early 2017, at the start of the country's cooperation with OPEC. In early January that year, the cold spell resulted in output reductions averaging 5,000 to 10,000 barrels a day, according to Energy Ministry estimates.
Bashneft PJSC, a unit of Russia's largest oil producer Rosneft PJSC, suffered the biggest drop in output last month, with its average daily production falling 18% from January to about 191,098 barrels of crude and condensate, according to Bloomberg calculations. Slavneft, owned by Rosneft and Gazprom Neft PJSC, reduced daily output by 2.3% to around 143,470 barrels.
Rosneft didn't respond to a request for a comment. The producer, excluding Bashneft and Slavneft, cut its daily production by 1.3% to 3.404 million barrels, while other oil companies, including Lukoil PJSC, Surgutneftegas PJSC, Tatneft PJSC and Gazprom Neft, increased their average daily output. Projects operating under production-sharing agreements, including with international partners such as Exxon Mobil Corp., reined in output by 3.5% to around 360,678 barrels a day.

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https://www.opec.org/opec_web/en/press_room/6375.htm

14th OPEC and non-OPEC Ministerial Meeting

No 08/2021
Vienna, Austria
04 Mar 2021

The 14th Meeting of OPEC and non-OPEC Ministers took place via video conference on Thursday March 4, 2021, under the Chairmanship of HRH Prince Abdul Aziz bin Salman, Saudi Arabia's Minister of Energy, and Co-Chair HE Alexander Novak, Deputy Prime Minister of the Russian Federation.

The Meeting welcomed the appointment of HE Mohammed Al-Fares, Minister of Petroleum of Kuwait and the return of HE Mohamed Arkab, Energy Minister of Algeria.

The Meeting emphasized the ongoing positive contributions of the Declaration of Cooperation (DoC) in supporting a rebalancing of the global oil market in line with the historic decisions taken at the 10th (Extraordinary) OPEC and non-OPEC Ministerial Meeting on 12 April 2020 to adjust downwards overall crude oil production and subsequent decisions.

The Ministers noted, with gratitude, the significant voluntary extra supply reduction made by Saudi Arabia, which took effect on 1 February for two months, which supported the stability of the market.

The Ministers also commended Saudi Arabia for the extension of the additional voluntary adjustments of 1 mb/d for the month of April 2021, exemplifying its leadership, and demonstrating its flexible and pre-emptive approach.

The Ministers approved a continuation of the production levels of March for the month of April, with the exception of Russia and Kazakhstan, which will be allowed to increase production by 130 and 20 thousand barrels per day respectively, due to continued seasonal consumption patterns.

The Meeting reviewed the monthly report prepared by the Joint Technical Committee (JTC), including the crude oil production data for the month of February.

It welcomed the positive performance of participating countries. Overall conformity with the original decision was 103 per cent, reinforcing the trend of aggregate high compliance by participating countries.

The Meeting noted that since the April 2020 meeting, OPEC and non-OPEC countries had withheld 2.3bn barrels of oil by end of January 2021, accelerating the oil market rebalancing.

The Meeting Extended special thanks to Nigeria for achieving full conformity in January 2021, and compensating its entire overproduced volumes.

The ministers thanked HE Timipre Sylva, Minister of State for Petroleum Resources of Nigeria, for his shuttle diplomacy as Special Envoy of the JMMC to Congo, Equatorial Guinea, Gabon and South Sudan to discuss matters pertaining to conformity levels with the voluntary production adjustments and compensation of over-produced volumes.

In this regards the Ministers agreed to the request by several countries, which have not yet completed their compensation, for an extension of the compensation period until end of July 2021.

It urged all participants to achieve full conformity and make up for pervious compensation shortfalls, to reach the objective of market rebalancing and avoid undue delay in the process.

The Meeting observed that in December, stocks in OECD countries had fallen for the fifth consecutive month.

The Meeting recognized the recent improvement in the market sentiment by the acceptance and the rollout of vaccine programs and additional stimulus packages in key economies, but cautioned all participating countries to remain vigilant and flexible given the uncertain market conditions, and to remain on the course which had been voluntarily decided and which had hitherto reaped rewards.

The Ministers thanked the JTC and the OPEC Secretariat for their contributions to the meeting. The next meetings of the JMMC and OPEC and non-OPEC Ministers are scheduled for 31 March and 1 April 2021, respectively.

https://english.alarabiya.net/News/middle-east/2021/03/07/Iran-says-US-approved-release-of-frozen-Iranian-assets-in-Iraq

Iran says US approved release of frozen Iranian assets in Iraq

Yaghoub Fazeli, Al Arabiya English

Published: 07 March ,2021: 12:29 AM GSTUpdated: 07 March ,2021: 12:52 AM GST

An Iranian trade official said Friday the US green-lit the release of Iranian funds that have been frozen in Iraq due to US sanctions.
Citing Iraqi sources, Hamid Hosseini, board member of the Iran-Iraq Joint Chamber of Commerce, said Washington has approved the release of frozen Iranian assets at the Trade Bank of Iraq.

“Several transactions have [already] been made,” Hosseini wrote on Twitter, without mentioning the value of the assets.
US sanctions have prevented Iran from accessing tens of billions of its assets in foreign banks.
Iranian frozen assets in Iraq amount to more than $6 billion, according to Iranian officials.
The release of Iran’s frozen assets will help with the “provision of essential items” for the public ahead of the Iranian new year and the Muslim fasting month of Ramadan, Hosseini said.
Under US sanctions, Iraq pays the money for gas bought from Iran to an account at the Trade Bank of Iraq, which Tehran is only allowed to use to buy humanitarian goods from Iraq itself.
Last October, the head of the Iran-South Korea Chamber of Commerce said the release of Iranian frozen funds in South Korea, which he said are worth $8.5 billion, depended on the outcome of the US presidential election.
Iran’s economy has been hit hard since 2018 when former US President Donald Trump withdrew from the 2015 nuclear deal between Tehran and world powers and reimposed sweeping sanctions on the country.
Last month, South Korea said it reached an agreement with Iran over the release of Tehran’s frozen funds in South Korean banks but signalled that the agreement was effectively subject to US approval.

IRAN TANKER TRACKER: Ships Vanish as Diplomatic Strains in Focus
2021-03-02 09:55:54.857 GMT

By Julian Lee
(Bloomberg) -- Just one Iranian oil tanker began sending position signals indicating it left the country in February, as Iran and the U.S. make faltering steps toward reviving the nuclear deal that President Trump binned.

OBSERVED FLOWS:
* Total observed shipments of crude and condensate were 1m bbl, or 36k b/d, in February, compared with revised 12m bbl, or 387k b/d, in January, according to tanker-tracking data monitored by Bloomberg
* 1 tanker appeared leaving the Persian Gulf during February
* 2 more appeared in the Strait of Malacca on dates that indicate they left Iran in January
* Observed crude, condensate flows from Iran (k b/d):

Destination	February	January	December
China	0	290	323
Syria	0	65	32
Unknown	36	32	0

IRAN'S FLEET:
* The vast majority of the fleet remains dark
* Latest signals received as of March 1: *T

	VLCC	Suezmax	Total
Total fleet	39	15	54
Not seen for more than 1 month	31	7	38
Last seen in past month, but not last week	5	6	11
Last seen within the past week, but not in last 48 hours	1	1	2
Last seen within the past 48 hours	2	1	3

* Most of the vessels that have disappeared from tracking were last seen in, or near, the Persian Gulf and may be either transporting crude with their transponders switched off, or used for floating storage
* Click here for PDF of Iran's exports and recent tanker movements
* Click here to see vessels on BMAP

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https://blinks.bloomberg.com/news/stories/QP1G9QDWLU6L

https://mailchi.mp/mees/second-saudi-aramco-share-offer-may-come

3 MARCH 2021 – INSIGHTS

Second Saudi Aramco Share Offer May Come

At the start of 2021, Saudi Arabia's de-facto ruler Prince Mohammed bin Salman dangled the possibility of a second partial flotation of Saudi Aramco. Now, the Governor of the Public Investment Fund (PIF) and Chairman of Saudi Aramco, Yasir Al-Rumayyan, says a further slice of the giant oil company would be offered when market conditions improve. In other words, now is not the time to consider diluting further the government's stake in what he called the Kingdom's crown jewel.

Saudi Arabia and specifically Prince Mohammed have made news headlines in recent weeks and not in a good way. Given current oil market conditions and negative press generated by the release of the US intelligence report on the murder of Saudi journalist Jamal Khashoggi. Now would certainly not be the right time to launch a second IPO even if Saudi Aramco's credentials as a highly efficient oil company and good governance are not in doubt.

Rumayyan, speaking at CERAWeek, one of the largest energy events that is being held in virtual format this year, said it was always on the cards to offer a second tranche of shares in Saudi Aramco. "I think once we see market conditions improve and more appetite from different investment institutions and investors, we will definitely consider selling more shares," he said. Rumayyan did not say whether Saudi Arabia would look to bring in foreign investors this time around.

https://www.jpost.com/middle-east/iranian-backed-houthis-threaten-to-attack-aramco-wider-scope-than-2019-attack-660672

Iranian-backed Houthis threaten to attack Aramco: 'Wider scope than 2019 attack'

The Houthis pointed to the “Safer oil fields”, as an example. It was not clear where this red line was or what specific infrastructure they don’t want targeted.

By SETH J. FRANTZMAN
MARCH 2, 2021 11:44

The Iranian-backed Houthi rebels in Yemen, who released footage of their ballistic missiles targeted Saudi Arabia’s capital over the weekend, have warned Saudi Arabia against escalation in the western and northern frontlines of Yemen. They say they will strike at Saudi Arabia’s Aramco if Saudi Arabia or UAE “fighters or supporters” commit “aggression” in certain areas.

The Houthis pointed to the “Safer oil fields”, as an example. It was not clear where this red line was or what specific infrastructure they don’t want targeted.

The reports, which appeared in numerous media in Iran and media linked to the Houthis quoted several reports which warned Riyadh that future Houthi attacks will for “far beyond the recent ‘5th deterrence balance’ that they have achieved. The Houthis using drones and missiles have targeted Aramco facilities before over the last several years.

A massive Iranian attack on Saudi Arabia’s Abqaiq in September 2019 also struck at Aramco.

It appears the Safer reference is to an area that was once at the heart of the battle for Marib in 2015. Today the Houthis are marching on Marib again. The Biden administration has warned them against attacks on Riyadh and urged them to stop the offensive but the Biden administration also took them off a terror list.

In 2015 The National noted that the Saudi-led Coalition “began moving supplies to Marib in March, using land routes from Saudi Arabia through Hadramout and Shabwa provinces. Last month, coalition forces started flying more reinforcements to Marib using a small airport in the tiny town of Safer, 60km east

of Marib city. Loyalist military sources said further reinforcements including tanks, armoured vehicles, rocket launchers and Apache helicopters arrived last week."
The area was a base for the "Safer Exploration and Production Operations Company and other foreign companies working in Yemen's vital energy sector. The main gas pipeline south also runs through the town, which is controlled by the pro-Hadi military commander Abdullah Al Shaddadi.
The nearest Houthi presence was in Baihan in Shabwa province, 50km away." Houthis at the time used a Tochka missile to kill 45 UAE troops, ten Saudis and five Bahrainis from the coalition. "It was by far the worst loss suffered by the coalition and one of the darkest days in the UAE's history."
Fars News in Iran quotes Houthi spokesman Brigadier General Yahya Sarei who warned that any attack would be retaliated against, like the "airport-to-airport" equation against Riyadh attacks. Fars News notes that "informed sources said that Sanaa was determined to give a 'painful response' to any direct or indirect attack by Riyadh on the Safar oil fields, quoting Yemeni [Houthi] government officials as saying: 'As long as Aramco - the backbone of the Saudi economy - If we do not disable it, we will not rest.'"
The Houthis say they are in the midst of their latest operations against Saudi Arabia and a large scale offensive in Marib. The report quotes Mujib Shamsan telling Al-Akhbar: "The most important message is to warn the Saudi regime not to think of attacking Ma'rib oil structures ....Therefore, if the Safar oil sectors are targeted by Saudi or Riyadh-based fighter jets, the Sanaa forces will also use 'UAVs and missiles will bomb Saudi oil structures in a large-scale operation.'" He warned of another Abqaiq-style attack.
That attack was carried out by Iran, showing how Houthi operations and Iranian operations are closely coordinated. The warning now is of a larger "scope" attack on Saudi Arabia. The Houthis claim they recently targeted five Saudi airports and "prompted the Saudi Airlines to delay dozens of flights."
The warnings represent a major potential escalation.

Libya's observed oil exports from tanker tracking (February 2021)

Crude export history

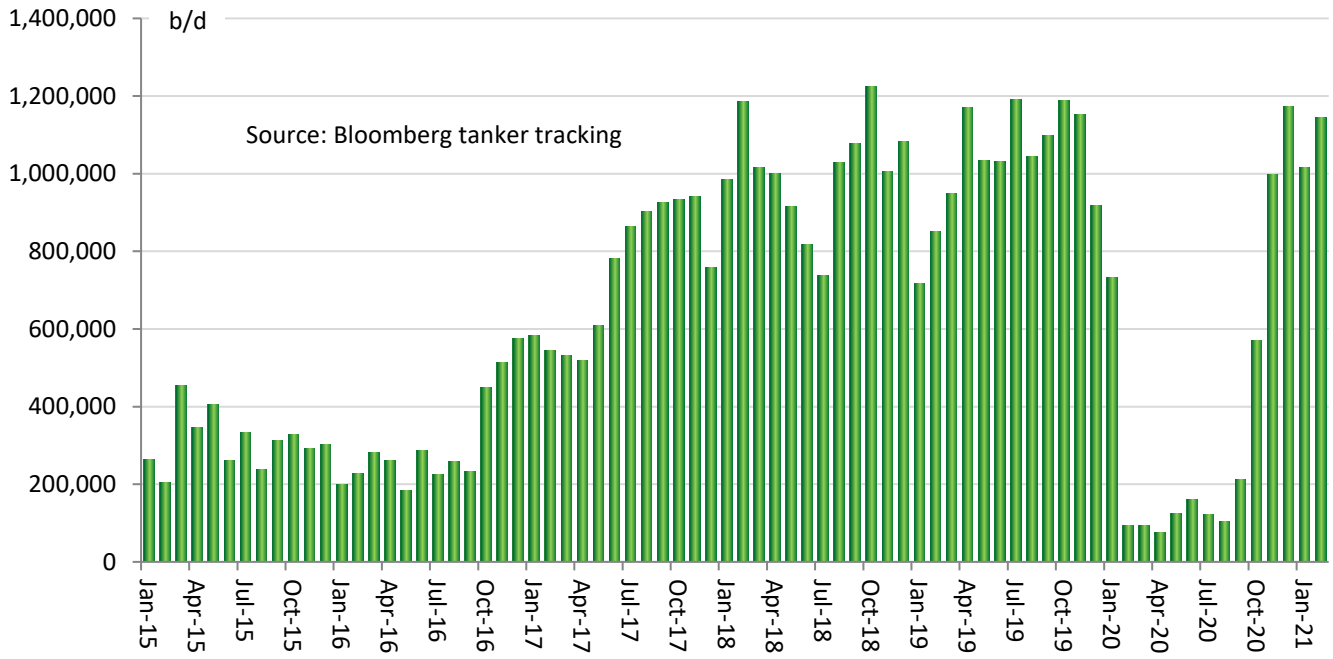
	Crude b/d
Feb-21	1,144,214
Jan-21	1,016,452
Dec-20	1,174,194
Nov-20	997,000
Oct-20	571,373
Sep-20	213,333
Aug-20	103,226
Jul-20	122,581
Jun-20	160,000
May-20	125,806
Apr-20	76,667
Mar-20	93,548
Feb-20	94,138

Shipments by terminal

	February b/d	January b/d
Bouri	21,429	38,710
Brega	73,214	85,484
Es Sider	283,929	200,000
Farwah	42,857	19,355
Hariga	71,429	148,387
Mellitah	125,000	112,903
Ras Lanuf	97,143	112,903
Zawiya	285,714	227,742
Zueitina	143,500	70,968

Crude exports by destination

Destination	February k b/d	January k b/d
Italy	278	378
Spain	190	120
Turkey	21	19
China	125	81
U.A.E.	48	10



Vessels observed loading Libyan crude

Vessel	IMO	Type	Load date	Load terminal	Destination	Est. vol. (k bbl)
Makronissos	9232450	Aframax	25-Feb	Bouri	Spain	600
Saint George	9231468	LR2	06-Feb	Brega	Spain	600
Nordic Agnetha	9422639	MR	14-Feb	Brega	U.A.E.	250
Bareilly	9299769	Aframax	19-Feb	Brega	Spain	600
NS Creation	9312896	Aframax	24-Feb	Brega	Italy	600
Santa Cruz I	9259680	Aframax	01-Feb	Es Sider	Greece	600
Bareilly	9299769	Aframax	04-Feb	Es Sider	Italy	600
Seavelvet	9843211	Aframax	04-Feb	Es Sider	Turkey	600
Delta Eurydice	9700706	Suezmax	11-Feb	Es Sider	China	950
Front Polaris	9791004	Aframax	12-Feb	Es Sider	China	600
Thomas Zafiras	9724087	Aframax	14-Feb	Es Sider	Spain	550
New Amorgos	9370836	Aframax	18-Feb	Es Sider	Italy	500
Eagle San Juan	9594846	Suezmax	19-Feb	Es Sider	Spain	950
Zarifa Aliyeva	9420617	Aframax	20-Feb	Es Sider	Italy	550
Kriti Samaria	9329409	Aframax	22-Feb	Es Sider	Italy	550
Tilos I	9800271	Suezmax	25-Feb	Es Sider	Italy	950
Olib	9334739	Aframax	26-Feb	Es Sider	Italy	550
Seaoath	9290361	Aframax	02-Feb	Farwah	Greece	600
Agathonissos	9232448	Aframax	27-Feb	Farwah	Unknown	600
Front Seoul	9831854	Suezmax	18-Feb	Hariga	China	1000
Nordic Cross	9438418	Suezmax	22-Feb	Hariga	France	1000
Pacific Debbie	9772058	LR1	01-Feb	Mellitah	U.A.E.	500
Delta Captain	9288710	Aframax	04-Feb	Mellitah	Croatia	600
Breiviken	9817470	Aframax	11-Feb	Mellitah	Netherlands	600
Alpine Aqualina	9469687	Aframax	16-Feb	Mellitah	U.A.E.	600
Delta Star	9458016	Aframax	18-Feb	Mellitah	Spain	600
Minerva Roxanne	9276585	Aframax	21-Feb	Mellitah	Netherlands	600
Minerva Eleonora	9276573	Aframax	04-Feb	Ras Lanuf	Unknown	600
Kriti Samaria	9329409	Aframax	08-Feb	Ras Lanuf	Italy	570
Malibu	9776731	Suezmax	19-Feb	Ras Lanuf	China	950
Penelop	9325908	Aframax	22-Feb	Ras Lanuf	U.K.	600
Delta Star	9458016	Aframax	01-Feb	Zawiya	Spain	700
NS Creation	9312896	Aframax	03-Feb	Zawiya	Spain	730
Prometheus Energy	9801988	Aframax	05-Feb	Zawiya	Italy	730
Zarifa Aliyeva	9420617	Aframax	07-Feb	Zawiya	Italy	730
Matilda	9407457	Aframax	10-Feb	Zawiya	Italy	730
NS Concept	9299707	Aframax	13-Feb	Zawiya	Netherlands	730
Saint George	9231468	LR2	17-Feb	Zawiya	Italy	730
Front Sirius	9767340	Aframax	20-Feb	Zawiya	France	730
Thomas Zafiras	9724087	Aframax	26-Feb	Zawiya	Denmark	730
Bonita	9297541	Aframax	27-Feb	Zawiya	Netherlands	730
Drepanos	9420643	Aframax	28-Feb	Zawiya	Unknown	730
Freud	9804461	Suezmax	02-Feb	Zueitina	U.S.	1000

Seaexpress	9344019	LR1	08-Feb	Zueitina	Netherlands	318
Seaborn	9288746	Aframax	10-Feb	Zueitina	Unknown	700
Delta Poseidon	9468671	Suezmax	23-Feb	Zueitina	Greece	1000
Delta Spirit	9419096	Suezmax	27-Feb	Zueitina	Unknown	1000

Source: Bloomberg tanker tracking

Note: In the absence of alternative information sources, standard cargo sizes are used: Suezmax - 1m bbl, Aframax, LR1 - 600k bbl.

Exxon's Math Calls For Overall Global Oil Decline Rate of ~7%, A Very Bullish Argument For Post 2020 Oil Prices

Posted: Thursday June 20, 2019. 5:30pm Mountain

We believe Exxon presented a very bullish argument for oil prices beyond 2020 and that it has been overlooked because most readers only flip thru a slide deck and don't listen to or read transcripts of management's spoken words. Exxon's spoken words highlighted one of the forgotten (and perhaps most important) oil supply/demand concerns for post 2020 - the mid term challenge to replace increasing rate of overall global oil declines. And what is eye opening is Exxon's estimated overall global oil decline rate, which is way higher than any we can ever remember seeing. Its impossible to tell from the small oil supply/demand graph in the slide deck, but Exxon's spoken words says long term oil demand is 0.7% per year and then "*When you factor in depletion rates, the need for new oil grows at close to 8% per year and new gas at close to 6% per year*." Exxon may not specifically say what the global decline rate is, but their math is that the world needs new oil supply to grow annually at close to 8% to meet the 0.7% annual increase in oil demand and offset declines ie. an overall global decline rate of approx. 7%. This is an overall global oil decline rate for OPEC and non-OPEC. This compares to BP's estimate of overall global oil decline rate of 4.5% and we expect most are probably assuming something around 5%, certainly not above 6%. No one should be surprised by the increased decline rate given that high decline US shale and tight oil have increased by ~2.5 mmb/d in the last ~2 years. But an implied ~7% overall global oil decline rate is way higher than expectations. There is a big difference between needing to offset oil declines of ~7 mmb/d vs declines of ~4.5 mmb/d ie. an additional 2.5 mmb/d of new oil supply every year. Even if the implied difference was to 6%, it would still be an additional 1.5 mmb/d of new oil supply and that would also be very bullish for post 2020 oil. We recognize that the 2019/2020 oil supply demand story is the need for OPEC+ to keep cuts thru 2020, but Exxon's math implying ~7% overall global oil decline rate sets up a very bullish view for oil post 2020. We believe the reality to replace oil declines post 2020 is overlooked.

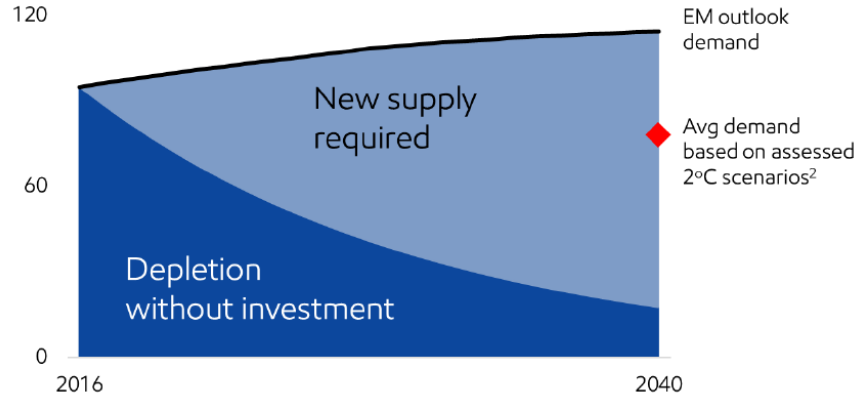
The 2019/2020 oil story - oil inventories still above the 5 yr ave and OPEC+ need to work together in 2020. There is increasing geopolitical risk to oil in a range of regions (Iran/Saudi Arabia, Libya, Venezuela, etc.) yet the prevailing tone to oil in the past month is negative with the concerns on trade wars/lower economic growth leading to weakness in oil demand. This was reinforced in the past week with the view that there is the need for OPEC+ to continue to work together in H2/19 and in 2020. Our SAF June 16, 2019 Energy Tidbits memo [LINK] reviewed the IEA's new monthly Oil Market Report [LINK], which included (i) "*OECD oil stocks remain at comfortable levels 16 mb above the five-year average"*, (ii) the EIA lowered its 2019 oil demand growth rate by 0.1 mmb/d to +1.2 mmb/d, and (iii) a negative first look at 2020 oil supply/demand. The EIA's first 2020 forecast puts more pressure on OPEC+ to continue with cuts through 2020. IEA says oil demand growth rate will grow from +1.2 mmb/d in 2019 to +1.4 mmb/d in 2020. This is a positive, however, it is more than offset as the IEA forecasts another year of big non-OPEC oil supply growth of +2.3 mmb/d in 2020. In theory a lesser call on OPEC of 0.9 mmb/d. The IEA writes "*A clear message from our first look at 2020 is that there is plenty of non-OPEC supply growth available to meet any likely level of demand, assuming no major geopolitical shock, and the OPEC countries are sitting on 3.2 mb/d of spare capacity".*

Exxon sees modest annual growth in oil demand, but peak oil demand sometime after 2040. Exxon presented at a US sellside energy conference on Tues. We expect a big reason why Exxon's oil outlook was ignored was that the presentation was almost all about providing a great detailed look at the Guyana oil play. Plus its headline annual growth rate for oil demand of 0.7% per year wouldn't have made anyone bullish, if anything maybe even more so so on oi. Exxon only provided some brief comments on their oil supply and demand outlook. Exxon said *"In this scenario, oil demand is expected to grow 0.7% per year, driven by commercial transportation and chemical"*. This compares to 2018 oi demand growth of 1.45% and even this year's lower oil demand growth rates of 1.15%. However, we recognize it is tough to get data from a small graph, but a positive tn the graph is that it seems to indicate that peak oil demand doesn't happen before 2040.

However, Exxon says new oil supply of 8% per year is needed to meet demand growth and offset decline rates. On one hand, we continue to be surprised that Exxon's view on new oil supply has received no attention. On the other, it makes sense because the vast majority of readers only flip thru a slide deck so will miss the spoken word that gives numbers and context to a slide. That was clearly the case with the Exxon presentation. If Exxon is anywhere near right, this is a hugely bullish view for mid/long term oil ie post 2020 oil. Exxon highlighted one of the forgotten oil supply/demand concerns is

the mid term challenge to replace global oil declines. And what is eye opening is Exxon's estimated decline rate, which is way higher than any we can ever remember seeing. Exxon says long term oil demand is 0.7% per year and then says "*When you factor in depletion rates, the need for new oil grows at close to 8% per year and new gas at close to 6% per year*." Exxon didn't specifically say that the overall global decline rate was ~7%, but the math looks straightforward. The world needs new oil supply to growth at close to 8% per year to meet 0.7% annual demand growth and to offset declines in global (OPEC and non-OPEC) oil production ie. the overall global oil decline rate is approx. 7%. This is an overall OPEC and non-OPEC global decline rate.

Oil Supply/Demand (moebd)

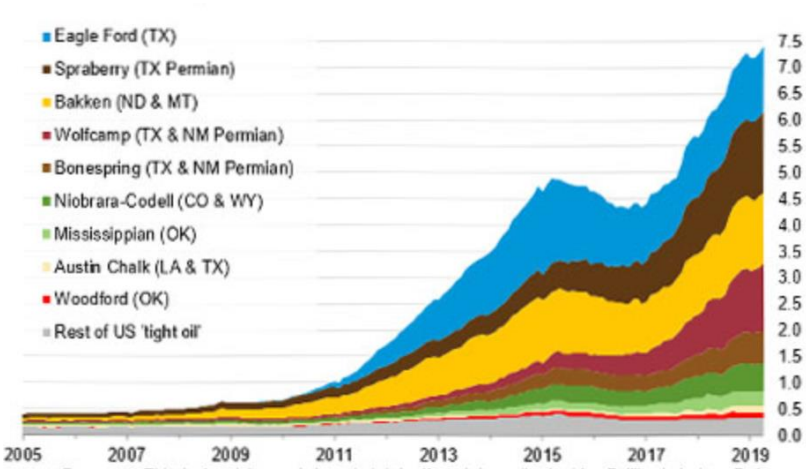


Source: Exxon US Sellside Conference Presentation June 18, 2019

Implies a huge overall global decline rate of ~7% - way higher than other estimates. It may well be the case that forecasters haven't updated their global oil decline models to reflect the impact of the US adding ~2.5 mmb/d of high decline shale and tight oil in the past two years. But we aren't aware of anyone who is using an overall global oil decline rate as high as 7%. We have seen estimates for 7% for decline rates for non-OPEC oil, but not for the decline rates overall for global oil. Rather, we expect that most have been assuming overall global oil decline rates of 4% to 5%. Later in the blog, we note our peak oil demand comment from Nov 6, 2017 (prior to the big ramp up in US shale and tight oil) that used Core Laboratories spring 2017 estimate for overall global oil decline of ~3.3%.

Exxon's global leadership position, especially in shale, is why we should pay attention to this view of significantly higher global oil decline rates. Everyone knows Exxon is the largest public international oil company and is in all major oil regions and all types of plays from conventional, oil sands, middle east, deepwater oil and shale oil, We believe that Exxon is viewed as the global leader in the Permian, and this shale oil leadership is critical to understand as we believe that the growth of US shale is the key reason for the increasing overall global oil decline rates. Exxon's shale oil leadership is why we should be paying attention to this estimate. The game changer to global oil decline rates has been the increasing oil production from high decline US shale and tight oil. The EIA estimates [LINK] that US shale and tight oil plays are up over 6 mmb/d this decade and ~2.5 mmb/d n the past two years alone.

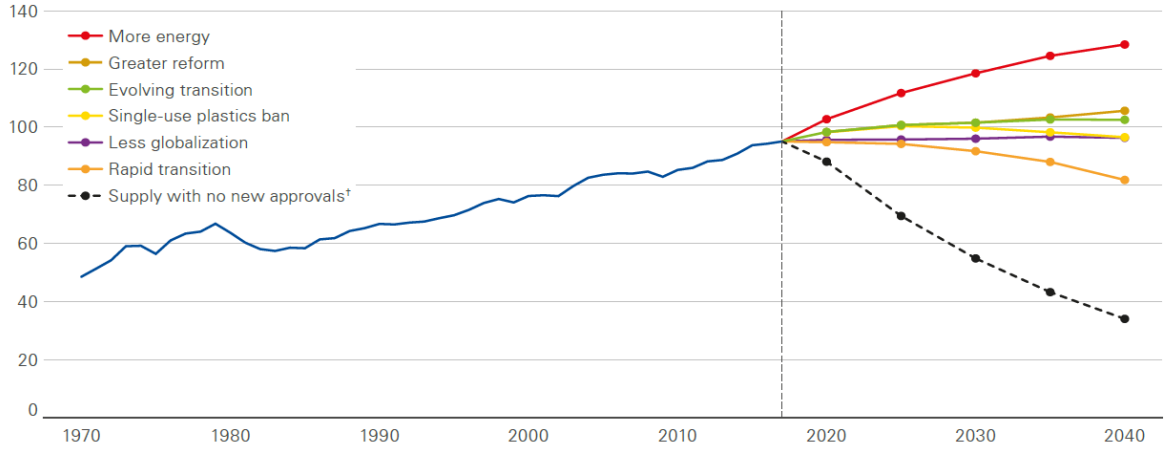
US Tight Oil Production – Selected Plays (Million barrels of oil per day)



Source: EIA

BPs recent forecast for overall global oil decline rate is 4.5% per year. BP's Energy Outlook 2019 Edition (Feb 14, 2019) [LINK] included their outlook for oil supply and demand and specifically on overall global oil decline rates. BP wrote "*Second, significant levels of investment are required for there to be sufficient supplies of oil to meet demand in 2040. If future investment was limited to developing existing fields and there was no investment in new production areas, global production would decline at an average rate of around 4.5% p.a. (based on IEA's estimates), implying global oil supply would be only around 35 Mb/d in 2040."* Below is the graph from their Energy Outlook 2019 Edition report.

Demand and Supply of Oil (Mbd)



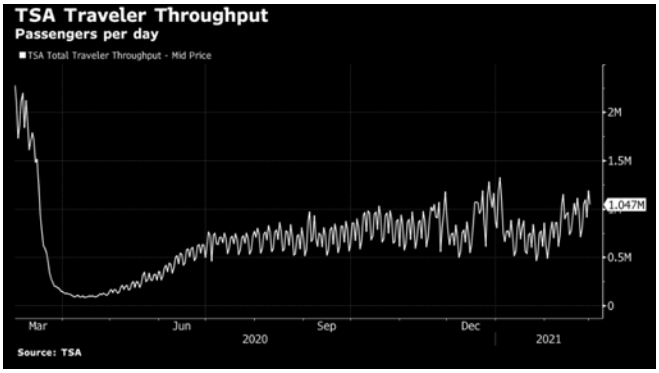
Source: BP Energy Outlook 2019 Edition

If Exxon is anywhere close, this is a hugely bullish signal for mid/long term oil ie. post 2020 oil. We recognize that this significantly higher than expected overall global oil decline rate will take a year or two to work thru the current supply/demand fundamentals given where markets are today. However, over the mid term, the need to add ~7 mmb/d of new oil supply is a huge challenge for the world. The difference between an Exxon type view of ~7% declines vs BP's 4.5% declines is approx. 2.5 mmb/d of an additional new oil supply every year is needed to balance the markets. In reality, even if Exxon's implied overall global decline rate was ~6%, it would still be very bullish for mid/long term oil as this means an additional ~1.5 mmb/d of new global oil supply per year.

Its even more bullish for post 2020 oil than we thought in our Nov 6, 2017 peak oil demand blog. We have always been in the camp that believes peak oil demand is coming, but we have also been of the view that the post 2020 challenge to replace oil declines would be getting tougher. We believe Exxon's view of higher global oil decline rates is consistent with the ~2.5 mmb/d increase in US shale and tight oil in the past two years. And is way more bullish than we wrote in our Nov 6, 2017 blog "*Peak Oil Demand Is Coming, But >4 Mmb/d Of New Oil Supply Will Be Needed Every Year To Replace Declines To Get There*" [LINK], and "*We buy into the narrative of peak oil demand, believe it is inevitable, its visible and will happen before 2030. Peak oil demand will be from the cumulative impact of a number of factors including EVs, battery/storage, LNG for power, LNG for transportation, increased energy efficiency, etc. But the peak oil demand narrative forgets the most basic fundamentals of oil – industry has to add new oil supply every year to replace declines just to keep production flat. Even after today's big oil rally, long dated strips are still under $52 from 2020 thru 2025. We don't believe long dated 2020 thru 2025 strips are predictive of future prices or indicative of the marginal supply costs to add 4 to 5 million b/d every year in 2020 to 2025 or to add >3 million b/d every year once peak oil demand is reached and is in plateau. We believe these marginal supply costs are significantly higher and >$60. We believe oil can quickly move to a base of >$60 with this supply challenge and there will be longevity to this call as markets appreciate this challenge and that the marginal supply cost to add this much new oil production every year is well over $60. Peak oil demand won't take away from the challenge to add significant new oil production every year."* Note that our Nov 6, 2017 blog was based on the spring 2017 Core Laboratories estimate that the global world wide annual decline rate in oil was then 3.3%. But to Core Laboratories support, this estimate would have been before the ~2.5 mmb/d of added US shale and tight oil in the past two years.

Bloomberg OIL DEMAND MONITOR: Aviation Picks Up; Jet Still Lags Road Fuel
2021-03-03 12:52:31.939 GMT

By Stephen Voss
(Bloomberg) -- The number of commercial flights is picking up globally, helping jet fuel demand, after declining through January and early February. The advance is clearest in China, coming after a holiday period when authorities urged citizens to stay at home, and the gains are visible in actual scheduled flights measured by OAG Aviation, not just on a year-over-year basis.
Other regions of the world are also showing an upward trend, with Europe still the furthest behind.
Some 1.05 million passengers passed through U.S. airports on March 1, the first Monday since Jan. 4 when the count has exceeded a million, according to turnstile data from the Transportation Security Administration.



Furthermore, it's only the third Monday to reach that threshold since airline activity started to tumble in March 2020, the TSA data shows. Overall, jet fuel demand remains 32% below year-ago levels in the U.S., 41% down in India and 68% less in Portugal, according to the most recent weekly or monthly data for those nations, as detailed in the tables below.

Jet Lag

Demand for aviation fuel was hit harder than other petroleum products by the coronavirus pandemic in 2020 and all over the globe it is taking longer to recover than gasoline and diesel as movement restrictions limit both business and leisure travel.
"Unsurprisingly, the biggest gap is still in jet fuel volumes, but also that is probably going to restore itself more or less by the second half of the year," Royal Dutch Shell Plc Chief Executive Officer Ben Van Beurden said Monday during IHS Markit's CERAWeek conference.
Speaking at the same virtual conference on Tuesday, ConocoPhillips Chief Economist Helen Currie said that even with government stimulus programs "it will take another year before we really get back to a full normal 100-million-barrel-a-day" global oil market.
The latest weekly data on airline seat capacity from OAG Aviation shows Europe is still 75% behind the equivalent week in 2019 while the Asia-Pacific region lags by 30% and North America is down 44%. Within Europe's five biggest economies, air traffic in the U.K. has been hit the hardest.
When comparing year-over-year changes, it's important to consider when coronavirus restrictions on mobility came into effect last year.
China began localized lockdowns in late January 2020, for example, while most places in Europe and North America waited until mid-March. By the end of that month, virtually all nations were under strict lockdown, including countries in South America and Africa, according to government response tracking by Oxford University.
That's why Asia-Pacific seat capacity is down 30% against 2019 but only 12% lower than the same week in 2020, since airline activity was already plunging at this time last year.
U.K. Roads, Texas Refineries
While U.K. consumption of aviation fuels remains low, the nation's road fuel demand is creeping higher, with combined diesel and gasoline use gaining 9% over the past month, according to a moving average measure of typical sales at about 4,500 service stations.

Shanghai and Beijing were, once again, the only places among 13 world cities regularly followed in this monitor that showed traffic congestion above 2019 average levels, according to TomTom. The data in the table below shows congestion time added to a journey that would normally take one hour on empty roads at 8 a.m. local time on Monday morning.

The next tranche of weekly U.S. data, due later Wednesday, may show a pick-up in Gulf Coast refinery utilization, which plunged to 62.8% in the week ended Feb. 19 because of freezing conditions and power cuts, from 86.5% the week before. The sudden drop also pulled down U.S. refinery crude intake to near 12.2 million barrels a day, the lowest since 2008.

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.	-20		-8	w	Feb. 19	7.21m b/d	EIA
Distillates demand	U.S.	-4.5		-8.6	w	Feb. 19	3.93m b/d	EIA
Jet fuel demand	U.S.	-32		-21	w	Feb. 19	979,000 b/d	EIA
Total oil products demand	U.S.	-6		-5	w	Feb. 19	18.7m b/d	EIA
All vehicles miles traveled	U.S.		-15		w	Feb. 21	12b miles	DoT
Passenger car VMT	U.S.		-17		w	Feb. 21	n/a	DoT
Truck VMT	U.S.		-3		w	Feb. 21	n/a	DoT
Gasoline (petrol) avg sales per filling station	U.K.	-37		+13	w	Feb. 21	4,376 liters/d	BEIS
Diesel avg sales per station	U.K.	-25		+7	w	Feb. 21	7,717 liters/d	BEIS
Total road fuels sales per station	U.K.	-30		+9	w	Feb. 21	12,093 liters/d	BEIS
Large truck mileage index	Germany	+0.5	+0.3	+0.9	d	Feb. 17	115.2	Destatis
Light vehicle traffic	France	-19	-10		m	January	n/a	Vinci
Heavy vehicle traffic	France	-5.4	-4.3		m	January	n/a	Vinci
Passenger car traffic	Poland	-4		+14	w	Feb. 28	19,985	GDDKiA
Heavy goods traffic	Poland	+9		+3.7	w	Feb. 28	4,696	GDDKiA
Gasoline	India	-2		+12	2/m	February	2.22m tons	Bberg
Diesel	India	-8.6		+13	2/m	February	5.81m tons	Bberg
Jet fuel	India	-41		+7.4	2/m	February	388k tons	Bberg
All vehicles traffic	Italy	-34		-8	m	January	n/a	Anas
Heavy vehicle traffic	Italy	-11		-5	m	January	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	-14		-14	m	January	5.2m gal/d	Ministry
Diesel	Colombia	-11		-10	m	January	4.7m gal/d	Ministry
Jet fuel	Colombia	-29		+15	m	January	700k gal/d	Ministry

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

* BEIS comparison is now y/y, not versus pre-lockdown as in some previous monitors.

Road Mobility:

Measure	Location	% chg vs 2019 avg	% chg m/m	Mar. 1	Feb. 22	Feb. 15	Feb. 8	Feb. 1	Jan. 25	Jan. 18	Jan. 11
		for March 1		(minutes of congestion at 8am local time)							
Congestion	Shanghai	+25	+38	50	34	0	17	37	28	39	45
Congestion	Beijing	+20	+77	51	27	0	20	29	26	34	46
Congestion	Tokyo	-16	-2	31	33	29	31	32	31	30	5
Congestion	Mumbai	-79	-13	8	8	9	8	9	9	10	10
Congestion	New York	-38	-24	19	16	4	17	25	10	3	9
Congestion	Los Angeles	-54	+50	16	17	5	11	11	8	5	8
Congestion	London	-46	+10	20	19	23	22	19	19	18	16
Congestion	Rome	-22	+15	38	32	36	34	33	37	37	27
Congestion	Madrid	-46	+28	19	8	16	18	15	19	22	32
Congestion	Paris	-27	-5	32	21	25	32	34	35	33	31
Congestion	Berlin	-34	+19	22	20	18	23	19	18	21	21
Congestion	Mexico City	-62	n/a	19	17	14	14	0	13	13	13
Congestion	Sao Paulo	-47	+27	23	25	11	20	18	5	16	13

Source: TomTom. M/m comparison is March 1 vs Feb. 1. Mexico City was on a public holiday on Feb. 1. Click here for a PDF with more information on sources, methods.

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.	-54		+67	daily	March 1	1.047m people	TSA
Commercial flights	Worldwide	-33	-37	+13	daily	March 1	68,678	FlightRadar24
Air traffic (flights)	Europe		-65	+8	daily	March 1	9,870	Eurocontrol
Scheduled flights	Worldwide	-40		+10	weekly	March 1	400,329	OAG
Sch. flights	U.S.	-40		+13	weekly	March 1	109,152	OAG
Sch. flights	China	+70		+26	weekly	March 1	93,175	OAG
Sch. flights	India	-29		+4.6	weekly	March 1	18,491	OAG
Sch. flights	France	-70		-9	weekly	March 1	3,697	OAG
Sch. flights	France	-70		-9	weekly	March 1	3,697	OAG
Sch. flights	U.K.	-90		-1	weekly	March 1	1,906	OAG
Seat capacity	Worldwide	-41		+12	weekly	March 1	57.2m	OAG
Seat cap.	Asia-Pac	-12	-30		weekly	March 1	29.01m	OAG
Seat cap.	North America	-44	-44		weekly	March 1	13.45m	OAG
Seat cap.	Europe	-75	-75		weekly	March 1	5.95m	OAG
Seat cap.	Latin America	-45	-42		weekly	March 1	4.98m	OAG
Seat cap.	China	+76		+28	weekly	March 1	15.77m	OAG
Seat cap.	U.S.	-40		+15	weekly	March 1	13.10m	OAG

Click here for PDF with more information on sources, methods

China Air Travel Weekly View:

China (Scheduled amounts)	Jan. 11	Jan. 18	Jan. 25	Feb. 1	Feb. 8	Feb. 15	Feb. 22	March 1
Flights (thousands)	87.0	85.6	77.5	73.7	54.3	77.4	81.2	93.2
Flights (y/y % chg)	-13.3	-12.3	-21	+2.2	+47.3	+170	+123	+70
Seats (millions)	14.7	14.4	13.0	12.3	9.0	12.9	13.6	15.8
Seats (y/y % chg)	-15.1	-14.7	-23.2	-1.3	+46.8	+176	+126	+76

Source: OAG

Refinery Activity:

Measure	Location	y/y change	m/m change	Latest as of Date	Latest Value	Source
Crude intake	U.S.	-24%	-17%	Feb. 19	12.2m b/d	EIA
Utilization	U.S.	-19 ppt	-13 ppt	Feb. 19	68.6 %	EIA
Utilization	Gulf Coast U.S.	-26 ppt	-20 ppt	Feb. 19	62.8 %	EIA
Utilization	East Coast U.S.	+13 ppt	+1.7 ppt	Feb. 19	70.6 %	EIA
Utilization	Midwest U.S.	-15 ppt	-11 ppt	Feb. 19	76.0 %	EIA
Indep. refs run rate	Shandong province, China	+31 ppt	+0.6 ppt	Feb. 26	73.3 %	SCI99
State refs run rate	East China	-1.8 ppt	-3.7 ppt	Feb. 25	76.6 %	SCI99
State refs run rate	South China	+13 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.

Embargoed until 0945 CST (0145 UTC) 1 March 2021

Caixin China General Manufacturing PMI ™

Manufacturing PMI slips to nine-month low in February

PMI data revealed a further, albeit softer, improvement in the health of China's manufacturing sector in February. Notably, companies recorded slower rises in both output and new work for the third month running. Firms often commented that the coronavirus disease 2019 (COVID-19) pandemic had weighed on demand and impacted business operations in the latest survey period. New export work declined for the second month running, while raw material shortages and transport delays led to a marked lengthening of suppliers' delivery times. Nonetheless, companies were strongly optimistic that output will rise over the next year amid hopes of a rebound in global economic conditions.

The headline seasonally adjusted Purchasing Managers' Index™ (PMI™) – a composite indicator designed to provide a single-figure snapshot of operating conditions in the manufacturing economy – slipped from 51.5 in January to 50.9 in February, to signal a marginal improvement in operating conditions. Notably, the rate of improvement was the slowest seen since the current period of recovery began last May.

The fall in the headline index was partly driven by a slower expansion of output. The latest increase in production was modest overall, with growth having eased to a ten-month low. Panel members frequently mentioned that output rose in line with client demand. Total new work expanded at the weakest rate for nine months and only marginally overall. While there were reports of firmer demand conditions, the pandemic and recent rise in cases globally had reportedly weighed on overall sales growth. Notably, new export business declined for the second month in a row.

Firms maintained a cautious approach to staffing levels, with employment falling modestly in February. Concurrently, there seemed little pressure on operating capacities, as backlogs of work fell for the first time since last May, albeit marginally.

In line with the trend for new work, buying activity rose only slightly. At the same time, firms registered a second monthly drop in inventories of purchased items, while stocks of finished goods rose marginally.

Stock shortages and restrictions around travel continued to inhibit supplier performance in February. Notably, lead times for inputs lengthened to the greatest extent for nearly a year.

Greater prices for raw materials and higher transport costs led to a further substantial rise in input costs. As a result, prices charged by manufacturers rose solidly as companies looked to partially pass on higher cost burdens to customers.

Manufacturers in China were generally confident that output would increase over the next 12 months. Furthermore, the degree of positive sentiment was the second-highest in six-and-a-half years, supported by forecasts of rising client demand globally once the pandemic comes to an end and planned product releases.

China General Manufacturing PMI

sa, >50 = improvement since previous month

Sources: Caixin, IHS Markit

Key findings:

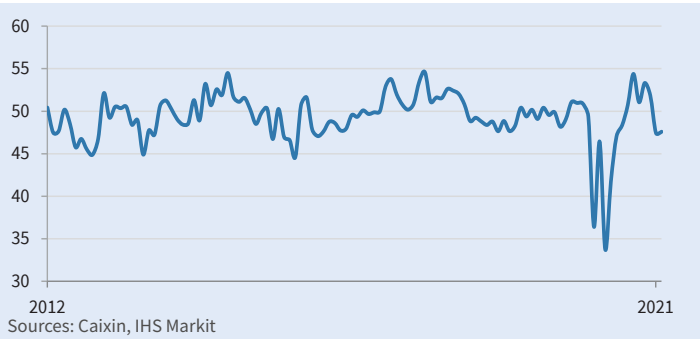
Output expands modestly amid notably softer rise in new work

Pandemic weighs on export sales and supplier performance

Business confidence improves on hopes of global economic recovery in months ahead

New Export Orders Index

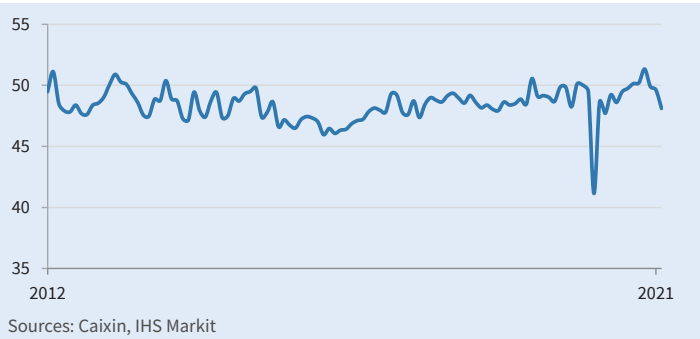
sa, >50 = growth since previous month



Sources: Caixin, IHS Markit

Employment Index

sa, >50 = growth since previous month



Sources: Caixin, IHS Markit

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

"The Caixin China General Manufacturing PMI fell to 50.9 in February and stayed in positive territory for 10 straight months, indicating that the economic recovery in the manufacturing sector continued. But the effect of the recovery further weakened as the reading declined for a third straight month, falling to the lowest since May.

1. Both supply and demand in the manufacturing industry continued to expand, albeit at a slower pace. The subindexes for output and total new orders fell to the lowest levels in 10 months and nine months, respectively. Overseas demand continued to drag down overall demand as the measure for new export orders remained deep in negative territory for the second consecutive month. Surveyed manufacturers highlighted fallout from domestic flare-ups of Covid-19 in the winter as well as the overseas pandemic.

2. The job market remained under pressure. The subindex for employment fell for a third straight month, remaining in contractionary territory for the same period. Companies were not in a hurry to fill vacancies. It is also worth noting that backlogs of work fell for the first time in nine months, adding to evidence that demand was sluggish.

3. Inflationary pressure continued to increase as price measures stayed high. The gauge for input costs was well above 50, hitting highs not seen since December 2017 over the last three months. Surveyed companies said the prices of raw materials, especially industrial metals, continued to rise fast, and the price of transportation also increased. The rise in costs had to some extent been transmitted to the demand side, with output prices still rising sharply last month and increasing for the past 10 months.

4. The market became more optimistic. Manufacturers were confident that both the domestic and overseas epidemics would fade as the gauge for future output expectations jumped to the second highest level since August 2014.

"To sum up, the momentum of the manufacturing recovery further weakened as the supply and demand both rose at a slower clip, adding pressure on employment. The prices of raw materials continued to increase and inflationary pressure continued to grow. Despite the headwinds mentioned above, manufacturers became more optimistic about the outlook for their businesses. The confidence mainly came from the accumulation of the experience in fighting the pandemic over the past year, as well as the expectation that the winter Covid-19 flare-ups were coming to an end.

"Now the major challenge for policymakers will be maintaining the post-coronavirus recovery while paying close attention to inflation."

BHP Looking to Low Carbon Liquid Fuels for Energy Transition
2021-03-04 10:30:29.714 GMT

By Elizabeth Low
(Bloomberg) -- Low carbon liquid fuels are likely to play a part in BHP's plans to become carbon neutral by 2050, Colin Martin, the head of energy, said at S&P Global Platts Refining Virtual Summit Thursday.
* BHP consumed 15m barrels of diesel across its mining operations last year; the fuel contributes 40% of its scope 1 and 2 emissions
* The company is seeking to help drive down emissions with the use of electrification, or hydrogen; BHP has also been looking at blending renewable fuels with fossil fuel diesel
* Liquid fuels have an advantage as it would complement the co.'s current supply chain infrastructure, such as its diesel tanks
* Companies need to decarbonise the supply chain rather than just buying carbon offsets
* NOTE: Scope 1 emissions are direct emissions from company controlled resources, while scope 2 are indirect emissions from the generation of purchased energy
* READ: BHP Sees Profit in a World Speeding Up Climate Action

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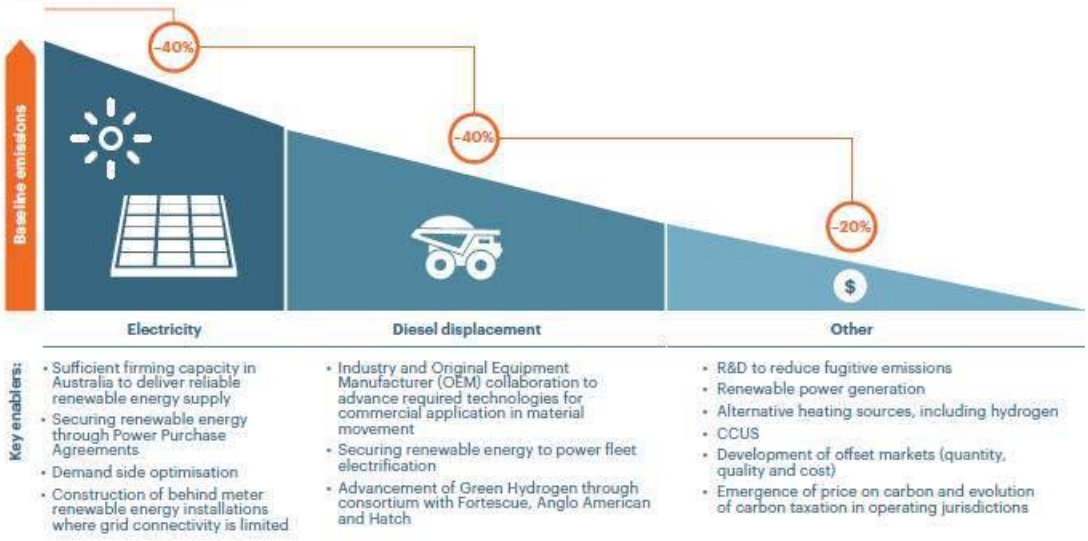
Excerpt from BHP's Sept Climate Change Report 2020 https://www.bhp.com/-/media/documents/investors/annual-reports/2020/200910_bhpclimatechangereport2020.pdf

Figure 11: The pathway to net-zero GHG emissions by 2050

Renewable electricity is the first step to decarbonise our operations. As our electricity supply decarbonises, benefits can accrue via diesel displacement using electrification options in material handling. Our goal is to achieve net-zero emissions from our operations by 2050



Pathways to net zero emissions continued

Diesel displacement

Combustion of diesel contributed about 40 per cent of operational emissions in FY2020. Greater than 85 per cent of these emissions were associated with material movement by mining equipment. Transitioning the fuel source of material movement from diesel to renewable electricity can unlock value, given the higher efficiency of electric motors compared with relatively inefficient ICEs, in addition to switching to a lower cost fuel source.

The path to electrification of mining equipment will likely include solutions such as trolley assist, in-pit crush and convey, overland conveyors and battery solutions. Diesel displacement represents a higher risk, higher capital step towards decarbonisation, so a phased approach to execution is proposed with particular emphasis on Minerals Americas operated assets that are further advanced on the decarbonisation journey. Taking a transitional approach to electrification provides flexibility to allow for the potential for rapid development of emerging technologies and to resolve the complexities of integrating these technologies into existing operations.

During FY2021, we will seek to collaborate further with International Council on Mining and Metals members, industry and original equipment manufacturers (OEMs) to progress research and development to reduce costs and assess any potential impacts from electrified mining equipment solutions to replace current diesel options.

Source: BHP

Freight Railroads & Climate Change

Our planet and nation face challenges that demand communities, businesses, and policymakers come together and create solutions that will fuel economic recovery and combat climate change. With nearly 200 years of experience moving America through times of both prosperity and trouble, freight railroads have always looked to the future, adapted, and risen to the challenge.

March 2021

ASSOCIATION OF AMERICAN RAILROADS

Summary

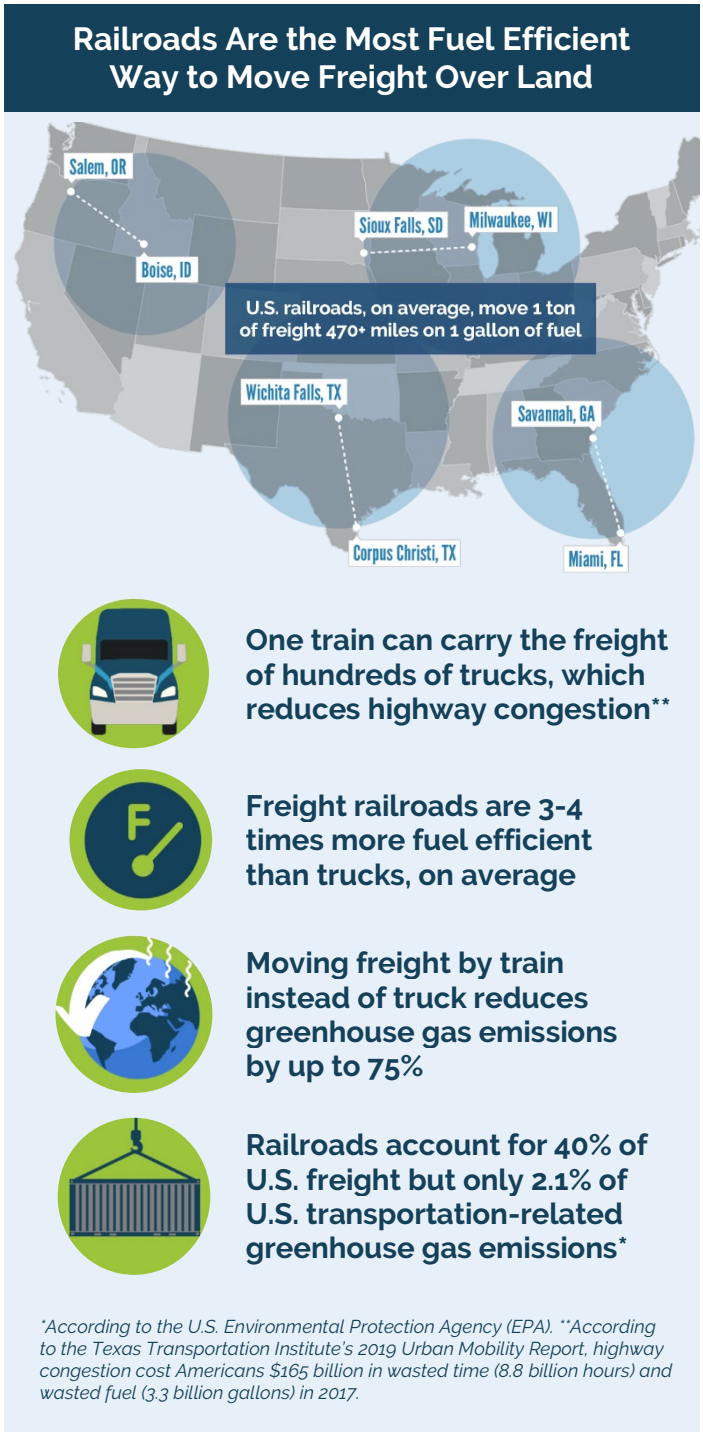
As policymakers attempt to balance economic recovery from the coronavirus pandemic with meaningful progress toward combating climate change, the nation's railroads want to be — and must be — a part of the solution.

The Association of American Railroads (AAR) and the rail industry recognize that the climate is changing. If action is not taken, climate change will have significant repercussions for the planet, our economies, our society, and even day-to-day railroad operations.

The Congressional Budget Office recently projected that the effects of climate change will reduce real GDP growth rate by 0.03% annually from 2020-2050, and, as a result, this diminished annual GDP growth rate will reduce real U.S. GDP by 1.0% in 2050. AAR urges U.S. policymakers to adopt effective, coordinated, and market-based strategies to significantly reduce greenhouse gas (GHG) emissions and combat climate change.

Today, railroads account for roughly 40% of U.S. long-distance freight volume (measured by ton-miles) — more than any other mode of transportation.[1] Through smart, targeted investments, the freight rail industry has worked to increase fuel efficiency, drive down GHG emissions, and make rail operations even more sustainable. However, the industry recognizes there is much more work to be done and the right policies are essential for charting a path forward.

To be effective, policy strategies aimed at fighting climate change must encourage innovative solutions, leverage market-based competition, and allow for varied approaches that drive down emissions. Most importantly, these strategies must be grounded in data and established through a cooperative, multi-faceted approach involving all stakeholders.



[1] Federal Highway Administration, Freight Analysis Framework, Version 4.5.1.

Leading by Example: How Railroads Help Reduce Emissions

Railroads are developing and implementing new technologies, refining operating practices, and working with their suppliers, customers, and supply chain partners to create a more sustainable future. For example, railroads have greatly improved their fuel efficiency. On a gross ton-miles per gallon basis (gross tons include the weight of rail cars as well as the weight of the freight in them), rail fuel efficiency in 2019 was up 82% since 1980 and up 17% since 2000.

U.S. freight railroads move more freight with much less fuel than before thanks to technological innovations, improved operating practices and a lot of hard work. In 2019 alone, U.S. freight railroads consumed some 656 million fewer gallons of fuel and emitted 7.3 million fewer tons of CO_2 than they would have if their fuel efficiency had remained level compared to 2000. From 2000 through 2019, U.S. freight railroads consumed 9.6 billion fewer gallons of diesel fuel and emitted 108 million fewer tons of CO_2 thanks to industry-wide fuel efficiency efforts. In 2019, railroad CO_2 emissions from diesel fuel consumption were 18% lower than their peak in 2006.

These efforts continue. Many of AAR's members voluntarily report GHG emissions from their operations to the Climate Disclosure Project (CDP), an international non-profit organization that helps companies disclose their environmental impact. Several Class I railroads have also committed to voluntary reductions in GHG emissions intensity.

For example, Canadian Pacific, Canadian National, CSX, Kansas City Southern, and Union Pacific are participating in the Science Based Targets Initiative (SBTi), an international collaboration focused on limiting global warming to less than two degrees Celsius. Norfolk Southern has created the "Trees to Trains" program — a carbon-mitigation strategy that reforests thousands of acres in environmentally critical areas to offset the company's carbon footprint. BNSF is testing the first battery electric locomotive in the United States and both Canadian Pacific and Canadian National are participating in pilot projects to test hydrogen fuel cell locomotives. And AAR and its members have formed a dedicated working group to understand new lower-or-zero-carbon fuel technologies and other climate-related issues.

Railroads Consistently Improve Fuel Efficiency

Fuel-efficient Locomotives: Acquiring and retrofitting thousands of new, more fuel-efficient locomotives that emit fewer criteria pollutants and GHGs over the past decade.

Operational Improvements: Carrying an average of 3,667 tons of freight per train in 2019, up 25% since 2000. By carrying more freight, railroads reduce unnecessary train and railcar movements, which reduces fuel use.

Fuel Management Systems: Developing and installing computer systems that calculate the most fuel-efficient speed for a train over a given route, determine the most efficient spacing and timing of trains on a railroad's system and monitor locomotives to ensure peak performance and efficiency.

Zero-emission Cranes: Increasing use of zero-emission cranes to transfer containers between ships, trucks, and trains at ports and rail facilities.

Aerodynamics & Lubrication: Adopting operational fixes to reduce fuel use. For example, advances in lubrication techniques reduce friction, ultimately decreasing drag and saving fuel.

Anti-idling Tech: Installing idling-reduction technologies, such as stop-start systems that shut down a locomotive when it is not in use and restart it as needed.

Distributed Power: Expanding use of distributed power (positioning locomotives throughout the train) to reduce the total horsepower required for train movements.

Training: Training employees and contractors to help locomotive engineers and other personnel develop and implement best practices and improve awareness of fuel-efficient operations.

More Rail Means a Sustainable & More Prosperous Future

The potential reduction in transportation-related GHG emissions associated with moving more freight by rail is substantial. If 10% of the freight shipped by the largest trucks were moved by rail instead, greenhouse gas emissions would fall by more than 17 million tons annually. That's the equivalent of removing 3.35 million cars from our highways or planting 260 million trees. Policymakers can help make this happen by removing impediments to transporting freight by rail, promoting policies that enable the rail industry to move more goods, more efficiently, and promoting modal equity in the incorporation of new and emerging technologies. Here are three approaches to consider:

Encourage Competition & Harness Market-based Solutions to Reduce Emissions

Policies that demand change through market solutions — rather than prescriptive regulations — hold the greatest promise for lasting change and meaningful emissions reductions. Through well-designed policies, market behavior can — and will — shift toward lower-emission fuels and modes of transportation. Several examples of these policies within the transportation space are provided below.

✓ Institute market solutions to reduce emissions

Programs that establish market incentives to reduce emissions from the freight transportation sector specifically should strive to achieve two key policy goals: encouraging businesses to ship their products using modes with lower GHG emissions — such as rail — and incentivizing transportation providers to find the most cost-efficient ways to further reduce or eliminate emissions associated with their operations.

Any broad climate change policies should provide long-term regulatory certainty and be crafted to permit capital-intensive industries to make investment and planning decisions in an economically rational manner while also maintaining their competitiveness. This approach will allow markets, not mandates, to drive the reduction in GHG emissions. An appropriate, predictable policy can enhance the nation's competitiveness, grow the economy, and create jobs.

✓ Return the Highway Trust Fund to a user-pays system

The pending insolvency of the Highway Trust Fund (HTF) should be a matter of significant concern within the larger transportation sector and beyond. Policymakers can address both the solvency of the HTF and climate change through a short-term, temporary fuel tax increase. In the longer term, policymakers should implement a vehicle miles traveled (VMT) fee that takes into account vehicle weight or axle count along with an emissions surcharge (see below for a more detailed discussion).

The United States has historically relied upon a user-pays system to fund investments in public road and bridge infrastructure. Unfortunately, revenues into the HTF have failed to keep pace with investment needs, requiring general fund transfers to cover the shortfall.

According to the Congressional Budget Office, general fund transfers into the HTF have totaled almost $157 billion since 2008, including the $13 billion provided by the continuing resolution signed on October 20, 2020. An additional $203 billion could be required to cover expected deficits through 2030.[2] With the one-year extension of the FAST Act, the issue of HTF solvency will come to a head in September 2021.

Funding the HTF through a VMT fee instead of the existing gas and diesel taxes could also resolve impending insolvency and restore a user-pays model. Additionally, a VMT fee offers the opportunity to create a more equitable system of funding public road and bridge infrastructure by ensuring that all passenger and commercial vehicles pay for their use. Because the technologies to implement a VMT fee are still under development, a modest, short-term increase in the gas tax and the diesel tax over the next several years would still be required to shore up the HTF.[3] However, while fuel taxes incentivize the purchase of more fuel-efficient vehicles, they are not the long-term solution for HTF solvency.

✓ Impose an emissions surcharge and provide dedicated funding for passenger rail

Imposing a graduated emissions surcharge based on the fuel efficiency of vehicles (utilizing Environmental Protection Agency miles per gallon ratings), in addition to a VMT fee, as discussed above, could encourage the transition to more environmentally-friendly passenger and commercial vehicles. Doing so would also raise additional revenues for the HTF.

From a modal-shift perspective, a reliable passenger rail network is the most environmentally-friendly mode to move people over land[4] and is essential to helping address transportation-related emissions. Intercity passenger rail is the only mode of passenger transportation in the United States that does not receive any dedicated federal funding through a trust fund, leaving Amtrak completely dependent upon annual discretionary appropriations. This fiscal uncertainty makes it difficult for Amtrak to plan its operations and capital needs for the long term. Given the benefit of reduced congestion on our nation's highways, a Passenger Rail Account similar to the Mass Transit Account of the HTF could be created, and Amtrak's operating and capital costs could be funded with a portion of the additional revenues from the emissions surcharge. This Passenger Rail Account could be dedicated to Amtrak's Northeast Corridor and National Network Accounts. However, states could also be eligible to receive funding for their state-supported routes.

Drive Research & Adoption of Promising Technologies

Significant investments in national and sector-specific research are essential to unlocking energy solutions capable of powering our economy and reducing GHG emissions. Just as important as discovering new lower-or-zero-carbon fuels and technologies is ensuring American businesses can test and adopt these innovations. Below are a few policy proposals that will boost and further innovation.

✓ Embrace partnership opportunities for research funding

Despite impressive improvements in fuel efficiency, railroads continue to search for ways to further reduce their GHG emissions footprints. Technological advancements will play a major role in future gains, and AAR supports increased federal funding for research into a variety of technologies on the cusp of economic viability.

For decades, diesel fuel has been the only realistic option to power freight rail locomotives. However, BNSF and Wabtec are working with the California Air Resources Board to test a prototype long-haul battery electric locomotive. Additionally, Canadian Pacific and Canadian National plan to develop what would be North America's first line-haul hydrogen-powered locomotives and conduct rail service trials and qualification testing to evaluate the technology's readiness for freight rail operations. Finally, Progress Rail and the Pacific Harbor

2 Congressional Budget Office, The Outlook for Major Federal Trust Funds: 2020 to 2030, September 2020, page 3.
3 While technologies may not yet be available for implementation of a VMT fee for personal vehicles, previous Congresses have considered proposals to implement a VMT fee for commercial motor vehicles utilizing existing electronic logging devices to measure miles travelled.
4 https://www.uic.org/com/IMG/pdf/iea-uic_2012final-lr.pdf.

Line are planning a demonstration project of a new EMD Joule battery electric locomotive in the Ports of Los Angeles and Long Beach. These projects have the potential to further reduce GHG emissions.

Partnerships between the federal government and railroads to further research and develop technologies that fuel locomotives with alternatives to traditional diesel fuel are also essential to advancing innovation. Additional funding should be provided for the development of battery and fuel cell technologies, such as the ongoing efforts at the Joint Center for Energy Storage Research (JCESR), a Department of Energy (DOE) Energy Innovation Hub focused on technologies to enable next-generation batteries.

Another potential fuel source is "blue hydrogen," which is hydrogen made from natural gas in a way that captures, stores, or reuses associated carbon emissions. Similarly, biofuels are traditional fuel alternatives including ethanol, biodiesel (diesel made from nonpetroleum renewable sources such as natural fats and vegetable oils), and renewable hydrocarbon biofuels or green drop-in fuels (renewable hydrocarbon fuels derived from biomass sources that are comparable and compatible to existing petroleum-based fuels). Although biofuels and renewable diesel are widely available as fuel blend stock, there are limited ASTM standards for these fuels, and equipment manufacturers have been leery of approving their use in locomotives. Additional funding for research on these lower-or-zero-carbon fuels and technologies will speed their adoption and continue to inform the development of standards for such fuels. Finally, funding should continue to be provided for grants under the Diesel Emissions Reduction Act (DERA) program.

✓ Support policies to further develop carbon capture, utilization, and storage technology

Policymakers should continue to invest in the development and scaling of technologies that would both reduce emissions and keep the economy moving. Carbon capture, utilization, and storage (CCUS) technology is one of these solutions.

CCUS technology would allow industries to capture up to 90% of emissions and prevent their release into the atmosphere. Since 2008, Congress has provided a tax credit (Internal Revenue Code Section 45Q) on a per-ton basis for CO_2 that is captured and either sequestered or utilized. As a result, many programs, including pilot and demonstration projects, have been proposed to spur industries and create new markets for CCUS technology. AAR supports efforts to further mature this technology and expand the commercial use of CCUS technology through market development programs and tax incentives. Encouraging storage and broader industrial utilization of captured carbon creates new economic opportunities, and railroads believe this technology can be an important part of a broad effort to address the impacts of climate change.

Since railroads provide the most fuel-efficient way to move freight over land, railroads believe they can play an integral part in the broader utilization of CCUS, as transportation remains one of the bigger challenges of scaling up CCUS technology. In most cases, captured carbon dioxide must be transported from the point of capture to a permanent storage site. Current limited capacity for these movements has been a significant challenge to further scaling up CCUS technology. Today, trucks, ships, and pipelines transport the carbon that has been captured from the gases produced in electricity generation and industrial processes as part of a CCUS chain using the same technologies as those used to transport natural gas, oil, and other fluids. The rail industry has decades of experience safely transporting carbon dioxide. Moreover, construction of new pipelines in the United States can be a lengthy process that is expensive, environmentally harmful, and subject to intense community and legal opposition.

Railroads are a nimbler transportation solution that can increase traffic as needed, while also meeting demand from varied origins and destinations. As plans for new CCUS facilities are developed, the carbon captured at these facilities could be transported via rail. This would minimize additional GHG emissions, avoid unnecessary highway congestion, and take advantage of the world-class private rail network already in existence. It is likely the facilities where carbon would be captured — and the destination where it would be stored or utilized — already have rail service.

✓ Help railroads test and deploy green technologies by streamlining waiver acquisition

Railroads have shown their commitment to developing, testing, and deploying new technologies that reduce the environmental impact of their operations. Policymakers should offer industries — including freight rail — operational and regulatory flexibility to encourage further innovation. This would allow railroads to experiment with new technologies and processes that could help meet environmental goals, including decarbonization and lower emissions. This needed flexibility could cover everything from technologies and procedures to increase fuel efficiency to new technologies that require extensive testing and research. Flexibility and streamlining are necessary to empower the rail industry to explore these options without risking regulatory enforcement. For example, policymakers should consider streamlining waiver review timelines, encouraging pilot programs, and establishing performance-based thresholds.

Partner with Industry to Advance Sector-specific Progress

Each American industry — including freight railroads — has its own unique set of advantages and challenges to reducing its impacts on the environment. For long-term, sustainable gains, these stakeholders are essential partners in identifying and prioritizing proposals that will empower real change in their own operations. Freight railroads stand ready to be partners in this effort and need policymakers to understand what is already working, as well as what is untenable for the nation's 140,000-mile rail network.

✓ Ensure railroads can invest in maintaining and greening their infrastructure

An efficient and sustainable rail industry depends upon railroads' private investments, which the Staggers Rail Act of 1980 helped make possible by creating a balanced regulatory system. Partial deregulation allowed railroads to improve their financial performance from anemic levels prior to Staggers to much healthier levels today. That, in turn, has allowed railroads to pour nearly $740 billion — of their own funds, not taxpayer funds — back into their networks since 1980. These investments have greatly improved the productivity and sustainability of their operations. Policy decisions that upset the productivity and efficiency gains of the railroads or shift freight to other modes of transportation can impact the environment. Policymakers must maintain the existing regulatory balance to ensure railroads can meet customers' needs in a safe, reliable and sustainable manner.

✓ Invest in what works

As policymakers examine potential solutions, they should invite stakeholders to the table to provide needed insight and prevent the wasting of resources. While AAR encourages federal investment in the development of technologies that reduce GHG emissions, policymakers should avoid prescriptive means for reducing emissions by certain industries and allow innovation to guide GHG emissions reduction decisions. For example, studies over the years have consistently shown that the catenary electrification of the freight rail network would be unworkable. Initiatives, such as catenary electrification, that are clearly not viable should be set aside to focus on and invest in policies and programs that will work to reduce GHG emissions and combat climate change, such as those noted above.

Berkshire's Performance vs. the S&P 500

Year	Annual Percentage Change in Per-Share Market Value of Berkshire	Annual Percentage Change in S&P 500 with Dividends Included
1965	49.5	10.0
1966	(3.4)	(11.7)
1967	13.3	30.9
1968	77.8	11.0
1969	19.4	(8.4)
1970	(4.6)	3.9
1971	80.5	14.6
1972	8.1	18.9
1973	(2.5)	(14.8)
1974	(48.7)	(26.4)
1975	2.5	37.2
1976	129.3	23.6
1977	46.8	(7.4)
1978	14.5	6.4
1979	102.5	18.2
1980	32.8	32.3
1981	31.8	(5.0)
1982	38.4	21.4
1983	69.0	22.4
1984	(2.7)	6.1
1985	93.7	31.6
1986	14.2	18.6
1987	4.6	5.1
1988	59.3	16.6
1989	84.6	31.7
1990	(23.1)	(3.1)
1991	35.6	30.5
1992	29.8	7.6
1993	38.9	10.1
1994	25.0	1.3
1995	57.4	37.6
1996	6.2	23.0
1997	34.9	33.4
1998	52.2	28.6
1999	(19.9)	21.0
2000	26.6	(9.1)
2001	6.5	(11.9)
2002	(3.8)	(22.1)
2003	15.8	28.7
2004	4.3	10.9
2005	0.8	4.9
2006	24.1	15.8
2007	28.7	5.5
2008	(31.8)	(37.0)
2009	2.7	26.5
2010	21.4	15.1
2011	(4.7)	2.1
2012	16.8	16.0
2013	32.7	32.4
2014	27.0	13.7
2015	(12.5)	1.4
2016	23.4	12.0
2017	21.9	21.8
2018	2.8	(4.4)
2019	11.0	31.5
2020	2.4	18.4
Compounded Annual Gain – 1965-2020	20.0%	10.2%
Overall Gain – 1964-2020	2,810,526%	23,454%

Note: Data are for calendar years with these exceptions: 1965 and 1966, year ended 9/30; 1967, 15 months ended 12/31.

BERKSHIRE HATHAWAY INC.

To the Shareholders of Berkshire Hathaway Inc.:

Berkshire earned $42.5 billion in 2020 according to generally accepted accounting principles (commonly called "GAAP"). The four components of that figure are $21.9 billion of operating earnings, $4.9 billion of realized capital gains, a $26.7 billion gain from an increase in the amount of net *unrealized* capital gains that exist in the stocks we hold and, finally, an $11 billion *loss* from a write-down in the value of a few subsidiary and affiliate businesses that we own. All items are stated on an after-tax basis.

Operating earnings are what count most, even during periods when they are *not* the largest item in our GAAP total. Our focus at Berkshire is both to increase this segment of our income and to acquire large and favorably-situated businesses. Last year, however, we met neither goal: Berkshire made no sizable acquisitions and operating earnings *fell* 9%. We did, though, increase Berkshire's per-share intrinsic value by both retaining earnings and repurchasing about 5% of our shares.

The two GAAP components pertaining to capital gains or losses (whether realized or unrealized) fluctuate capriciously from year to year, reflecting swings in the stock market. Whatever *today's* figures, Charlie Munger, my long-time partner, and I firmly believe that, over time, Berkshire's capital gains from its investment holdings will be substantial.

As I've emphasized many times, Charlie and I view Berkshire's holdings of marketable stocks – at yearend worth $281 billion – as a collection of *businesses*. We don't control the operations of those companies, but we do share proportionately in their long-term prosperity. From an accounting standpoint, however, our portion of their *earnings* is *not* included in Berkshire's income. Instead, only what these investees pay us in dividends is recorded on our books. Under GAAP, the huge sums that investees retain on our behalf become invisible.

What's out of sight, however, should *not* be out of mind: Those unrecorded retained earnings are usually building value – *lots* of value – for Berkshire. Investees use the withheld funds to expand their business, make acquisitions, pay off debt and, often, to repurchase their stock (an act that increases our share of their future earnings). As we pointed out in these pages last year, retained earnings have propelled American business throughout our country's history. What worked for Carnegie and Rockefeller has, over the years, worked its magic for millions of shareholders as well.

Of course, some of our investees will disappoint, adding little, if anything, to the value of their company by retaining earnings. But others will over-deliver, a few spectacularly. In aggregate, we expect our share of the huge pile of earnings retained by Berkshire's non-controlled businesses (what others would label our equity portfolio) to eventually deliver us an equal or greater amount of capital gains. Over our 56-year tenure, that expectation has been met.

The final component in our GAAP figure – that ugly $11 billion write-down – is almost entirely the quantification of a mistake I made in 2016. That year, Berkshire purchased Precision Castparts ("PCC"), and I paid too much for the company.

No one misled me in any way – I was simply too optimistic about PCC's normalized profit potential. Last year, my miscalculation was laid bare by adverse developments throughout the aerospace industry, PCC's most important source of customers.

In purchasing PCC, Berkshire bought a fine company – the best in its business. Mark Donegan, PCC's CEO, is a passionate manager who consistently pours the same energy into the business that he did before we purchased it. We are lucky to have him running things.

I believe I was right in concluding that PCC would, over time, earn good returns on the net tangible assets deployed in its operations. I was wrong, however, in judging the *average* amount of future earnings and, consequently, wrong in my calculation of the proper price to pay for the business.

PCC is far from my first error of that sort. But it's a big one.

Two Strings to Our Bow

Berkshire is often labeled a conglomerate, a negative term applied to holding companies that own a hodge-podge of unrelated businesses. And, yes, that describes Berkshire – but only in part. To understand how and why we differ from the prototype conglomerate, let's review a little history.

Over time, conglomerates have generally limited themselves to buying businesses *in their entirety*. That strategy, however, came with two major problems. One was unsolvable: Most of the truly great businesses had no interest in having *anyone* take them over. Consequently, deal-hungry conglomerateurs had to focus on so-so companies that lacked important and durable competitive strengths. That was not a great pond in which to fish.

Beyond that, as conglomerateurs dipped into this universe of mediocre businesses, they often found themselves required to pay staggering "control" premiums to snare their quarry. Aspiring conglomerateurs knew the answer to this "overpayment" problem: They simply needed to manufacture a vastly overvalued stock of their own that could be used as a "currency" for pricey acquisitions. ("I'll pay you $10,000 for your dog by giving you two of my $5,000 cats.")

Often, the tools for fostering the overvaluation of a conglomerate's stock involved promotional techniques and "imaginative" accounting maneuvers that were, at best, deceptive and that sometimes crossed the line into fraud. When these tricks were "successful," the conglomerate pushed its own stock to, say, 3x its business value in order to offer the target 2x *its* value.

Investing illusions can continue for a surprisingly long time. Wall Street loves the fees that deal-making generates, and the press loves the stories that colorful promoters provide. At a point, also, the soaring price of a promoted stock can itself become the "proof" that an illusion is reality.

Eventually, of course, the party ends, and many business "emperors" are found to have no clothes. Financial history is replete with the names of famous conglomerateurs who were initially lionized as business geniuses by journalists, analysts and investment bankers, but whose creations ended up as business junkyards.

Conglomerates *earned* their terrible reputation.

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Charlie and I want our conglomerate to *own* all or part of a diverse group of businesses with good economic characteristics and good managers. Whether Berkshire *controls* these businesses, however, is unimportant to us.

It took me a while to wise up. But Charlie – and also my 20-year struggle with the textile operation I inherited at Berkshire – finally convinced me that owning a non-controlling portion of a wonderful business is more profitable, more enjoyable and *far* less work than struggling with 100% of a marginal enterprise.

For those reasons, *our* conglomerate will remain a collection of controlled *and* non-controlled businesses. Charlie and I will simply deploy your capital into whatever we believe makes the most sense, based on a company's durable competitive strengths, the capabilities and character of its management, and price.

If that strategy requires little or no effort on our part, so much the better. In contrast to the scoring system utilized in diving competitions, you are awarded *no* points in business endeavors for "degree of difficulty." Furthermore, as Ronald Reagan cautioned: "It's said that hard work never killed anyone, but *I* say why take the chance?"

The Family Jewels and How We Increase Your Share of These Gems

On page A-1 we list Berkshire's subsidiaries, a smorgasbord of businesses employing 360,000 at yearend. You can read much more about these controlled operations in the 10-K that fills the back part of this report. Our major positions in companies that we partly own and *don't* control are listed on page 7 of this letter. That portfolio of businesses, too, is large and diverse.

Most of Berkshire's value, however, resides in four businesses, three controlled and one in which we have only a 5.4% interest. All four are jewels.

The largest in value is our property/casualty insurance operation, which for 53 years has been the core of Berkshire. Our family of insurers is unique in the insurance field. So, too, is its manager, Ajit Jain, who joined Berkshire in 1986.

Overall, the insurance fleet operates with *far* more capital than is deployed by any of its competitors worldwide. That financial strength, coupled with the huge flow of *cash* Berkshire annually receives from its *non-insurance* businesses, allows our insurance companies to safely follow an equity-heavy investment strategy not feasible for the overwhelming majority of insurers. Those competitors, for both regulatory and credit-rating reasons, *must* focus on bonds.

And bonds are *no*t the place to be these days. Can you believe that the income recently available from a 10-year U.S. Treasury bond – the yield was 0.93% at yearend – had fallen *94%* from the 15.8% yield available in September 1981? In certain large and important countries, such as Germany and Japan, investors earn a *negative* return on trillions of dollars of sovereign debt. Fixed-income investors worldwide – whether pension funds, insurance companies or retirees – face a bleak future.

Some insurers, as well as other bond investors, may try to juice the pathetic returns now available by shifting their purchases to obligations backed by shaky borrowers. Risky loans, however, are *not* the answer to inadequate interest rates. Three decades ago, the once-mighty savings and loan industry destroyed itself, partly by ignoring that maxim.

Berkshire now enjoys $138 billion of insurance "float" – funds that do not belong to us, but are nevertheless ours to deploy, whether in bonds, stocks or cash equivalents such as U.S. Treasury bills. Float has some similarities to bank deposits: cash flows in and out daily to insurers, with the total they hold changing very little. The massive sum held by Berkshire is likely to remain near its present level for many years and, on a cumulative basis, has been *costless* to us. That happy result, of course, could change – but, over time, I like our odds.

I have repetitiously – some might say endlessly – explained our insurance operation in my annual letters to you. Therefore, I will this year ask new shareholders who wish to learn more about our insurance business and "float" to read the pertinent section of the 2019 report, reprinted on page A-2. It's important that you understand the risks, as well as the opportunities, existing in our insurance activities.

Our second and third most valuable assets – it's pretty much a toss-up at this point – are Berkshire's 100% ownership of BNSF, America's largest railroad measured by freight volume, and our 5.4% ownership of Apple. And in the fourth spot is our 91% ownership of Berkshire Hathaway Energy ("BHE"). What we have here is a very unusual utility business, whose annual earnings have grown from $122 million to $3.4 *billion* during our 21 years of ownership.

I'll have more to say about BNSF and BHE later in this letter. For now, however, I would like to focus on a practice Berkshire will periodically use to enhance *your* interest in both its "Big Four" as well as the many other assets Berkshire owns.

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Last year we demonstrated our enthusiasm for Berkshire's spread of properties by repurchasing the equivalent of 80,998 "A" shares, spending $24.7 billion in the process. That action increased *your* ownership in *all* of Berkshire's businesses by 5.2% *without* requiring you to so much as touch your wallet.

Following criteria Charlie and I have long recommended, we made those purchases because we believed they would both enhance the intrinsic value per share for continuing shareholders *and* would leave Berkshire with more than ample funds for any opportunities or problems it might encounter.

In no way do we think that Berkshire shares should be repurchased at simply any price. I emphasize that point because American CEOs have an embarrassing record of devoting more company funds to repurchases when prices have risen than when they have tanked. Our approach is exactly the reverse.

Berkshire's investment in Apple vividly illustrates the power of repurchases. We began buying Apple stock late in 2016 and by early July 2018, owned slightly more than one billion Apple shares (split-adjusted). Saying that, I'm referencing the investment held in Berkshire's general account and am excluding a very small and separately-managed holding of Apple shares that was subsequently sold. When we finished our purchases in mid-2018, Berkshire's general account owned 5.2% of Apple.

Our cost for that stake was $36 billion. Since then, we have both enjoyed regular dividends, averaging about $775 million annually, and have also – in 2020 – pocketed an additional $11 billion by selling a small portion of our position.

Despite that sale – voila! – Berkshire now owns 5.4% of Apple. That increase was *costless* to us, coming about because Apple has continuously repurchased its shares, thereby substantially shrinking the number it now has outstanding.

But that's far from all of the good news. Because we also repurchased *Berkshire* shares during the 2½ years, *you* now indirectly own a full 10% more of Apple's assets and future earnings than you did in July 2018.

This agreeable dynamic continues. Berkshire has repurchased more shares since yearend and is likely to further reduce its share count in the future. Apple has publicly stated an intention to repurchase its shares as well. As these reductions occur, Berkshire shareholders will not only own a greater interest in our insurance group and in BNSF and BHE, but will also find their indirect ownership of Apple increasing as well.

The math of repurchases grinds away slowly, but can be powerful over time. The process offers a simple way for investors to own an ever-expanding portion of exceptional businesses.

And as a sultry Mae West assured us: "Too much of a good thing can be . . . wonderful."

Investments

Below we list our fifteen common stock investments that at yearend were our largest in market value. We exclude our Kraft Heinz holding — 325,442,152 shares — because Berkshire is part of a control group and therefore must account for that investment using the "equity" method. On its balance sheet, Berkshire carries the Kraft Heinz holding at a GAAP figure of $13.3 billion, an amount that represents Berkshire's share of the audited net worth of Kraft Heinz on December 31, 2020. Please note, though, that the market value of our shares on that date was only $11.3 billion.

			12/31/20	
*Shares**	*Company*	*Percentage of Company Owned*	*Cost***	*Market*
			(in millions)	
25,533,082	AbbVie Inc.	1.4	$ 2,333	$ 2,736
151,610,700	American Express Company	18.8	1,287	18,331
907,559,761	Apple Inc.	5.4	31,089	120,424
1,032,852,006	Bank of America Corp.	11.9	14,631	31,306
66,835,615	The Bank of New York Mellon Corp.	7.5	2,918	2,837
225,000,000	BYD Co. Ltd.	8.2	232	5,897
5,213,461	Charter Communications, Inc.	2.7	904	3,449
48,498,965	Chevron Corporation	2.5	4,024	4,096
400,000,000	The Coca-Cola Company	9.3	1,299	21,936
52,975,000	General Motors Company	3.7	1,616	2,206
81,304,200	Itochu Corporation	5.1	1,862	2,336
28,697,435	Merck & Co., Inc.	1.1	2,390	2,347
24,669,778	Moody's Corporation	13.2	248	7,160
148,176,166	U.S. Bancorp	9.8	5,638	6,904
146,716,496	Verizon Communications Inc.	3.5	8,691	8,620
	Others***		29,458	40,585
	Total Equity Investments Carried at Market		$ 108,620	$ 281,170

* Excludes shares held by pension funds of Berkshire subsidiaries.

** This is our actual purchase price and also our tax basis.

*** Includes a $10 billion investment in Occidental Petroleum, consisting of preferred stock and warrants to buy common stock, a combination now being valued at $9 billion.

A Tale of Two Cities

Success stories abound throughout America. Since our country's birth, individuals with an idea, ambition and often just a pittance of capital have succeeded beyond their dreams by creating something new or by improving the customer's experience with something old.

Charlie and I journeyed throughout the nation to join with many of these individuals or their families. On the West Coast, we began the routine in 1972 with our purchase of See's Candy. A full century ago, Mary See set out to deliver an age-old product that she had reinvented with special recipes. Added to her business plan were quaint stores staffed by friendly salespeople. Her first small outlet in Los Angeles eventually led to several hundred shops, spread throughout the West.

Today, Mrs. See's creations continue to delight customers while providing life-long employment for thousands of women and men. Berkshire's job is simply not to meddle with the company's success. When a business manufactures and distributes a non-essential consumer product, the *customer* is the boss. And, after 100 years, the customer's message to Berkshire remains clear: "Don't mess with *my* candy." (The website is https://www.sees.com/; try the peanut brittle.)

Let's move across the continent to Washington, D.C. In 1936, Leo Goodwin, along with his wife, Lillian, became convinced that auto insurance – a standardized product customarily purchased from agents – could be sold directly at a much lower price. Armed with $100,000, the pair took on giant insurers possessing 1,000 times or more their capital. Government Employees Insurance Company (later shortened to GEICO) was on its way.

By luck, I was exposed to the company's potential a full 70 years ago. It instantly became my first love (of an investment sort). You know the rest of the story: Berkshire eventually became the 100% owner of GEICO, which at 84 years of age is constantly fine-tuning – but not changing – the vision of Leo and Lillian.

There has been, however, a change in the company's size. In 1937, its first full year of operation, GEICO did $238,288 of business. Last year the figure was $35 billion.

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Today, with much of finance, media, government and tech located in coastal areas, it's easy to overlook the many miracles occurring in middle America. Let's focus on two communities that provide stunning illustrations of the talent and ambition existing *throughout* our country.

You will not be surprised that I begin with Omaha.

In 1940, Jack Ringwalt, a graduate of Omaha's Central High School (the alma mater as well of Charlie, my dad, my first wife, our three children and two grandchildren), decided to start a property/casualty insurance company funded by $125,000 in capital.

Jack's dream was preposterous, requiring his pipsqueak operation – somewhat pompously christened as National Indemnity – to compete with giant insurers, all of which operated with abundant capital. Additionally, those competitors were solidly entrenched with nationwide networks of well-funded and long-established local agents. Under Jack's plan, National Indemnity, unlike GEICO, would itself use whatever agencies deigned to accept it and consequently enjoy *no* cost advantage in its acquisition of business. To overcome those formidable handicaps, National Indemnity focused on "odd-ball" risks, which were deemed unimportant by the "big boys." And, improbably, the strategy succeeded.

Jack was honest, shrewd, likeable and a bit quirky. In particular, he disliked regulators. When he periodically became annoyed with their supervision, he would feel an urge to sell his company.

Fortunately, I was nearby on one of those occasions. Jack liked the idea of joining Berkshire, and we made a deal in 1967, taking all of 15 minutes to reach a handshake. I never asked for an audit.

Today National Indemnity is the *only* company in the world prepared to insure certain giant risks. And, yes, it remains based in Omaha, a few miles from Berkshire's home office.

Over the years, we have purchased four additional businesses from Omaha families, the best known among them being Nebraska Furniture Mart ("NFM"). The company's founder, Rose Blumkin ("Mrs. B"), arrived in Seattle in 1915 as a Russian emigrant, unable to read or speak English. She settled in Omaha several years later and by 1936 had saved $2,500 with which to start a furniture store.

Competitors and suppliers ignored her, and for a time their judgment seemed correct: World War II stalled her business, and at yearend 1946, the company's net worth had grown to only $72,264. Cash, both in the till and on deposit, totaled $50 (that's not a typo).

One invaluable asset, however, went unrecorded in the 1946 figures: Louie Blumkin, Mrs. B's only son, had rejoined the store after four years in the U.S. Army. Louie fought at Normandy's Omaha Beach following the D-Day invasion, earned a Purple Heart for injuries sustained in the Battle of the Bulge, and finally sailed home in November 1945.

Once Mrs. B and Louie were reunited, there was no stopping NFM. Driven by their dream, mother and son worked days, nights and weekends. The result was a retailing miracle.

By 1983, the pair had created a business worth $60 million. That year, on my birthday, Berkshire purchased 80% of NFM, again without an audit. I counted on Blumkin family members to run the business; the third and fourth generation do so today. Mrs. B, it should be noted, worked daily until she was 103 – a ridiculously premature retirement age as judged by Charlie and me.

NFM now owns the three largest home-furnishings stores in the U.S. Each set a sales record in 2020, a feat achieved despite the closing of NFM's stores for more than six weeks because of COVID-19.

A post-script to this story says it all: When Mrs. B's large family gathered for holiday meals, she always asked that they sing a song before eating. Her selection never varied: Irving Berlin's "God Bless America."

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Let's move somewhat east to Knoxville, the third largest city in Tennessee. There, Berkshire has ownership in *two* remarkable companies – Clayton Homes (100% owned) and Pilot Travel Centers (38% owned now, but headed for 80% in 2023).

Each company was started by a young man who had graduated from the University of Tennessee and stayed put in Knoxville. Neither had a meaningful amount of capital nor wealthy parents.

But, so what? Today, Clayton and Pilot each have *annual* pre-tax earnings of more than *$1 billion*. Together they employ about 47,000 men and women.

Jim Clayton, after several other business ventures, founded Clayton Homes on a shoestring in 1956, and "Big Jim" Haslam started what became Pilot Travel Centers in 1958 by purchasing a service station for $6,000. Each of the men later brought into the business a son with the same passion, values and brains as his father. Sometimes there is a magic to genes.

"Big Jim" Haslam, now 90, has recently authored an inspirational book in which he relates how Jim *Clayton*'s son, Kevin, encouraged the Haslams to sell a large portion of Pilot to Berkshire. Every retailer knows that satisfied customers are a store's best salespeople. That's true when businesses are changing hands as well.

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When you next fly over Knoxville or Omaha, tip your hat to the Claytons, Haslams and Blumkins as well as to the army of successful entrepreneurs who populate every part of our country. These builders needed America's framework for prosperity – a unique experiment when it was crafted in 1789 – to achieve their potential. In turn, America needed citizens like Jim C., Jim H., Mrs. B and Louie to accomplish the miracles our founding fathers sought.

Today, many people forge similar miracles *throughout* the world, creating a spread of prosperity that benefits *all* of humanity. In its brief 232 years of existence, however, there has been *no* incubator for unleashing human potential like America. Despite some severe interruptions, our country's economic progress has been breathtaking.

Beyond that, we retain our constitutional aspiration of becoming "a more perfect union." Progress on that front has been slow, uneven and often discouraging. We have, however, moved forward and will continue to do so.

Our unwavering conclusion: *Never* bet against America.

The Berkshire Partnership

Berkshire is a Delaware corporation, and our directors must follow the state's laws. Among them is a requirement that board members *must* act in the best interest of the corporation and its stockholders. Our directors embrace that doctrine.

In addition, of course, Berkshire directors want the company to delight its customers, to develop and reward the talents of its 360,000 associates, to behave honorably with lenders and to be regarded as a good citizen of the many cities and states in which we operate. We value these four important constituencies.

None of these groups, however, have a *vote* in determining such matters as dividends, strategic direction, CEO selection, or acquisitions and divestitures. Responsibilities like those fall *solely* on Berkshire's directors, who must faithfully represent the long-term interests of the corporation and its *owners*.

Beyond legal requirements, Charlie and I feel a special obligation to the many *individual* shareholders of Berkshire. A bit of personal history may help you to understand our unusual attachment and how it shapes our behavior.

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Before my Berkshire years, I managed money for many individuals through a series of partnerships, the first three of those formed in 1956. As time passed, the use of multiple entities became unwieldy and, in 1962, we amalgamated 12 partnerships into a single unit, Buffett Partnership Ltd. ("BPL").

By that year, virtually all of my own money, and that of my wife as well, had become invested alongside the funds of my many limited partners. I received no salary or fees. Instead, as the general partner, I was compensated by my limited partners only after they secured returns above an annual threshold of 6%. If returns failed to meet that level, the shortfall was to be carried forward against my share of future profits. (Fortunately, that never happened: Partnership returns always exceeded the 6% "bogey.") As the years went by, a large part of the resources of my parents, siblings, aunts, uncles, cousins and in-laws became invested in the partnership.

Charlie formed his partnership in 1962 and operated much as I did. Neither of us had *any* institutional investors, and very few of our partners were financially sophisticated. The people who joined our ventures simply trusted us to treat their money as we treated our own. These individuals – either intuitively or by relying on the advice of friends – correctly concluded that Charlie and I had an extreme aversion to permanent loss of capital and that we would not have accepted their money unless we expected to do reasonably well with it.

I stumbled into *business* management after BPL acquired control of Berkshire in 1965. Later still, in 1969, we decided to dissolve BPL. After yearend, the partnership distributed, pro-rata, all of its cash along with three stocks, the largest by value being BPL's 70.5% interest in Berkshire.

Charlie, meanwhile, wound up his operation in 1977. Among the assets he distributed to partners was a major interest in Blue Chip Stamps, a company his partnership, Berkshire and I jointly controlled. Blue Chip was also among the three stocks my partnership had distributed upon its dissolution.

In 1983, Berkshire and Blue Chip merged, thereby expanding Berkshire's base of registered shareholders from 1,900 to 2,900. Charlie and I wanted everyone – old, new and *prospective* shareholders – to be on the same page.

Therefore, the 1983 annual report – up front – laid out Berkshire's "major business principles." The *first* principle began: "Although our form is corporate, our attitude is partnership." That defined our relationship in 1983; it defines it today. Charlie and I – and our directors as well – believe this dictum will serve Berkshire well for many decades to come.

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Ownership of Berkshire now resides in five large "buckets," one occupied by me as a "founder" of sorts. That bucket is certain to empty as the shares I own are annually distributed to various philanthropies.

Two of the remaining four buckets are filled by institutional investors, each handling *other people's money*. That, however, is where the similarity between those buckets ends: Their investing procedures could not be more different.

In one institutional bucket are index funds, a large and mushrooming segment of the investment world. These funds simply mimic the index that they track. The favorite of index investors is the S&P 500, of which Berkshire is a component. Index funds, it should be emphasized, own Berkshire shares simply because they are *required* to do so. They are on automatic pilot, buying and selling *only* for "weighting" purposes.

In the other institutional bucket are professionals who *manage* their clients' money, whether those funds belong to wealthy individuals, universities, pensioners or whomever. These professional managers have a mandate to move funds from one investment to another based on their judgment as to valuation and prospects. That is an honorable, though difficult, occupation.

We are happy to work for this "active" group, while they meanwhile search for a better place to deploy the funds of their clientele. Some managers, to be sure, have a long-term focus and trade very infrequently. Others use computers employing algorithms that may direct the purchase or sale of shares in a nano-second. Some professional investors will come and go based upon their macro-economic judgments.

Our fourth bucket consists of individual shareholders who operate in a manner similar to the active institutional managers I've just described. These owners, understandably, think of their Berkshire shares as a possible source of funds when they see another investment that excites them. We have no quarrel with that attitude, which is similar to the way we look at *some* of the equities we own at Berkshire.

All of that said, Charlie and I would be less than human if we did not feel a special kinship with our fifth bucket: the million-plus *individual* investors who simply trust us to represent their interests, whatever the future may bring. They have joined us with no intent to leave, adopting a mindset similar to that held by our original partners. Indeed, many investors from our partnership years, and/or their descendants, remain substantial owners of Berkshire.

A prototype of those veterans is Stan Truhlsen, a cheerful and generous Omaha ophthalmologist as well as personal friend, who turned 100 on November 13, 2020. In 1959, Stan, along with 10 other young Omaha doctors, formed a partnership with me. The docs creatively labeled their venture Emdee, Ltd. Annually, they joined my wife and me for a celebratory dinner at our home.

When our partnership distributed its Berkshire shares in 1969, *all* of the doctors kept the stock they received. They may not have known the ins and outs of investing or accounting, but they *did* know that at Berkshire they would be treated as partners.

Two of Stan's comrades from Emdee are now in their high-90s and continue to hold Berkshire shares. This group's startling durability – along with the fact that Charlie and I are 97 and 90, respectively – serves up an interesting question: Could it be that Berkshire ownership fosters longevity?

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Berkshire's unusual and valued family of individual shareholders may add to your understanding of our reluctance to court Wall Street analysts and institutional investors. We *already have* the investors we want and don't think that they, on balance, would be upgraded by replacements.

There are only so many seats – that is, shares outstanding – available for Berkshire ownership. And we very much like the people already occupying them.

Of course, some turnover in "partners" will occur. Charlie and I hope, however, that it will be minimal. Who, after all, seeks rapid turnover in friends, neighbors or marriage?

In 1958, Phil Fisher wrote a superb book on investing. In it, he analogized running a public company to managing a restaurant. If you are seeking diners, he said, you can attract a clientele and prosper featuring *either* hamburgers served with a Coke *or* a French cuisine accompanied by exotic wines. But you must not, Fisher warned, capriciously switch from one to the other: Your message to potential customers must be consistent with what they will find upon entering your premises.

At Berkshire, we have been serving hamburgers and Coke for 56 years. We cherish the clientele this fare has attracted.

The tens of millions of other investors and speculators in the United States and elsewhere have a wide variety of equity choices to fit *their* tastes. They will find CEOs and market gurus with enticing ideas. If they want price targets, managed earnings and "stories," they will not lack suitors. "Technicians" will confidently instruct them as to what some wiggles on a chart portend for a stock's next move. The calls for action will never stop.

Many of those investors, I should add, will do quite well. After all, ownership of stocks is very much a "positive-sum" game. Indeed, a patient and level-headed monkey, who constructs a portfolio by throwing 50 darts at a board listing all of the S&P 500, will – *over time* – enjoy dividends and capital gains, just as long as it *never* gets tempted to make changes in its original "selections."

Productive assets such as farms, real estate and, yes, business ownership *produce* wealth – lots of it. Most owners of such properties will be rewarded. All that's required is the passage of time, an inner calm, ample diversification and a minimization of transactions and fees. Still, investors must never forget that their *expenses* are Wall Street's *income*. And, unlike my monkey, Wall Streeters do not work for peanuts.

When seats open up at Berkshire – and we hope they are few – we want them to be occupied by newcomers who understand and desire what we offer. After decades of management, Charlie and I remain unable to promise results. We *can* and *do*, however, pledge to treat you as partners.

And so, too, will our successors.

A Berkshire Number that May Surprise You

Recently, I learned a fact about our company that I had never suspected: Berkshire owns *American-based* property, plant and equipment – the sort of assets that make up the "business infrastructure" of our country – with a GAAP valuation exceeding the amount owned by *any* other U.S. company. Berkshire's depreciated cost of these *domestic* "fixed assets" is $154 billion. Next in line on this list is AT&T, with property, plant and equipment of $127 billion.

Our leadership in fixed-asset ownership, I should add, does *not*, in itself, signal an investment triumph. The *best* results occur at companies that require *minimal* assets to conduct high-margin businesses – *and* offer goods or services that will expand their sales volume with only minor needs for additional capital. We, in fact, own a few of these exceptional businesses, but they are relatively small and, at best, grow slowly.

Asset-heavy companies, however, can be *good* investments. Indeed, we are delighted with our two giants – BNSF and BHE: In 2011, Berkshire's first full year of BNSF ownership, the two companies had combined earnings of $4.2 billion. In 2020, a tough year for many businesses, the pair earned $8.3 billion.

BNSF and BHE will require major capital expenditures for decades to come. The good news is that both are likely to deliver appropriate returns on the incremental investment.

Let's look first at BNSF. Your railroad carries about 15% of all non-local ton-miles (a ton of freight moved one mile) of goods that move in the United States, whether by rail, truck, pipeline, barge or aircraft. By a significant margin, BNSF's loads top those of any other carrier.

The history of American railroads is fascinating. After 150 years or so of frenzied construction, skullduggery, overbuilding, bankruptcies, reorganizations and mergers, the railroad industry finally emerged a few decades ago as mature and rationalized.

BNSF began operations in 1850 with a 12-mile line in northeastern Illinois. Today, it has 390 antecedents whose railroads have been purchased or merged. The company's extensive lineage is laid out at http://www.bnsf.com/bnsf-resources/pdf/about-bnsf/History_and_Legacy.pdf.

Berkshire acquired BNSF early in 2010. Since our purchase, the railroad has invested $41 billion in fixed assets, an outlay $20 billion in excess of its depreciation charges. Railroading is an outdoor sport, featuring mile-long trains obliged to reliably operate in both extreme cold and heat, as they all the while encounter every form of terrain from deserts to mountains. Massive flooding periodically occurs. BNSF owns 23,000 miles of track, spread throughout 28 states, and must spend whatever it takes to maximize safety and service throughout its vast system.

Nevertheless, BNSF has paid substantial dividends to Berkshire – $41.8 billion in total. The railroad pays us, however, only what remains after it both fulfills the needs of its business and maintains a cash balance of about $2 billion. This conservative policy allows BNSF to borrow at low rates, independent of any guarantee of its debt by Berkshire.

One further word about BNSF: Last year, Carl Ice, its CEO, and his number two, Katie Farmer, did an extraordinary job in controlling expenses while navigating a significant downturn in business. Despite a 7% decline in the volume of goods carried, the two actually increased BNSF's profit margin by 2.9 percentage points. Carl, as long planned, retired at yearend and Katie took over as CEO. Your railroad is in good hands.

BHE, unlike BNSF, pays *no* dividends on its common stock, a highly-unusual practice in the electric-utility industry. That Spartan policy has been the case throughout our 21 years of ownership. Unlike railroads, our country's electric utilities need a massive makeover in which the ultimate costs will be staggering. The effort will absorb all of BHE's earnings for decades to come. We welcome the challenge and believe the added investment will be appropriately rewarded.

Let me tell you about one of BHE's endeavors – its $18 billion commitment to rework and expand a substantial portion of the outdated grid that now transmits electricity throughout the West. BHE began this project in 2006 and expects it to be completed by 2030 – yes, 2030.

The advent of renewable energy made our project a societal necessity. Historically, the coal-based generation of electricity that long prevailed was located close to huge centers of population. The best sites for the new world of wind and solar generation, however, are often in remote areas. When BHE assessed the situation in 2006, it was no secret that a huge investment in western transmission lines had to be made. Very few companies or governmental entities, however, were in a financial position to raise their hand after they tallied the project's cost.

BHE's decision to proceed, it should be noted, was based upon its trust in America's political, economic and judicial systems. Billions of dollars needed to be invested before meaningful revenue would flow. Transmission lines had to cross the borders of states and other jurisdictions, each with its own rules and constituencies. BHE would also need to deal with hundreds of landowners and execute complicated contracts with both the suppliers that generated renewable power and the far-away utilities that would distribute the electricity to their customers. Competing interests and defenders of the old order, along with unrealistic visionaries desiring an instantly-new world, had to be brought on board.

Both surprises and delays were certain. Equally certain, however, was the fact that BHE had the managerial talent, the institutional commitment and the financial wherewithal to fulfill its promises. Though it will be many years before our western transmission project is completed, we are today searching for other projects of similar size to take on.

Whatever the obstacles, BHE will be a leader in delivering ever-cleaner energy.

The Annual Meeting

Last year, on February 22nd, I wrote you about our plans for a gala annual meeting. Within a month, the schedule was junked.

Our home office group, led by Melissa Shapiro and Marc Hamburg, Berkshire's CFO, quickly regrouped. Miraculously, their improvisations worked. Greg Abel, one of Berkshire's Vice Chairmen, joined me on stage facing a dark arena, 18,000 empty seats and a camera. There was no rehearsal: Greg and I arrived about 45 minutes before "showtime."

Debbie Bosanek, my incredible assistant who joined Berkshire 47 years ago at age 17, had put together about 25 slides displaying various facts and figures that I had assembled at home. An anonymous but highly-capable team of computer and camera operators projected the slides onto the screen in proper order.

Yahoo streamed the proceedings to a record-sized international audience. Becky Quick of CNBC, operating from her home in New Jersey, selected questions from thousands that shareholders had earlier submitted or that viewers had emailed to her during the four hours Greg and I were on stage. See's peanut brittle and fudge, along with Coca-Cola, provided us with nourishment.

This year, on May 1st, we are planning to go one better. Again, we will rely on Yahoo and CNBC to perform flawlessly. Yahoo will go live at 1 p.m. Eastern Daylight Time ("EDT"). Simply navigate to https://finance.yahoo.com/brklivestream.

Our formal meeting will commence at 5:00 p.m. EDT and should finish by 5:30 p.m. Earlier, between 1:30-5:00, we will answer your questions as relayed by Becky. As always, we will have no foreknowledge as to what questions will be asked. Send your zingers to BerkshireQuestions@cnbc.com. Yahoo will wrap things up after 5:30.

And now – drum roll, please – a surprise. This year our meeting will be held in Los Angeles . . . and *Charlie will be on stage with me* offering answers and observations throughout the 3½-hour question period. I missed him last year and, more important, *you* clearly missed him. Our other invaluable vice-chairmen, Ajit Jain and Greg Abel, will be with us to answer questions relating to their domains.

Join us via Yahoo. Direct your really tough questions to Charlie! We will have fun, and we hope you will as well.

Better yet, of course, will be the day when we see you face to face. I hope and expect that will be in 2022. The citizens of Omaha, our exhibiting subsidiaries and all of us at the home office can't wait to get you back for an honest-to-God annual meeting, *Berkshire-style*.

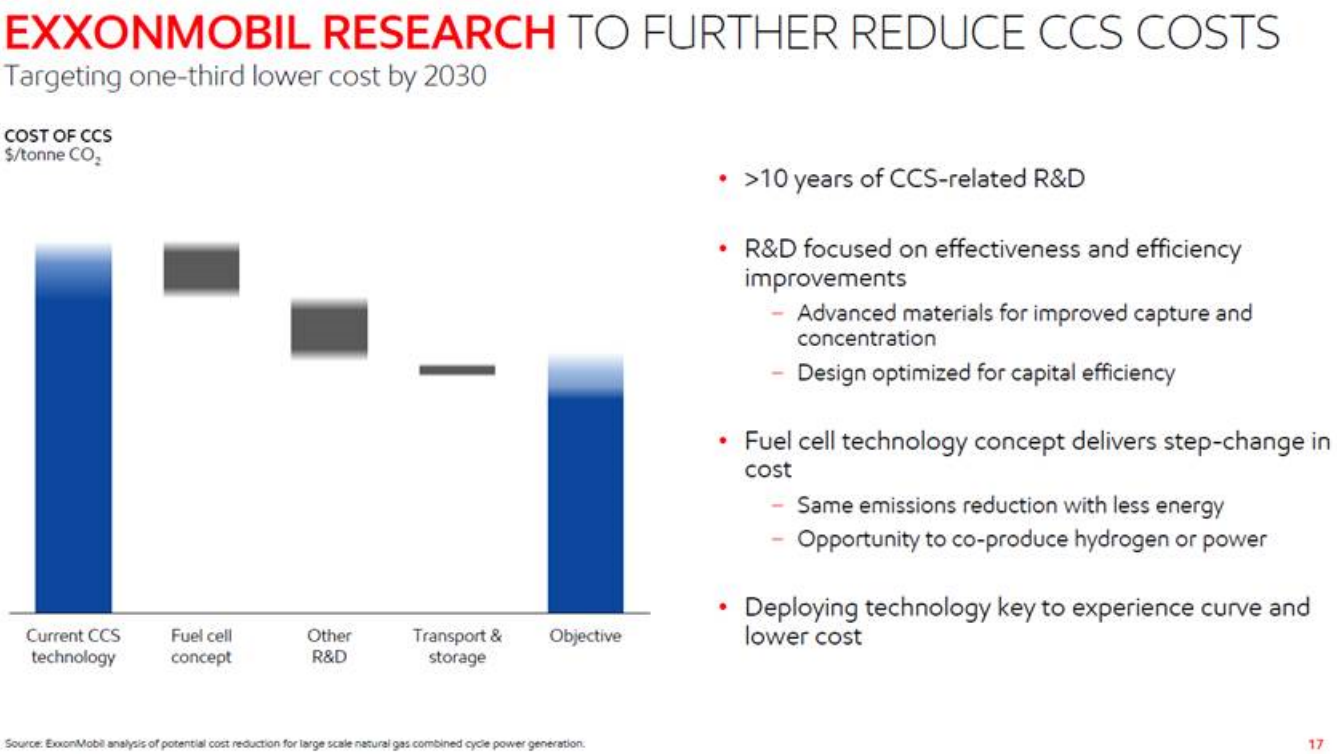
February 27, 2021

Warren E. Buffett
Chairman of the Board

SAF Group created transcript of Exxon 2021 Investor Day – CEO Woods key comments on Slide 17 below
Items in "italics" are SAF created transcript

Sl 17. Also working on direct air capture technology. At 25 mi 20 mark, CEO Woods "*we've discovered a new material that, while very early in its development, has the potential to cost effectively capture CO2 from nearly any gas mixture including dilute sources such as air. Laboratory tests indicate the new material acts like a sponge for CO2, capturing carbon dioxide emissions 6 times more effectively than conventional technology using significantly less energy*"

26"00 CEO Woods "*in another collaboration with Fuel Cell Energy we are researching the potential of utility scale fuel cells to capture carbon emissions while generating power. the process is promising. Unlike other carbon capture technologies, the fuel cells concentrate CO2 emissions and at the same time, generates power versus today's technology that consumes it. you can see how this could be very helpful in reducing costs. We're looking to trial this technology as part of the project in the Netherlands that I mentioned earlier. Field deployment is a critical step in developing the technologies and evaluating the potential to scale. Its also critical in getting on the experience curve, which will further help to drive down cost for the technology and other elements of the value chain such as transportation and storage. Another promising potential for the fuel cell is the option to adjust the configuration to produce hydrogen rather than power. This could be of significant value as low carbon fuel in hard to abate applications such as heavy duty transport, power generation or energy intense industrial processes*."



Source: ExxonMobil

https://www.argusmedia.com/en/news/2191508-calls-for-germany-to-bolster-grid-ahead-of-ev-surge?backToResults=true

Calls for Germany to bolster grid ahead of EV surge

Published date: 01 March 2021

Germany must address potential bottlenecks in its distribution grid ahead of an expected surge in electric vehicle (EV) sales, delegates heard at an event organised by the opposition Green Party last week.

The country's EV registrations are expected to reach 1mn this year, and some first-time owners are being told by their local grid operator that they will need to wait before installing a wallbox because of grid constraints, automotive association VDA president Hildegard Muller said.

Strong EV sales are of vital interest to Germany's automotive industry, and the sector will face stiff fines if it misses its emissions targets because potential EV buyers are put off by the possibility of not being able to charge their car when they want to, Muller warned. "We cannot tell our customers 'you need to negotiate with your grid operator'," she said.

The federal economy and energy ministry is working on a "law on controllable facilities" that will seek to to ensure the extension of the grid as cost-efficiently as possible by incentivising demand-side flexibility. But a draft was withdrawn in January after the VDA and consumer and renewables associations attacked its "one-sidedness", for suggesting giving distribution system operators (DSO) the right to curtail power flow to EV charging points at certain times to prevent grid overload.

Economy and energy minister Peter Altmaier recently pledged to instead look at solutions modelled on demand-side management rules. The law is due to be passed before parliament's summer break.

Germany's energy industry, and the power grid sector in particular, had welcomed the draft bill, which they said was not about "cutting off" EVs, but about the possibility of DSOs lowering power flow — to "dim it, so to speak", energy and water association BDEW's managing director, Kerstin Andreae, said.

Variable tariffs — as suggested by the VDA — will only be possible once digitalisation has advanced sufficiently, and they could defeat their purpose if households shift their consumption to the same "cheap" times, Andreae warned.

The level of digitalisation in Germany's low and medium-voltage systems is far too low to allow DSOs to know "what is going on in their grids", DSO Stromnetz Berlin's chief executive, Erich Landeck, said. DSOs are tackling this, but it will take time, Landeck said. And most EVs do not yet offer bidirectional charging, so cannot discharge power back into the grid. It is also too early for EVs or heat pumps to contribute to grid stability outside special projects, Landeck said.

State intervention

Restructuring the distribution grid should be an "infrastructure task for the state", VDA's Muller said. She also urged policy makers to rapidly establish a standard for EV charging points. The fact that most cannot be steered remotely is unacceptable, she said.

The government should act beyond subsidy programmes, Muller said. The federal transport ministry on 26 February announced that state-owned bank KfW received 300,000 funding applications for private wallboxes in three months, and that the ministry will top up the programme with an additional €100mn ($120mn). "But the problem runs deeper," Muller said.

The Green Party's energy economy spokeswoman Ingrid Nestle suggested initially leaving things unchanged, and simply monitoring existing "hotspots" with high EV penetration, where DSOs could implement ad hoc measures.

But Muller rejected this, saying it will be years between the DSOs defining a specific need and completion of the necessary grid upgrade.

A daily "intervention time" of two hours, is the minimum needed to have an effect on grid stabilisation, giving drivers 22 hours per day of potential charging time, northwest German system operator EWE Netz's head of grid management, Michael Westerburg, said earlier this year. Even charging for just two hours per day, at a capacity of 11kW — the typical home-charging capacity — would allow the average car to cover 40,000km per year, Westerburg said.

By Chloe Jardine

https://www.fastcompany.com/90588882/how-to-tell-if-a-companys-net-zero-goals-are-serious-or-just-greenwashing

- 02-02-21

How to tell if a company's 'net zero' goals are serious—or just greenwashing

Here are some questions to ask when a company says it plans to get to zero emissions.

BY ADELE PETERS LONG READ

The number of companies that have set net-zero climate goals—meaning that they'll cut their CO2 emissions as much as possible, and any they still emit will be offset by projects that capture carbon—has more than tripled over roughly the last year. Nestlé, the world's largest food company, says that it plans to reach net-zero emissions by 2050. Unilever, another consumer product giant with hundreds of brands, plans to get there by 2039. Duke Energy, the North Carolina-based electric utility with a long history of using coal, plans to reach net zero by 2050. Even oil companies such as BP now say that they are aiming for the same thing. Others, including Amazon and Microsoft, plan to hit the goal much sooner.

Climate scientists say that society as a whole needs to reach net zero by the middle of the century, at the latest, to avoid the worst impacts from climate change. That means that businesses, along with governments, have to do the same. But when companies set net-zero goals, some plans are more credible than others.

"Not every net-zero target is the same," says Angel Hsu, the founder of the Data Driven EnviroLab at Yale-NUS College and one of the authors of a recent report with NewClimate Institute examining net-zero pledges in detail. "Part of the problem is that there isn't a unified single definition of what net zero actually means. And there are many different opinions about what that *should* mean too."

A company might set a net-zero target, but then not actually cut emissions as much as it feasibly can or as much as is needed for society to stay on track for climate goals. A recent report from the Sierra Club gives Duke Energy an "F" grade for its net-zero strategy: The report faults the company for not yet having plans to retire the majority of its current coal plants, and for planning to build new gas plants rather than shifting fully to clean energy. The report says that this is "entirely incompatible with limiting warming to 1.5°C," a threshold for avoiding the worst impacts from climate change.

So what makes net-zero goals truly ambitious—and when are they the latest version of greenwashing?

DO THEY HAVE MORE THAN JUST A 2050 GOAL?

"I think the most important thing that a company can do is, in addition to the long-term net-zero commitment, they can commit to medium-term goals or targets," says Steven Clarke, the director of corporate clean energy leadership at the nonprofit Ceres. "That ensures that they're actually taking action now to start getting them on that trajectory to net zero."

Many of the massive transitions that have to happen take time, and without clear interim goals, there's a risk that companies won't be able to make changes quickly enough. And as company leadership changes, the company might also later say that it's no longer possible to meet the net-zero goal. (Companies have already missed major environmental targets, such as pledges to end deforestation by 2020, with little public blowback.) Right now, according to a recent report from DataDriven EnviroLab and the NewClimate Institute, only 8% of companies with net-zero goals have interim targets.

The world also needs to cut emissions now to avoid blowing past 1.5 degrees of global warming long before 2050. A 2018 UN report warned that the world would need to cut emissions roughly in half by 2030. For some companies, a 2030 goal to halve emissions makes sense. But because some industries can move faster than others, they need more aggressive goals to ensure that society as a whole can meet its target.

"ONLY 8% OF COMPANIES WITH NET-ZERO GOALS HAVE INTERIM TARGETS."

Solar and wind power, for example, is already so affordable that electric utilities should be aiming for cuts of at least 80% by the end of the decade, says John Romankiewicz, a senior analyst for the Beyond Coal Campaign at the Sierra Club. "We're looking at a sector that has the technology on hand to do a really steep cut," he says. "That will also enable other sectors like buildings and transportation to take off and have a clean electricity supply." That's why the organization gave Duke Energy a failing grade, even though Duke is aiming to reduce its emissions by 50% by 2030.

For other companies that can feasibly reach net zero sooner than 2050, it makes sense to act much more quickly. Microsoft, for example, plans to become "carbon negative" (a step beyond net zero, meaning that it removes more carbon from the atmosphere than it emits) by 2030."We know that to get to the ultimate outcome we want, which is a net-zero carbon economy, that there is all a lot of work that needs to happen," says Lucas Joppa, chief environmental officer at Microsoft. "And Microsoft strongly believes that if there's a lot of work you need to do you better get started now."

The company is working to virtually eliminate all of the emissions that are in its direct control; it's shifting to 100% renewable energy, including the backup generators at its data centers that currently run on diesel, and moving to electric vehicles for its company fleet. Because its products are still responsible for other emissions that it can't directly control, including the electricity used in customer's homes, the company will also be relying on carbon offsets.

WHAT DO THEY MEAN WHEN THEY SAY "NET ZERO"?

As companies set emissions goals, they don't always use the same language. Some, like Microsoft, talk about becoming "carbon negative." Some use "climate positive" or "net-negative emissions" to mean the same thing—removing more CO2 from the atmosphere than the company is responsible for emitting. Some say they're aiming for "net zero" while others use the phrase "carbon neutral" to indicate that any remaining emissions from the business will be offset by projects that remove carbon, such as tree-planting. One nonprofit that works with companies to measure their carbon footprint, reduce emissions, and offset remaining emissions uses the phrase "climate neutral," which some prefer because it refers to all greenhouse gases, not just carbon dioxide. Some organizations use "zero-carbon" or "carbon-free" as a synonym for net zero.

"I THINK YOU HAVE TO LOOK AT THE WHOLE PICTURE, FROM SUPPLY CHAIN TO END-STATE USER, IF WE WANT TO ACHIEVE THIS GOAL AS A SOCIETY.""

The mix of phrases can be confusing for consumers, but the even bigger challenge is differences in how companies are measuring their footprints. When some companies say they're aiming for net zero, they're only talking about the emissions that come directly from their own operations. Some oil companies, for example, have a goal to get to net zero at oil and gas wells but don't include the much larger amount of emissions from the customers actually burning the fuel. (BP, for instance, doesn't count most of these downstream emissions in its goal.) Others are setting broader goals, such as Apple, which plans to reach net-zero emissions across its entire supply chain by 2030. Emissions beyond a company's control, including what its suppliers and customers are responsible for, are called "Scope 3" emissions.

If companies don't look at the full impact of their products and services—including these so-called "Scope 3" emissions—the world won't stay on track to actually address climate change. "I think you have to look at the whole picture, from supply chain to end-state user, if we want to achieve this goal as a society," says Andrew Poreda, a research analyst at Sage Advisory, an investment management firm. "I think that's essential. If we

saw 90% of companies make a pledge and then the 10% didn't include Scope 3, like in the oil and gas sector and utilities, we would still be experiencing global warming, and then ultimately, the whole net-zero goal is not achieved."

ARE THEY CUTTING EMISSIONS AS MUCH AS POSSIBLE, AS QUICKLY AS POSSIBLE?

The biggest challenge for businesses is how to steeply cut emissions. One early step, typically, is switching to renewable electricity, but even that can be done in different ways—some more effective than others. Google, for example, was an early corporate buyer of renewable energy, but then shifted to funding the construction of new wind and solar projects, not just paying for power from existing plants. Because the facilities were new, it was a way to ensure that the company was actually helping reduce overall emissions.

Now, it's working to make sure that all of its operations run on renewables from local electric grids. (Companies often just purchase renewable energy from other locations, buying enough to match their own energy use. If a solar or wind farm is on another grid, it's a little misleading to say that the company is running on renewable power.) By 2030, it plans to run the entire business on carbon-free energy 24-7, a more challenging goal, since wind and solar power aren't available continuously and need to be paired with energy-storage infrastructure that isn't yet fully in place. The company is shrinking the emissions from everything under its control, from company shuttles to Nest thermostats, and then, like Microsoft, using carefully vetted offsets for the rest. In September 2020, it announced that it had used offsets to eliminate its operational carbon footprint for the entire history of the company.

Shrinking emissions is harder for some companies than others. For a tech company with a carbon footprint that mostly depends on electricity use, shifting to renewable energy has a huge impact. Others have emissions that are harder to eliminate—such as the cement industry, which collectively emits more greenhouse gases than most countries; the emissions come both from burning fuel and from the chemical process of making cement. But even for something such as cement, solutions may soon be available. New technology is making it possible to run heavy industrial processes on renewable energy for the first time. Pollution from cement plants can be captured and sequestered in the cement itself. For every company, planning for net zero involves understanding what technology and systemic solutions are available, what's feasible for the future—and how their business model should change if emissions are impossible to eliminate. Some fossil fuel companies, for example, are now transitioning completely away from fossil fuels.

Hsu argues that as companies invest in new technology to cut future emissions, they should also be very clear about what can happen feasibly now. "I think what we would like to see from the scientific perspective is that companies be realistic about what they can actually do, and be really transparent," she says. "So they can really only reduce their emissions by 50% by 2025, or 2030, to me, that's a much more credible target than if a company says we're going to go net zero by 2050, and they have no way of actually achieving that goal. Then it becomes an exercise in greenwashing or offsetting and questionable offsets."

WHAT OFFSETS ARE THEY USING?

When companies can't eliminate some emissions, they turn to carbon offsets to account for them—supporting projects such as reforestation, or capturing methane pollution at landfills, or making changes in agriculture to capture more carbon in the soil. But offsets are challenging to do right. "Many companies have set net-zero targets without making substantial changes to their operations, and offset their carbon footprint without any discussion on where the offsets came from and how they verified their quality," says Hsu.

Offset programs that plant trees, for example, can be hard to track, and there's a risk that the trees might still later be lost to logging or forest fires. Because offsets are cheap, she says, some companies also might not be motivated to actually do the work of reducing emissions as much as possible—it could be easier to pay to keep polluting. "We have seen a lot of companies that have come out and they said, we're only going to reduce emissions by 50%, and then we're going to be offsetting the rest," she says. "And there's a big risk in that because it could be a form of greenwashing."

“MANY COMPANIES HAVE SET NET-ZERO TARGETS WITHOUT MAKING SUBSTANTIAL CHANGES TO THEIR OPERATIONS.”

Microsoft is trying to fix some of the issues in the current offset market. With natural ways to capture carbon, including reforestation or changes in agriculture that can store more carbon in soil, one problem is how to measure how much extra carbon a forest or farm is absorbing. “The measurement is actually pretty difficult,” Joppa says. “We still need to mature our ability to measure and verify the carbon sequestration that’s actually occurring.” Companies selling offsets also need to factor in risks such as forest fires and offer insurance policies such as planting extra trees.

Hsu says that projects such as tree planting could be used in the short term if they’re high-quality projects, meaning that they’re carefully tracked and account for challenges such as forest fires through planting extra trees as insurance, for example. But in the long term, we’ll need to shift to a more diverse set of projects that remove carbon, such as “direct air capture” machines that pull CO_2 out of the air. When United Airlines recently announced that it would reduce its greenhouse gas emissions 100% by 2050, it made a point of choosing not to use traditional carbon offsets. Instead, the company is investing in direct air capture, something that it says is necessary. “The reality is that traditional carbon offset programs simply can’t come close to offsetting the 4,000-times increase in annual carbon emissions since the industrial era began,” CEO Scott Kirby said at the time. “It is just mathematically impossible to find enough land to plant 4,000 times as many trees.” But the technologies involved in capturing carbon still need to scale up and come down in cost for them to be a fully effective offsetting strategy. If they don’t, companies counting on them will have to rethink the pathway to their goals.

HOW TRANSPARENT IS THE PROCESS?

When companies don’t have clear plans for reaching net zero, their goals lack credibility. The bank HSBC recently announced that it would reduce “financed emissions”—that is, the emissions from the companies they invest in—in line with the Paris Agreement, but it didn’t say how it planned to phase out its funding for oil, gas, and coal projects. Activists derided the announcement, saying it was “like saying you’ll give up smoking by 2050, but continuing to buy a pack a week, or even smoking more.”

Few companies with net-zero pledges have shared the details of their plans, says Hsu. Her team is currently working with CDP, a nonprofit that asks companies questions each year to disclose climate risk, to add new questions that delve into the details of net-zero goals—from what policies a company has in place to whether they’re including customer or supplier emissions in their calculations. “All these questions are really important to understanding how credible that zero target is,” she says. “And the fact of the matter is that we don’t really have that information.”

As companies share information, they can also help others move faster. Microsoft, for example, partnered with Nike, Starbucks, and several other companies in 2020 to launch a new organization, Transform to Net Zero, to help build road maps for others to reach the same net-zero goals. “If we achieve our carbon-negative goals by 2030, and we don’t help anybody else do that, it’s not a win for us,” says Joppa. “And it’s not a win for society.”

***Correction**: By 2030, Google will use all carbon-free energy, rather than all renewable energy (which leaves it open for sources other than renewables).*

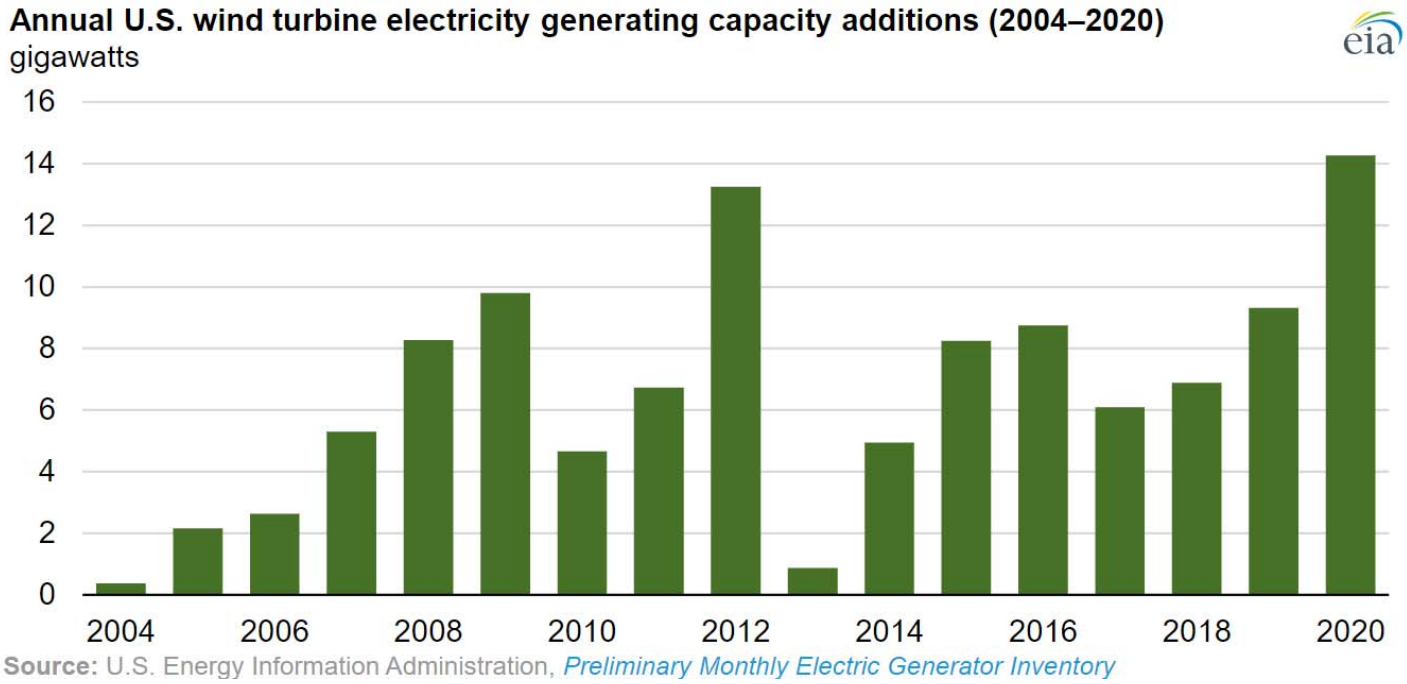
ABOUT THE AUTHOR

Adele Peters is a staff writ

https://www.eia.gov/todayinenergy/detail.php?id=46976

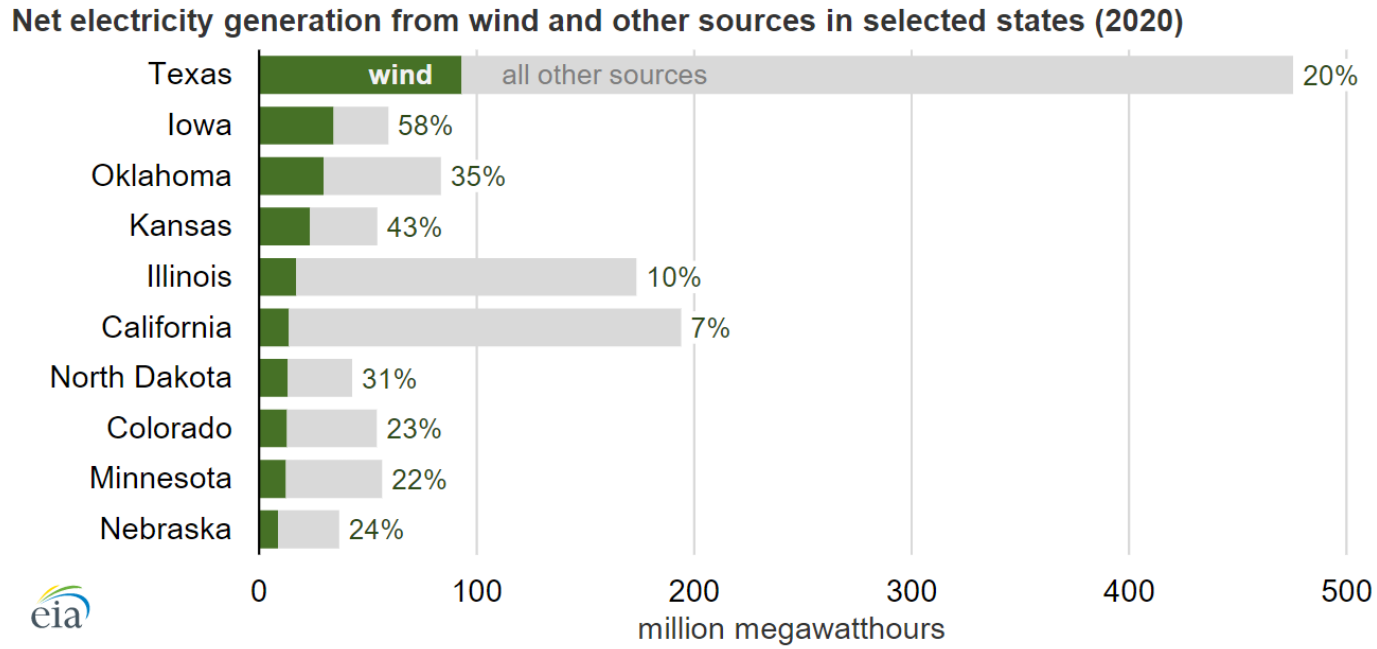
MARCH 3, 2021

The United States installed more wind turbine capacity in 2020 than in any other year



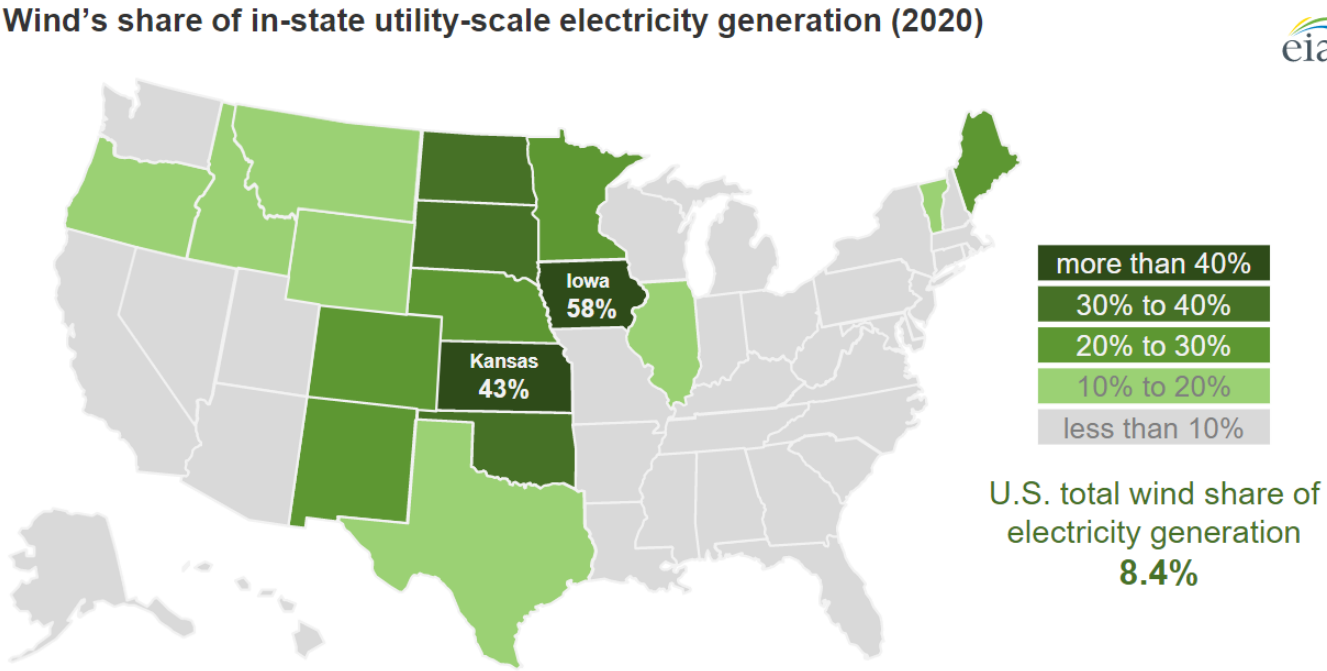
In both 2019 and 2020, project developers in the United States installed more wind power capacity than any other generating technology. According to data recently published by the U.S. Energy Information Administration (EIA) in its *Preliminary Monthly Electric Generator Inventory*, annual wind turbine capacity additions in the United States set a record in 2020, totaling 14.2 gigawatts (GW) and surpassing the previous record of 13.2 GW added in 2012. After this record year for wind turbine capacity additions, total wind turbine capacity in the United States is now 118 GW.

The impending phaseout of the full value of the U.S. production tax credit (PTC) at the end of 2020 primarily drove investments in wind turbine capacity that year, just as previous tax credit reductions led to significant wind capacity additions in 2012 and 2019. In December 2020, Congress extended the PTC for another year.



Source: U.S. Energy Information Administration, *Electric Power Monthly*

Texas has the most wind turbine capacity among states: 30.2 GW were installed as of December 2020. In 2020, Texas generated more electricity from wind than the next three highest states (Iowa, Oklahoma, and Kansas) combined. However, Texas generates and consumes more total electricity than any other state, and wind remains slightly less than 20% of the state's electricity generation mix. In two other states—Iowa and Kansas—wind is the most prevalent source of in-state electricity generation. In both states, wind surpassed coal as the state's top electricity generation source in 2019.



Source: U.S. Energy Information Administration, *Electric Power Monthly*

Nationally, 8.4% of utility-scale electricity generation in 2020 came from wind turbines. Many of the turbines added in late 2020 will contribute to increases in wind-powered electricity generation in 2021. EIA expects wind's share of electricity generation to increase to 10% in 2021, according to forecasts in EIA's most recent *Short-Term Energy Outlook*.

https://ag.ny.gov/press-release/2021/attorney-general-james-and-nyc-corporation-counsel-johnson-announce-recovery-105

Attorney General James and NYC Corporation Counsel Johnson Announce Recovery of $105 Million from Hedge Fund Manager Who Evaded Taxes

AG James and Corporation Counsel Johnson Deliver Largest New York False Claims Act Recovery Against an Individual Defendant in NYS History

NEW YORK – New York Attorney General Letitia James and New York City Corporation Counsel James E. Johnson today announced the **recovery of $105 million in back taxes and damages from a hedge fund manager who defrauded New York state and New York City out of taxes on deferred-compensation income in 2017**. Thomas E. Sandell through his firm, Sandell Asset Management Corporation (SAMC), recognized over $450 million in management and performance fees in 2017 from investment management services performed in New York City, but instead of paying the state and city proper taxes on those fees, Sandell tried to dodge liability for tens of millions of dollars in taxes.

"The greed that allowed one man to try to avoid paying his fair share of taxes is astonishing," said **Attorney General James**. "Thomas Sandell and his company bilked New York taxpayers out of tens of millions of dollars in a single year — placing a tremendous burden on our system and forcing ordinary New Yorkers to bear that cost. My office remains committed to ensuring that those who knowingly commit tax fraud — and those who facilitate their misconduct — pay a steep price for doing so."

"Tax revenues pay for vital city services. When a deadly pandemic has eviscerated the economy and severely strained our city's budget, every dollar counts," said **Corporation Counsel Johnson**. "Hedge funds are obligated to pay taxes just like everybody else, and when they don't, we'll use our legal tools and strategies to hold them accountable. Period."

As the result of a 2008 change in deferred fee income recognition rules, Sandell was required to recognize approximately $450 million in deferred fee income in 2017 and pay taxes on that income in New York state and New York City. But, to avoid this liability, Sandell left New York to live in London from August 2016 until mid-2019, and, even though SAMC continued operating in New York City, Sandell and SAMC took steps to make it appear as though SAMC's operations were no longer in New York City, often with the assistance of an international accounting firm (Accounting Firm A).

As part of this deception, Sandell opened a shell office with three back-office employees in Boca Raton, Florida, which Sandell and SAMC held out to New York's tax authorities as SAMC's sole U.S. operation — even after agreeing to a finding by the U.S. Securities and Exchange Commission (SEC) that SAMC's principal place of business continued to be in New York City. To further conceal SAMC's New York presence, Sandell also funneled SAMC's payroll and property expenses through a third-party entity — which he owned — even though SAMC had incurred, remained responsible for, and, in fact, continued paying those expenses.

Despite being put on notice that his tax position was problematic by multiple advisors, including his long-time tax preparer (Accounting Firm B), Sandell nonetheless claimed that he owed no New York taxes on the fee income he recognized in 2017. Accounting Firm B made clear to Sandell that he could not claim to owe no New York taxes on his deferred-fee income — particularly in light of the SEC's conclusion that SAMC's principal place of business continued to be in New York City. In response, Sandell replaced Accounting Firm B with Accounting Firm A without conducting any further

diligence into Accounting Firm A's tax position, and wrongfully claimed no New York tax was due on returns filed for the 2017 year, depriving the state and city of tens of millions of dollars in tax revenues.

Sandell has already transmitted the full $105 million agreed upon in back taxes and damages.

Sandell and SAMC neither admit nor deny the allegations made by the Office of the Attorney General (OAG) and by the New York City Department of Law.

The investigation leading to today's agreement began with a whistleblower lawsuit filed in October 2018 under the New York False Claims Act. The investigation found that Sandell performed the investment services that generated the deferred fees at issue exclusively in New York City and that his deferred fees were therefore taxable in New York state and New York City.

The OAG expresses its appreciation to the whistleblower, without whose information the misconduct might not have been discovered, and to the whistleblower's attorneys. Under the New York False Claims Act, whistleblowers are entitled to receive a percentage of settlement proceeds for bringing this misconduct to light.

New Yorkers can learn more about **filing a New York False Claims Act on the OAG website** and can **file an anonymous, secure transmission through the OAG's whistleblower portal**.

The OAG also thanks the New York state Department of Taxation and Finance and the New York City Department of Finance for their invaluable assistance in this matter.

This matter was handled for the OAG by Senior Trial Counsel David N. Ellenhorn and Assistant Attorney General Joshua B. Dugan of the Taxpayer Protection Bureau, with assistance from Senior Legal Support Analyst Bianca M. LaVeglia. The Taxpayer Protection Bureau is led by Bureau Chief Thomas Teige Carroll and Deputy Bureau Chief Scott Spiegelman, and is a part of the Division for Economic Justice, led by Chief Deputy Attorney General Chris D'Angelo and First Deputy Attorney General Jennifer Levy.

https://elizabethwarren.com/plans/ultra-millionaire-tax

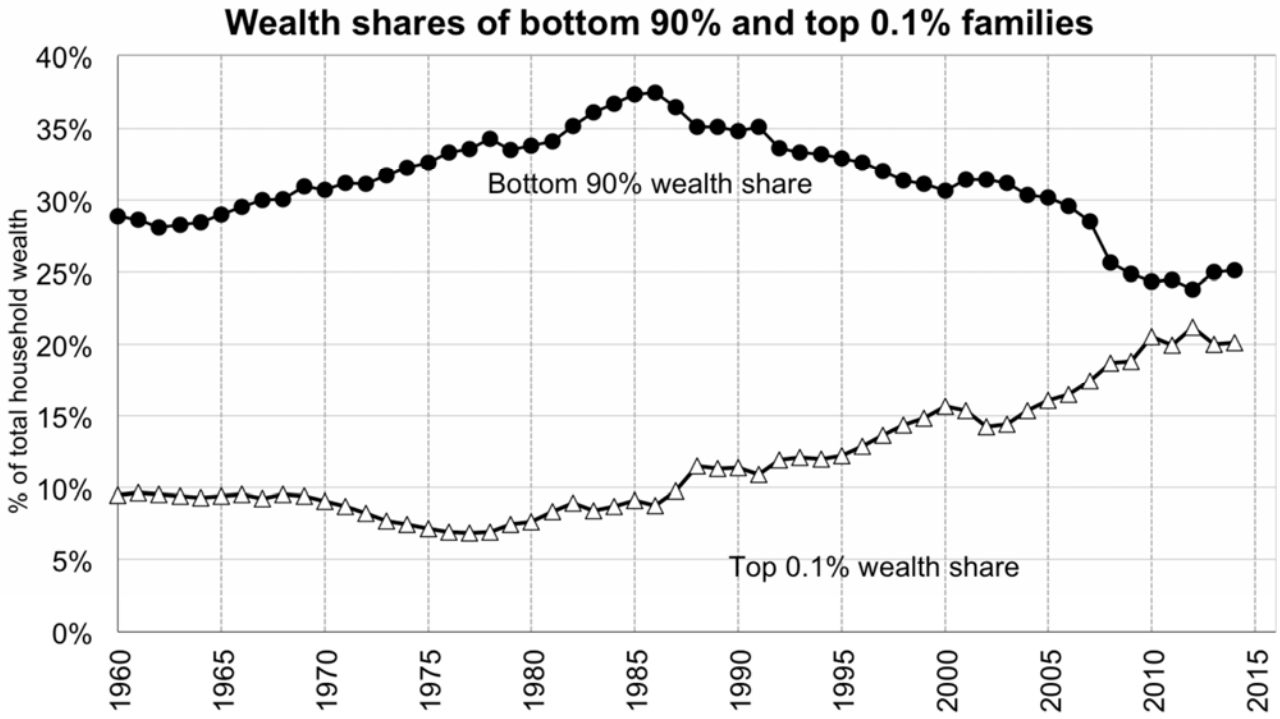
ULTRA-MILLIONAIRE TAX

A small tax on the great fortunes of more than $50 million can bring in nearly $4 trillion to rebuild America's middle class. Add your name if you agree: It's time for the rich to pay their fair share.
Email

This plan was originally released during Senator Elizabeth Warren's presidential campaign.

For decades, the wealthy and the well-connected have put American government to work for their own narrow interests. As a result, a small group of families has taken a massive amount of the wealth American workers have produced, while America's middle class has been hollowed out.

The result is an extreme concentration of wealth **not seen** in any other leading economy. **The 400 richest Americans currently own more wealth than all Black households and a quarter of Latino households combined.** According to **an analysis from economists Emmanuel Saez and Gabriel Zucman from the University of California-Berkeley**, the richest top 0.1% has seen its share of American wealth nearly triple from 7% to 20% between the late 1970s and 2016, while the bottom 90% has seen its share of wealth decline from 35% to 25% in that same period. Put another way, **the richest 130,000 families in America now hold nearly as much wealth as the bottom 117 million families combined.**



Our tax code focuses on taxing income, but a family's wealth is also an important measure of how much it has benefitted from the economy and its ability to pay taxes. And judged against wealth, our tax system asks the rich to pay a lot less than everyone else. According to Saez and Zucman, **the**

families in the top 0.1% are projected to owe 3.2% of their wealth in federal, state, and local taxes this year, while the bottom 99% are projected to owe 7.2%.

While we must make income taxes more progressive, that alone won't straighten out our slanted tax code or our lopsided economy. Consider two people: an heir with $500 million in yachts, jewelry, and fine art, and a teacher with no savings in the bank. If both the heir and the teacher bring home $50,000 in labor income next year, they would pay the same amount in federal taxes, despite their vastly different circumstances. Increasing income taxes won't address this problem.

That's why we need a tax on wealth. The Ultra-Millionaire Tax taxes the wealth of the richest Americans. It applies only to households with a net worth of $50 million or more—roughly the wealthiest 75,000 households, or the top 0.1%. Households would pay an annual 2% tax on every dollar of net worth above $50 million and a 6% tax on every dollar of net worth above $1 billion. Because wealth is so concentrated, **this small tax on roughly 75,000 households will bring in $3.75 trillion in revenue over a ten-year period.**

Rates and Revenue

- Zero additional tax on any household with a net worth of less than $50 million (99.9% of American households)
- 2% annual tax on household net worth between $50 million and $1 billion
- 4% annual Billionaire Surtax (6% tax overall) on household net worth above $1 billion
- 10-Year revenue total of $3.75 trillion

ADDITIONAL DETAILS

- **All assets are included in the net worth calculation, which will produce more revenue and reduce opportunities for avoidance and evasion:**
  All household assets held anywhere in the world will be included in the net worth measurement, including residences, closely held businesses, assets held in trust, retirement assets, assets held by minor children, and personal property with a value of $50,000 or more.
- **Taxpayers will be permitted to defer payment of the tax with interest for up to five years:**
  For the rare taxpayer with an extremely high net worth but liquidity constraints that make it difficult to pay this additional tax, there will be an option to defer payment of the tax for up to five years, with interest. The IRS will also be instructed to create rules for cases where deferment is required in truly exceptional circumstances to prevent unintended negative impacts on an ongoing enterprise or a taxpayer facing unusual circumstances that would advise for delay.
- **Valuing assets for the purposes of the Ultra-Millionaire Tax will provide an opportunity to tighten and expand upon existing valuation rules for the estate tax:**
  The IRS already has rules to assess the value of many assets for estate tax purposes. The Ultra-Millionaire Tax is a chance for the IRS to tighten these existing rules to close loopholes and to develop new valuation rules as needed. For example, the IRS would be authorized to use cutting-edge retrospective and prospective formulaic valuation methods for certain harder-to-value assets like closely held business and non-owner-occupied real estate.

- **The proposal also includes strong anti-evasion measures, including but not limited to:**
    - a significant increase in the IRS enforcement budget;
    - a minimum audit rate for taxpayers subject to the Ultra-Millionaire Tax;
    - a 40% "exit tax" on the net worth above $50 million of any U.S. citizen who renounces their citizenship; and systematic third-party reporting that builds on existing tax information exchange agreements adopted after the Foreign Account Tax Compliance Act.
- **Leading constitutional law scholars believe the Ultra-Millionaire Tax is constitutional:**
  Legal experts have submitted two separate letters in support of the constitutionality of this proposal.

EXAMPLES

Married couple with household net worth of $100,000—the median level in the United States

- Pays zero tax because they are below the $50 million threshold

Married couple with a primary and vacation residence and substantial retirement savings for a household net worth of $20 million

- Pays zero tax because they are below the $50 million threshold

Extremely successful small business owner of a $30 million business as well as additional assets for a household net worth of $40 million

- Pays zero tax because they are below the $50 million threshold

Hedge fund manager with a net worth of $500 million

- Pays a 2% tax on the $450 million in net worth above the $50 million threshold, producing a total annual liability of $9 million

Heir with a net worth of $20 billion

- Pays a 2% tax on the $950 million between $50 million and $1 billion, and a 6% tax on the remaining $19 billion, for a total annual liability of $1.16 billion.

Note: Elizabeth originally proposed a wealth tax of 2% on wealth between $50 million and $1 billion, and a 3% tax on wealth above $1 billion. On November 1, 2019, Elizabeth proposed an additional 3% surtax on wealth over $1 billion - bringing the total annual rate to 6% on every dollar over $1 billion - which generates an additional $1 trillion in revenue.

STAY IN TOUCH

POLICY BRIEF MARCH 4, 2021

CALIFORNIA POLICY LAB

CalExodus: Are People Leaving California?

NATALIE HOLMES

Recent news reports, preliminary data, and anecdotes suggest the COVID-19 pandemic is either causing or accelerating an exodus from California. There are many reasons Californians might move because of the pandemic. Faced with the prospect of indefinite remote work and school, some families have sought additional space or proximity to support networks. Others, out of work because of public health directives or weak demand for their services, have sought relief from high costs of living. The extent of any such exodus, and whether it proves to be temporary or permanent, is not yet clear — at least not in data sources traditionally used to quantify residential mobility. The stakes are high: significant population shifts could affect the size and composition of regional labor markets as well as rent and home values. Some fear that mass departures by the state's wealthy could reduce local and state tax revenues, potentially affecting the services governments are able to provide for years to come.

Using the University of California Consumer Credit Panel (UC-CCP), a new dataset containing residential locations for all Californians with credit history, we are able to track domestic residential moves at a quarterly frequency through the end of 2020.

KEY RESEARCH FINDINGS

- We find no evidence of a pronounced exodus from the state.
- Drilling down, however, we find that net exits from the Bay Area have increased during the pandemic, particularly in San Francisco, where exits in the second through fourth quarters of 2020 were 31% higher than during the same period in 2019, and new entrances were 21% lower.
- Historically, the number of people leaving California tracks the number of people entering California, but this pattern deviated in Q4 2020, when 267,000 people left the state and only 128,000 entered.
- Despite concerns about tax revenue impacts, there is little evidence that wealthy Californians are leaving en masse.

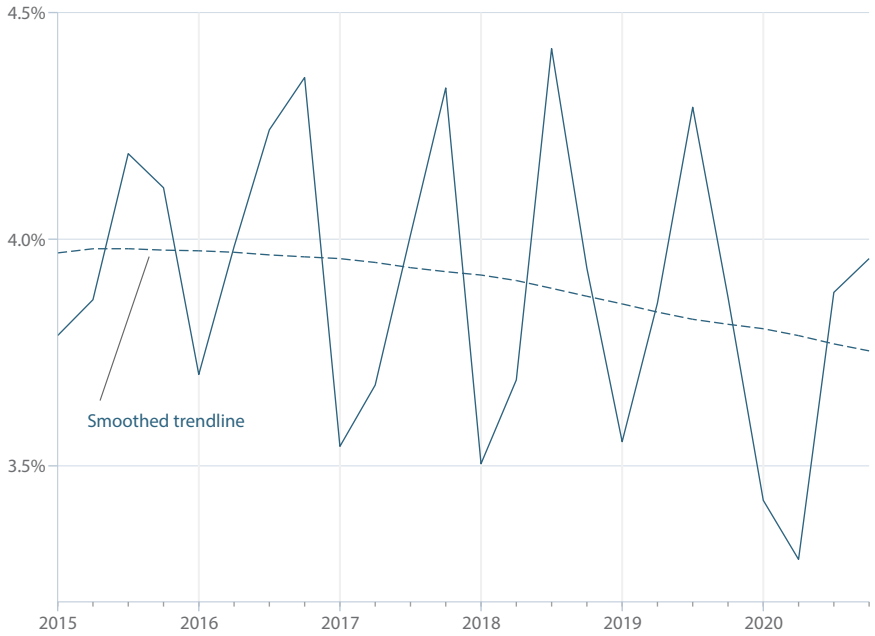
HOW IS THE PANDEMIC CHANGING STATEWIDE MOBILITY TRENDS?

First, the overall percent of Californians moving anywhere, either within California or out of California, each quarter has declined steadily since 2004 (the first year we are able to observe), from 6% to 4%, and has hovered around 4% since the end of 2014 (see Figure 1). This finding is consistent with other research documenting an overall decline in rates of residential mobility in the U.S. in recent decades.

Second, residential mobility is highly seasonal, with *reported* moves in our data typically lowest in the first quarter and peaking during the third or fourth quarters of each year.

We expect a short lag between *actual* moves, when an individual moves locations, and *reported* moves, defined as the date when that move is reported to financial institutions and shows up in our data. In 2020, that seasonality was somewhat disrupted, perhaps because planned moves were delayed due to the pandemic. Statewide residential mobility was at its lowest during the second quarter, 14% lower than a year prior. Third quarter mobility in 2020 was 9% lower than in 2019. Mobility increased by 3% in the fourth quarter of 2020 compared to the prior year.

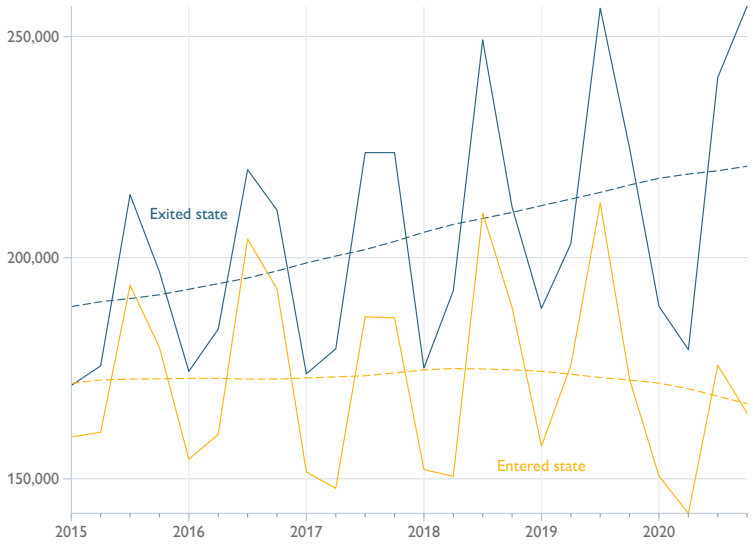
FIGURE 1. Percentage of California residents that move each quarter, 2015–20



Source: California Policy Lab analysis of University of California Consumer Credit Panel (UC-CCP) data.
Notes: A move is defined as having a different ZIP code in the next quarter. The data universe for this analysis is individuals in the UC-CCP with credit history. We cannot report people moving into or out of the state from outside the U.S.

Third, in most years the number of people leaving California closely tracks the number who arrive (see Figure 2). In particular, these typically move in the same direction — if entrances increase, so do exits, and vice versa. The same pattern appears true through the third quarter of 2020, but deviates in the fourth quarter. While the number arriving in California appears to have decreased year-over-year in the second and third quarters, it is not markedly different from changes we see in prior years. **In the fourth quarter, by contrast, exits and entrances clearly move in opposite directions. About 267,000 left the state in the fourth quarter, while just 128,000 moved in.** Despite this, the peak *number* of departures in 2020 is on par with those in earlier years. In sum, we see no marked increase in exits, though entrances have slowed.

FIGURE 2. Number of people moving into and out of California each quarter, 2015–20

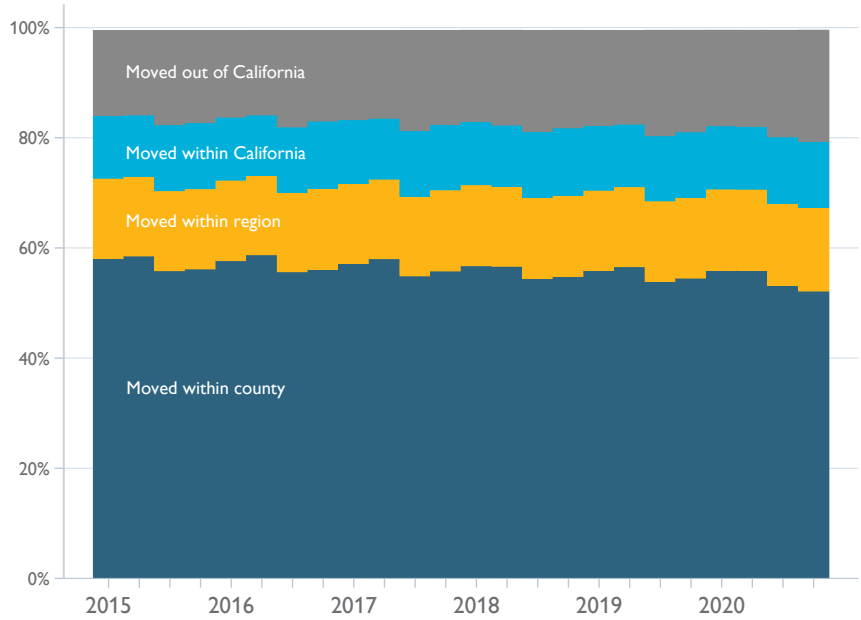


Source: California Policy Lab analysis of University of California Consumer Credit Panel (UC-CCP) data.
Notes: A move is defined as having a different ZIP code in the next quarter. The data universe for this analysis is individuals in the UC-CCP with credit history. We cannot report people moving into or out of the state from outside the U.S.

Fourth, among those that do move, the share leaving the state — versus moving within the state — has grown only slightly since 2015, from 16% to 18% (see Figure 3).

This slight upward trend continued in 2020, with no marked increase.

FIGURE 3. Destinations of California residents that move, 2015–20

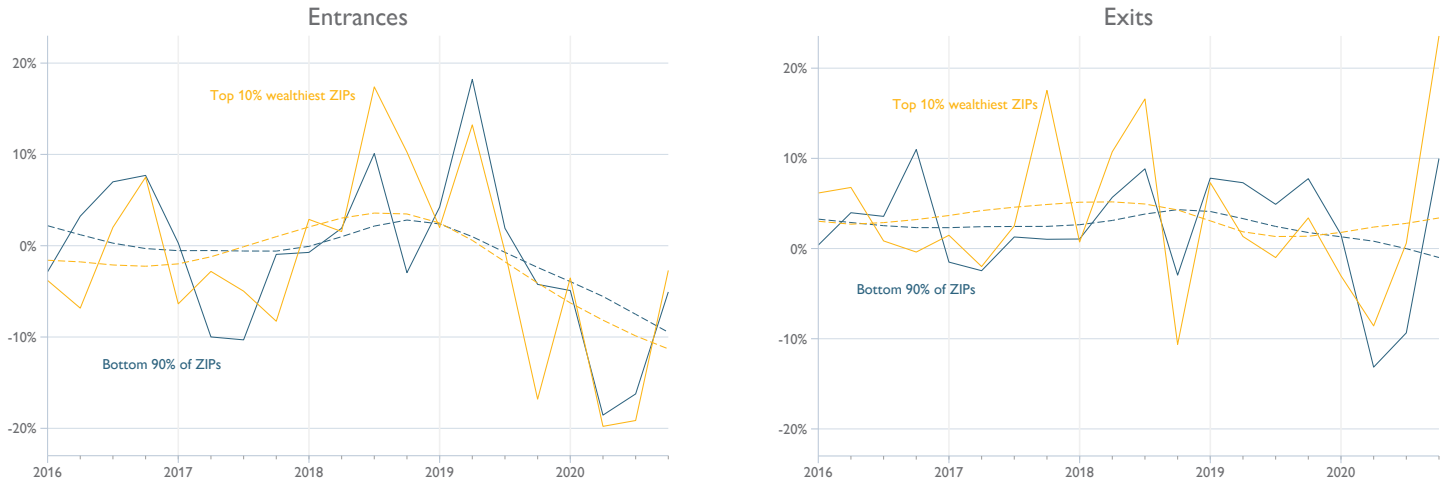


Source: California Policy Lab analysis of University of California Consumer Credit Panel (UC-CCP) data.
Notes: A move is defined as having a different ZIP code in the next quarter. The data universe for this analysis is individuals in the UC-CCP with credit history. We cannot report people moving into or out of the state from outside the U.S.

Fifth, the rates at which people exit the state from the wealthiest 10% of California ZIP codes, as well as the rates at which people move into those ZIP codes from out of state, have closely tracked patterns of mobility in the bottom 90% of ZIP codes (see Figure 4, below) over the past five years.

This pattern largely appears to have held during the pandemic. Note that, although the wealthiest 10% of ZIP codes saw departures relative to the prior year increase more than did the bottom 90% of ZIP codes, these changes still parallel each other.

FIGURE 4. Year-over-year percent change in California entrances and exits, by income, 2016–20



Source: California Policy Lab analysis of University of California Consumer Credit Panel (UC-CCP) and 2015-19 American Community Survey (ACS) data.
Notes: A move is defined as having a different ZIP code in the next quarter. The data universe for this analysis is individuals in the UC-CCP with credit history. We cannot report people moving into or out of the state from outside the U.S. The top 10% wealthiest ZIP codes are determined by median household income in the 2015-19 ACS.

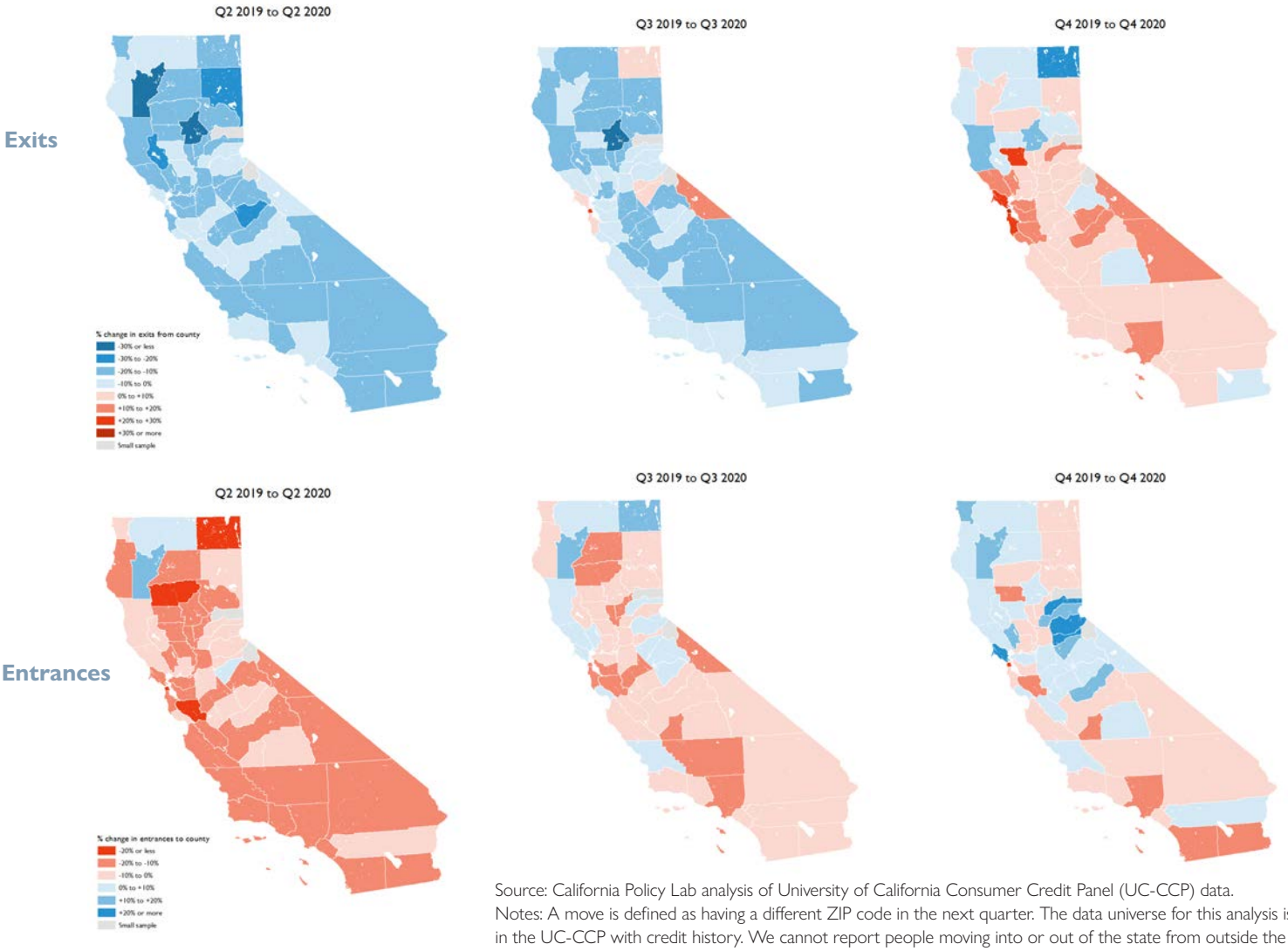
THE BAY AREA IS DIFFERENT

While our analysis reveals no obvious exodus from the state, the story is different in the 11-county Bay Area economic region, and San Francisco in particular. Net domestic exits from the Bay since the onset of the pandemic have increased 178% compared to pre-pandemic trends, reflecting both a 9% increase in departures and a 21% decrease in entrances in the last three quarters of 2020 relative to the same period in 2019.

Deviation from prior trends is even starker in San Francisco, which has seen a 31% increase in departures and 21% decrease in entrances since the end of March 2020. Net exits from San Francisco increased 649%, from 5,200 to 38,800.

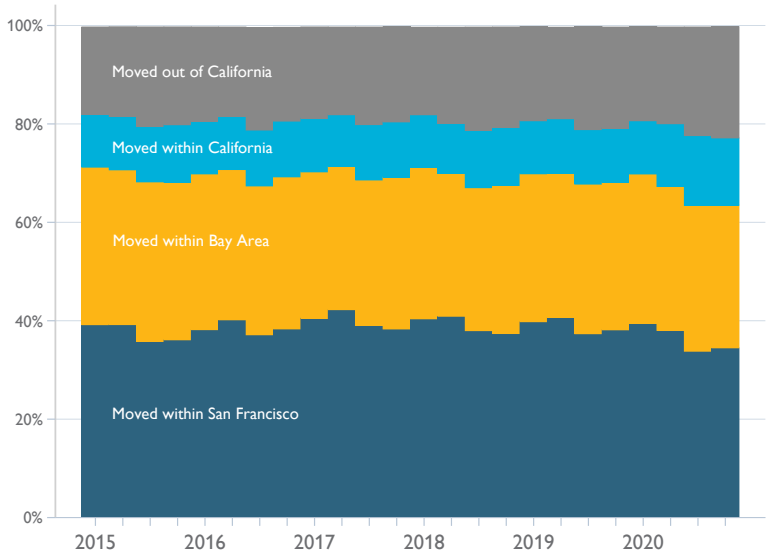
The series of maps in Figure 5 show, in the top row, year-over-year changes in quarterly residential exits from a given county, and in the bottom row, year-over-year changes in quarterly residential entrances to a given county. In each of the last three quarters of 2020, San Francisco experienced the largest percentage increase in residential exits of any California county. Meanwhile, it experienced the largest percentage decrease in residential entrances of any county during the last two quarters of 2020, and was third-highest in the second quarter.

FIGURE 5. Percent change in county migration, compared to one year prior



Source: California Policy Lab analysis of University of California Consumer Credit Panel (UC-CCP) data.
Notes: A move is defined as having a different ZIP code in the next quarter. The data universe for this analysis is individuals in the UC-CCP with credit history. We cannot report people moving into or out of the state from outside the U.S.

FIGURE 6. Destinations of San Francisco residents that move, 2015-20



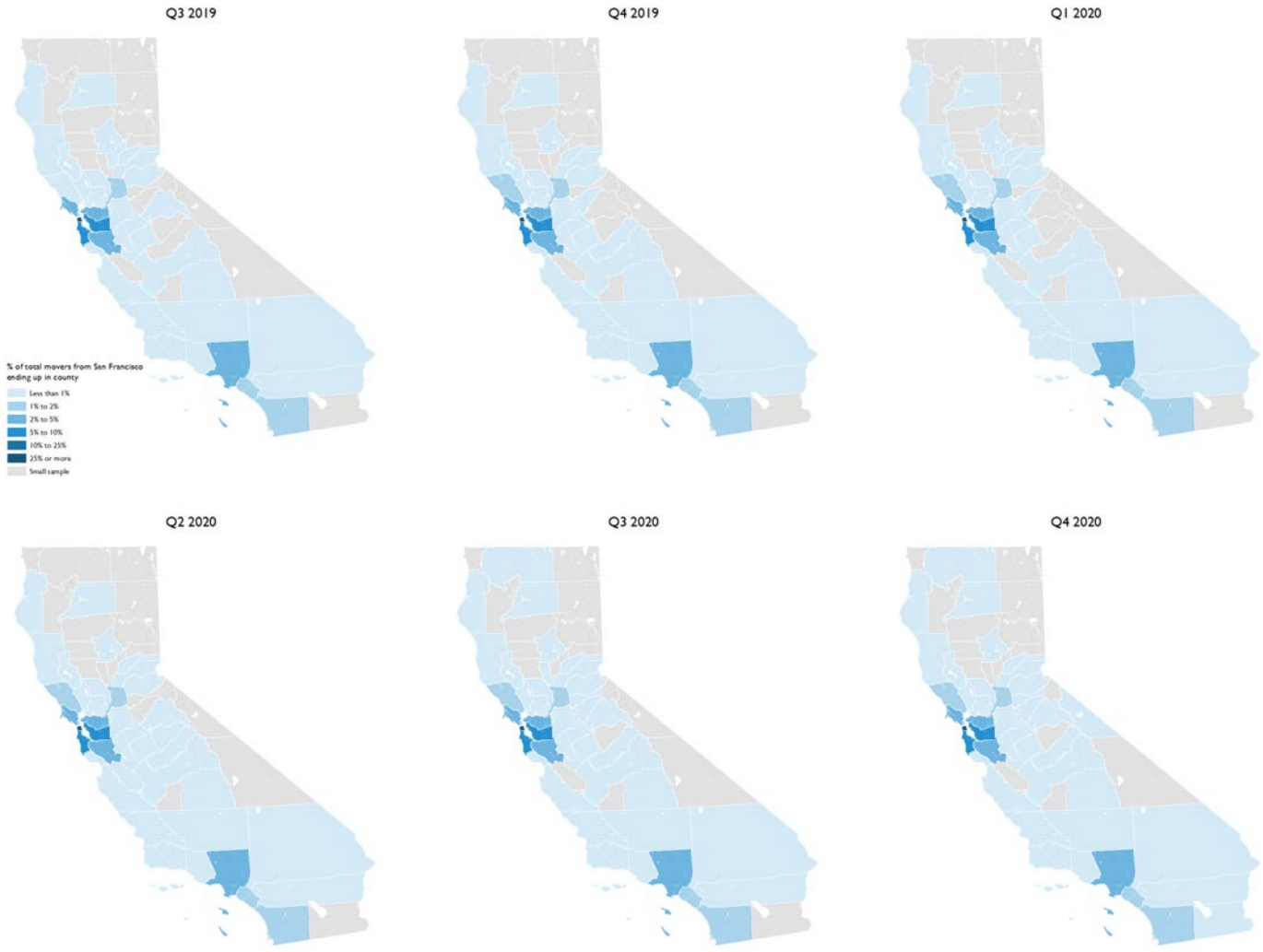
Source: California Policy Lab analysis of University of California Consumer Credit Panel (UC-CCP) data.
Notes: A move is defined as having a different ZIP code in the next quarter. The data universe for this analysis is individuals in the UC-CCP with credit history. We cannot report people moving into or out of the state from outside the U.S.

Although net migration to the Bay Area and San Francisco has dropped since this time last year, most movers appear to be sticking close to home, with approximately two-thirds of San Franciscan movers remaining in the Bay Area economic region and nearly 80% remaining in the state (see Figure 6). This is consistent with pre-pandemic patterns.

The patterns of *where* San Franciscans have been moving since the onset of the pandemic look largely the same as before COVID. The most common destinations continue to be Bay Area counties and urban centers in Southern California. Figure 7 shows the destination counties of people moving from San Francisco each quarter over the past two years. The consistency underscores that the overall distribution of destinations has not budged during the pandemic.

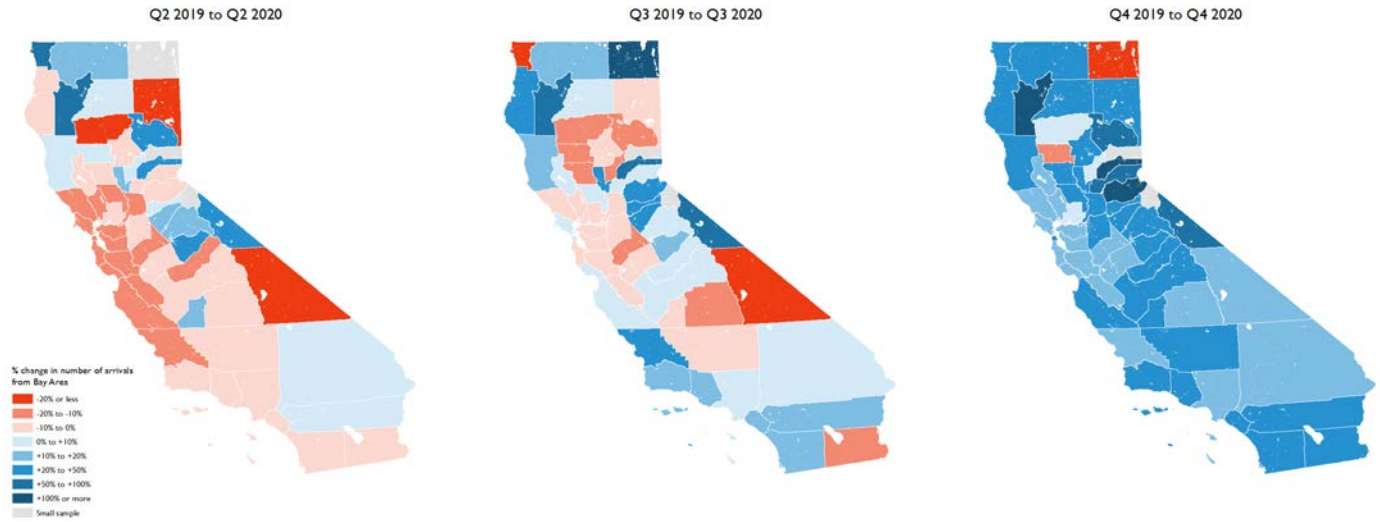
While overall patterns of where San Franciscans move do not appear to have changed during the pandemic, from the perspective of the *destination* counties in California, 2020 saw large swings in the number of Bay Area residents moving in. Figure 8 shows the percent change in the number of Bay Area arrivals. The Sierras saw some of the largest increases in population coming from the Bay Area, particularly in the last quarter of 2020, when overall reported mobility during the pandemic was at its highest.

FIGURE 7. Destinations of San Francisco movers who stay in California



Source: California Policy Lab analysis of University of California Consumer Credit Panel (UC-CCP) data.
Notes: A move is defined as having a different ZIP code in the next quarter. The data universe for this analysis is individuals in the UC-CCP with credit history. We cannot report people moving into or out of the state from outside the U.S.

FIGURE 8. Year-over-year change in number of county arrivals from Bay Area



Source: California Policy Lab analysis of University of California Consumer Credit Panel (UC-CCP) data.
Notes: A move is defined as having a different ZIP code in the next quarter. The data universe for this analysis is individuals in the UC-CCP with credit history. We cannot report people moving into or out of the state from outside the U.S.

CONCLUSION

Consistent with recent reporting, we find that people have left the Bay Area, and especially San Francisco, since the onset of the COVID-19 pandemic. They tend not to move far, but many Sierra counties are getting 50%+ more San Francisco in-migrants than in the prior year. This net loss of San Franciscans helps explain the dramatic decline in the city's rents in 2020: with fewer people competing for housing, landlords slashed rents to keep units occupied. Most movers have relocated within California, and the overall rate of exits from the state does not appear abnormally high — or indeed to have changed at all — relative to existing trends. Nor do exits originating from California's wealthiest ZIP codes appear to have changed in their relationship to exits from all other areas. Another, less-discussed trend is the pronounced decrease in new entrances to California's urban centers.

In short, to date the pandemic has not so much propelled people out of California as it has shifted them around within it. The absence of a pronounced exodus from the state should come as a relief to people concerned about effects on state tax revenues. However, an important caveat is that because the top 0.5% of California taxpayers account for 40% of state income tax renvenues, the choice of a single billionaire to leave the state could have an outsized effect on the state's coffers. Our analysis, although based on geographically granular data, cannot track the behavior of specific wealthy individuals. Local tax revenues, in particular sales tax and San Francisco's payroll tax on workers, may well experience swings in the coming year due to residential moves as well as documented changes in spending behavior.

While this analysis is able to quantify moves, it cannot tell us *why* people have chosen to move or remain where they are. Future planned analyses will investigate trends by housing costs, political affiliation, and exposure to wildfires and wildfire smoke.

METHODS/TECHNICAL APPENDIX

This analysis uses the University of California Consumer Credit Panel (UC-CCP), a new dataset created through a partnership between the California Policy Lab, the Student Borrower Protection Center, and the Student Loan Law Initiative. The UC-CCP consists of data from Experian, and contains longitudinal information about adults with a credit history who have lived in California since 2004. Data includes each person's ZIP code of residence, as reported by creditors, and credit information at a quarterly frequency. We define moves as changes in ZIP codes from one quarter to the next.

We omit from the analysis individuals who do not live in a U.S. state or the District of Columbia, who are deceased, or for whom the credit agency does not have a birthdate on file. Note that because we omit individuals residing outside the U.S. in a given period, we are limited to describing domestic migration. Because California experiences significant in-migration from abroad, we will understate the total number of entrances. Finally, moves in a given quarter are not evaluated unless an individual is present at both the beginning and end of that period: in this way, we do not mistakenly characterize people entering the data for the first time or dropping out of the data as having moved.

Several factors may cause our estimates of residential mobility to be biased. We do not capture moves within the same ZIP code, which will cause us to understate the frequency of moves. We are not able to capture moves not reported to financial institutions, which will cause us to understate the frequency of moves. Credit data may also lag in its ability to measure mobility because it relies on people changing their addresses with creditors. Finally, because our sample consists of adults with credit histories (nearly 90 percent of adults, according to the Consumer Financial Protection Bureau), it is slightly older, more financially advantaged, and less racially and ethnically diverse than the overall adult population. As such, these results are not able to capture patterns of residential mobility among California's most disadvantaged residents.

We define wealthy ZIP codes as the 10 percent with the highest median household income in the 2015–19 5-year American Community Survey (ACS). ZIP codes are converted to ZIP Code Tabulation Areas (ZCTAs) for better correspondence with the ACS using a publicly available crosswalk file from the Missouri Census Data Center.

The smoothed trendlines in Figures 1, 2, and 4, represent four-quarter moving averages.

ACKNOWLEDGMENTS

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https://www.wsj.com/articles/the-covid-19-baby-bust-is-here-11614853803

The Covid-19 Baby Bust Is Here

Nine months after the pandemic began, birthrates began to fall in many advanced economies, early data shows

In Italy, births plunged 21.6% in December from the previous year, according to first estimates by Italy's statistical agency.

By Margherita Stancati
Updated March 4, 2021 8:31 am ET

ROME—Angela Di Iorio wanted to be pregnant with her first baby by now. Instead, the 36-year-old Italian, who just postponed her wedding for a second time, is starting to wonder whether she should have a child at all.

"Our plan was always to get married and then to start a family," said Ms. Di Iorio, an osteopath from Rome whose fiance has been out of work for nearly a year, ever since a gym they co-own was forced to close because of measures to stop the spread of Covid-19. "We no longer have the kind of stability my partner and I worked so hard to achieve. And I'm getting older," she said.

A year into the pandemic, early data and surveys point to a baby bust in many advanced economies from the U.S. to Europe to East Asia, often on top of existing downward trends in births.

A combination of health and economic crises is prompting many people to delay or abandon plans to have children. Demographers warn the dip is unlikely to be temporary, especially if the pandemic and its economic consequences drag on.

"All evidence points to a sharp decline in fertility rates and in the number of births across highly developed countries," said Tomas Sobotka, a researcher at the Wittgenstein Center for Demography and Global Human Capital in Vienna. "The longer this period of uncertainty lasts, the more it will have lifelong effects on the fertility rate."

A survey carried out by Italian research group Osservatorio Giovani between late March and early April in Western Europe's five largest countries—Germany, France, Italy, Spain and the U.K.—found that over two-thirds of respondents who initially planned to have a child in 2020 decided to postpone or abandon plans to conceive over the next year.

In the U.S., a survey by the Guttmacher Institute, a research organization, found that one-third of women polled in late April and early May wanted to delay childbearing or have fewer children because of the pandemic.

The Brookings Institution estimated in December that, as a result of the pandemic, 300,000 fewer babies would be born in the U.S. in 2021 compared with last year. That estimate is based on survey evidence and the historical experience that a one-percentage-point increase in the unemployment rate reduces the birthrate by roughly 1%.

For many countries, detailed data on births in late 2020 are still months away. Where numbers are available, they aren't encouraging.

Japan, France and Belgium are among the nations reporting unusually abrupt drops in births nine months after the pandemic began, compared with a year earlier. In France, the number of births in January was down 13.5% compared with a year earlier, a much steeper drop than the 1.7% monthly decline recorded on average during the first 10 months of 2020.

In Hungary, one of few European countries where fertility was rising before the pandemic, the number of births fell sharply year-over-year in December.

The worst-affected country so far appears to be Italy. The country has one of the world's oldest populations and has struggled with declining birthrates for years, partly the consequence of a sclerotic economy that left young people behind. Then came Covid-19, which hit Italy early and hard.

Births in Italy plunged 21.6% in December from the previous year, according to first estimates by Italy's statistical agency based on data from 15 major cities. That is a far bigger drop than during the first 10 months of 2020, when births declined 3.3% on average. Overall in 2020, nearly twice as many people died in Italy than were born there.

Italy's and Europe's continuing health emergency and struggle to bounce back economically mean the baby crisis is unlikely to end soon. An added factor is the long-term impact of people being unable to start new relationships during the pandemic.

“The phenomenon of declining births has reached an unprecedented level,” said Maria Vicario, who heads Italy’s national midwives association. “The problems that we had before are still here. On top of that, weddings are being postponed and more young couples are unemployed. People who lose their jobs can’t think about a pregnancy.”

Historically, traumatic events such as pandemics, wars and economic crises have often resulted in fewer births. Some baby busts are short-lived and followed by rebounds. But the longer a crisis lasts, the higher the chances that potential births aren’t just postponed but never happen, say demographers.

No rebound followed the global financial crisis, for instance. The U.S. birthrate—after rising to its highest level in decades in 2007—plunged after the 2008 crisis and has declined gradually ever since.

Declining births are bad news for advanced economies. Young people fuel innovation, driving growth, and are needed to fund pensions and healthcare systems in aging societies. A dearth of workers makes it difficult to sustain rising productivity.

That is a concern in China. The world’s most populous country was already on a path of declining births due to the lingering effects of its one-child policy, abolished in late 2015 after three decades.

Chinese couples can now have two children, but many who were undecided about having a first or second child postponed their plans in 2020. Surveys have found concerns ranging from uncertain incomes to fear of contracting the virus during maternity checkups.

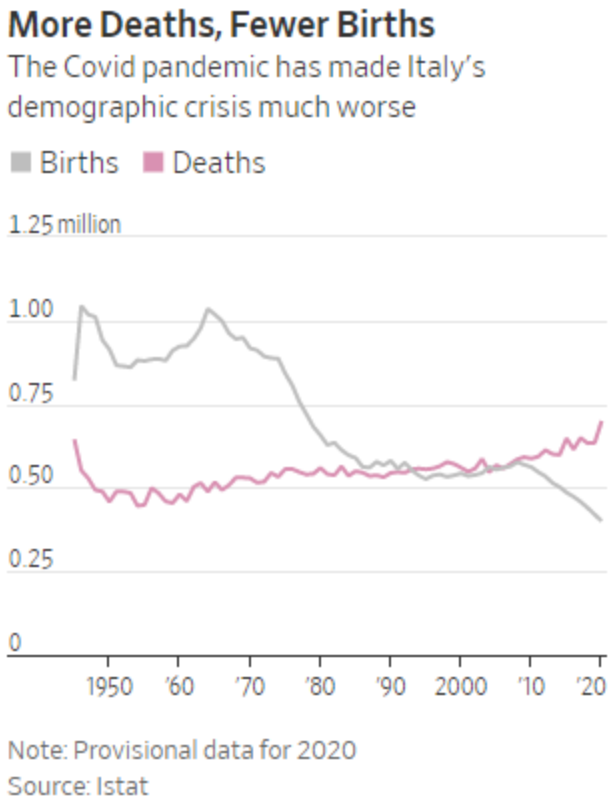
Liu Xiaoqing, a 32-year-old from Beijing, said the pandemic turned her against the idea of having a second child, which she and her husband had been considering. The mother of a 2-year-old said, “I can’t even protect one child from a big disaster like this with absolute certainty, let alone two children.”

China has yet to release nationwide 2020 population data but several local governments have reported double-digit-percentage declines in the number of births from 2019.

Some countries are trying to increase financial support for marriage and pregnancy. In Japan, which has the oldest population of any major nation, that has included more aid for fertility treatment since January.

The number of births in Japan dropped 9.3% in December from a year earlier, compared with an average of 2.3% during the first 10 months of 2020.

Haruka Matsui stopped going for fertility treatment in December when a fresh wave of Covid-19 cases hit Japan. “It made it much harder for me to visit the clinic,” said the 34-year-old working mother of a 3-year-old boy. Ms. Matsui, who became pregnant naturally for her first baby, struggled to conceive a second one before she started treatment in August. “I will hold it off for some time, as I’m not that old.”



Key findings

Liam Bailey, Knight Frank's Global Head of Research, journeys through *The Wealth Report 2021* to offer his top takeaways

In the middle of a global pandemic and the related economic crisis, why should we be interested in the wealthy? Simply put, if we are to understand market and asset performance then they form a central part of the story.

The objective of *The Wealth Report* is to assess how the fortunes of UHNWIs are changing, where they spend time, what they invest in and what they are likely to do next. From policymakers to investors, a lack of insight into the behaviour and attitudes of the "1%" risks a serious misreading of economic trends. This is the knowledge gap we fill.

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The global response to the pandemic supported the wealthy

With lower interest rates and more fiscal stimulus, asset prices have surged, driving the world's UHNWI population 2.4% higher over the past 12 months to more than 520,000. The process was seen across North America and Europe, but it was Asia, with 12% growth, that saw the real upswing. The expansion in wealth was not universal, with a fall in the number of UHNWIs in Latin America, Russia and the Middle East as currency shifts and the pandemic undermined local economies.

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Asia is the key wealth story

The US is, and will remain, the world's dominant wealth hub over our forecast period, but Asia will see the fastest growth in UHNWIs over the next five years, at 39% compared with the 27% global average. By 2025, Asia will host 24% of all UHNWIs, up from 17% a decade earlier. The region is already home to more billionaires than any other (36% of the global total). The Chinese Mainland is the key to this phenomenon, with 246% forecast growth in very wealthy residents in the decade to 2025.

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Inequality will fuel risks to wealth accumulation

While Covid-19 is viewed as the biggest single risk to future wealth creation, nearly half of our Attitudes Survey respondents (wealth managers and private bankers) expect the growth in wealth inequality to fuel demand for policies aimed at curbing imbalance – specifically wealth taxes – with new or proposed plans in Argentina, Canada and South Korea likely to be replicated elsewhere.

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The world will be less global...

Unsurprisingly, our survey confirms international travel will remain weak, with 84% of respondents expecting to continue to travel less this year. Where this trend could become more entrenched is the notable drop in demand for international education that our survey reveals. However, with 11% of Asian UHNWI house purchases expected to be driven by educational motives we may see a rise in permanent family relocations to education hubs, with London the main target.

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...but the wealthy still want options

Despite a reduced desire to travel, nearly a quarter of UHNWIs are planning to apply for a second passport or citizenship – a remarkable 50% growth in a year. As we note, there is a growing tension between rising transparency concerns over citizenship-by-investment schemes and a need to plug gaps in government finances through these schemes.

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Long live the city

As urban guru Professor Saskia Sassen explains, history shows us that cities rise and fall, but always rise again. The pandemic, far from undermining the city, has shown the potential for rebirth – expect to hear more about the 15-minute city, green cities, place-making and the coming redevelopment boom. No wonder, then, that development land is the third most popular property investment pick this year for UHNWIs. Our city leaders in 2021 for wealth, investment, business heft and innovation: London and New York. For wellbeing: Helsinki and Madrid.

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House prices are rising because of the pandemic, not despite it

Our assessment of the world's leading prime residential markets confirms that average price growth accelerated over the past 12 months. While Auckland led the pack with an 18% uptick, reflecting New Zealand's sure-footed handling of Covid-19, even those markets hard hit by the pandemic are seeing growth. Low mortgage rates, a search for space, privacy and changing commuting patterns are helping push prices higher.

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The pandemic-induced residential mini-boom will continue through 2021

The Attitudes Survey reveals that 26% of UHNWIs are planning to buy a new home in 2021, with the biggest driver the desire to upgrade main residences. Our survey points to a growth in demand for rural and coastal properties, with access to open space the most highly desired feature. The pandemic is supercharging demand for locations that offer a surfeit of wellness – think mountains, lakes and coastal hotspots. Demand will help fuel price rises of up to 7% for our key markets this year.

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Expect more private investment in property

Despite overall property investment volumes falling in 2020, the capital deployed by private investors was still 9% above the 10-year average, far stronger than the 6% fall in the amount committed by institutional investors. This theme will continue through 2021 with a quarter of UHNWIs planning to invest this year. In addition to development land, residential investments and logistics will lead requirements.

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The pandemic is driving real estate innovation

The ubiquity of Amazon and Zoom has confirmed the ability of tech to concentrate wealth. However, the Attitudes Survey confirms that tech disruption is viewed as a key post-pandemic area for investment, driving demand in the still embryonic data centre market and the burgeoning life sciences sector. Spurred by the pandemic, life sciences, tech and advanced data analytics are creating new opportunities for rethinking office space in key markets. With 43% of investors more interested in environmental, social and governance (ESG) focused investments than 12 months ago, expect rapid growth in the demand for green and energy-efficient buildings.

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Luxury investments confirm the ongoing search for returns

Finally, despite logistical challenges, investors continued to drive values higher for key collectible assets over the past year – led by handbags (+17%), fine wine (+13%) and classic cars (+6%). However, a shift to private sales, as auctions were put on hold, saw the art market stutter and values decline. With disruption to these most global of markets likely to continue through the first half of 2021, it is the second half of the year when investors will likely see the longer-term direction for investment performance.

For more articles and regular updates throughout the year, head online to our new digital platform

Databank

The numbers behind *The Wealth Report*

THE WEALTH REPORT ATTITUDES SURVEY

WEALTH TRENDS

On average, what percentage of your clients derive the majority of their wealth from the following sources?

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
Own business	47%	56%	44%	47%	63%	59%	34%	51%	44%	**49%**
Investment portfolio	19%	17%	27%	24%	23%	16%	31%	15%	16%	**21%**
Salaried employment	15%	14%	13%	13%	5%	11%	18%	25%	16%	**14%**
Mix	15%	10%	10%	9%	8%	7%	13%	5%	16%	**10%**
Other	4%	4%	6%	6%	1%	7%	5%	4%	9%	**5%**

On average, how did your clients' total wealth change in 2020? % respondents

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
Increased significantly (above 10%)	3%	23%	16%	11%	0%	15%	36%	7%	11%	**14%**
Increased marginally (below 10%)	26%	30%	47%	38%	29%	29%	36%	39%	40%	**35%**
Remained the same	16%	25%	25%	31%	43%	23%	23%	29%	33%	**27%**
Decreased marginally (below 10%)	33%	16%	11%	16%	21%	25%	0%	11%	10%	**16%**
Decreased significantly (above 10%)	22%	6%	2%	3%	7%	8%	5%	14%	6%	**8%**

On average, how do you expect your clients' total wealth to change in 2021? % respondents

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
Increase significantly (above 10%)	15%	34%	21%	16%	14%	31%	32%	18%	14%	**22%**
Increase marginally (below 10%)	49%	46%	60%	52%	43%	38%	55%	46%	51%	**49%**
Remain the same	15%	12%	16%	29%	43%	29%	9%	21%	22%	**22%**
Decrease marginally (below 10%)	17%	6%	2%	3%	0%	2%	5%	14%	11%	**7%**
Decrease significantly (above 10%)	3%	1%	2%	0%	0%	0%	0%	0%	2%	**1%**

What are the three biggest issues affecting their wealth that will most worry your clients in 2021? % respondents

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
Ongoing disruption by Covid-19	88%	82%	89%	74%	64%	79%	82%	86%	76%	**80%**
Domestic government policy	55%	46%	51%	45%	64%	40%	50%	46%	39%	**49%**
Tax issues	31%	35%	26%	58%	57%	25%	50%	43%	52%	**42%**
Geopolitics (trade wars, etc.)	22%	44%	46%	18%	21%	46%	27%	68%	18%	**35%**
Wealth transfer to the next generation	19%	35%	47%	30%	36%	25%	18%	11%	29%	**28%**
Brexit	4%	3%	0%	23%	0%	6%	5%	4%	45%	**10%**
Impact of rising wealth inequality	7%	4%	5%	8%	14%	10%	18%	0%	6%	**8%**
Civil unrest	11%	4%	0%	8%	14%	2%	9%	0%	4%	**6%**
Armed conflict	1%	1%	0%	6%	7%	4%	0%	4%	0%	**3%**

What are the three biggest issues affecting their wealth that will most excite your clients in 2021? % respondents

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
New post-pandemic investment opportunities	86%	89%	89%	80%	100%	79%	95%	89%	79%	**87%**
Technological disruption as an opportunity	50%	44%	61%	47%	14%	52%	64%	43%	44%	**47%**
Improving geopolitics	23%	23%	25%	24%	50%	35%	14%	61%	20%	**31%**
Domestic government policy	33%	31%	26%	29%	36%	33%	9%	11%	19%	**25%**
Wealth transfer to the next generation	15%	29%	28%	26%	50%	8%	18%	11%	25%	**23%**
Opportunities arising from the ESG agenda	17%	20%	40%	21%	14%	13%	32%	11%	25%	**22%**
Tax issues	12%	18%	7%	33%	29%	10%	14%	21%	14%	**18%**
Brexit	3%	3%	0%	5%	0%	8%	5%	11%	23%	**6%**

What percentage of your clients are planning to apply for a second passport or new citizenship? % respondents

Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
25%	24%	8%	24%	41%	28%	14%	32%	18%	**24%**

Do you expect your clients to reduce their international travel as a result of Covid-19? % respondents who said yes

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
For business	80%	89%	86%	89%	79%	81%	90%	75%	91%	**84%**
For leisure	88%	91%	84%	83%	71%	78%	90%	89%	80%	**84%**

Do you expect your clients to be more or less likely to use private aviation as a result of Covid-19? % respondents

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
More likely	45%	32%	42%	51%	46%	52%	50%	71%	33%	**47%**
Less likely	16%	29%	9%	14%	15%	13%	9%	11%	14%	**15%**
No change	38%	38%	49%	35%	38%	35%	41%	18%	53%	**38%**

Are your clients more or less likely to send their children overseas for their university education due to Covid-19? % respondents

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
More likely	30%	8%	2%	14%	29%	13%	18%	11%	2%	**14%**
Less likely	26%	41%	64%	45%	14%	19%	32%	29%	23%	**33%**
No change	44%	51%	34%	42%	57%	67%	50%	61%	74%	**53%**

Are your clients more or less likely to send their children overseas for their secondary education due to Covid-19? % respondents

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
More likely	12%	6%	2%	3%	7%	12%	9%	7%	0%	**6%**
Less likely	36%	52%	63%	58%	36%	37%	41%	50%	30%	**45%**
No change	52%	42%	35%	38%	57%	51%	50%	43%	70%	**49%**

Thinking of the next generation, do you agree with the following statements? % respondents who said yes

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
My clients reassessed their attitudes to succession planning during the pandemic	67%	65%	54%	42%	64%	62%	75%	36%	51%	**57%**
My younger clients (below 40) have different attitudes towards their property investments	76%	75%	65%	57%	86%	77%	73%	68%	57%	**70%**

PASSION INVESTMENTS

Respondents who said their clients' philanthropic activities have increased as a result of the pandemic

Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
56%	45%	26%	45%	29%	63%	67%	26%	50%	**45%**

Respondents who said their clients are becoming more interested in the following causes...

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
Healthcare/disease prevention	91%	92%	77%	81%	85%	81%	95%	79%	66%	**83%**
Conservation/the environment	75%	78%	72%	66%	46%	71%	85%	32%	75%	**67%**
Education	71%	70%	41%	50%	64%	70%	67%	43%	46%	**58%**

Respondents who said their clients have increased their spending on tangible investments of passion, such as art and classic cars during the pandemic

Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
10%	21%	35%	21%	29%	18%	29%	17%	28%	**23%**

Most popular investments of passion among clients 1 = most popular

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
Art	2	2	1	1	1	1	1	1	1	**1**
Classic cars	4	5	2	2	2	3	2	6	2	**2**
Watches	1	1	4	3	3	2	4	3	4	**3**
Wine	5	4	3	3	3	6	3	4	3	**4**
Jewellery	3	3	5	5	7	4	5	2	5	**5**
Rare whisky	6	6	9	6	7	7	6	8	7	**6**
Furniture	7	8	6	8	5	8	7	9	6	**7**
Coloured diamonds	8	9	7	9	7	5	10	6	10	**8**
Coins	10	10	8	9	5	10	8	5	8	**9**
Handbags	9	7	10	7	7	9	8	10	8	**10**

RESIDENTIAL PROPERTY

On average, what proportion of your clients' wealth is directly allocated to their....

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
Principal and second homes?	20%	17%	22%	14%	13%	17%	24%	19%	20%	**18%**
Property investment portfolio?	23%	18%	24%	26%	22%	23%	20%	16%	16%	**21%**

What proportion of your clients...

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
Bought a new home in 2020?	15%	18%	17%	20%	23%	24%	27%	18%	21%	**20%**
Are planning to buy a new home in 2021?	26%	24%	16%	31%	32%	31%	29%	20%	25%	**26%**

Due to Covid-19, are your clients more likely to want to buy a house in a... % respondents

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
Resort/coastal area?	35%	27%	73%	57%	77%	48%	77%	50%	55%	**56%**
Rural location?	41%	16%	55%	52%	46%	40%	52%	42%	75%	**47%**
City or urban area?	36%	32%	23%	10%	7%	12%	27%	23%	6%	**20%**
Ski destination?	9%	5%	9%	26%	0%	10%	19%	8%	10%	**11%**

The main reason for purchasing a new home is... % respondents

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
Upgrading the family's main residence	20%	28%	47%	30%	25%	17%	40%	24%	30%	**29%**
A new holiday home	15%	21%	32%	21%	17%	38%	20%	20%	23%	**23%**
Moving permanently to a new country or territory	23%	19%	4%	13%	50%	17%	10%	32%	13%	**20%**
Tax reasons	3%	7%	4%	20%	0%	4%	10%	8%	16%	**8%**
Downsizing or retirement	14%	5%	8%	8%	0%	0%	15%	4%	3%	**6%**
Education	10%	11%	0%	2%	0%	6%	0%	4%	3%	**4%**

When choosing a new home which attributes are most important to your clients? 1 = most popular

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
Outdoor space/nearby access	5	4	2	1	1	1	1	1	1	**1**
Offices within home/development or close by	1	1	1	3	2	6	2	7	4	**2**
Transport links	2	2	6	3	3	4	3	4	2	**3**
Leisure facilities/amenities within home/development or close by	6	7	3	2	5	2	4	3	7	**4**
Access to quality healthcare	3	3	4	7	7	3	5	2	5	**5**
Internet connectivity/technology	4	5	5	6	6	5	6	6	3	**6**
Air quality	7	6	7	5	3	7	7	5	6	**7**

INVESTMENT PROPERTY

In terms of your clients' property portfolios, please indicate the percentage allocated to each property type

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
Residential private rented sector (PRS)	26%	20%	27%	31%	16%	18%	18%	16%	34%	**23%**
Offices	19%	23%	17%	24%	16%	24%	13%	25%	17%	**20%**
Retail	12%	7%	11%	8%	12%	8%	6%	12%	8%	**9%**
Development land	6%	7%	7%	6%	15%	11%	8%	12%	3%	**8%**
Hotels and leisure	7%	7%	3%	9%	6%	12%	12%	9%	6%	**8%**
Industrial	5%	5%	14%	2%	6%	7%	8%	4%	5%	**6%**
Logistics	3%	4%	3%	7%	11%	5%	6%	7%	3%	**5%**
Retirement	7%	9%	1%	4%	0%	2%	6%	4%	1%	**4%**
Agricultural	4%	2%	5%	1%	6%	1%	2%	1%	5%	**3%**
Infrastructure	2%	2%	4%	1%	2%	0%	6%	1%	1%	**2%**
Education	3%	5%	1%	0%	2%	3%	2%	1%	3%	**2%**
Student housing	3%	2%	0%	1%	0%	3%	4%	3%	4%	**2%**
Healthcare	2%	4%	1%	1%	0%	3%	3%	3%	2%	**2%**

What percentage of your clients are planning to invest in commercial property in 2021?

Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
25%	22%	25%	29%	23%	23%	30%	21%	27%	25%

Which of these sectors are becoming of more interest to your clients? % respondents (respondents chose up to three sectors)

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
Residential private rented sector	29%	21%	26%	48%	43%	33%	36%	18%	37%	**32%**
Logistics	10%	23%	19%	39%	43%	33%	27%	36%	20%	**28%**
Development land	26%	16%	23%	20%	43%	23%	18%	21%	27%	**24%**
Offices	19%	32%	9%	15%	21%	13%	18%	14%	17%	**18%**
Industrial	15%	11%	51%	5%	21%	19%	18%	4%	13%	**17%**
Healthcare	24%	30%	19%	15%	0%	25%	23%	7%	13%	**17%**
Retirement	21%	26%	11%	14%	0%	15%	18%	7%	15%	**14%**
Hotels and leisure	11%	11%	4%	23%	21%	13%	14%	11%	13%	**13%**
Agricultural	18%	3%	26%	3%	7%	15%	18%	4%	13%	**12%**
Infrastructure	12%	9%	18%	9%	14%	8%	18%	7%	7%	**11%**
Data centres	13%	13%	11%	11%	7%	23%	0%	14%	7%	**11%**
Retail	20%	10%	9%	2%	14%	4%	9%	25%	4%	**11%**
Student housing	17%	6%	0%	9%	7%	6%	9%	11%	12%	**9%**
Education	6%	14%	4%	2%	7%	8%	5%	7%	2%	**6%**

ESG-focused property investments % respondents who said yes

	Africa	Asia	Australasia	Europe (excl UK)	Latin America	Middle East	North America	Russia & CIS	UK	Regional average
Are your clients more interested in ESG-focused property investments than they were 12 months ago?	42%	46%	60%	46%	38%	33%	65%	9%	51%	**43%**
Do your clients feel they have all the information they require to assess ESG-related investments?	30%	20%	36%	53%	36%	27%	70%	35%	43%	**39%**

The Attitudes Survey is based on responses from more than 600 private bankers, wealth advisors and family offices representing combined wealth of more than US$3.3 trillion. The survey was taken during October/November 2020. For selected country-level data please email siobhan.leahy@knightfrank.com

If you'd like to participate in next year's survey do please get in touch. All respondents receive the full country-level dataset.

Head online for methodology, billionaire populations and city-level data

THE KNIGHT FRANK WEALTH SIZING MODEL

	HNWI populations (US$1m+)				% change			UHNWI populations (US$30m+)				% change		
Country/territory	**2015**	**2019**	**2020**	**2025**	**2019–20**	**2015–20**	**2020–25**	**2015**	**2019**	**2020**	**2025**	**2019–20**	**2015–20**	**2020–25**
World	42,631,231	52,946,429	48,505,781	68,185,442	-8%	14%	41%	392,038	509,252	521,653	663,483	2%	33%	27%
Africa	248,908	251,511	231,309	290,079	-8%	-7%	25%	3,330	3,127	3,270	4,361	5%	-2%	33%
Asia	7,885,560	12,073,601	10,421,021	15,221,529	-14%	32%	46%	65,350	104,570	116,697	161,878	12%	79%	39%
Australasia	541,129	699,644	663,986	928,071	-5%	23%	40%	3,476	4,790	5,263	6,689	10%	51%	27%
Europe	11,726,729	15,334,637	14,222,839	21,257,622	-7%	21%	49%	109,118	150,541	151,665	185,860	1%	39%	23%
Latin America	1,320,373	1,341,985	1,105,343	1,481,842	-18%	-16%	34%	14,288	16,770	14,504	18,060	-14%	2%	25%
Middle East	812,349	1,259,070	1,117,232	1,445,362	-11%	38%	29%	22,872	33,236	29,880	37,241	-10%	31%	25%
North America	19,601,000	21,288,941	20,173,329	26,794,070	-5%	3%	33%	163,727	183,239	190,085	236,297	4%	16%	24%
Russia & CIS	495,183	697,040	570,722	766,867	-18%	15%	34%	9,877	12,979	10,289	13,097	-21%	4%	27%
Argentina	127,855	95,229	85,583	106,255	-10%	-33%	24%	1,147	861	881	1,045	2%	-23%	19%
Australia	134,050	167,064	176,862	215,075	6%	32%	22%	1,995	2,818	3,124	3,760	11%	57%	20%
Brazil	447,933	466,032	373,433	481,158	-20%	-17%	29%	5,653	5,845	5,140	6,316	-12%	-9%	23%
Canada	952,632	1,116,925	1,102,765	1,404,006	-1%	16%	27%	7,890	9,259	10,025	12,342	8%	27%	23%
Chinese Mainland	3,735,100	7,195,011	5,843,228	9,105,036	-19%	56%	56%	29,771	60,832	70,426	103,042	16%	137%	46%
Egypt	30,009	27,586	30,355	38,630	10%	1%	27%	608	504	583	711	16%	-4%	22%
France	1,474,054	2,555,336	2,554,936	3,608,769	0%	73%	41%	12,752	17,119	15,503	23,692	-9%	22%	53%
Germany	1,837,596	2,971,934	2,840,102	4,121,842	-4%	55%	45%	19,889	27,607	28,396	37,554	3%	43%	32%
Greece	107,235	119,002	95,917	151,363	-19%	-11%	58%	865	1,013	678	958	-33%	-22%	41%
Hong Kong SAR	205,144	272,287	279,090	375,632	2%	36%	35%	3,408	4,447	5,042	6,341	13%	48%	26%
Hungary	27,770	31,674	29,710	39,842	-6%	7%	34%	175	226	242	313	7%	38%	30%
India	280,378	378,898	350,050	611,503	-8%	25%	75%	5,428	6,993	6,884	11,198	-2%	27%	63%
Indonesia	14,730	23,594	21,430	45,063	-9%	45%	110%	516	730	673	1,125	-8%	30%	67%
Ireland	195,554	233,836	239,466	326,430	2%	22%	36%	2,035	2,253	2,560	3,230	14%	26%	26%
Italy	1,367,740	1,451,979	1,214,736	1,979,311	-16%	-11%	63%	10,886	10,747	10,441	14,721	-3%	-4%	41%
Japan	2,184,691	2,463,205	2,228,305	2,682,897	-10%	2%	20%	10,840	13,557	14,755	17,004	9%	36%	15%
Kenya	3,321	4,235	3,323	4,840	-22%	0%	46%	89	106	90	110	-15%	1%	22%
Malaysia	15,226	17,936	16,442	22,354	-8%	8%	36%	515	628	606	801	-3%	18%	32%
Mexico	252,282	271,676	241,152	318,011	-11%	-4%	32%	3,426	3,470	3,287	4,140	-5%	-4%	26%
Monaco	6,331	7,571	8,096	10,474	7%	28%	29%	145	179	184	222	3%	27%	21%
New Zealand	158,782	226,134	208,384	359,251	-8%	31%	72%	1,450	1,936	1,904	2,886	-2%	31%	52%
Nigeria	56,444	53,021	43,571	52,029	-18%	-23%	19%	821	855	867	992	1%	6%	14%
Philippines	14,423	14,570	13,936	18,989	-4%	-3%	36%	542	524	489	658	-7%	-10%	35%
Poland	48,922	64,573	68,146	130,461	6%	39%	91%	608	720	878	1,418	22%	44%	61%
Portugal	104,035	126,104	104,374	130,052	-17%	0%	25%	891	1,106	841	983	-24%	-6%	17%
Romania	24,836	33,459	25,848	34,486	-23%	4%	33%	215	212	290	379	36%	35%	31%
Russia	361,899	513,189	404,882	557,988	-21%	12%	38%	6,721	9,015	8,015	10,346	-11%	19%	29%
Saudi Arabia	178,023	281,003	239,198	287,115	-15%	34%	20%	2,146	6,402	7,020	8,416	10%	227%	20%
Singapore	201,157	275,903	244,700	387,836	-11%	22%	58%	2,731	3,387	3,732	4,888	10%	37%	31%
South Africa	50,823	52,109	44,605	63,404	-14%	-12%	42%	910	768	742	977	-3%	-18%	32%
South Korea	947,423	1,082,684	1,086,328	1,620,536	0%	15%	49%	6,349	6,918	7,354	9,985	6%	16%	36%
Spain	695,667	1,157,662	886,014	1,399,670	-23%	27%	58%	5,428	6,861	5,938	8,233	-13%	9%	39%
Sweden	420,388	598,488	590,539	864,502	-1%	40%	46%	4,132	4,712	5,243	8,350	11%	27%	59%
Switzerland	714,531	760,930	773,076	874,540	2%	8%	13%	6,756	6,907	7,553	8,301	9%	12%	10%
Taiwan	103,031	108,144	110,369	124,056	2%	7%	12%	1,888	1,951	1,996	2,248	2%	6%	13%
Tanzania	3,106	4,002	3,700	4,192	-8%	19%	13%	75	95	84	92	-12%	11%	10%
Thailand	23,932	32,303	31,357	36,330	-3%	31%	16%	687	1,028	990	1,140	-4%	44%	15%
Turkey	172,239	145,810	114,821	187,095	-21%	-33%	63%	1,957	1,789	1,429	2,045	-20%	-27%	43%
Uganda	798	1,098	1,138	1,633	4%	43%	43%	10	15	16	20	7%	60%	25%
UAE	171,015	193,641	155,929	205,664	-19%	-9%	32%	1,818	1,663	1,305	1,592	-22%	-28%	22%
UK	2,515,426	2,427,847	2,165,040	3,809,638	-11%	-14%	76%	17,877	16,491	16,370	22,741	-1%	-8%	39%
US	18,648,368	20,172,016	19,070,564	25,390,064	-5%	2%	33%	155,838	173,980	180,060	223,955	3%	16%	24%
Vietnam	15,453	20,645	19,491	25,812	-6%	26%	32%	188	405	390	511	-4%	108%	31%
Zambia	437	877	712	1,001	-19%	63%	41%	12	12	10	14	-17%	-17%	40%

Dan Tsubouchi @Energy_Tidbits · 4h

Note often get more specifics on Houthi missile attacks from @USAinKSA security alerts. this morning, said reports of suspected attacks and explosions today near Jeddah and Khamis Musheit. #OOTT

sa.usembassy.gov/security-alert...

> **Al Arabiya English** @AlArabiya_Eng · 8h
>
> The Arab Coalition intercepts ten explosive-laden drones launched by the Iran-backed #Houthis towards #SaudiArabia in less than five hours, Colonel Turki al-Maliki says.
>
> english.alarabiya.net/News/gulf/2021...

2

Dan Tsubouchi @Energy_Tidbits · 12h

#Oil story to watch. Iran says US approved release of frozen Iranian assets in Iraq. No US confirmation yet. But if so, not clear how much of >$6b is released, would be a big good faith signal from US that want return to #JCPOA sooner than later. #OOTT

Iran says US approved release of frozen Iranian assets in Iraq | Al Arabi...
An Iranian trade official said Friday the US green-lit the release of Iranian funds that have been
english.alarabiya.net

7 4

Dan Tsubouchi @Energy_Tidbits · Mar 6

ICYMI, Correcting #Oil global inventories are driven by an OPEC+ supply holdback still >7 mmb/d. But increasing Iran oil is being absorbed by market. @JLeeEnergy noted 39 VLCC, 15 Suezmax Iran tankers gone dark ie ~93 mmb. some will be floating storage. but most deliveries #OOTT

Bloomberg Iran Tanker Tracker March 2, 2021			
	VLCC	Suezmax	Total
Not seen for more than 1 month	31	7	38
Last seen in past month, but not last week	5	6	11
Last seen within the past week, but not in last 48 hours	1	1	2
Last seen with the past 48 hours	2	1	3
Total Fleet	39	15	54
Source: Bloomberg			

1 3

Dan Tsubouchi @Energy_Tidbits · Mar 5

hey @ericnuttall did you notice WTI is $66 or are you already celebrating your great (and persistent) call backed by analysis the entire time. better hurry to calgary or canmore so we can celebrate. the older vinos are dwindling under covid wine consumption. congrats

1 45

Dan Tsubouchi @Energy_Tidbits · Mar 5

Positive to #LNG. @narandramcdi keynote at @CERAWeek, 9:20 min "India is working to increase the share of #NatGas from the current 6% to 15% by 2030". Until India shows it can increase #NatGas production, increases in demand = increases in LNG imports.

Full Event : PM Modi receives CERAWeek Global En...
Prime Minister Narendra Modi today received the CERAWeek Global Energy and Environment ...
youtube.com

6 9

Dan Tsubouchi @Energy_Tidbits · Mar 5

#Bakken. WTI >$65, US shale happy today thx to KSA Abdulaziz. But good @RBNEnergy blog for reference info. Ruling on 570,000 b/d #DAPL on Lake Ohae easement expected Apr 9. If revoked, producers need to find another takeaway route. RBN recaps alternatives for takeaway. #OOTT

> **RBN Energy** @RBNEnergy · Mar 1
> The Dakota Access Pipeline was a lifesaver for Bakken #crudeoil producers when it started up in June 2017. How would producers cope on the off-chance that #DAPL is ordered offline? See today's blog: rbnenergy.com/dont-wanna-los...

1 3

Dan Tsubouchi @Energy_Tidbits · Mar 4

Another reason why KSA Abdulaziz is less worried about US shale. #DallasFed reminds Permian growth not just held back by capital. #POTUS federal land restrictions could reduce #Permian oil growth by 230-490,00 b/d by end of 2025. Thx @DallasFed #OOTT

dallasfed.org/research/econo...

- Reference Case: This serves as the benchmark and assumes little-changed leasing, permitting and drilling from first-quarter 2021 levels.

  Under this scenario, Permian Basin production grows from 4.3 mb/d today to 5.3 mb/d in December 2025. New Mexico's production expands from 1.0 mb/d to 1.5 mb/d.

- Hybrid Case: It assumes no new federal leasing, but existing leaseholders continue receiving drilling permits. Permit reviews are more rigorous, leading to slower approvals and a costlier operating environment beginning in 2022. Based on companies' public statements, firms that hold acreage across the basin gradually relocate drilling rigs and completion crews to their nonfederal locations.

  Permian Basin production increases to 5.1 mb/d in 2025, or 0.2 mb/d below the Reference Case. New Mexico's oil output is 1.1 mb/d, or 0.4 mb/d below the Reference Case in 2025.

- Restrictive Case: No new federal permits or extensions are granted starting in 2023. This is when the most-recently issued permits will expire. The existing permitting freeze adversely affects production in the near term due to a lack of approvals of permit modifications and pipeline rights-of-way. As in the Hybrid Case, companies shift their focus to nonfederal acreage.

2 2

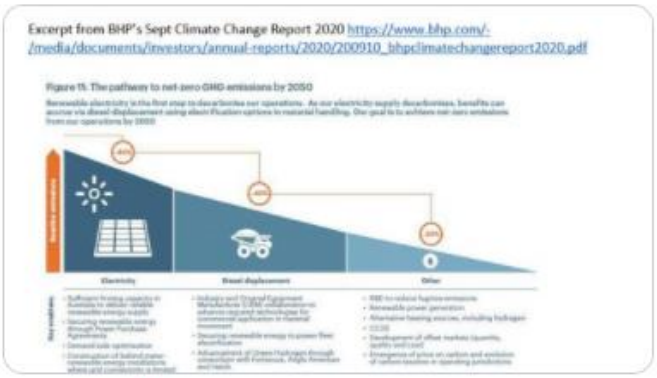
Dan Tsubouchi @Energy_Tidbits · Mar 4

some of the local #Canmore elk are enjoying the +9c temps beside the Bow River. amazing how low snowfall this winter

3

Dan Tsubouchi @Energy_Tidbits · Mar 4

1/3. #EnergyTransition. Is #RenewableEnergy shortfall leading to $BHP changing plan on how it will reduce diesel emissions that account for 40% of its emissions? Sept Climate Change Report 2020 focus was use renewable electricity to reduce diesel emissions. But … #OOTT



2 2

Dan Tsubouchi @Energy_Tidbits · Mar 4

2/3. @Bloomberg @elizabethlow reports "BHP has also been looking at blending renewable fuels with fossil fuel diesel * Liquid fuels have an advantage as it would complement the co.'s current supply chain infrastructure, such as its diesel tanks" #OOTT

use of electrification, or hydrogen; BHP has also been looking at blending renewable fuels with fossil fuel diesel
* Liquid fuels have an advantage as it would complement the co.'s current supply chain infrastructure, such as its diesel tanks
* Companies need to decarbonise the supply chain rather than just buying carbon offsets
* NOTE: Scope 1 emissions are direct emissions from company controlled resources, while scope 2 are indirect emissions from the generation of purchased energy
* READ: BHP Sees Profit in a World Speeding Up Climate Action

To contact the reporter on this story:
Elizabeth Low in Singapore at elow39@bloomberg.net

1 1

Dan Tsubouchi @Energy_Tidbits · Mar 4

3/3. Reminds practical reality of #RenewableEnergy shortfall for heavy industry & transportation. Seems inconsistent but mean longer life for #Diesel & larger market for #RenewableFuels at BHP. Another reality check why #EnergyTransition will take longer than expected. #OOTT

2 1

Dan Tsubouchi @Energy_Tidbits · Mar 4

#OPEC+ reminder of by country quotas prior to today's meeting. Courtesy of @VossAvatar @JLeeEnergy #OOTT

To contact the reporters on this story:
Stephen Voss in London at sev@bloomberg.net;
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To contact the editors responsible for this story:
Will Kennedy at wkennedy3@bloomberg.net
Stephen Voss, Helen Robertson

1 6

Dan Tsubouchi @Energy_Tidbits · Mar 3

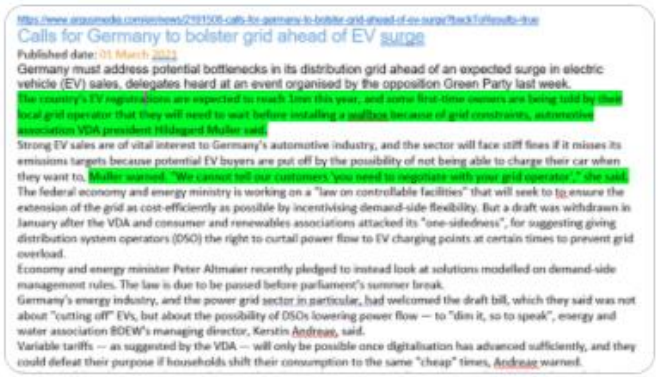
1/3. @BillGates on #EnergyTransition on @FoxNewsSunday Feb 21. At 4:28 min mark says " In fact, we're going to have to almost triple the size of the electric grid and build all that transmission". Triple the grid is big $$. #NatGas #RenewableEnergy

Bill Gates addresses critics of climate change push ...
Microsoft co-founder Bill Gates provides insight into the causes of the energy crisis in Texas on 'Fox Ne...
video.foxnews.com

2 2 4

Dan Tsubouchi @Energy_Tidbits · Mar 3

2/3. DE grid already needing upgrade as #EVs penetration is accelerating. Interesting @ArgusMedia report notes a hold back to DE EVs penetration rate. Some local DE grid limitations means a delay for home wallbox for EV charging. #NatGas #RenewableEnergy. argusmedia.com/en/news/219150...



https://www.argusmedia.com/en/news/2191508-calls-for-germany-to-bolster-grid-ahead-of-ev-surge?backToResults=true

Calls for Germany to bolster grid ahead of EV surge

Published date: 01 March 2021

Germany must address potential bottlenecks in its distribution grid ahead of an expected surge in electric vehicle (EV) sales, delegates heard at an event organised by the opposition Green Party last week.

The country's EV registrations are expected to reach 1mn this year, and some first-time owners are being told by their local grid operator that they will need to wait before installing a wallbox because of grid constraints, automotive association VDA president Hildegard Muller said.

Strong EV sales are of vital interest to Germany's automotive industry, and the sector will face stiff fines if it misses its emissions targets because potential EV buyers are put off by the possibility of not being able to charge their car when they want to, Muller warned. "We cannot tell our customers 'you need to negotiate with your grid operator'," she said.

The federal economy and energy ministry is working on a "law on controllable facilities" that will seek to to ensure the extension of the grid as cost-efficiently as possible by incentivising demand-side flexibility. But a draft was withdrawn in January after the VDA and consumer and renewables associations attacked its "one-sidedness", for suggesting giving distribution system operators (DSO) the right to curtail power flow to EV charging points at certain times to prevent grid overload.

Economy and energy minister Peter Altmaier recently pledged to instead look at solutions modelled on demand-side management rules. The law is due to be passed before parliament's summer break.

Germany's energy industry, and the power grid sector in particular, had welcomed the draft bill, which they said was not about "cutting off" EVs, but about the possibility of DSOs lowering power flow — to "dim it, so to speak", energy and water association BDEW's managing director, Kerstin Andreae, said.

Variable tariffs — as suggested by the VDA — will only be possible once digitalisation has advanced sufficiently, and they could defeat their purpose if households shift their consumption to the same "cheap" times, Andreae warned.

1 1 3

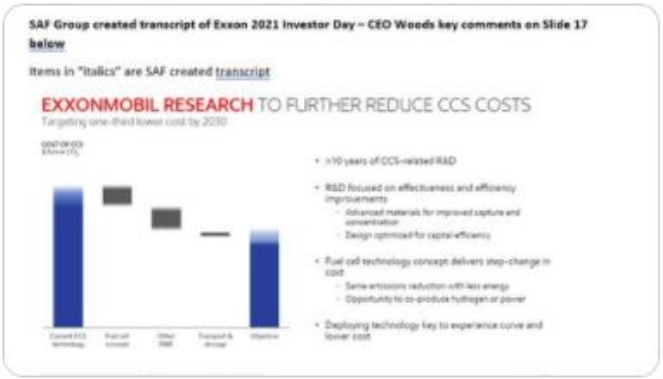
Dan Tsubouchi @Energy_Tidbits · Mar 3

3/3. #EVs wallbox delays when DE EVs are ~1 mm vs DE passenger cars of ~47 mm. Maybe doesn't tie to @BillGates need to triple the US grid, but points to need for a big DE grid increase. Also why #AngelaMerkel wants to have #NordStream2 for grid capacity/reliability. #NatGas

2 2

Dan Tsubouchi @Energy_Tidbits · Mar 3

Add #FuelCell to #EnergyTransition must watch list. Note $XOM low key #17 below doesn't tell the story, then see SAF transcript. Exciting CO2 potential, reminds carbon neutral #Oil #NatGas could solve key #RenewableEnergy shortfalls. #OOTT #Hydrogen safgroup.ca/research/trend...



SAF Group created transcript of Exxon 2021 Investor Day – CEO Woods key comments on Slide 17 below

Items in "Italics" are SAF created transcript

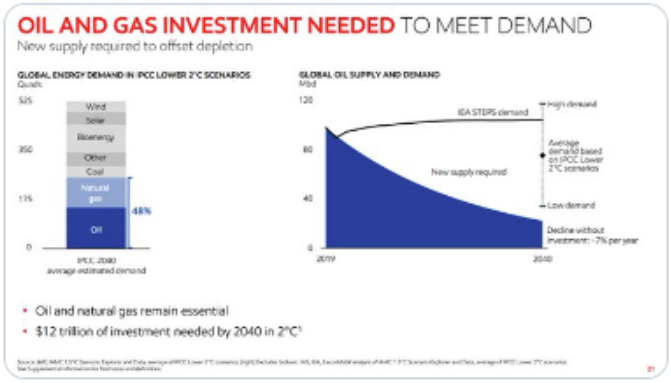
EXXONMOBIL RESEARCH TO FURTHER REDUCE CCS COSTS

Targeting one-third lower cost by 2030

- >10 years of CCS-related R&D
- R&D focused on effectiveness and efficiency improvements
  - Advanced materials for improved capture and concentration
  - Design optimized for capital efficiency
- Fuel cell technology concept delivers step-change in cost
  - Same emissions reduction with less energy
  - Opportunity to co-produce hydrogen or power
- Deploying technology key to experience curve and lower cost

Dan Tsubouchi @Energy_Tidbits · Mar 3

Bullish to post Covid oil. $XOM CEO just said global oil decline of "about 5 to 7%" per year. a little lower than his below Oct comment, but just as bullish considering even more capital is moving from #Oil to renewable. #OOTT



> **Dan Tsubouchi** @Energy_Tidbits · Oct 21, 2020
>
> 
>
> Bullish to post 2021 #Oil even 2019 demand 99 mmbd only gets to 97 post Covid and peaks at 100 in 2030 ie a BP type scenario. $XOM CEO reminds global oil depletion rate >7%. Need to ~7 mmbd per year to stay flat. $EIA STEO est OPEC surplus capacity is ~6 mmbd...

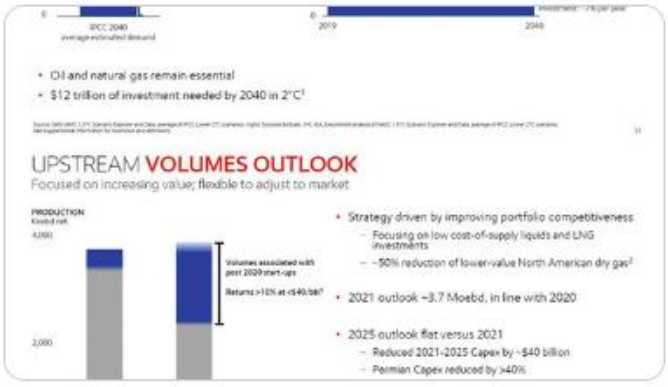
4 4

Dan Tsubouchi @Energy_Tidbits · Mar 3

, $XOM investor day ongoing. Interesting highlighting fuel cell technology with step change potential. an overlooked theme. worth watching their Netherlands trial. #OOTT #EnergyTransition

Dan Tsubouchi @Energy_Tidbits · Mar 3

Positive for post-Covid #Oil. $XOM investor day about to start. reminds massive capex needed to replace declines at time when more capex from #Oil #NatGas to renewables. 2025 production flat to 2021. #OOTT



3 2

Dan Tsubouchi @Energy_Tidbits · Mar 3

don't forget the "rollover" consideration at the #OPEC+ meeting won't include what saudi does with their voluntary 1 mmbd cut for feb and march ie saudi by itself decides on what, if anything, extra they do for april. #OOTT

> **Dan Tsubouchi** @Energy_Tidbits · Mar 3
>
> #Oil been pulling back. hard to believe in particular RUS would support a rollover. #OOTT twitter.com/Energy_Tidbits...

1 2

Dan Tsubouchi @Energy_Tidbits · Mar 3

#Oil been pulling back. hard to believe in particular RUS would support a rollover. #OOTT

> **Dan Tsubouchi** @Energy_Tidbits · Mar 3
>
> 
>
> #Oil price jumped after @Reuters 2:28am MT report that "three #OPC+ sources" say #OPEC+ "considering rolling over oil production cuts from March into April instead of raising output. #OOTT
> ...

1 1 4

Dan Tsubouchi @Energy_Tidbits · Mar 3

Very unusual for a major #Oil co. press release to state this type of reason why a director wants out. That in itself says must be crazy inside #Petrobras. Positive for #Oil, Brazil supposed to be in oil growth, how can they be focused on plan execution? #OOTT

PETROBRAS

Petrobras on non-reappointment of Board Members

Rio de Janeiro, March 2, 2021 - Petróleo Brasileiro S.A. - Petrobras following up on the releases disclosed on February 19, 2021 and February 23, 2021 announces that it was informed by the Board Members João Cox Neto, Nivio Ziviani, Paulo Cesar de Souza e Silva and Omar Carneiro da Cunha Sobrinho that they do not intend to be reappointed to the company's Board of Directors at the next Extraordinary General Meeting (EGM).

The Board Members João Cox Neto and Nivio Ziviani informed that, at the same time that they are grateful for the invitation to be reappointed, unfortunately they would not be able to accept for personal reasons.

> **Dan Tsubouchi** @Energy_Tidbits · Feb 22
>
> 
>
> Positive for mid term #Oil. Bolsonaro replaced Petrobras CEO Branco with former General Silva e Luna. Shares -20%. Raises questions from capital providers & partners what does this do to Dec 1 growth plan? Does plan change? At a minimum changing CEO has to lea...

1 2

Dan Tsubouchi @Energy_Tidbits · Mar 3

#Oil price jumped after @Reuters 2:28am MT report that "three #OPC+ sources" say #OPEC+ "considering rolling over oil production cuts from March into April instead of raising output. #OOTT

reuters.com/article/us-oil...

2 10 27

Dan Tsubouchi @Energy_Tidbits · Mar 2

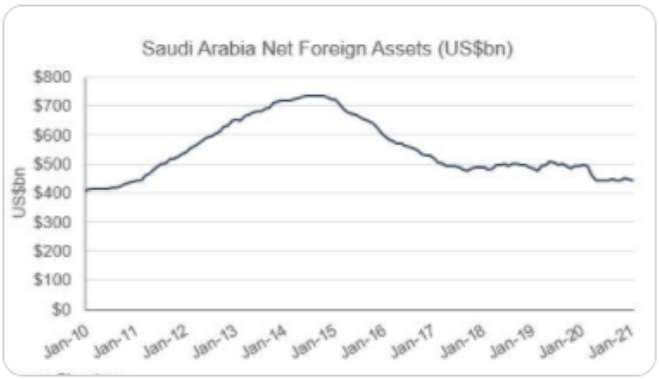
#Pemex says no need to reduce exports with good demand for MEX #Oil. But more likely due to less domestic demand, Pemex refinery processing well below fcast. Q4 584,000 b/d, 2020 591,000 b/d v Oct 5 fcast 681,000 b/d. Big miss to #AMLO priority #OOTT
ca.sports.yahoo.com/news/mexico-se...

> **SENER México** @SENER_mx · Oct 26, 2020
>
> 
>
>
> De acuerdo con el programa de procesamiento de crudo se ha ido incrementando carga en el Sistema Nacional de Refinación y al cierre de septiembre se logró llegar a 697 mil barriles por día de proceso: @rocionahle

1

Dan Tsubouchi @Energy_Tidbits · Mar 2

ICYMI. KSA Net Foreign Assets at Jan 31/2021 now $445b vs peak $737b on Aug 31/2014. Good thing they had #SaudiAramco IPO $25.6b in 2020 & $106.7b from corruption crackdown in 2018. Supports why KSA wants stronger for longer #Oil prices, also more Aramco share sales ahead? #OOTT



2 4

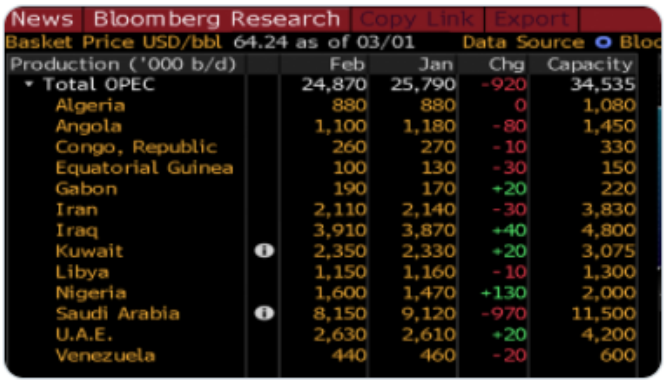
Dan Tsubouchi @Energy_Tidbits · Mar 2

the geese and ducks are enjoying a beautiful sunny day on #Calgary along the Elbow River. yesterday's +9c melted a lot of the ice in the river.

1 2

Dan Tsubouchi @Energy_Tidbits · Mar 2

#OPEC Bloomberg Survey Feb OPEC production just out. Down 920 mb/d, driven by KSA voluntary extra cuts 1mmb/d in Feb/Mar. Iran still >2.1 mmb/d, VEN still 0.44 mmb/d ie. both have been getting more oil on mkt. Nigeria had Qua Iboe force majeure in Jan. Thx @TheTerminal #OOTT

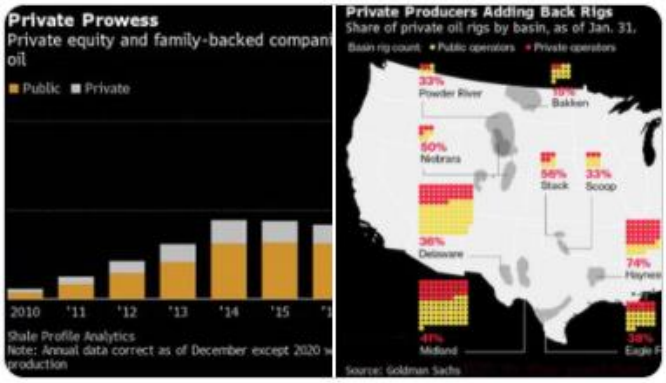


Production ('000 b/d)	Feb	Jan	Chg	Capacity
Total OPEC	24,870	25,790	-920	34,535
Algeria	880	880	0	1,080
Angola	1,100	1,180	-80	1,450
Congo, Republic	260	270	-10	330
Equatorial Guinea	100	130	-30	150
Gabon	190	170	+20	220
Iran	2,110	2,140	-30	3,830
Iraq	3,910	3,870	+40	4,800
Kuwait	2,350	2,330	+20	3,075
Libya	1,150	1,160	-10	1,300
Nigeria	1,600	1,470	+130	2,000
Saudi Arabia	8,150	9,120	-970	11,500
U.A.E.	2,630	2,610	+20	4,200
Venezuela	440	460	-20	600

1 6 10

Dan Tsubouchi @Energy_Tidbits · Mar 1

#Shale #Oil #NatGas Public E&P may be forced (voluntarily or not) to focus on shareholder returns by capital providers. Note @DavidWethe est for private share of shale oil production, then chart of increasing oil rigs. Sets up increasing production over 2021. #OOTT

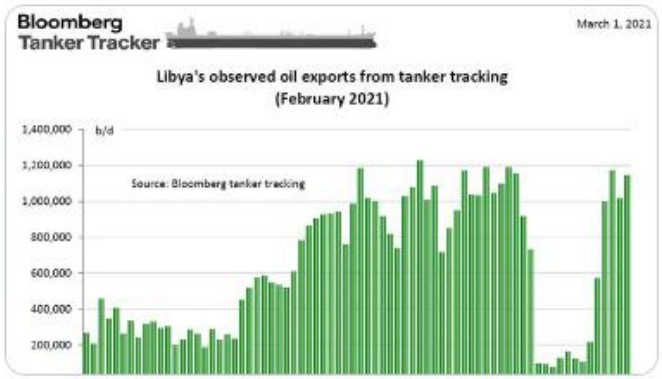


> **David Wethe** @DavidWethe · Mar 1
>
> Shale's farm system now finds itself in the Major Leagues w/ @CrowleyKev & @vtobben bloomberg.com/news/articles/...

1 3

Dan Tsubouchi @Energy_Tidbits · Mar 1

Libya tanker tracker data: Feb oil + condensate exports 1.14 mmb/d in Feb vs 1.02 mmb/d in Jan. Recovered to pre blockade levels. Focus for is @NOC_Libya capex for repairs/maintenance/neglected oil fields & infra. Thx Bloomberg @JLeeEnergy @_MissVee_ for tracker recap. #OOTT



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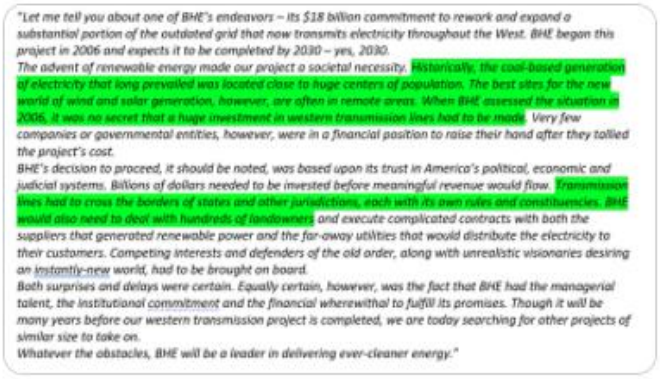
Dan Tsubouchi @Energy_Tidbits · Feb 28

Need to move on #Transmission to match increasing #Wind #Solar in 2020s. @WarrenBuffett reminds best #renewableenergy sites often in remote areas & transmission takes long time. Risk, each state has a say, NIMBY is bipartisan. Delays = need for #NatGas
berkshirehathaway.com/letters/2020lt...



"Let me tell you about one of BHE's endeavors – its $18 billion commitment to rework and expand a substantial portion of the outdated grid that now transmits electricity throughout the West. BHE began this project in 2006 and expects it to be completed by 2030 – yes, 2030.

The advent of renewable energy made our project a societal necessity. Historically, the coal-based generation of electricity that long prevailed was located close to huge centers of population. The best sites for the new world of wind and solar generation, however, are often in remote areas. When BHE assessed the situation in 2006, it was no secret that a huge investment in western transmission lines had to be made. Very few companies or governmental entities, however, were in a financial position to raise their hand after they tallied the project's cost.

BHE's decision to proceed, it should be noted, was based upon its trust in America's political, economic and judicial systems. Billions of dollars needed to be invested before meaningful revenue would flow. Transmission lines had to cross the borders of states and other jurisdictions, each with its own rules and constituencies. BHE would also need to deal with hundreds of landowners and execute complicated contracts with both the suppliers that generated renewable power and the far-away utilities that would distribute the electricity to their customers. Competing interests and defenders of the old order, along with unrealistic visionaries desiring an instantly-new world, had to be brought on board.

Both surprises and delays were certain. Equally certain, however, was the fact that BHE had the managerial talent, the institutional commitment and the financial wherewithal to fulfill its promises. Though it will be many years before our western transmission project is completed, we are today searching for other projects of similar size to take on.

Whatever the obstacles, BHE will be a leader in delivering ever-cleaner energy."

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Dan Tsubouchi @Energy_Tidbits · Feb 28

Caixin manufacturing PMI hits 9 month low in Feb at 50.9 vs 51.4 est. companies recorded slower rises in both output & new work for 3rd mth running, new export work declined for 2nd mth running. Worth a read for good China recap Thx @IHSMarkitPMI #OOTT

markiteconomics.com/Public/Home/Pr...

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Dan Tsubouchi @Energy_Tidbits · Feb 28

Our weekly SAF February 28, 2021 Energy Tidbits memo was just posted our SAF Group website. This 45-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

February 28, 2021

Produced by: Dan Tsubouchi

Trudeau "Reaffirmed the Goal for Canada to Achieve 90% Non-emitting Electricity by 2030", Isn't This a New Goal?

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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