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Energy Tidbits

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Produced by: Dan Tsubouchi

Saudi Oil Inventory Is At Lowest Level Since Apr 2004, How Low Will They Let It Go With This Russia Oil War?

Welcome to new Energy Tidbits memo readers. We are continuing to add new readers to our Energy Tidbits memo and energy blogs. 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 focusing on day to day trading. Our priority was and still is to not just report on events, but 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/guidance. Our target is to write on 48 to 50 weekends per year and to send out by noon mountain time on Sunday.

This week's memo highlights:

1. Aramco Q4 call, CEO stresses can produce at 12 mmb/d for 1 year without any added capex or opex. (Click Here)
2. Saudi oil inventory down to ~154 mmb at Jan 31 (lowest level since April 2004), how low will Saudi let it go with the Russia oil war? (Click Here)
3. Massive Coronavirus demand hit is leading to a global oil inventories getting full quickly, which is making this not the normal bottom of cycle time. (Click Here)
4. US shale/tight natural gas may have peaked in Nov 2019, even before the recent big oil and gas capex cuts. (Click Here)
5. US shale/tight oil was plateauing in H1/20, even before the recent big oil and gas capex cuts. (Click Here)
6. Please follow us on Twitter at [LINK] for breaking news that ultimately ends up in the weekly Energy Tidbits memo that doesn't get posted until Sunday noon MT.
7. For new readers to our Energy Tidbits and our blogs, you will need to sign up at our blog sign up to receive future Energy Tidbits memos. The sign up is available at [LINK].

Dan Tsubouchi	Ryan Dunfield	Aaron Bunting	Ryan Haughn
Principal, Chief Market Strategist	Principal, CEO	Principal, COO, CFO	Principal, Energy
dtsubouchi@safgroup.ca	rdunfield@safgroup.ca	abunting@safgroup.ca	rhaughn@safgroup.ca

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Natural Gas – Natural gas withdraw of 9 bcf, storage now +878 bcf YoY surplus

YoY storage at 878 bcf YoY surplus

The EIA reported a 9 bcf natural gas draw (vs 5 bcf draw expectations) and well below the 5-yr average draw of 99 bcf. This brings storage to 2.034 tcf as of Mar 13, which is a widening of the YoY surplus to 878 bcf vs 796 bcf surplus last week, with storage now 281 bcf above the 5 yr average. HH remains weak as the winter withdraw season is almost finished and the YoY surplus could reach 1 tcf YoY by April 1. Below is the EIA's storage table from its Weekly Natural Gas Storage Report. [LINK]

Figure 1: US Natural Gas Storage

	Stocks billion cubic feet (Bcf)				Historical Comparisons: Year ago (03/13/19)		Historical Comparisons: 5-year average (2015-19)	
Region	03/13/20	03/06/20	net change	implied flow	Bcf	% change	Bcf	% change
East	412	426	-14	-14	250	64.8	325	26.8
Midwest	512	529	-17	-17	273	87.5	400	28.0
Mountain	96	97	-1	-1	63	52.4	110	-12.7
Pacific	199	200	-1	-1	98	103.1	198	0.5
South Central	814	791	23	23	472	72.5	721	12.9
Salt	247	235	12	12	133	85.7	209	18.2
Nonsalt	568	556	12	12	338	68.0	512	10.9
Total	2,034	2,043	-9	-9	1,156	76.0	1,753	16.0

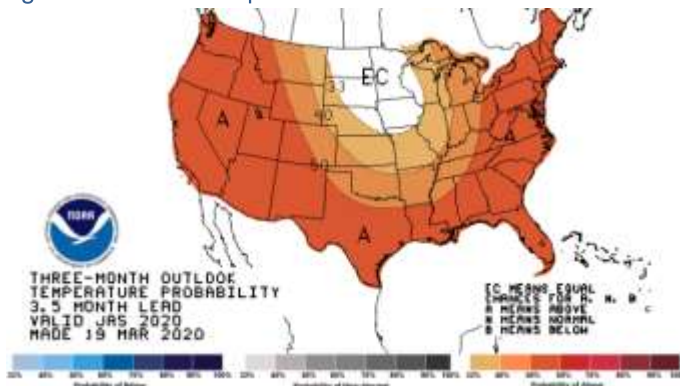
Source: EIA

Natural Gas – NOAA forecasts hot summer 2020, but summer 2019 was very hot

NOAA forecasts hot summer 2020

It won't make any impact to natural gas markets for now given we are on track to finish winter storage withdraw season likely close to 1 tcf higher YoY, but NOAA's new seasonal outlook is calling for a hot summer. NOAA provided its updated seasonal outlook [LINK] and the good news in this early forecast is that NOAA calls for a hot summer. On Thurs, we tweeted [LINK] "*NOAA new J/A/S temp forecast is for a hot summer, but won't matter to #NatGas markets as comp is to summer 2019 that was 122nd hottest of last 125 yrs. and storage surplus now +878 bcf YoY at March 13 and could reach +1 tcf YoY to end winter withdraw season*". The key reason for why the new forecast wont make a big impact, is that the YoY comparison is against last summer, which was the 4th hottest summer in the last 125 years, so its not likely to see weather drive more YoY natural gas demand. Although it looks like residential natural gas demand will see a boost from people working from home due to social distancing, it will be interesting to see how this will play into potentially lesser demand in offices and commercial buildings. Below is the NOAA temp forecast for Jul/Aug/Sept, and the comparable statewide average temperature ranks for the Jul/Aug/Sept period in 2019.

Figure 2: NOAA Temp Forecast J/A/S



Source: NOAA

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Figure 3: Statewide Average Temperature Ranks 2019 J/A/S

Source: NOAA

Natural Gas – US shale/tight gas may have peaked in Nov/19, even before capex cuts

Declining gas production from US shale

On Tuesday, the EIA issued its Drilling Productivity Report March 2020 [LINK], which is the EIA's forecast for oil and natural gas production from the top shale/tight oil and gas basins for the current month (in this case March) and the next month (in this case April) and the key takeaway is that even before the recent capex cuts, the data supports the view that US natural gas may have peaked in Nov/19. And now with massive capex cuts, US natural gas will go into faster decline with lower capex and also with lower associated gas from oil wells from the big capex cuts to oil drilling and completions. (i) These key natural gas trends are changing the narrative to US natural gas for 2020 and 2021, especially because US shale/tight gas is 89% of total US natural gas in total. Ie. just under 86 bcf/d vs total US natural gas production of just over 96 bcf/d, so whatever the trends are for shale/tight gas are the trends for US natural gas in total. (ii) US natural gas is basically flat from Oct thru April, with Oct of 84.774 bcf/d to April estimated at 84.949 bcf/d. Even before the recent capex cuts, US natural gas production has slightly declined for the past 5 months. Its small, but was 85.649 bcf/d in Dec and has worked down to 84.979 bcf/d in April. (iii) Marcellus has been showing small declines the past few months, with Nov at 33.914 bcf/d and now at 32.555 bcf/d in April. (iv) Note that the YoY growth is slightly more to the associated natural gas from shale oil plays. The big YoY growth is from the Permian +3.219 bcf/d, then Haynesville +1.338 bcf/d and then Appalachia +1.160 bcf/d. Below is our table showing the running EIA DPR data for the shale/tight gas plays, and the MoM changes in major shale/tight natural gas production. Our Supplemental Documents package includes the Drilling Productivity Report.

Figure 4: EIA - Major Shale/Tight Play's Natural Gas Production

	2019									2020					
mmcf/d	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Apr YoY	Apr Less Mar
Anadarko	7,755	7,884	7,661	7,698	7,672	7,851	7,982	7,860	7,770	7,631	7,481	7,341	7,198	-558	-143
Appalachia	31,395	31,215	31,534	32,351	32,603	32,851	33,160	33,914	33,470	33,245	33,003	32,786	32,555	1,160	-231
Bakken	2,856	2,843	2,913	2,968	3,037	2,978	3,114	3,174	3,100	3,092	3,080	3,071	3,065	209	-6
Eagle Ford	6,655	6,756	6,878	6,947	7,019	7,115	7,087	6,950	6,944	6,903	6,867	6,851	6,851	196	0
Haynesville	11,109	11,307	11,446	11,752	11,793	11,628	11,795	12,030	12,183	12,303	12,411	12,445	12,447	1,338	2
Niobrara	5,291	5,299	5,391	5,369	5,406	5,461	5,664	5,708	5,722	5,734	5,728	5,711	5,692	402	-19
Permian	13,952	14,394	14,598	14,877	15,498	15,873	15,971	16,014	16,319	16,545	16,756	16,962	17,171	3,219	209
Total	79,012	79,698	80,421	81,962	83,028	83,757	84,774	85,649	85,507	85,453	85,325	85,168	84,979	5,967	-189

Source: EIA

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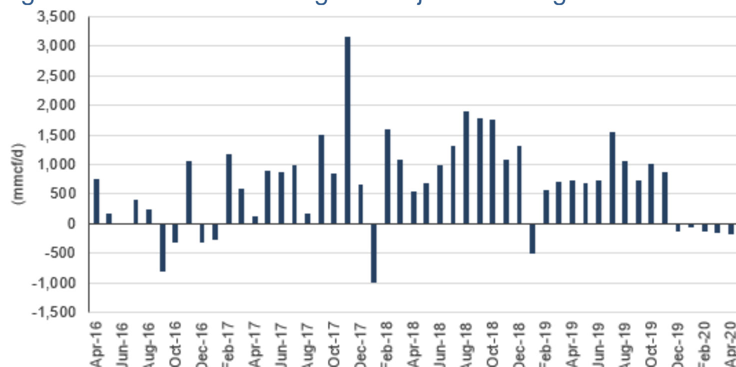
Figure 5: EIA – MoM Change In Major Shale/Tight Natural Gas Production



Source: EIA

Natural Gas – LNG Canada reducing non-essential work

LNG Canada reducing non-essential work

One of the big stories this week was the increasing push for employees to work from home, which has applied to basically every sector, and this includes in plants, field operations, etc for oil and gas and mining companies. This week, LNG Canada announced it is implementing a mandatory work from home policy for non-business critical positions and is deferring many non-essential activities at the Kitimat site [LINK]. They don't say it specifically, but the press release comments infer no change to LNG Canada timing schedule, and they write *"Essential work that will continue during this time includes seasonal activities that must take place within regulatory windows, activities which have commenced and need to be finished to safely secure the area, and unloading of material delivery vessels at the port"*. However, in LNG Canada's "COVID-19 Preparedness" Q&A page [LINK] they note that worsening conditions could lead to the workforce being limited to only site security and environmental controls, which we would have to believe means delays to the project. They write *"The number of staff at our Kitimat site will be gradually reduced to half of current levels over the coming week. This will entail reducing the number of workers flying in on rotation. If necessary, LNG Canada, JFJV and site contractors will implement a final reduction of staff working on site to critical levels required to maintain site security and environmental controls"*.

Natural Gas – Japan LNG imports for February down 12.7% YoY

Japan Feb LNG imports down 12.7% YoY

Even before Coronavirus, we were seeing data to show an oversupplied LNG market in 2020, and with the Coronavirus impact, it sets 2020 up for an even weaker year for LNG. On Wed, Japan's Ministry of Finance posted its monthly import/export data for Feb [LINK], and Japan LNG imports for Feb were 10.93 bcf/d, down 12.7% YoY from 12.60 bcf/d in Feb 2019 and also down MoM from 11.63 bcf/d in Jan. A weaker Feb was expected as the forecast from late January was calling for warm weather, and this was reflected in the Tokyo temperatures for Feb. The other negative for Japan LNG demand in Feb was coronavirus impact, which will only be increasing in March along with very warm March temperatures in Japan. Natural gas is already in oversupply and it unfortunately the import data and weather forecasts are only making it worse. Its very hard to see how it can be anything but a really tough year for LNG and natural gas. Below is our table that tracks Japan LNG import data and the February temperature graph for Tokyo.

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Figure 6: Japan Monthly LNG Imports

bcf/d	2015	15/14	2016	16/15	2017	17/16	2018	18/17	2019	19/18	2020	20/19
Jan	13.06	3.1%	11.22	-14.1%	12.85	14.6%	12.79	-0.5%	11.69	-8.7%	11.63	-0.5%
Feb	13.25	2.9%	12.30	-7.2%	13.35	8.5%	14.22	6.5%	12.60	-11.4%	10.99	-12.7%
Mar	12.60	1.2%	12.62	0.1%	12.61	-0.1%	12.28	-2.6%	11.30	-8.1%		
Apr	10.56	-8.5%	10.21	-3.3%	10.52	3.0%	8.97	-14.7%	9.00	0.3%		
May	8.91	-11.4%	8.55	-4.0%	9.66	13.0%	9.92	2.7%	8.62	-13.1%		
June	10.61	-2.8%	10.02	-5.6%	9.90	-1.2%	8.88	-10.3%	8.32	-6.3%		
July	10.77	-11.3%	10.19	-5.4%	10.19	0.0%	10.55	3.6%	10.56	0.1%		
Aug	10.93	0.2%	11.96	9.4%	11.24	-6.0%	11.73	4.4%	9.45	-19.5%		
Sept	11.06	-5.0%	10.67	-3.5%	9.31	-12.7%	10.04	7.8%	10.30	2.6%		
Oct	9.38	-12.8%	9.73	3.7%	9.50	-2.3%	10.12	6.5%	9.75	-3.6%		
Nov	10.71	-2.7%	12.07	12.7%	10.26	-15.0%	10.15	-1.0%	10.03	-1.2%		
Dec	12.51	-2.2%	11.69	-6.5%	12.31	5.4%	11.23	-8.8%	10.54	-6.2%		

Source: Japan Ministry of Economy, Trade and Industry

Figure 7: Tokyo Feb Temperature Graph vs Average

Source: AccuWeather

Natural Gas – India LNG imports for Feb +37.9% YoY or +1.3 bcf/d

India Feb LNG imports +37.9% YoY

Bloomberg's Mar 6 Global LNG Monthly was titled *"India Takes Spotlight From China"* where they wrote on LNG data for Feb and said *"India jumped on the opportunity to procure cheap cargoes and ended up with a record 42 deliveries for the month, the highest level seen since the country began imports. India not only stole the limelight from China, but also took some Australian cargoes originally destined for China"*. And this week, Bloomberg Terminal reported on India LNG imports for Feb, which showed India imported a record high 4.55 bcf/d, up from 3.2 bcf/d in Jan and up 37.9% YoY from 3.3 bcf/d in Feb 2019. This data fits the commentary from our Feb 23, 2020 Energy Tidbits memo [LINK], where we wrote "*It looks like India is capitalizing on cheap LNG cargos without a home. This week, Bloomberg Terminal reported India issued a string of tenders seeking more than 24 LNG cargoes, and last week, purchased a cargo for late-Feb delivery for $2.40-$2.50/MMBTu. Bloomberg said traders believe this is likely the lowest price ever paid for a spot shipment to India and said, "Other buyers in the nation are now seeking deals in the lower $2 range, according to traders". No question, LNG prices are extremely weak, but this can create a buying opportunity for those countries with sufficient storage to take advantage of this pricing, such as India*. India is still not a huge LNG market compared to Japan, South Korea and China, but ample storage capacity and very cheap LNG prices is allowing the country to capitalize on strategic purchases.

Natural Gas – Reuters: Exxon Mozambique LNG likely delayed from H1/20

Reuters: Exxon Mozambique LNG FID likely delayed

Last night, we tweeted [LINK] on the Reuters story "*Exclusive: Coronavirus, gas slump put brakes on Exxon's giant Mozambique LNG plan"* [LINK] said "*Exxon Mobil is likely to delay*

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the greenlighting of its $30 billion liquefied natural gas (LNG) project in Mozambique as the coronavirus disrupts early works and a depressed gas market makes investors wary, six sources told Reuters", and ""*COVID-19 is affecting guys going into Mozambique, it's affecting Chinese and Korean financiers, and clearly you've had the arse drop out of the oil market," said a source with knowledge of the project".* (i) We believe it will be very tough for any LNG project to go FID in the face of already weak 2020 LNG from the mile winter leading to LNG oversupply leaving the winter. And then throw on top of that, Coronavirus hitting economies and natural gas demand will almost certainly ensure 2021 LNG will be weak. (ii) Reuters highlights Chinese and Korean financiers. This also makes sense given the Coronavirus has hit Asian finances harder than other areas. (iii) When we first saw the headline, our first thought was that it tied to the concept that that this wasn't the normal bottom of cycle time and Coronavirus had put the LNG balancing back at least 1 or 2 years. Reuters didn't really say, but we still wonder if this is part of the "depressed gas market" concept. (iv) This also would fit with Exxon's release this week about significantly reducing capex. (v) The other item to remember is that if the Chinese and Korean issue is financing, then what else is at risk? ie. LNG Canada Phase 2. It makes sense that there will not be any potential for FID of LNG Canada Phase 2 in 2020. But that has never been LNG Canada's plan. Rather, prior to the mild Asian winter and Coronavirus, we had expected to see more LNG FIDs in 2020 than expected and some to come years earlier than expected as the priority for major LNG players is how to minimize capital costs in the face of lower mid/long term Asian LNG prices. We still the key way to do so is to have a continuous construction cycle for LNG phases. Our Supplemental Documents package includes the Reuters story.

Natural Gas – FERC approves Pembina Jordan Cove LNG project and feeder pipeline

FERC approves Jordan Cove

This week, Pembina announced it had received FERC approval for the Jordan Cove LNG project and the Pacific Connector gas feeder pipeline [LINK]. Although definitely a positive for the project, Jordan Cove is still facing regulatory headwinds, as last year, it was denied a water quality certificate and still doesn't have a dredging permit. Even absent regulatory hurdles, we still see risk of the project moving forward given extremely low LNG prices and the high capital costs associated with the greenfield project. Given the regulatory issues, the FERC approval probably doesn't improve the odds for FID on the ~1.3 bcf/d LNG project to move ahead anytime soon but does provide the asset that it is the only US west coast approved LNG project. Below we pasted a project map and a project description slide from Pembina's March 2020 corporate update.

Figure 8: Pembina Jordan Cove Project

Source: Pembina

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Figure 9: Pembina Jordan Shipping Map

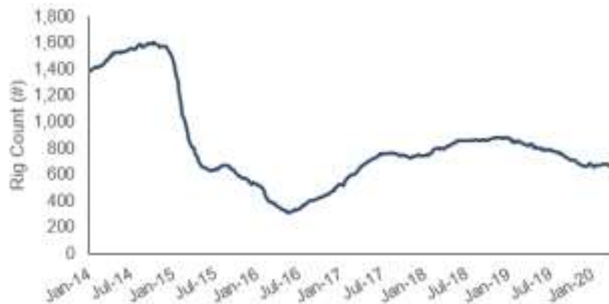
Source: Pembina

Oil – US oil rigs down 19 to 664 oil rigs and going lower

US oil rigs were -19 this week

Baker Hughes reported its weekly rig data on Friday which confirmed what we have been expecting, an immediate pullback in US oil rigs, which is only going to accelerate with low oil prices and massive reductions to US capex. US oil rigs were down 19 to 664 oil rigs vs 824 oil rigs a year ago. The only increase was in Granite Wash +1, and decreases were in Permian -13, Others -4, Williston -1, Eagle Ford -1, and Cana Woodford -1. The Permian oil rig decrease fits the commentary we have seen from producers, for example Centennial dropped 4 Permian oil rigs this month, along with plans from Diamondback, Parsley, Pioneer, and Supermajors etc. to reduce Permian rigs in the coming months. Below is our graph of total US oil rigs.

Figure 10: Baker Hughes Total US Oil Rigs



Source: Baker Hughes

Oil – Total Cdn rigs down 77 to 98 total rigs

Total Cdn -77 this week

Baker Hughes reported total Cdn rigs were down 77 to 98 total rigs. Cdn oil rigs were down 63 to 52 oil rigs. Cdn gas rigs were down 14 to 46 gas rigs. This is the normal seasonal decline period for Cdn rigs, which will continue in the next few weeks. But we don't expect the post spring ramp up to be nearly as strong this year, with several Cdn producers announcing massively lower 2020 capex. To put in perspective, a year ago, Cdn oil rigs were 49 and Cdn gas rigs were 56 for a total Cdn rigs of 105, meaning total Cdn rigs are -7 YoY. Below is our graph of total Cdn oil rigs.

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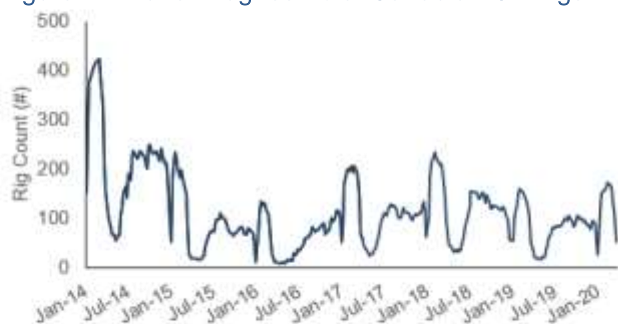
Figure 11: Baker Hughes Total Canadian Oil Rigs



Source: Baker Hughes

Oil – US oil production up 100,000 b/d to 13.1 mmb/d

US oil production at 13.1 mmb/d

This week, the EIA reported US oil production was up 100,000 b/d to 13.1 mmb/d for the Mar 13 week. Lower 48 was up 100,000 b/d to 12.6 mmb/d. The ongoing story continues to be US producers massively cutting capex for 2020, which will inevitably lead to a decline in US oil production as producers pull back on drilling plans and cutting maintenance capital, albeit there will be a several month lag between lower capex and lower US oil production. Below we pasted an excerpt from the EIA weekly oil production data. [LINK]

Figure 12: EIA's Estimated Weekly US Oil Production

Year-Month	Week 1		Week 2		Week 3		Week 4		Week 5	
	End Date	Value	End Date	Value	End Date	Value	End Date	Value	End Date	Value
2018-Jan	01/05	9,492	01/12	9,750	01/19	9,878	01/26	9,919		
2018-Feb	02/02	10,251	02/09	10,271	02/16	10,270	02/23	10,283		
2018-Mar	03/02	10,369	03/09	10,381	03/16	10,407	03/23	10,433	03/30	10,460
2018-Apr	04/06	10,525	04/13	10,540	04/20	10,586	04/27	10,619		
2018-May	05/04	10,703	05/11	10,723	05/18	10,725	05/25	10,769		
2018-Jun	06/01	10,800	06/08	10,900	06/15	10,900	06/22	10,900	06/29	10,900
2018-Jul	07/06	10,900	07/13	11,000	07/20	11,000	07/27	10,900		
2018-Aug	08/03	10,800	08/10	10,900	08/17	11,000	08/24	11,000	08/31	11,000
2018-Sep	09/07	10,900	09/14	11,000	09/21	11,100	09/28	11,100		
2018-Oct	10/05	11,200	10/12	10,900	10/19	10,900	10/26	11,200		
2018-Nov	11/02	11,600	11/09	11,700	11/16	11,700	11/23	11,700	11/30	11,700
2018-Dec	12/07	11,600	12/14	11,600	12/21	11,700	12/28	11,700		
2019-Jan	01/04	11,700	01/11	11,900	01/18	11,900	01/25	11,900		
2019-Feb	02/01	11,900	02/08	11,900	02/15	12,000	02/22	12,100		
2019-Mar	03/01	12,100	03/08	12,000	03/15	12,100	03/22	12,100	03/29	12,200
2019-Apr	04/05	12,200	04/12	12,100	04/19	12,200	04/26	12,300		
2019-May	05/03	12,200	05/10	12,100	05/17	12,200	05/24	12,300	05/31	12,400
2019-Jun	06/07	12,300	06/14	12,200	06/21	12,100	06/28	12,200		
2019-Jul	07/05	12,300	07/12	12,000	07/19	11,300	07/26	12,200		
2019-Aug	08/02	12,300	08/09	12,300	08/16	12,300	08/23	12,500	08/30	12,400
2019-Sep	09/06	12,400	09/13	12,400	09/20	12,500	09/27	12,400		
2019-Oct	10/04	12,600	10/11	12,600	10/18	12,600	10/25	12,600		
2019-Nov	11/01	12,600	11/08	12,800	11/15	12,800	11/22	12,900	11/29	12,900
2019-Dec	12/06	12,800	12/13	12,800	12/20	12,900	12/27	12,900		
2020-Jan	01/03	12,900	01/10	13,000	01/17	13,000	01/24	13,000	01/31	12,900
2020-Feb	02/07	13,000	02/14	13,000	02/21	13,000	02/28	13,100		
2020-Mar	03/06	13,000	03/13	13,100						

Source: EIA

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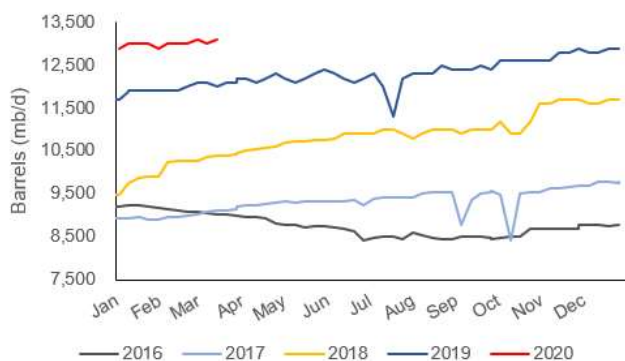
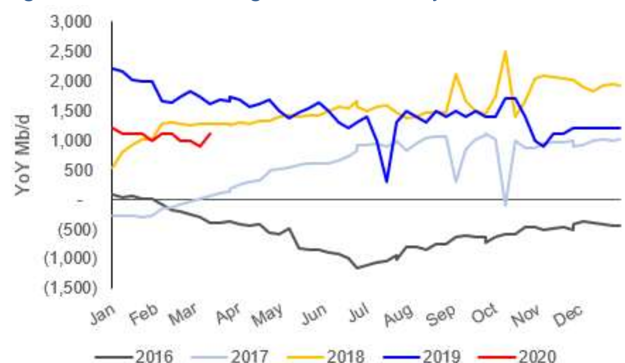
Figure 13: US Weekly Oil Production



Source: EIA, SAF

Figure 14: YoY Change in US Weekly Oil Production



Source: EIA, SAF

Oil – US shale/tight oil was plateauing in H1/20 even before recent capex cuts

US shale/tight oil growth is heading for decline

The key emerging trend in the five months was that US shale/tight oil was going to plateau in H1/20, and now with the massive capex cuts to oil drilling and completions, the narrative is moving from reaching a plateau and holding a plateau to a view that US oil production is moving into decline. The question now is how steep and how much of a decline. Similar to our commentary on gas production, we expect the EIA's oil numbers in the new Drilling Productivity Report [LINK] to increasingly move lower each month from these capex reductions. (i) EIA forecasts April +17,000 b/d MoM to 9.075 mmb/d, but note March was revised down 117,000 b/d from 9.174 mmb/d to 9.057 mmb/d. Meaning without revisions, April would have been -99,000 b/d MoM. (ii) Note that shale/tight oil is approx. 70% of total US production of 13.0 mmb/d, so the trends in shale/tight oil will be representative of total US oil. (iii) No surprise the big YoY increase is Permian at +637,000 b/d to 4.792 mmb/d and note, Permian was for March was also revised down from the original estimate of 4.855 mmb/d by 101,000 b/d to 4.754 mmb/d. (vi) When you look at the numbers and relative size of the oil production by basin, it really shows that the US shale/tight oil growth is all about the Permian whereas the rest of the shale/tight are very small. And with the big capex cuts leading to big cuts to Permian oil wells and completions, its inevitable that Permian growth will grind to a halt over the coming months, and then the question is how long do the cuts last and can industry stop the Permian from declining. Our Supplemental Documents package includes the Drilling Productivity Report. Below is our table of running DPR estimates of shale/tight oil production and our graph of MoM changes in major shale/tight oil production.

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Figure 15: EIA - Major Shale/Tight Plays Oil Production

	2019									2020					
Thousand b/d	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Apr YoY	Apr Less Mar
Anadarko	574	572	552	566	556	606	593	578	562	550	537	527	517	-57	-10
Appalachia	125	127	138	148	155	158	158	147	151	151	150	149	149	24	0
Bakken	1,398	1,399	1,426	1,445	1,478	1,444	1,517	1,518	1,478	1,476	1,472	1,469	1,468	70	-1
Eagle Ford	1,352	1,344	1,367	1,384	1,373	1,413	1,420	1,384	1,381	1,365	1,352	1,345	1,344	-8	-1
Haynesville	41	38	39	39	39	40	40	40	40	40	40	39	39	-2	0
Niobrara	698	715	729	731	743	755	787	793	786	786	782	774	766	68	-8
Permian	4,155	4,230	4,254	4,321	4,444	4,473	4,550	4,597	4,636	4,680	4,718	4,754	4,792	637	38
Total	8,343	8,426	8,505	8,634	8,788	8,888	9,065	9,058	9,034	9,049	9,050	9,057	9,075	732	17

Source: EIA, SAF

Figure 16: MoM Change – Major Shale/Tight Oil production

Source: EIA, SAF

Oil – DUCs continue to be worked down for 9th consecutive month

DUCs continue to be worked down

The EIA's Drilling Productivity Report [LINK] also includes the EIA's estimate of Drilled UnCompleted wells at February 29, and DUCs continue to be worked down MoM. We do not have the access to direct data, but those that do, such as RJ, believe the EIA DUC numbers are still well overstated. (i) There was another month of reducing DUCs in Feb, which is the 9th straight month of DUCs being worked down. Feb DUCs were down 60 to 7,637 DUCs. If this number is accurate, then we think there is still more declines to get rid of all the surplus DUCs. We highlighted the H2/19 trend in our Dec 6 blog [LINK], as the work down of DUCs has provided a one time supply burst in US oil production, and likely accounted for almost all of the growth in US oil production in H2/19. The item to note here however, is the surplus (rainy day fund) of DUCs will soon be gone and DUCs will be down to normal levels. This concept is even more applicable in the $25 WTI world, as its way cheaper to complete a DUC than to drill new wells. (ii) The one item that is still a concern or certainly a question is the Permian DUCs. The EIA estimates Permian DUCs have been flat for the past 5 months and this will fit the views of RJ and others earlier in Q1/20 that the EIA's DUCs are still to high. Below is our running table of the EIA Drilling Productivity Report DUCs.

Figure17: EIA - Estimated Drilled UnCompleted Wells

	2019											2020	
Drilled UnCompleted	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Feb YoY
Anadarko	1,148	1,107	1,081	1080	1,063	1,044	1,006	965	908	855	801	752	703	-445
Appalachia	722	731	721	731	696	672	641	638	604	588	576	574	565	-157
Bakken	911	908	904	904	879	872	842	825	816	815	824	839	852	-59
Eagle Ford	1,485	1,484	1,500	1,495	1,511	1,495	1,479	1,454	1,428	1,400	1,385	1373	1360	-125
Haynesville	215	215	208	207	208	212	213	214	221	220	227	231	230	15
Niobrara	685	688	663	635	597	581	527	503	489	479	472	457	445	-240
Permian	3,288	3,357	3,477	3,545	3,578	3,591	3,577	3,527	3,485	3,467	3,458	3471	3482	194
Total	8,454	8,490	8,554	8,597	8,531	8,467	8,285	8,126	7,951	7,824	7,743	7,697	7,637	-817

Source: EIA

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Oil – North Dakota oil production starting to decline, will continue declining in Q2/20

North Dakota oil production declining

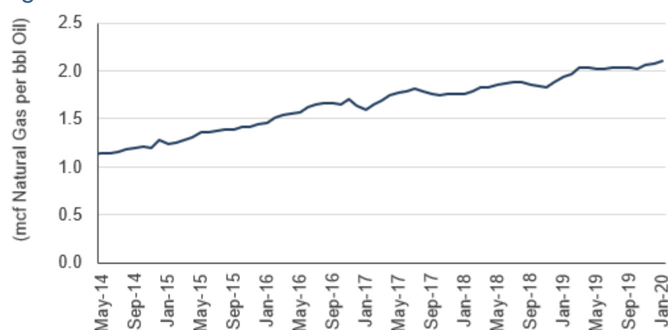
The North Dakota Industrial Commission posted its monthly Directors Cut on Tuesday, which includes its estimate for North Dakota oil production in Jan. The key takeaway is that it looks like North Dakota oil production peaked in Nov and has declined MoM thru to Jan. The NDIC has North Dakota oil production for Nov at 1.519 mmb/d, declining to 1.477 mmb/d in Dec, and declined further to an estimated 1.430 mmb/d in Jan. We recognize that there are always weather factors impacting oil production in he peak winter months (Dec, Jan, Feb), but there are data points indicating that there is a fundamental underlying decline with les completions and now reducing rig counts. It is important to note that this decline was before the recent capex cuts and supports the narrative that even before the recent pullback in capex, US shale was on track to plateau in H1/20. North Dakota oil production will likely continue a modest decline in Q1/20, but then accelerate in Q2/20. Well completions were 92 in Nov, down to 88 in Dec, and estimated at 70 in Jan, with the ultimate reality being lower completions leading to less new oil production being brought online. The other point to show the maturing basin is increasing gas/oil ratios. Bakken are oil wells with associated natural gas, and over time, gas ratios increase in proportion as these oil wells age. Its not a huge increase, but the gas oil ratio was up again in Dec and Jan, continuing a steady modest increase. Below is our ongoing table of North Dakota oil production from the monthly NDIC Directors Cut's along with our graph of the North Dakota gas-oil ratio going back to 2014. Our Supplemental Documents package includes excerpts from the NDIC Directors Cut. [LINK]

Figure 18: North Dakota Oil Production By Month

(b/d)	2015	2015/2014	2016	2016/2015	2017	2017/2016	2018	2018/2017	2019	2019/2018	2020	2020/2019
Jan	1,191,198	27.4%	1,122,462	-5.8%	981,380	-12.6%	1,179,564	20.2%	1,403,808	19.0%	1,429,515	1.8%
Feb	1,178,082	23.7%	1,119,092	-5.0%	1,034,248	-7.6%	1,175,316	13.6%	1,335,591	13.6%		
Mar	1,190,502	21.8%	1,111,421	-6.6%	1,025,690	-7.7%	1,162,134	13.3%	1,391,760	19.8%		
Apr	1,169,045	16.5%	1,041,981	-10.9%	1,050,476	0.8%	1,225,391	16.7%	1,392,485	13.6%		
May	1,202,615	15.6%	1,047,003	-12.9%	1,040,995	-0.6%	1,246,355	19.7%	1,394,648	11.9%		
June	1,211,328	10.9%	1,027,131	-15.2%	1,032,873	0.6%	1,227,320	18.8%	1,425,230	16.1%		
July	1,206,996	8.3%	1,029,734	-14.7%	1,048,099	1.8%	1,269,290	21.1%	1,445,934	13.9%		
Aug	1,187,631	4.9%	982,011	-17.3%	1,089,318	10.9%	1,292,505	18.7%	1,480,475	14.5%		
Sept	1,162,159	-2.0%	971,760	-16.4%	1,107,345	14.0%	1,359,282	22.8%	1,443,980	6.2%		
Oct	1,171,119	-1.0%	1,043,693	-10.9%	1,183,810	13.4%	1,392,369	17.6%	1,517,936	9.0%		
Nov	1,181,787	-0.5%	1,034,484	-12.5%	1,194,920	15.5%	1,375,803	15.1%	1,519,037	10.4%		
Dec	1,152,696	-6.1%	942,322	-18.3%	1,182,836	25.5%	1,402,741	18.6%	1,476,777	5.3%		

Source: North Dakota Industrial Commission

Figure 19: North Dakota Gas-Oil Ratio



Source: NDIC, NDPA

Operators making big cuts to North Dakota rigs

The big US oil theme over the past two weeks has been a massive reduction in US capex budgets, and therefore a subsequent pullback on oil rigs and completions activity. We looked at press releases from producers in North Dakota, and in aggregate, rigs are going lower by at least 12 rigs. Hess is cutting Bakken rigs from

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6 to just 1 by the end of May, Continental is reducing its Bakken rigs from 9 to 3, Whiting is dropping one rig and one completion crew, Enerplus is ceasing all operated drilling and completions activity in North Dakota by mid-April (note they have 32 DUCs in North Dakota), and Marathon said they will "optimize" development programs in the Bakken and Eagle Ford. These comments reinforce the narrative that North Dakota will continue moving lower at a moderate pace in Q1, and this decline will only accelerate as rigs come offline and completions decline.

Oil – North Dakota crude by rail down MoM in Jan to ~296,500 b/d

North Dakota CBR down in Jan

The North Dakota Pipeline Authority also posted its monthly update "January 2020 Production & Transportation" [LINK]. Please note that starting mid 2019, we have gone to the backup excel sheets from the North Dakota Pipeline Authority for more detailed numbers of crude by rail out of North Dakota. The NDPA Monthly Update (graph below) report only provides rounded numbers, and these rounded numbers are not accurate enough to match the graphs. In the backup excel, the NDPA estimates crude by rail in Jan was a low of 281,493 b/d to a high of 311,493 b/d for an average of ~296,500 b/d. This is down from Dec low of 292,466 to high of 322,466 b/d for an average of ~307,466 b/d. It looks like the main driving factor for the lower MoM CBR volumes was simply lower total North Dakota oil production, as rail took the same percentage of total volumes MoM from Dec, with both month's showing rail taking 19% of total oil transportation. Below is a chart from the NDPA monthly update showing the crude by rail volumes since 2013. Our Supplemental Documents package includes the NDPA monthly update. [LINK]

Figure 20: Estimated North Dakota Rail Export Volumes

Source: North Dakota Pipeline Authority

Oil – IHS sees low oil prices could lead to US oil down 2-4 mmb/d over 18 mths

IHS: US oil risk is 2-4 mmb/d over 18 mths

On Friday, we tweeted [LINK] in response to an @ericnuttall tweet question "*could global declines offset Saudi+Russia surge in a year if a truce is not found*?". Our tweet was "*Re @ericnuttal what if no truce ?, great @IHSMarkit blog suggests US alone can offset surge, US players moving quickly on big capex cuts & high tight decline, US oil prod "could fall by 2-4 MMb/d over next 18 months". big ST pain, but set up 4 big LT gain 4 oil post Covid19".* IHS posted a March 16 blog "*Historic Surplus of Oil Will Push Prices Lower*" that received a lot of attention (and rightly so) for its warning of the massive global oil inventory surplus that is coming down the road at record speed. More on this later in the memo. But because the oil inventory surplus is so massive, the IHS views on the impact of low pries on US shale didn't

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get much attention. IHS wrote "*The largest 2020–21 impact on production volumes will be in the United States due to the fast reactivity of U.S. oil producers and the high decline rates of tight oil wells. U.S. crude oil production could fall by 2-4 MMb/d over next 18 months".* It may take time to work thru the slowing rig count/completion activity with the existing declines (why we tweeted still short term pain) but 2 to 4 mmb/d decline over the next 18 months is a huge number and why we tweeted big long term gains for oil.

Oil – US to begin buying oil for strategic petroleum reserve within 2 weeks

US to begin SPR purchases

One of the very few positive stories for oil last week was Trump announcing he instructed commerce to purchase *"large quantities"* for storage of oil for the strategic petroleum reserve and that *"we're going to fill it right to the top"*. This week, Bloomberg reported [LINK] the US is preparing to begin buying up to 77 mmb within the next two weeks, which would effectively max out SPR capacity given that the SPR currently has 635 mmb of inventory, with total capacity of about 713.5 mmb (78.5 mmb delta). While the increasing offtake is a positive for US producers who are faced with expected declines in oil exports, we don't think the SPR purchases will have a material impact on oil prices. The US Dept of Energy stated SPR injection capacity is 685,000 b/d (225,000 b/d at each of Bryan Mound and Big Hill, 125,000 b/d at West Hackberry, and 110,000 b/d at Bayou Choctaw) which is still a very small number compared to recent global demand loss estimates ranging from 6-10 mmb/d. Bloomberg also noted the oil will likely be purchased through direct purchases, not royalty in kind agreements like in the past. They write *"The oil will probably be procured through direct purchases, the official said, as opposed to the royalty-in-kind arrangements that were the hallmark of the last plan to replenish the stockpile"*.

Oil – US targets smaller producers for strategic petroleum reserve purchases

US targets smaller producers for SPR purchases

As part of the US plan to fill the strategic petroleum reserve, the US Dept of Energy issued a request for proposal to US producers to carry out an initial 30 mmb of the total 77 mmb in crude purchases [LINK]. The administration is targeting smaller producers for the crude purchases, and they write *"The small to midsize oil producers, which are the focus of the initial crude oil purchase, employ thousands of Americans" "These businesses have been particularly hard hit by recent events but under President Trump's leadership, we are taking swift action to assist hard hit producers and deliver strong returns to the taxpayer".* The RFP defines these smaller producers as those with less than 5,000 employees, which makes companies like Continental, Chesapeake, Whiting Petroleum and many others eligible. The DOE reiterated the maximum SPR injection capacity of 685,000 b/d and said *"The SPR is mission-ready to receive up to 685,000 barrels per day," explained Assistant Secretary for Fossil Energy, Steven Winberg. "With its extensive storage, pipeline, and marine infrastructure along the Gulf Coast, the SPR will help relieve oil-related disruptions to our economy"*.

Oil – Oil input into refineries 119,000 b/d to 15.820 mmb/d

Oil input into refineries up 119,000 b/d

For the Mar 13 week, EIA estimates crude oil inputs to refineries were up 119,000 b/d to 15.820 mmb/d, which compares to the Mar 6 week where oil inputs were up 5,000 b/d. We have been expecting crude inputs to ramp up over the next few weeks, but now the commentary has shifted to huge gasoline demand destruction in the US, which may delay/defer this ramp up. Refinery utilization was unchanged at 86.4% which is -2.5% YoY. Below is our ongoing graph of US refinery crude inputs.

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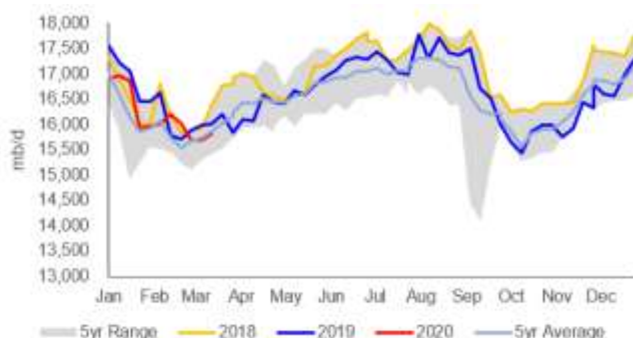
Figure 21: US Refinery Crude Oil Inputs (thousand b/d)



Source: EIA, SAF

Oil – Union accepts the mediator's recommendations, waiting on Co-op refinery

Union accepts mediator's recommendation

It looks like we could soon see the end of the labor fight at the 130,000 b/d Co-op refinery in Regina. No one should be surprised to see the union announcement [LINK] that "*Unifor accepts recommendations from independent mediator in Co-op lockout*". Last week's (March 15 2020) Energy Tidbits noted two key updates on the Co-op Refinery dispute that pointed to the union acceptance: First, the chatter has been that the refinery management has been able to sustain refinery operations not too much below capacity, which is impressive as the operating conditions have been difficult. The other reason is that, even with the continued Union picketing around Co-op facilities such as the grocery stores, there hasn't seemed to be an increasing local pressure on the refinery to cut a deal. In particular, we think mgmt's ability to run the refinery at close to capacity was likely the key reason for the union acceptance. To be fair, the other factor is likely the emergence of Coronavirus and, even though Saskatchewan hasn't had many cases, this has to have been a key factor in the union moving off their demands. As of our 8am MT news cut off this morning, we have not seen any Co-op Refinery acceptance. Rather the last was their Friday afternoon tweet [LINK] "*The Co-op Refinery is still analyzing the special mediators' report as it relates to the long-term impacts and benefits to our business. This is obviously an important decision and it requires some additional time to thoroughly review and evaluate the report."* Our Supplemental Documents package includes the Unifor release.

Oil – US "net" oil imports down 841,000 b/d to 2.161 mmb/d

US "net" oil imports -841,000 b/d

US "NET" imports were down 841,000 b/d to 2.161 mmb/d for the Mar 13 week. US imports were up 127,000 b/d to 6.539 mmb/d and US exports were up 968,000 b/d to 4.378 mmb/d and was a major contributor to the better than expected oil inventory data. Some items to note on the by country data. (i) Canada was up 178,000 b/d to 3.802 mmb/d for the Mar 13 week. (ii) Saudi Arabia was down 18,000 b/d to 425,000 b/d, which is well below the ~600,000 b/d capacity of their Motiva refinery capacity and compares to imports from Saudi in Mar/19 of ~660,000 b/d. (iii) Colombia continued the patten of down big one week and up big the next, as Colombia was -236,000 b/d to 293,000 b/d, whereas the country was +257,000 b/d the week before. (iv) Ecuador was +136,000 b/d to 216,000 b/d. (v) Venezuela remained at 0 due to US sanctions. (vi) Mexico was up 213,000 b/d to 816,000 b/d which is above Mar/19 import levels of ~655,000 b/d. Below is our table of the US oil imports by major country.

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Figure 22: US Weekly Preliminary Oil Imports By Major Countries

	Jan 17/20	Jan 24/20	Jan 31/20	Feb 7/20	Feb 14/20	Feb 21/20	Feb 28/20	Mar 6/20	Mar 13/20	WoW
Canada	3,559	3,845	3,825	3,685	3,690	3,603	3,644	3,624	3,802	178
Saudi Arabia	360	555	353	494	513	390	380	443	425	-18
Venezuela	0	0	0	0	0	0	0	0	0	0
Mexico	481	800	953	894	722	542	554	603	816	213
Colombia	727	338	304	183	128	467	272	529	293	-236
Iraq	227	143	400	229	179	336	375	352	169	-183
Ecuador	218	186	167	242	219	134	249	80	216	136
Nigeria	184	0	1	91	154	32	0	0	68	68
Kuwait	0	0	0	0	0	0	0	0	0	0
Angola	0	0	0	0	0	0	0	0	0	0
Top 10	5,756	5,867	6,003	5,818	5,605	5,504	5,474	5,631	5,789	158
Others	676	793	612	1,160	942	713	764	781	750	-31
Total US	6,432	6,660	6,615	6,978	6,547	6,217	6,238	6,412	6,539	127

Source: EIA, SAF

Oil – Massive over supply of global oil is inevitable and not fixed in months

IHS also sees massive oil inventory oversupply

It is important to note that the massive loss in demand from Coronavirus is leading to the inevitable massive oversupply of oil and global oil inventories and is not a going to be fixed quickly. It is reshaping more than just 2020 and making this not the normal bottom of cycle period. One of the big advantages I have in my research driven role at SAF is having my commodities and deal partners, who give great insight into oil and natural gas markets. Their concerns were on the increasing impact on demand as coronavirus started to spread around the world. This has been the major risk and why we have been worried about Coronavirus. The breakdown of any potential OPEC+ deal isn't the major factor, rather it was just an accelerant to the issue. The issue of oil inventory oil oversupply started to more broadly emerge two weeks ago and is now the major factor driving (and rightly so) all oil calls. The IHS blog, noted earlier in today's memo, and its views are excellent and in line with the concerns of my commodities partners. The math is simple, if demand is hit by 10 mmb/d, that's 300 mmb in a month. IHS wrote "*IHS Markit estimates that the global oil supply surplus on a monthly basis—the amount of global oil production in excess of demand—could range from 4 MMb/d to 10 MMb/d from February to May 2020. Indeed, demand in March and April could be down as much as 10 MMb/d. This estimated surplus translates into an inventory build of approximately 800 MMbbl–1.3 billion bbl in the first six months of 2020. The higher end of this range foreshadows the impact of increasing travel restrictions, reduced commuting and the likelihood of a severe global economic slowdown continuing in the second quarter. For context, up until now, the largest half-year global surplus since 2000 was in first half 2015, when it was a cumulative 352 MMbbl. The primary cause of this surplus is the sharp, severe drop in world oil (liquids) demand, which in the first quarter will be at least 4MMb/d below the year earlier level. Oil price weakness is exacerbated by the recent decision by Saudi Arabia to substantially increase oil supply by 2.6 MMb/d relative to February levels. Russia has said that it can increase production by 300,000–500,000 b/d.*" Our Supplemental Documents package includes the IHS blog.

Oil – Exxon's move signals to us its not the normal bottom of cycle time

Exxon's to make significant reduction in capex

On Monday, we tweeted [LINK] "*Exxon: "significantly reduce capital and operating expenses" in near term". has to include another slowdown in Permian capex. no surprise no hint of dividend that's increased on annual basis for 37 years. Not a normal bottom of cycle, rather "unprecedented environment*". Exxon issued a release that day on ho it was evaluating significant capital/operating cuts. This was significant given their analyst day was only two weeks prior and Exxon's key message then was how they were going to take advantage of the low part of the cycle, how they have always done so, and how their financial strength allowed them to do so. When we looked at their release, we added in our commentary that this was "not a normal bottom of cycle" and, as noted above, the massive oil oversupply won't

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be fixed within months and is not just a 2020 event. We believe Exxon's big change within 2 weeks of their analyst day is in line with our view that this is not a normal bottom of cycle time and not just a 2020 oil event. Note that a day later, Exxon accessed credit markets to issue $8.5b in new debt. Our Supplemental Documents package includes the Exxon release.

Oil – Saudi to increase exports to >10 mmb/d, partly due to using gas for power

Saudi to increase exports to 10 mmb/d

On Tuesday, we tweeted [LINK] "*Bloomberg's @JavierBlas reports Saudi to boost oil exports >10 mmbd in May, partly f/ #NatGas to replacing oil consumption. Fits SAF June 4, 2019 blog "Saudi's Significantly Lower Use of Crude Oil For Electricity Is A Negative To Summer Oil Markets*". Bloomberg's story "*Saudis to Boost Oil Exports to Record 10 Million Barrels a Day*" noted ""*The Kingdom of Saudi Arabia will utilize the gas produced from the Fadhili gas plant to compensate for around 250,000 barrels a day of domestic oil consumption, which will enable the Kingdom to increase its crude exports during the coming few months to exceed 10 million barrels a day," the official said, asking not be identified discussing the plan publicly."* Saudi Arabia's use of natural gas for power to replace some heavy oil historically used for power Is not a new phenomenon. Rather, it started in the last two years. On June 4, 2019, we posted a blog "*Saudi's Significantly Lower Use Of Crude Oil For Electricity Is A Negative To Summer Oil Markets*" [LINK]. The June 4, 2019 blog said "There was an overlooked EIA report yesterday that highlights a significant change in global oil demand fundamentals that should continue in future years. Yesterday, we tweeted [LINK] "*Good @EIAgov report "Saudi Arabia used less crude oil for power generation in 2018" replaced by nat gas/fuel oil. Est net >0.2 mmb/d less oil after increased fuel oil. Negative for oil, Saudi has more flexibility to increase exports in peak summer*". Saudi Arabia normally uses ~0.5 mmb/d more crude oil for electricity in its peak summer months vs winter. But the big change was in 2018, and the EIA estimates that Saudi Arabia's consumption of crude oil for electricity in the summer peak season was ~0.3 mmb/d less than prior years. Part of that saving is being offset by ~75,000 b/d increased fuel oil consumption for electricity, the balance by natural gas. But there is a compounding negative because it means that Saudi Arabia now has the flexibility to allocate these net oil/fuel oil savings to increase oil exports by >0.2 mmb/d in the summer." Saudi Arabia's normal 500,000 b/d increase in crude oil for electricity every summer was a huge driver to the normal large increase in global oil demand every Q3 and also made it more difficult for Saudi Arabia to increase oil exports in the summer. Our Supplemental Documents package includes the Bloomberg story and our June 4, 2019 blog.

Oil – Aramco says can "*produce*" at 12 mmb/d for 1 yr without any capex/opex

Aramco can produce 12 mmb/d for 1 yr

On Monday, we tweeted a couple times during the Saudi Aramco Q4 call because of some key new market disclosure items. (i) First, we tweeted [LINK] ""*Saudi Aramco earnings call still going on. CEO says a few times, Aramco will supply 12.3 mmbd in April from 12 mmb/d by producing at maximum sustained level and 300,000 b/d from inventory. And can maintain 12 mmb/d for 1 year without any additional capex or opex."* The CEO made this point a few times on the call – Saudi can produce at its maximum stated capacity of 12 mmb/d for a 1 year without any additional capex or opex. It seemed like Aramco really wanted to make sure analysts and other Aramco followers would takeaway that Saudi can "produce" at its max capacity of 12 mmb/d for 1 year. As noted in the next item, this is the key assumption for how long Saudi can/will withstand supplying the world at 12.3 mmb/d. Notwithstanding this insistence, it still seems like the Aramco followers aren't convinced that 12 mmb/d of "production" is sustainable. We guess we will find out in Aug/Sept when JODI data is released on Saudi crude oil inventory levels. (ii) Second, we tweeted [LINK] "*Saudi Aramco earnings Q&A still going on. CEO says decision for April is to supply 12.3 mmb/d and "i doubt May will be different". sounds like reminding Russia and others Saudi doesn't plan to be the first to blink in oil war*." This was the first disclosure that Aramco was expecting to

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supply at 12.3 mmb/d for May in addition to April. (iii) The CEO could not provide any details or insight into how or when Aramco could increase the maximum sustained production capacity from 12 to 13 mmb/d. (iv) We were surprised that there were no analyst questions on the Petronas/Aramco facility explosion noted later in the memo.

Oil – How low will Saudi go on its oil inventory?

How low will Saudi go on its oil inventory?

We recognize that Saudi is not showing any signs of giving in but, when we look at this week's data (JODI Saudi crude oil inventory data), we just have to wonder how long Saudi will want to keep up its oil war. There are two linked key questions/assumptions that also shape our view of why we don't expect Saudi to supply oil markets at 12.3 mmb/d for any extended period ie. more than 3 months – can Saudi "produce" at its max capacity of 12 mmb/d on a sustained basis and what is the lowest level of oil storage that Saudi will go down? (i) There was some key Saudi data released this week that made us think about these two questions/assumptions with the latest JODI data showing Saudi crude oil storage levels at Jan 31/20 at 153.968 mmb, which is down 23.3% YoY or down 46.866 mmb YoY from 200.834 mmb at Jan 31/19. Note there was a bigger decline in the period leading up to the Sept Abqaiq attack then after as Saudi crude oil storage was 172.753 mmb at Aug 31/19. Saudi crude oil storage levels peaked at Oct 31/15 at 329.430 mmb. It significant that Saudi oil storage is declining, but moreso because it is down to ~154 mmb. (ii) Saudi's oil inventory levels haven't been this low since 149.8 mmb at April 30, 2004 and 158.6 mmb at May 31, 2004. (iii) Saudi has clearly stated they will be supplying the market at 12.3 mmb/d for month and this will be done by producing at its current maximum capacity of 12.0 mmb/d and by drawing on it domestic and international oil storage by 0.3 mmb/d. An 0.3 mmb/d draw from oil storage is 9 mmb per month. (iv) This brings up the first key question, what is the maximum level of sustained production ie. can Saudi produce at its maximum capacity of 12.0 mmb/d for any sustained period. As noted earlier, Saudi plans to export over 10 mmb/d and Aramco insisted in its Q4 call that it can "produce" at 12 mmb/d for 1 year without any capex or opex. We do not have a Saudi oil model, but it sounds like most Saudi followers do not believe Saudi can "produce" at its maximum 12.0 mmb/d for any sustained period. Rather, it seems like Saudi followers are more assuming Saudi produces closer to 11.5 mmb/d for the next few months or however long they want to supply oil at 12.3 mmb/d. This is a huge question or assumption because, if Saudi only produces closer to 11.5 mmb/d, then its storage draw will be closer to 24 mmb per month. (v) Perhaps this is mitigated by the Saudi view that it can replace up to 0.3 mmb/d of oil this summer with natural gas for power (see our March 15, 2020 Energy Tidbits). If this is an incremental saving, it would reduce the oil storage draw by 9 mmb per month. (vi) Our other key question is how low will Saudi take its inventory. We do not believe they would take it down to zero, or for that matter much below 100 mmb at a minimum and, even so, that it may be a higher level for a minimum. After all, the Houthis are still out there, the attack on Abqaiq was only 6 months ago and that has to be a factor for any minimum level of oil inventory. But assuming the minimum was 100 mmb, then a 9 mmb per month draw is only possible for 6 months vs a 24 mmb per month draw is only possible for 2.5 months. (vii) We should highlight that Saudi can quickly restore its oil inventory by producing at high levels and cutting back exports. Every 1 mmb/d will restore 30 mmb per month to its inventory. Below is JODI Saudi oil inventory data from Jan 1, 2004 to Jan 31, 2020.

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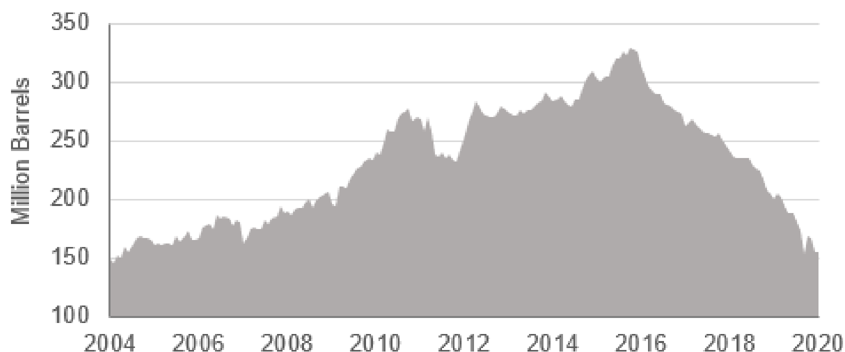
Figure 23: Saudi Arabia Crude Oil Inventories (million barrels)



Source: JODI, Bloomberg

Oil – TASS reminds that Putin calls the shots for Novak

Novak didn't have negotiating room at OPEC+

One of the key takeaways or reminders coming out of the recent OPEC+ meetings is that Russia energy minister Novak wasn't the person calling the shots. On Friday, TASS posted a story "*The Kremlin does not disclose the instructions that Putin gives Novak on negotiations with OPEC". [LINK]* Note this was a TASS story in Russian and we used Google Translate. The body of the story was consistent with the headline, and clearly noted Putin gives Novak instruction. The Kremlin just doesn't' disclose those instructions. In reality this is not much different than any other government in any other country, where the President or Prime Minister calls the shots. However, what typically happens Is that the senior minister also gets some room to negotiate and bring back a deal for President or Prime Minister approval. One other point to note is that many believe Putin is either joined in the power with Rosneft CEO Sechin or even share the Dennis Gartman view that Sechin is actually the power behind the throne. Regardless, its clear that Novak went to the OPEC+ meeting with instructions and no real ability to negotiate. Our Supplemental Documents package includes the TASS story.

Oil – Sechin clearly reminds its all about US taking global market share

Sechin notes US shale taking global market share

It looks like the reports on why Russia got into this price war are correct – Russia, in particular Sechin, are not pleased with US taking global market share. Interesting TASS story yesterday on lengthy comments from Rosneft CEO Sechin. It is interesting to reference both the TASS posted English [LINK] version and the original longer TASS Russian [LINK] version (at least translated by Google Translate). (i) US LNG. As noted later in the memo, the Russian version seemed to more clearly highlight US LNG into Russia's primary natural gas market – Europe. (ii) Coronavirus. Its not clear, but we think he is reinforcing the Russian position prior to the OPEC+ breakdown that you don't make big changes for coronavirus at its worst impact as it will get better. Sechin said "*From my point of view, coronavirus is really a serious problem that must be taken into account when balancing the market. But you also don't need to dramatize these things. China, as we see, has already practically coped with the development of the epidemic, there is a very positive dynamics in recovery, according to reduction of new infections. Therefore, it seems to me that a certain remedy has already been found, and this is really isolation, "said Sechin".* (iii) Sees oil markets correcting quite rapidly with oil to $60 by year end with an exit of US shale from the market. Basically the same message in both. English version is a "may" get to $60. "*The market will get corrected and I think quite rapidly. In a span of six months, we will see the changes in a more stable, right direction. By the end of the year, I believe, the price may be back to 60 US dollars in case shale oil is out of the market," he said.*" I assume market is export markets and US exports are down significantly. Russian version (Google Translate) is a little more or less the

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same as he assumes prices "can" get to $60 with US out of markets. *""The market will be corrected, and I think that it will be fast enough. Within six months we will see those changes in a more stable, right direction. By the end of the year, I assume that the price can return to the level of up to $ 60, provided that there will be an exit of shale oil from the market".* (iv) His correction is driven by his view that US shale not being able to compete in lower oil prices. This message was consistent in both versions including they can't attract capital at low oil prices. And if they can't attract capital, it means it has to decline and therefore take US oil out of export markets. (v) No question for Sechin, he wants to reduce US share of global markets and this seems to be his top priority and where OPEC+ agreement didn't work, rather it allowed the US to capture market share. The messaging on this part for oil is pretty consistent in both versions. (i) English version "*"Look at what happened during the three years of our participation in the OPEC+ agreement. US oil production was blooming, and they came to the fore of global oil production," Sechin said, adding that the United States was building new export pipelines and sea terminals, while its oil and gas companies attempted to gain a foothold on the European market*." (ii) Russian version (Google Translate) ""*Look what happened during these three years of our participation in the OPEC + agreement. The US oil industry grew rapidly, which came out on top in the world in oil production. This has never happened," Sechin said, adding that they were built about nine new export pipelines, offshore terminals, the active entry of American gas workers and oilmen into the European market began*." Our Supplemental Documents package includes the TASS English story and the Google Translate version of the original TASS Russian story.

Oil – Trump on Russia/Saudi "*at the appropriate time I'll get involved*"

Trump will get involved "*at the appropriate time*"

Oil got a boost on Thursday with Trump's comments on the Saudi/Russia oil fight and a view that the US may be working behind the scenes to get an end to the war. Reuters [LINK] and others reported Trump's quotes on getting involved to help resolve the Saudi Russia oil price/market share war. Trump said "*We are trying to find some kind of a medium ground,"* Trump told reporters at a White House news conference, adding that he had spoken to several people about the dispute. *"It's very devastating to Russia because when you look at it, their whole economy is based on that and we have the lowest oil prices in decades so it's very devastating to Russia. I would say it is very bad for Saudi Arabia but they're in a fight, they're in a fight on price, they're in a fight on output. At the appropriate time I'll get involved".* Our view is that even for those who aren't Trump fans, you have to give him credit for being shrewd and looking to be opportunistic where he might be able to take credit for something he really didn't do but can say he did, or prove to be right when others didn't' call it. We have been clearly in the camp that the stage was being set for a deal in the lead up to June 9/10 OPEC+ meetings because the damage to each other is more than Russia and Saudi thought would happen, a deal gets done and guess who gets the credit? Regardless, his comments were viewed as a positive to the potential to get an end to the war. Our Supplemental Documents package includes the Reuters report.

Oil – Texas RRC 3 commissioners all aren't onside with Texas restricting oil volumes

A split Texas RRC commission

The Texas Railroad Commission is run by a group of 3 commissioners – Chairman Wayne Christian, Ryan Sitton and Christi Craddick. Oil markets were excited with the Friday reports that Sitton had proposed Texas curtail 10% of its oil production in conjunction with an OPEC+ oil cut to provide a better oil market. The excitement was compounded when it was revealed that Sitton was invited by OPEC Secretary General Barkindo to attend the OPEC+ June meetings. However, as Bloomberg terminal and others reported yesterday the other two commissioners were not onside. Bloomberg wrote "*But even as the surprise announcement reverberated through petroleum circles, Sitton's call to curb Texas crude output for the first time since the 1970s was criticized by fellow regulators and some of the industry's biggest*

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drillers. "While I am open to any and all ideas to protect the Texas Miracle, as a free-market conservative I have a number of reservations about this approach," Wayne Christian, chairman of the Texas commission that oversees the oil industry, said in a statement. If Texas cuts supply, "there is no guarantee other nations, or even states will follow suit." Sitton, a Republican Party activist who ran for re-election on a platform of opposing "socialism and climate-change myths," proposed Texas would curb oil output by 10% in exchange for an equivalent gesture by the cartel that controls more than one-third of global production. Stability Quest. The third commissioner, Christi Craddick, also expressed doubts about capping production, according to a person with direct of knowledge of the situation. Shortly thereafter, EOG Resources Inc., the biggest shale specialist, and the American Petroleum Institute panned the idea." Our Supplemental Documents package includes the Bloomberg reporting.

Oil – Republican senators flip and then flop back to going after Saudi for dumping

Republican senators flip flop on Saudi

It seems like the Republican senators attempt at the carrot (or at least request) to Saudi Arabia to end the oil war didn't work and they are now back to the stick. We wouldn't have included this item if we hadn't had a chuckle after seeing the original flip flop and then a subsequent flip flop by the Republican senators. (i) The first flip flop started with the March 16 letter from 13 Republican senators to Saudi crown prince MBS asking ""*We urge the Kingdom to asse11 constructive leadership in stabilizing the world economy by calming economic anxiety in the oil and gas sector at a time when countries around the world are addressing the pandemic*." The senators were all republicans, there were no democrat senators signing the letter. The chuckle comes because the letter is really the direct opposite position to last year calling for the bust up of OPEC. This week's letter doesn't specifically say it, but the implication is asking for Saudi to go and get the cartel to work together so oil prices are higher and to more stable levels. The chuckle comes because this is in direct contrast to last year when the both parties in the Senate and House supported NOPEC bills. The Senate version was sponsored by republican senators Chuck Grassley and Mike Lee, and by Democrat senators Amy Klobuchar and Pat Leahy. NOPEC was the bill that wanted the attorney general to bring lawsuits against OPEC or any of the member nations for violating US ant-trust laws. (ii) The second flip flop came with two Republican senators March 20 letter to Commerce Secretary Ross asking to investigate Saudi and Russia for dumping. Interestingly, one of the Republican senators, Imhofe, signed both the March 16 and March 20 letters. Our Supplemental Documents package includes the two letters.

Oil – Perhaps US should try the carrot of removing US sanctions on Nord Stream 2

Russia also doesn't like US LNG into Europe

We are in the camp that believes the US Republicans going back to using the stick and threatening more US sanctions isn't likely to have success in getting Russia to end the war. Rather we think there is an obvious carrot – removing sanctions so Russia's Gazprom can complete the Nord Stream 2 gas pipeline to Germany. We have to believe the US closely reads Russian state media TASS reports. We went started with the TASS English version of the Sechin [LINK] version and the original longer version TASS story in Russian [LINK] version (at least translated by Google Translate) because there was one subtle difference that was hopefully noted by the US. (i) US LNG into Europe?. Note the difference. English version "*"Look at what happened during the three years of our participation in the OPEC+ agreement. US oil production was blooming, and they came to the fore of global oil production," Sechin said, adding that the United States was building new export pipelines and sea terminals, while its oil and gas companies attempted to gain a foothold on the European market*." (ii) Russian version (Google Translate) ""*Look what happened during these three years of our participation in the OPEC + agreement. The US oil industry grew rapidly, which came out on top in the world in oil production. This has never happened," Sechin said, adding*

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that they were built about nine new export pipelines, offshore terminals, the active entry of American gas workers and oilmen into the European market began." The TASS English version says "*its oil and gas companies attempted to gain a foothold on the European marke*t" whereas the Google Translate version of the original Russia story with his quotes said "*the active entry of American gas workers and oilmen into the European markets began"*. We have trouble believe that if Sechin said in Russian oil and gas industry (whatever that is) , the Google Translate version of that comment comes out to American gas workers and oilmen? The reason why it struck us is that the Russian version immediately highlighted to us US LNG into Europe whereas we don't think that jumps out in the English version. People often use oil and gas industry to refer to US producers whether they produce oil or natural gas. (ii) Nord Stream 2. The reason why we think this US LNG point is significant is that Sechin seems to include this as a reminder its not just a US shale oil export issue, its also US LNG into Russia's #1 natural gas market Europe. When Russia started the oil war, we wrote "*My big fear is that maybe the suggestion is right that Russia wanted to stick it to the US more than work together with OPEC, then that is a sea change as to what Russia wants. They must be hugely pissed by the US forcing Nord Stream 2 to be halted*." And our thoughts that a give for the US to get Russia to get back to some sort of OPEC+ deal is to remove the sanctions for Nord Stream 2. Its basically completed anyways and will eventually get done one way or another, so all it really is holding out the inevitable.

Oil – Maduro says oil price less than production cost

Maduro says oil price below production costs

On Tuesday, we tweeted [LINK] "*Maduro says oil price is less than production costs. Has to be asking/pleading w/ Russia to end oil war. Wonder what Russia can get if they end the oil war? more control of oil, what about other Venezuela resources ie. iron ore, coal, gold, nickel, diamonds, etc? #OOTT'.* Maduro spoke on Monday and was quoted by Spanish media Agencia Venezolana de Noticias in their March 16 story "*Presidente Maduro ofrece apoyo a sectores economicos del pais ante situation de pandemia*". [LINK]. AVN is one of the Venezuela newsites on our regular website scan list for Energy Tidbits items. The Google Translate version of the Maduro quote is *"Coronvavirus has brought an unprecedented crisis in the economy. the finances, and the oil, the Venezuelan president emphasized at the same time that he pointed out that the price of the Venezuelan crude is located, at the moment, below the production lines*." Once we saw this point, our immediate reaction was as in our tweet, Maduro must be pleading with Russia to end the oil war with Saudi Arabia. And then it wasn't hard to jump to what is the likely key question, what will Russia get from Venezuela if they end the oil war. It just seems like an obvious win for Russia. Venezuela is already in big debt and obligation to Russia and US sanctions have hammered Venezuela. They were hurting before and if the oil price is below production costs, the economy must be getting hammered. Our Supplemental Documents package include the Maduro story.

IMF said it couldn't even consider Maduro's request for $5b

No one should be surprised to have seen the Bloomberg terminal story "*IMF Won't Lend to Venezuela Because Maduro Lacks Recognition*" that said "*The International Monetary Fund said that it can't consider Venezuelan President Nicolas Maduro's request for $5 billion to deal with the coronavirus pandemic because his government isn't recognized by the international community. "Unfortunately, the fund is not in a position to consider this request," an IMF spokesperson said. "As we have mentioned before, IMF engagement with member countries is predicated on official government recognition by the international community, as reflected in the IMF's membership. There is no clarity on recognition at this time."* It was a good try as, on March 4, the IMF announced [LINK] "*The IMF is making available about $50 billion through its rapid-disbursing emergency financing facilities for low income and emerging market*

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countries that could potentially seek support. Of this, $10 billion is available at zero interest for the poorest members through the Rapid Credit Facility." Its too bad that Maduro isn't recognized because it looks like Venezuela would have been a perfect fit for the ideal country to qualify. Yesterday, Bloomberg terminal reported that Venezuela returned to the IMF to ask again, but this time, for only $1 billion. We have to believe it will be rejected for the same reason.

Oil – Libya oil production still below 100,000 b/d, lost revenue now ~$3.55 billion

Libya lost oil revenues now ~3.55 billion

There is no change to almost all of Libya oil production still being shut in with the Haftar ports blockade. As of our news cut off of 8am MT, the latest Libya National Oil Corporation update is at the end of Wed [LINK]. Production went below 100,000 b/d last week, was only down slightly this week and was down to 91,221 b/d on Wed night, down 1,128,779 b/d from pre blockade start on Jan 18. Lost Revenue Now $3.37 billion as of Wed night and should be now up to ~$3.55b. And fuel storage at Tripoli is near zero. Our Supplemental Documents package includes the NOC production update.

Yesterday's ceasefire didn't last 1 day

We had to rewrite this item this morning. Yesterday, the news out of Libya was how Haftar had agreed with a ceasefire to allow Libyans to deal with Coronavirus and we had drafted this item last night as saying we wonder if this ceasefire will actually hold? Recognizing that the Jan 12 ceasefire never really stopped Haftar's attacks. But in turning out computer this morning, we see that the ceasefire didn't even last 1 day. Earlier this morning, we tweeted [LINK] "*Yesterday, Haftar reportedly agreed to ceasefire as part of actions to fight Coronavirus. Didn't even last 1 day w/ reports Haftar rocket attacks on outskirts of Tripoli. Jan 12 ceasefire also didn't stop Haftar attacks. Libya #Oil production should continue to be shut in."* Our Supplemental Documents package include the Libya Observer stories on the ceasefire from 12:30pm Sat and the resuming attacks from 3:35am today.

Tripoli says UAE is illegally supply fuel to Haftar

Especially following the less than 1 day ceasefire, there are no signs that Haftar has any intention of letting up on using oil as a weapon and his attacks on Tripoli. If anything, his attacks on Tripoli are increasing. Most significantly, Haftar continues to be supported by the UAE. Our Monday tweet [LINK] "*how long can Tripoli hold out v Haftar's oil as a weapon? Tripoli is hit hard, prod now 91,108 b/d, down 1.13 mmb/d, lost revenue $3.28b. And Libya NOC notes UAE continues to support Haftar's attacks incl with fuel. increasing risk Libya oil comes back if Tripoli concede*". It was referencing the NOC release "*Chairman denounces illegal fuel imports to Eastern region of Libya"* [LINK] that said how the NOC informed the UN that there was an illegal shipment of fuel from the UAE into the Benghazi port for Haftar. Fuel is in short supply in Libya, so this is a critical advantage for Haftar. And a key one to allow him to keep his press on Tripoli. We believe that, as long as Haftar continues to be supported by the UAE, he has the option of continuing to squeeze Tripoli. A few weeks, ago, Tripoli warned that it faces a catastrophic financial event if the blockade continues. So the question remains how long can Tripoli hang on before conceding to Haftar. And our concern for oil markets is that a Tripoli concession will lead to a quick return of Libya oil to oil markets.

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Haftar expands rocket attacks to Tripoli's "Old City"

Libya Observer also reported this morning "*Tripolitanian Society: Haftar's bombing of the Old City is a vicious attack on the city's heritage*" [LINK]. The significance of the rocket attacks is that the Old City isn't on the outskirts of Tripoli but the heart of Tripoli. This is the "Old City", which is the northern part of Tripoli right at the port.

Figure 24: "Old City" At Northern Point of Tripoli

Source: Google Maps

Oil – Coronavirus shuts down Iraq's ~95,000 b/d Gharraf oilfield

Production halted at Gharraf oilfield

We may all be more worried that Coronavirus is going to cause a shut down to a food distribution center, but the reality is that Coronavirus can shut down any type of facility including oil and gas. Producing facilities can have remote monitoring but need people on the on the ground. It can't be fully run remotely. This week, we saw a good example of Coronavirus causing an oil shut in with the reports that Iraq's ~95,000 b/d Gharraf oil field n southern Iraq was shut down for Coronavirus reasons. Petronas announced it evacuated all employees from the ~95,000 b/d Gharraf oilfield in Iraq as a *"precautionary measure to ensure the health, safety and well-being of our employees"* [LINK]

Oil – Global fuels demand ~50 mmb/d for gasoline and ~7 mmb/d for jet fuel

Global oil demand by fuel

The most common question we are getting in the face of the slowing global economy is how does Coronavirus impact demand. This is especially so with the daily reports of more airlines cutting flight including this morning's news that Emirates is temporarily suspending all flights from March 25. Emirates is the largest airline to ground its entire fleet and has a fleet of 277 aircraft and flies the most passenger miles each year. We do not have a detailed global oil demand model, but, on Friday, we tweeted [LINK] "*Good reference for how global oil demand 100 mmbd is used: 25% gasoline, 30% diesel, 7% jet fuel, 10% NGLs, 20% other, and 7% resid. Lots more in @RaymondJames Marshall Adkins presentation "How Has The Oil Outlook Changed Due To Coronavirus and The Saudi/Russian Rift? #OOTT".* We were invited to the RJ call and they had a number of excellent slides on oil demand and Coronavirus. Our tweet included the below slide, which really answers the most common question on Coronavirus. Our Supplemental Documents only includes a couple of the RJ slides, and we suggest reaching out to them for the full slide deck.

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Figure 25: Global Oil Demand By Fuel

How Much Will Oil Demand Fall in Q2?

- US oil demand = 20 million bpd – 50% gasoline, 20% diesel, 10% jet fuel, 10% NGL's, 10% other
- Global demand = 100 million bpd – 25% gasoline, 30% diesel, 7% jet fuel, 10% NGL's, 20% other, and 7% resid
- Q1 Chinese consumption fell 13% or 1.8 mm bpd
- What will Q2 % decline be in the US?
- What will Q2 % decline be in the World?

RAYMOND JAMES 6

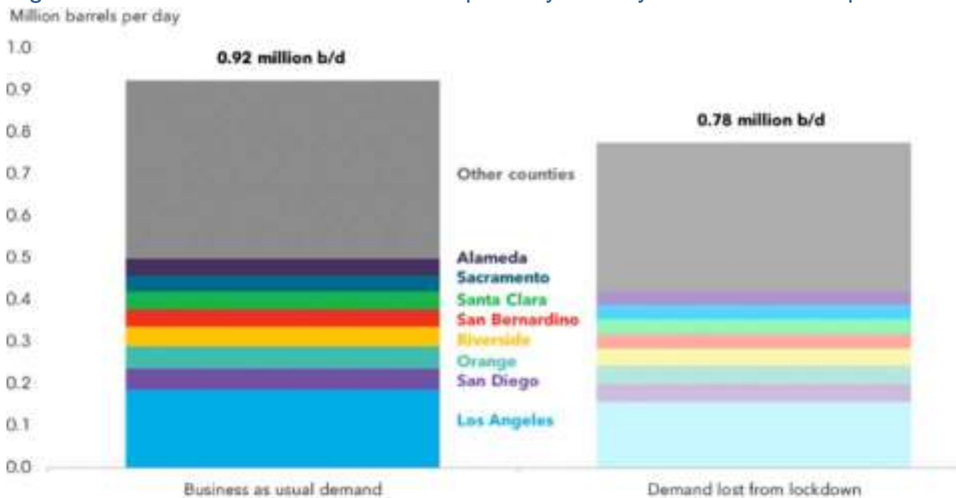
Source: Raymond James

Oil – Bloomberg, California lockdown to hit gasoline demand by 800,000 b/d

California to hit gasoline demand by 800,000 b/d

Most often forget how significant California is on energy markets, especially oil demand. Bloomberg terminal put out a good piece "*California Lockdown the Biggest Hit to Oil Demand Yet: BNEF*". Bloomberg estimates the California lockdown will lead to the loss of 800,000 b/d of gasoline demand. Bloomberg wrote "*California is the largest gasoline consumer of all U.S. states, with some counties consuming more gasoline per day than a large European nation like Italy. To estimate the demand disrupted by the lockdown, BloombergNEF assumes that 90% of work commutes will be disrupted and 80% of other daily trips will cease. Under this scenario, cars and light trucks travel 84% fewer miles each day in total*". Below is the Bloomberg by county graph. Our Supplemental Documents package includes the Bloomberg terminal story.

Figure 26: California Gasoline Consumption by County and Demand Impact



Source: Bloomberg

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Oil – Explosion at Petronas-Aramco Malaysia refinery kills 5 people

Explosion at Petronas-Aramco refinery

Horrible news this week, as for the second time in a year, there was an explosion at the Petronas-Aramco Pengerang refining complex in Malaysia [LINK]. The first explosion occurred in April of 2019, which luckily had no casualties, but another explosion happened last Sunday, leaving 5 people dead. The refinery is set to process 300,000 b/d once fully operational is owned 50/50 between Petronas and Saudi Aramco. Fortunately, the New Strait Times reported on Thurs [LINK] that the explosion and fire had not triggered any environmental pollution in the surrounding areas, and they wrote *"The Environment Department (DOE) said investigations had revealed that so far there was no pollution; no smoke was visible from the premises; and no odour was detected from the site that could affect residents and the public"*. As noted earlier, we were surprised that there were no analyst calls on the Aramco Q4 call on this incident to get more details. As of our 8am news cut off this morning, we still haven't seen much details and the cause of the incident is still under investigation

Oil & Natural Gas – Cdn companies have cut 29% or $6.2b from 2020 capex

Cdn companies have massively reduced capex

As we and others have been noting, one of the big stories this week has been a massive pullback in capex from US producers, and the story has been the same in Canada. With WTI sitting around $22, and WCS falling as low as ~$8 this week, Cdn producers have been quick to react by slashing 2020 capex. We have been tracking updated guidance from Cdn producers and midstreamers to gauge the aggregate reduction in capex to better understand how the lower capex will impact production in 2020, and also to compare against the CAPP oil and gas capex forecast for 2020. As we noted in our Feb 2, 2020 Energy Tidbits memo [LINK], CAPP had forecast that Cdn upstream capex would be up $2bn YoY to $37bn in 2020 but note, this forecast was put together before the oil price crash. Based on updated guidance from public Cdn oil and gas companies (including midstream), aggregate 2020 capex has been cut $6.2bn or -29% from initial guidance, and for Cdn producers, capex has been cut $5.1bn or -28%. We recognize that this $5.1bn reduction for Cdn listed producers isn't 100% directed at Cdn upstream capex, as some of the spending from senior/integrated companies relates to downstream etc. and not all of the spending from Cdn producers is entirely focused in Canada (Gran Tierra for example) but the takeaway is Cdn upstream capex is going way lower, which means lower Cdn production and slashing of jobs in the energy sector. The other important item to watch for in updated guidance, is how much companies have already spent in Q1, vs what rest of year spending looks like. Due to better surface access in winter drilling, many western Canadian producers will have Q1 capex being more than ¼ of a full year capex budget. And even with spring breakup always leading to low Q2 capex, first half capex is normally more than 50% of full year capex budgets. For example, Gear Energy cut its 2020 capex budget from $50mm to $13mm, but has already spent $11mm of the $13mm in Q1, and Cardinal Energy reduced its capex budget to $31mm but already spent $22mm in Q1, leaving just $9mm for the remaining 3 quarters in 2020. The other takeaway is that aggregate Cdn upstream capex (which includes private companies) for 2020 is going way lower than the CAPP forecast of $37bn. Below is our running table of capital spending reductions, which includes some general notes from updated guidance.

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Figure 27: Canadian Capex Responses

Senior/Integrated	2020 Capex ($mm)			
Company	Old	Reduction	New	Other Comments
CNRL	$4,050	($1,090)	$2,960	No change to production guidance or dividend
Husky	$3,300	($900)	$2,400	Also $100mm in additional cost saving measures
Cenovus	$1,400	($450)	$950	Temporarily suspending CBR program. Deferring FID on major growth projects
Ovintiv (US$mm)	$2,700	($300)	$2,400	$300mm reduction applies to Q2 only, will provide full 2020 outlook with Q1 reporting
Total Senior/Integrated	**$11,450**	**($2,740)**	**$8,710**	

Large/Mid Cap	2020 Capex ($mm)			
Company	Old	Reduction	New	Other Comments
Crescent Point	$1,150	($400)	$750	Also cut quarterly dividend to $0.0025 from $0.01
Enerplus	$545	($220)	$325	2020 production guidance cut 8%. Ceasing all drilling/completions in North Dakota
Baytex	$538	($263)	$275	Immedietly suspending drilling in Canada
7 Gens	$1,100	($200)	$900	2020 production guidance cut 7%
ARC	$500	($200)	$300	Cut dividend from $0.60/sh to $0.24/sh
Paramount	$400	($182)	$218	2020 production guidance cut 6%
Whitecap	$360	($155)	$205	2020 production guidance cut 6%. Cut monthly dividend from $0.0285 to $0.01425
Gran Tierra	$210	($140)	$70	Elected to shut in 1,000-1,500 b/d of higher cost production
Kelt	$225	($80)	$145	2020 production guidance cut 12% to reflect delayed start-up of new wells
Nuvista	$315	($75)	$240	Indicated possibility of reducing capex to "below $200mm"
Birchcliff	$350	($65)	$285	Primarily relates to deferral of 10 oil wells
MEG	$250	($50)	$200	Expects to internally fund the 2020 capital program
Vermillion	$100	($20)	$80	Also cut monthly dividend to $0.02 from $0.115
Total Large/Mid Cap	**$6,043**	**($2,050)**	**$3,993**	

Small Cap	2020 Capex ($mm)			
Company	Old	Reduction	New	Other Comments
Pipestone	$150	($90)	$60	2020 production guidance cut 8%
Tamarack	$175	($75)	$100	2020 production guidance cut 8%
Bonterra	$70	($45)	$25	Eliminated dividend effective April
Gear	$50	($37)	$13	$11mm of the $13mm has already been spent in Q1
Cardinal	$67	($36)	$31	Already spent $22mm in Q1, leaving $9mm of capex for remainder of 2020
Athabasca	$125	($30)	$95	Curtaliled Haringstone production by 50%
Total Small Cap	**$637**	**($313)**	**$324**	
Total Cdn Producers	**$18,130**	**($5,103)**	**$13,027**	

Pipelines/Midstream	2020 Capex ($mm)			
Company	Old	Reduction	New	Other Comments
Pembina	$2,300	($1,000)	$1,300	$4.55bn of projects delayed until at least 2021
Inter Pipeline	$1,195	($90)	$1,105	Reduced capex by $60mm-$90mm - used the midpoint
Total Pipelines/Midstream	**$3,495**	**($1,090)**	**$2,405**	
Total	**$21,625**	**($6,193)**	**$15,432**	

Source: Company Reports, SAF

Oil and Natural Gas – Indicators that China's activity is increasing, albeit slowly

Indictors point to China moving off the bottom

The Coronavirus headlines this week were on the US and other parts of the world (Italy, Iran, etc) that are seeing rising increase in Coronavirus cases and the major actions taken by governments to try to flatten the curve. As a result, China was mostly overlooked this week. China has reported 4 days with only one new home grown case, and the other new Coronavirus cases being from people entering the country. And we continue to see reports of China starting to get back to work. On Friday, we tweeted [LNK] "*Great charts (Thx BloombergNEF) showing China is starting to recover f/ Coronavirus. "labor migration back to cities" "northern cities have returned to regular industrial emissions levels". Still a long way to go, but looks like demand bottom has passed.*" We included the below two charts from BloombergNEF's report "*Covid-19 Indicators: Metals*" because they aren't the normal indicators on industrial activity used by others. Both charts point to a return to industrial activity recovery.

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Figure 28: Labor Migration in China

Labor Migration Back to Cities

More than half of seasonal migrants have now returned to major cities

Source: BloombergNEF, qianxi.baidu.com. Note: 'Migration index' is a proprietary calculation published by Baidu that represents the inbound and outbound flow of people from Chinese cities. T zero refers to the first day of the lunar calendar. Migration returning to cities is based on total net flows out of each city over a 20-day period prior to the Spring Festival holiday.

- More than half of the people that left China's major cities for the Chinese New Year holiday have now returned, according to mobile phone location data published by Baidu. In 2019, it took just over 25 days after the Lunar New Year holiday for 100% of seasonal migration to return to the cities. 35 days after the 2020 lunar new year, 40-50% of seasonal migration is yet to return.
- Seasonal migration is particularly important for the resumption of construction activities in China. Migrant laborers form the back-bone of on-site workers for many private construction sites (not as much for larger scale government driven infrastructure projects). There is a chicken-and-egg problem for the migrant labor market – seasonal laborers do not have long-term work contracts that guarantee them a job upon returning from Lunar Festival. Traditionally, they spend a week or two immediately following the holiday looking for new positions. However, without guarantee of construction site restarts, migrant laborers will be reluctant to risk trains/buses and other forms of transport that would expose them to Covid-19, to return to major cities. Without labor, construction sites can not restart.

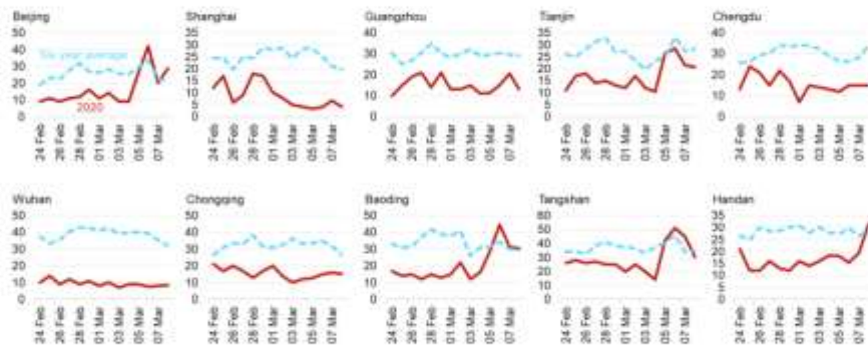
9 March 2020 BloombergNEF

Source: BloombergNEF

Figure 29: China Air Quality Index

Air Quality Index

Northern cities have returned to regular industrial emissions levels



Source: BloombergNEF, aqicn.org. Note: The charts show the daily average NO2 AQI for each city. The six-year average is calculated based on the lunar calendar.

- Nitrogen dioxide (NO2) levels in major Chinese cities are below historical average levels in several southern cities like Shanghai, Guangzhou, Chengdu, and Chongqing, indicating heavy duty commercial vehicles (trucks) activity (a source of NO2 emissions) has not returned to regular levels.
- However, NO2 levels have jumped over the past few days in a number of major industrial centers in Hebei province (Baoding, Tangshan and Handan) and across the north (Beijing, Tianjin). This could signal a return to normal level industrial output, particularly for steel producing regions.

11 March 2020 BloombergNEF

Source: BloombergNEF

Capital Markets – Nabors proposes reverse stock split, likely more to follow

Nabors proposes reverse stock split

We have to expect to see others follow Nabors lead in looking at reverse stock splits to raise share prices to ensure exchange eligibility and to maximize the number of potential investors in a dwindling pool of investors, in particular for oil and gas stocks. Penny stocks are generally not eligible for major exchange listings and also many institutional investors won't/can't invest in penny stocks. We were surprised to see the Nabors Wednesday announcement for a "*reverse stock split proposal includes a proposed range between 1-for-15 and 1-for-50 common shares*". [LINK] The big part for our surprise (and we probably shouldn't have been) in seeing Nabors stock at 41 cents or down ~90% YTD.

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Capital Markets – Shorter trading hours have to be coming soon

Shorter trading hours ahead?

On Tuesday, we tweeted [LINK] during the White House press conference on financial actions being taken "*Something to keep in mind for trading ie. stocks, oil, #NatGas, metals, bonds, etc Mnuchin just said it "may get to a point of shorter hours" "make it very clear we intend to keep markets open". Isn't it inevitable that shorter market hours are going to happen any day?*" Treasury Secretary Mnuchin was discussing the administration financial plan and in the Q&A responded to a question of keeping markets open. The reality is for all life is that people availability for all businesses is being stretched or just not available. Its why we think there will inevitably be shorter trading hours. On Wed, the NYSE announced it was moving away from its physical trading floor for Monday due to 2 positive coronavirus tests to a fully electronic trading. The concern is that more staff getting put out of commission for coronavirus impact (direct or indirect) will reduce capacity. Its why we have to think shorter trading hours for all financial markets are coming soon.

Demographics – Coronavirus is way more deadly for 50-64 age group than the flu

Coronavirus mortality by age group

As opposed to saying I am not a doctor, but …. I will say I am analyst so love numbers and, after seeing the Imperial College coronavirus data on mortality rates by age group (Imperial College COVID-19 Response Team "*Impact of non-pharmaceutical interventions (NPIs) to reduce COVID19 mortality and healthcare demand*" [LINK]), couldn't help do my own digging on how that compares to the normal flu. Everyone has clearly heard the mortality rate is higher with coronavirus than the normal flu and the data supports that common statement. And the data supports that the oldest have the highest mortality rates and then youngest have the lowest mortality rates. But when I compared the Imperial College data vs the CDC data for mortality rates for the flu (CDC "*Table 2: Estimated rates of influenza-associated disease outcomes, per 100,000, by age group — United States, 2017-2018 influenza season*" [LINK]), there was one surprising conclusion and tweeted [LINK] "*Interesting mortality rates by age group #Covid19 vs flu. No surprise all ages have multiples higher mortality rates. Age groups aren't exactly same, but surprisingly, the multiplier vs flu is highest for 50-64 yrs Boomers 2/Early Gen x (~15x) v >65 (~8x) v 20-49 (~5x).*" The 50-64 yrs group data so far for the US and UK was showing that this age group is having ~15 times higher mortality rate than the normal flu, an even higher multiplier than the oldest people relative to flu. Our Supplemental Documents package includes the excerpts from the Imperial College coronavirus data and the CDC flu data.

Twitter – Look for our first comments on energy items on Twitter every day

@Energy_Tidbits on Twitter

For new followers to our Twitter, we are trying to tweet on breaking news or early views on energy items, most of which are followed up in detail in the Energy Tidbits memo or in separate blogs. Our Twitter handle is @Energy_Tidbits and can be followed at [LINK]. We wanted to use Energy Tidbits in our name since I have been writing Energy Tidbits memos for over 19 consecutive years. Please take a look thru our tweets and you can see we aren't just retweeting other tweets. Rather we are trying to use Twitter for early views on energy items. Our Supplemental Documents package includes our tweets this week.

Energy Tidbits – Sign up on our email distribution for tidbits and blogs

Sign up to receive future Energy Tidbits memos

For those interested in receiving out Energy Tidbits memos and blogs, please go to our blog sign up. We will be using the blog notification list for Energy Tidbits. The blog sign up is available at [LINK].

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LinkedIn – Look for quick energy items from me on LinkedIn
I can also be reached on Linkedin and plan to use it as another forum to pass on energy items in addition to our weekly Energy Tidbits memo and our blogs that are posted on the SAF Energy website [LINK].

Look for energy items on LinkedIn

Misc Facts and Figures.
During our weekly review of items for Energy Tidbits, we come across a number of miscellaneous facts and figures that are more general in nature

Use Dr. Oz's "Turkish twist" to wash hands for coronavirus protection
By now everyone in North America should know to wash their hands for at least 20 seconds. CDC website [LINK] says "T*ake steps to protect yourself. Clean your hands often. Wash your hands often with soap and water for at least 20 seconds especially after you have been in a public place, or after blowing your nose, coughing, or sneezing."* What we hadn't realized was that there was certain method to washing hands to provide the maximum protection against coronavirus, that is until we saw the Dr. Oz demonstrate the proper hand washing method that includes using the "Turkish twist" technique. Where you put your palms together and rub your fingers, the key being it rubs the front of the finger against the back of other fingers and "*this rubbing action is important because it's the tip of the finger that infects you*".and "*then you rub your thumbs separately".* Below is a quick 57 sec Dr. Oz demonstration video.

Figure 30: Dr. Oz "Turkish twist" to wash hands

Source: TRTWorld, YouTube

Another leading China indicator for Coronavirus impact, movie theatres
Its been interesting to see how what happened in other parts of the world in dealing with, or the impacts from, Coronavirus in the earlier hit countries looks to find its way to later cities or countries. A good example of a leading indicator is movie theatres. Our Feb 16, 2020 Energy Tidbits noted a tidbit from Raymond James Feb 10, 2020 Coronavirus call. RJ noted in the opening weekend of Chinese new year holiday, 70,000 theatres closed, last year gross for the opening weekend was $360 mm, this year $2 mm. This week, WSJ reported [LINK] that box office sales in the US and Canada were just $54.2mm last weekend, the worst weekend sales since 9/11. This number will only get worse with more cinemas announcing closures this week, and begs the question, will we see a comeback in drive in cinemas? Below is a Capital Economics graph of daily cinema ticket sales in China

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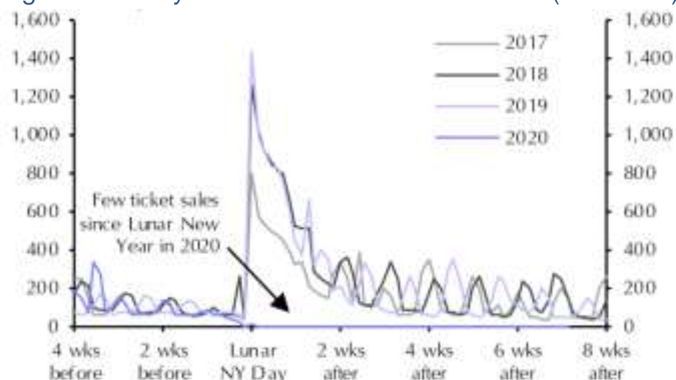
Figure 31: Daily Cinema Ticket Sales in China (RMB mm)



Source: Capital Economics

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