

Energy Tidbits

November 20, 2022

Produced by: Dan Tsubouchi

Did COP27 Sneak in Admission of a 2-Step? Step 1 Transform to Low-Carbon Economy, Step 2 Work to Reach Net Zero in 2050?

Welcome to new Energy Tidbits memo readers. We are continuing to add new readers to our Energy Tidbits memo, energy blogs and tweets. The focus and concept for the memo was set in 1999 with input from PMs, who were looking for research (both positive and negative items) that helped them shape their investment thesis to the energy space, and not just focusing on daily trading. Our priority was and still is to not just report on events, but also try to interpret and point out implications therefrom. The best example is our review of investor days, conferences and earnings calls focusing on sector developments that are relevant to the sector. Our target is to write on 48 to 50 weekends per year and to post by noon MT on Sunday. The Sunday noon timing was because PMs said they didn't have research to read on Sundays and Sundays are a day when they start to think about the investing week ahead.

This week's memo highlights:

1. COP27 seemed to sneak in admission that need to have an energy "transition" with step 1 to transform to a "Low-Carbon" economy and step 2 is work to reach Net Zero in 2050 ([Click Here](#))
2. COP27 warned need \$4T/yr in renewable energy investment "and that, furthermore, a global transformation to a Low-Carbon economy is expected to require an investment of at least \$4-6T per year". ([Click Here](#))
3. A slower China reopening as it looks like China local governments aren't following China leaderships "20 rules" to ease Covid restrictions ([Click Here](#))
4. Freeport LNG says restart will be ~2 months later than expected ie. Targets return to ~2 bcf/d sometime "in" Jan. ([Click Here](#))
5. Warmer than normal weather in Europe is forecast to continue in Dec/Jan/Feb. ([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
Chief Market Strategist
dtsubouchi@safgroup.ca

Ryan Dunfield
CEO
rdunfield@safgroup.ca

Aaron Bunting
COO, CFO
abunting@safgroup.ca

Ryan Haughn
Managing Director
rhaughn@safgroup.ca

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Natural Gas – Natural gas injection of +64 bcf, storage now +4 bcf YoY surplus

This winter started with a YoY storage deficit of -101 bcf YoY on Oct 28 and is now at a +4 bcf surplus YoY. The EIA reported a +64 bcf build (+66 bcf expectations) for the Nov 11 week, which was above both the 5-yr average of a -5 bcf draw, and last year’s injection of +26 bcf. Storage is 3.644 tcf as of Nov 11, with a now YoY surplus of +4 bcf YoY vs -37 bcf YoY last week and is -7 bcf below the 5-year average vs -76 bcf below last week. Below is the EIA’s storage table from its Weekly Natural Gas Storage Report [\[LINK\]](#).

YoY storage at now flat YoY4

Figure 1: US Natural Gas Storage

| Region | Stocks billion cubic feet (Bcf) | | | | Historical Comparisons | | | |
|---------------|------------------------------------|----------|------------|--------------|------------------------|----------|-----------------------------|----------|
| | 11/11/22 | 11/04/22 | net change | implied flow | Year ago (11/11/21) | | 5-year average (2017-21) | |
| | | | | | Bcf | % change | Bcf | % change |
| East | 882 | 865 | 17 | 17 | 900 | -2.0 | 902 | -2.2 |
| Midwest | 1,084 | 1,068 | 16 | 16 | 1,078 | 0.6 | 1,078 | 0.6 |
| Mountain | 208 | 208 | 0 | 0 | 212 | -1.9 | 212 | -1.9 |
| Pacific | 241 | 247 | -6 | -6 | 261 | -7.7 | 290 | -16.9 |
| South Central | 1,228 | 1,193 | 35 | 35 | 1,189 | 3.3 | 1,169 | 5.0 |
| Salt | 327 | 311 | 16 | 16 | 330 | -0.9 | 318 | 2.8 |
| Nonsalt | 901 | 882 | 19 | 19 | 859 | 4.9 | 851 | 5.9 |
| Total | 3,644 | 3,580 | 64 | 64 | 3,640 | 0.1 | 3,651 | -0.2 |

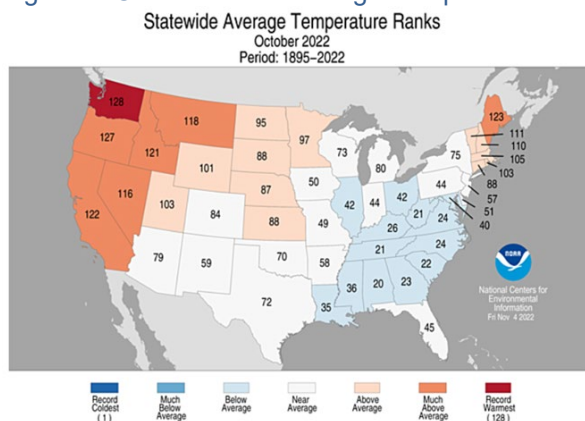
Source: EIA

Natural Gas – NOAA says it was 29th warmest October on record

On Thursday, NOAA released National Climate recap for the US for October. NOAA ranks Oct as the 29th warmest October in the last 128 years. This was perfect weather to note see any early start to weather related natural gas demand for heating, but generally not too hot to require significant air conditioning demand. At NOAA’s press conference on the recap, NOAA said “we see the contiguous U.S. had an average temperature of 55.3 degrees Fahrenheit, which is 1.2 degrees Fahrenheit above the 20th century average. This ranks in the warmest third of the historical record. Generally, temperatures were above average in New England and from parts of the central and northern plains to the West Coast.” Below is NOAA’s Statewide Average Temperature Rankings for October [\[LINK\]](#).

October was warm

Figure 2: US Statewide Average Temperature Ranks Oct 2022



Source: NOAA

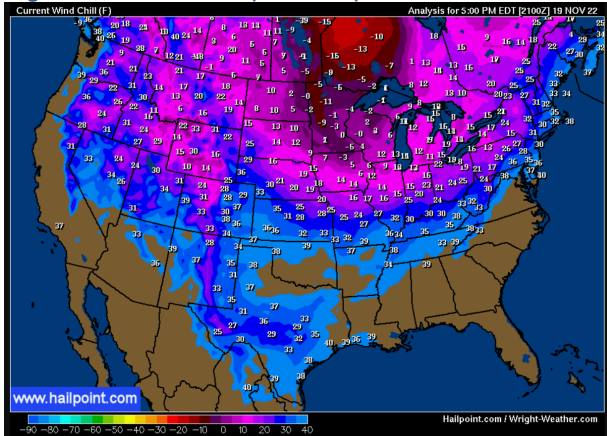
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Natural Gas – Big chill next few days but then US turning warmer

The short term weather forecasts have been pretty solid for the past week that has seen cold weather move into most of northern half of the US. Below is the chill map as of yesterday 5pm ET. [LINK](#). But, as has been the forecast, the US is expected to turn a warmer to end November. Below are NOAA's 6-10 day and 8-14 day temperature outlooks as of yesterday afternoon.

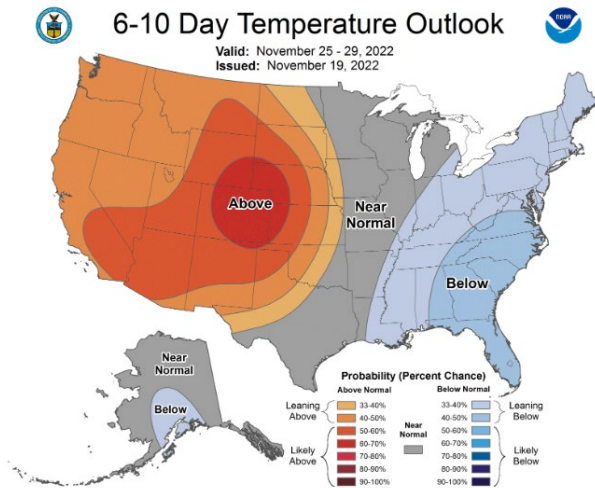
NOAA 6-10 & 8-14 day temp outlook

Figure 3: US chill map as of 5pm ET on Nov 19



Source: Hallpoint.com

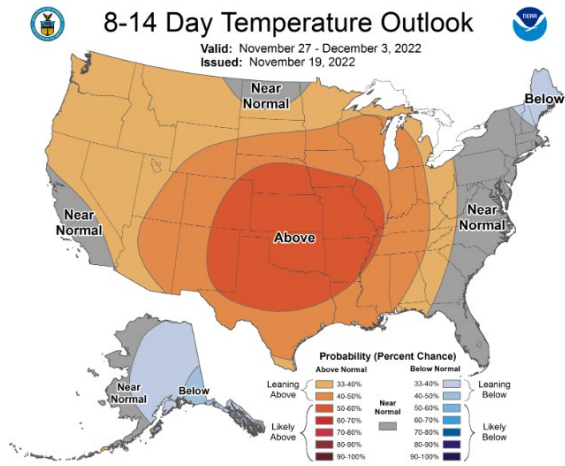
Figure 4: NOAA 6-10 day temperature outlook as of Nov 19



Source: NOAA

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Figure 5: NOAA 8-14 day temperature outlook as of Nov 19



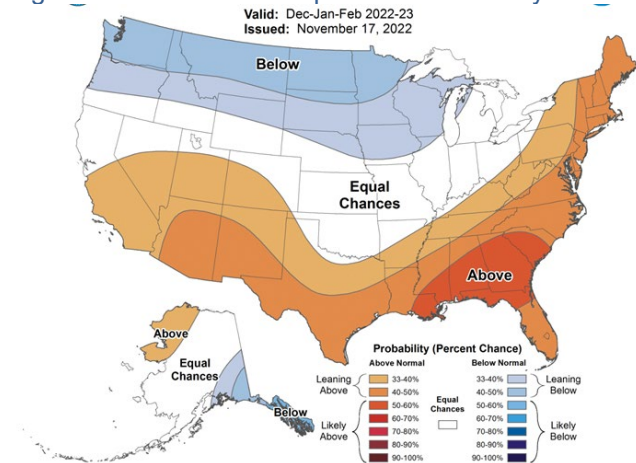
Source: NOAA

Natural Gas – NOAA still expects a warmer than normal DJF

On Thursday, we tweeted [LINK](#) “if it wasn’t for the scramble to replace Russian #NatGas, #LNG & Global #NatGas prices would be a lot lower with @CopernicusECMWF forecast for very warm DJF for EU & warmer than normal Asia, & now @NOAA forecasts a warmer than normal DJF for US. #OOTF”. Every month, NOAA posts its seasonal outlook [LINK](#). Weather forecasts are far from 100%, but this will impact tone on natural gas until we see different weather developing. However, the massive, expected lake-effect storm this weekend will possibly keep people positive for now. Overall, the NOAA is forecasting a warmer than normal DJF which will have a negative impact on weather related natural gas demand. Below is the new NOAA temperature probability map for DJF.

NOAA forecasts a warm DJF

Figure 6: NOAA DJF Temperature Probability Forecast



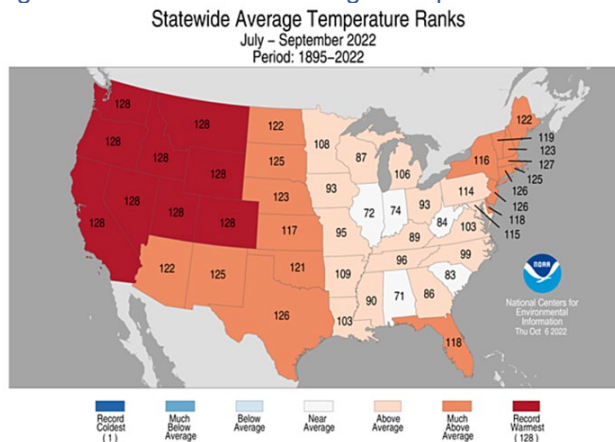
Source: NOAA

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Last 2021/22 winter Dec/Jan/Feb was 18th warmest on record

The new NOAA seasonal outlook for the peak winter DJF may not be great, but it will certainly be better for natural gas than the just passed winter 2021/22. Last winter was hot. Our April 10, 2022 Energy Tidbits memo highlighted NOAA's recap of winter 2021/22, when NOAA ranked DJF 2021/22 as the 18th warmest on record in the last 128 years.

Figure 7: US Statewide Average Temperature Ranks DJF 2021/2022



Source: NOAA

Natural Gas – EIA, US shale/tight natural gas forecast +7.5% or +6.683 bcf/d YoY in Dec

EIA's Drilling Productivity Report Nov 2022 was released on Monday, and the key takeaway is that Dec would be the 8th consecutive month of growth for US shale/tight natural gas, albeit the last few have been more modest MoM growth but growth nonetheless. The DPR [\[LINK\]](#) is the EIA's forecast for oil and natural gas production from the major shale/tight oil and gas basins for the current month (in this case Nov) and the next month (in this case Dec). (i) Shale/tight natural gas is forecasted to have 8 months of consecutive growth and has been breaking out since April, as increasing US LNG export capacity out of the Gulf Coast is driving natural gas growth in Louisiana and Texas. US shale/tight natural gas was 90.100 bcf/d in April and Dec is forecasted at 95.688 bcf/d. (ii) MoM. Three of the shale/tight gas areas were basically flat – Anadarko, Bakken and Niobrara. The largest increases came from Haynesville (+0.174 bcf/d MoM), Permian (+0.125 bcf/d MoM) and Appalachia (+0.135 bcf/d MoM). (iii) Total US shale/tight natural gas production is expected +6.683 bcf/d YoY for Dec. All shale/tight plays except for the Niobrara are up YoY, with the most notable YoY increases being Haynesville +2.383 bcf/d YoY and Permian +1.695 bcf/d YoY. The two key shale/tight plays feeding growth US LNG exports. Appalachia is basically flat YoY. (iv) Remember US shale/tight gas is ~90% of total US natural gas production. So whatever the trends are for shale/tight gas are the trends for US natural gas in total. Below is our running table showing the 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 EIA DPR.

Shale/tight gas production

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Figure 8: MoM Change – Major Shale/Tight Natural Gas Production

| mmcf/d | Dec | Jan | Feb | Mar | Apr | May | Jun | July | Aug | Sept | Oct | Nov | Dec | Dec YoY | Dec YoY % | Dec less Nov |
|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|--------------|
| Anadarko | 6,321 | 6,278 | 6,341 | 6,286 | 6,118 | 6,134 | 6,275 | 6,554 | 6,658 | 6,715 | 6,708 | 6,832 | 6,836 | 515 | 8% | 4 |
| Appalachia | 34,825 | 34,988 | 35,716 | 36,298 | 35,443 | 35,476 | 35,155 | 35,121 | 35,332 | 35,486 | 35,577 | 35,434 | 35,569 | 744 | 2% | 135 |
| Bakken | 3,071 | 3,150 | 3,137 | 3,079 | 2,932 | 3,076 | 3,088 | 3,086 | 2,915 | 3,191 | 3,156 | 3,246 | 3,275 | 204 | 7% | 29 |
| Eagle Ford | 6,012 | 6,118 | 6,176 | 6,288 | 6,298 | 6,394 | 6,538 | 6,671 | 6,985 | 7,101 | 7,220 | 7,311 | 7,390 | 1,378 | 23% | 79 |
| Haynesville | 13,874 | 14,019 | 14,291 | 14,425 | 14,527 | 14,863 | 15,023 | 15,261 | 15,643 | 15,835 | 15,878 | 16,083 | 16,257 | 2,383 | 17% | 174 |
| Niobrara | 5,329 | 5,339 | 5,293 | 5,196 | 5,254 | 5,187 | 5,195 | 5,205 | 5,212 | 5,223 | 5,062 | 5,074 | 5,092 | -237 | -4% | 18 |
| Permian | 19,573 | 19,936 | 20,233 | 20,160 | 19,533 | 19,870 | 20,227 | 20,373 | 20,417 | 20,584 | 20,930 | 21,143 | 21,268 | 1,695 | 9% | 125 |
| Total | 89,005 | 89,828 | 91,187 | 91,732 | 90,105 | 91,000 | 91,501 | 92,271 | 93,162 | 94,135 | 94,531 | 95,123 | 95,688 | 6,683 | 8% | 565 |

Source: EIA, SAF

Natural Gas – US LNG exports +3.7% YoY in Sept at 9.8 bcf/d

As a reminder, the US Dept of Energy posts monthly US LNG export data at least a week before the EIA (part of the US Dept of Energy) posts US LNG export data in its monthly Natural Gas Monthly report (next report is Nov 30). Normally, the data points are the same. On Wednesday, the DOE posted its LNG Monthly for US LNG exports in September. [\[LINK\]](#) The headline numbers as the US exported 9.8 bcf/d of LNG in Sept, which was down 1.6% MoM vs August 2022, and +3.7 YoY vs Sept 2021. Our table below is rounded numbers to one decimal and the actual Sept exports were 9.83 bcf/d. Reminder, US LNG is down because of the continued outage at Freeport LNG, which is 2.2 bcf/d. Below is our table of EIA's monthly LNG exports. Our Supplemental Documents package includes excerpts from the DOE LNG Monthly.

US Sept LNG exports

Figure 9: US LNG Exports (bcf/d)

| (bcf/d) | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---------------|-------|-------|---------|---------|---------|---------|---------|
| Jan | 0.0 | 1.7 | 2.3 | 4.1 | 8.1 | 9.8 | 11.4 |
| Feb | 0.1 | 1.9 | 2.6 | 3.7 | 8.1 | 7.4 | 11.3 |
| March | 0.3 | 1.4 | 3.0 | 4.2 | 7.9 | 10.4 | 11.7 |
| Apr | 0.3 | 1.7 | 2.9 | 4.2 | 7.0 | 10.2 | 11.0 |
| May | 0.3 | 2.0 | 3.1 | 4.7 | 5.9 | 10.2 | 11.3 |
| June | 0.5 | 1.7 | 2.5 | 4.7 | 3.6 | 9.0 | 10.0 |
| July | 0.5 | 1.7 | 3.2 | 5.1 | 3.1 | 9.7 | 9.7 |
| Aug | 0.9 | 1.5 | 3.0 | 4.5 | 3.6 | 9.6 | 9.7 |
| Sept | 0.6 | 1.8 | 2.7 | 5.3 | 5.0 | 9.5 | 9.8 |
| Oct | 0.1 | 2.6 | 2.9 | 5.7 | 7.2 | 9.6 | |
| Nov | 1.1 | 2.7 | 3.6 | 6.4 | 9.4 | 10.2 | |
| Dec | 1.3 | 2.7 | 4.0 | 7.1 | 9.8 | 11.1 | |
| Full Year | 0.5 | 1.9 | 3.0 | 5.0 | 6.6 | 9.7 | 10.7 |
| Full Year bcf | 186.8 | 707.5 | 1,083.1 | 1,819.4 | 2,390.0 | 3,560.8 | 2,912.8 |

Source: EIA, DOE

Europe continues to be main destination for US LNG in 2022

One of the reasons why we like the DOE LNG Monthly is that it provides LNG insights on more than just the numbers. The DOE always summarizes the top destinations for US LNG in the month. We went back to the DOE LNG Monthly report in Nov 2021 that had the comparable top LNG destinations data for Sept 2021. For September 2022, the DOE reported "Top five countries of destination, representing 61.4% of total U.S. LNG exports in September 2022 was France (57.9 Bcf), United Kingdom (48.0 Bcf), Netherlands (30.9 Bcf), Spain (24.7 Bcf), and South Korea (19.7 Bcf). For September 2021, last year's DOE LNG Monthly Nov 2021 reported highlighted "Top five countries of destination, representing 61.4% of total U.S. LNG exports in September 2021. China (48.6 Bcf), Brazil (38.3 Bcf), South Korea (31.4 Bcf), Spain (31.3 Bcf), and Turkey (24.2 Bcf).

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Natural Gas – Freeport LNG targets mid-Dec initial production and hit ~2 bcf/d “in” Jan

Recall that the last formal FreeportLNG timing update was for a restart in early to mid Nov from its 2.2 bcf/d LNG export facility that was shut down on June 8. We were surprised it took all week to see Freeport LNG to provide a formal update to the restart but that it looks to be about two months later than expected. (i) Recall on Nov 11, US natural gas markets were hit with what Freeport LNG later press released were false tweets. (ii) On Monday, we tweeted [\[LINK\]](#) “Near term negative to HH #NatGas price. See 📌, sounds like #FreeportLNG cargos won't resume until after Dec, not target mid Nov. Makes sense, haven't seen any indications they have even started the process to resume operations. Thx @SStapczynski @a_shiryaevskaya #LNG #OOTT. The key for us remains that we need to see an indication they are moving on a restart process ie. that will signal approvals have been received and fix up is complete. Bloomberg reported that LNG cargoes weren't happening in Dec as they “told buyers it will likely cancel shipments scheduled for November and December as work continues on repairs and regulatory approvals before a restart”. (iii) No one should have been surprised to see Freeport LNG's Friday release providing a formal update to the timing for LNG. It's about 2 months later than expected. On Friday midday, Freeport LNG released [\[LINK\]](#) “Subject to Freeport LNG meeting its regulatory requirements, it is targeting initial production at the facility in mid-December. Each of Freeport LNG's three liquefaction trains will be restarted and ramped up safely, in a slow and deliberate manner, with each train starting separately before restarting a subsequent train. It is expected that approximately 2 BCF per day of production will be achieved in January 2023. Full production utilizing both docks remains anticipated to commence in March 2023.” Based on how Freeport LNG uses early or mid month when it can, we have to believe a timing of “in” Jan is suggesting a late Jan timeline. The key reminder from their release is that it takes about 4-6 weeks for when they restart to when they get to ~2 bcf/d. We tweeted [\[LINK\]](#) “Key #FreeportLNG timing to watch - when do they actually start up production. Today's update suggests 4-6 weeks from restart to ~2 bcf/d ie. now target mid-Dec initial production at facility to hit ~2 bcf/d "in" Jan. Continued negative to HH #NatGas, positive to #LNG prices #OOTT”. Our Supplemental Documents package includes the Freeport LNG Nov 18 release and the Bloomberg Nov 14 report.

**Freeport LNG
restart ~2 mths
delayed**

Freeport released an extensively blacked out failure analysis report

On Tuesday, Freeport LNG issued a release [\[LINK\]](#) “Freeport LNG provides a summary of root cause failure analysis report”. This was a summary of a 290+ pg report by the IFO Group “June 8, 2022 – Loss of Primary Containment Incident Investigation Report”. We downloaded and we were surprised by the extensive amount of text and graphics that were blacked out throughout the report. It's hard to read an extensively blacked out report and get the detailed message. The Freeport LNG short summary release did note a number of direct, root and contributing causes. Freeport LNG did say that the “IFO Group proposed recommendations to resolve each of the above root and contributing causes, and Freeport LNG is implementing each of those recommendations.” The release may be a summary of what Freeport LNG wants to say about the IFO Group 290+ pg report, but it makes sense why the restart isn't hitting Freeport LNG's prior restart timing. Our Supplemental Documents package includes the Freeport release. We did not see the value in included excerpts from the extensively blacked out IFO Group report.

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On Nov 11, Freeport LNG said not legitimate tweet, but didn't update restart

Here is what we wrote in the Nov 13, 2022 Energy Tidbits. "US natural gas markets got hit on Friday with what Freeport LNG later press released were false tweets. (i) Late Friday morning, HH fell 10% on a tweet (was deleted). We couldn't find the original deleted tweet that reportedly noted cracks in pipes. WSJ wrote [\[LINK\]](#) "That speculation ratcheted up sharply Friday morning, when a Twitter account, @Lithium_Plays, made several unconfirmed statements regarding Freeport that were widely shared by other Twitter accounts, including a top, so-called energy Twitter influencer, an oil analyst for a major international bank whose account has 64,000 followers. But those tweets by @Lithium_Plays were then quickly deleted." (ii) Post the market close, Freeport LNG issued a short press release [\[LINK\]](#) "In response to false information circulated today about the restart of Freeport LNG's liquefaction facility, the company provides the following statement: Freeport LNG has not made any public statements today regarding the restart of our liquefaction facility. Any Tweets and/or posts on Freeport LNG branded letterhead that may have been obtained or published, are reporting false information and are not legitimate, official public information from Freeport LNG." (iii) The Freeport LNG short release did not mention any update to when they expect to restart Freeport LNG. Freeport LNG's last official update [\[LINK\]](#) was Aug 23 and said "Although typical construction risks could impact the recovery plan, it is anticipated that initial production can commence in early to mid-November, and ramp up to a sustained level of at least 2 BCF per day by the end of November, representing over 85% of the export capacity of the facility. The recovery plan will utilize Freeport LNG's second LNG loading dock as a lay berth until loading capabilities at the second dock are reinstated in March 2023, at which time we anticipate being capable of operating at 100% of our capacity." (iv) From the outside, it's hard to see any restart within a few weeks. The plant has been shut down close to five months and there has to be some sort of restart process that would take some time. And we would expect that Freeport LNG would have indicated they were starting a restart process if that was the case. And until there is a restart, this is a negative on HH as it keeps ~2.2 bcf/d of natural gas demand offline."

Natural Gas – India Oct natural gas production -4.1% YoY to 3.29 bcf/d

It's still not clear if India's earlier 2022 domestic natural gas production growth can be maintained or if it's in a plateau. India natural gas production peaked in 2010 at 4.6 bcf/d. Its 2018-2019 production averaged 3.18 bcf/d, declining to 3.02 in 2019-2020 and then further declined to average 2.78 bcf/d 2020-2021. But then natural gas production. Returned to growth in 2021-2022, but looks to have more or less plateaued for the past few months. On Thursday, India's Petroleum Planning and Analysis Cell released their monthly report for October natural gas and oil statistics [\[LINK\]](#). India's domestic natural gas production was down -4.1% YoY from 3.44 bcf/d in October 2021 to 3.29 bcf/d in October 2022 but up MoM from 3.25 bcf/d in September. Our Supplemental Documents package includes excerpts from the PPAC monthly package.

India natural gas production -4.1% YoY

Natural Gas – India October LNG imports down -10.8% YoY to 2.75 bcf/d, up 2.0% MoM

For the past several years, there has been increased India LNG imports whenever domestic natural gas production was flat or decreased. But the overriding factor in 2022 has been the sky-high LNG prices. India is always viewed as an extremely price sensitive buyer in terms

India LNG imports -10.8% YoY

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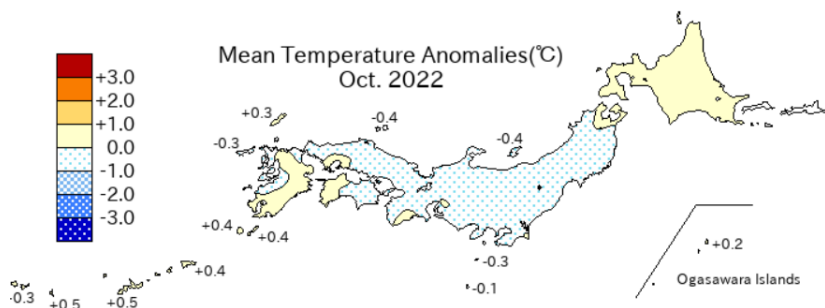
of its LNG imports. We saw this in periods of low LNG prices such as June to Oct 2020 when India had a big ramp up in LNG imports. But with the sky-high LNG prices in 2022, India has done their best to minimize LNG imports. On Thursday, India's Petroleum Planning and Analysis Cell released their monthly report for October natural gas and oil statistics [\[LINK\]](#). Imports began to decline in November 2020 as LNG prices rose, with the price trajectory ramping up in late Dec and reaching record levels in January. This resulted in India LNG imports declining from a 2020-2021 peak of 3.84 bcf/d in Oct 2020 to just 2.85 bcf/d in Jan 2021. July imports increased MoM to 2.75 bcf/d and down -10.8% YoY.

Natural Gas – Cooler than normal October in Japan meant no air conditioning

The Japan Meteorological Agency recap of October temperatures in Japan were that there was cooler than normal temperatures for most of Japan ie. highs in Tokyo were generally in low to mid 20s ie. no support for weather related natural gas consumption. On Wednesday, the Japan Meteorological Agency posted its recap of October weather [\[LINK\]](#) and their mean temperature anomalies map (below) shows the mean temperature breakdown for the month. Their recap noted, “monthly mean temperatures were below normal in eastern Japan due to cold-air inflow from the continent. Temperatures varied widely across Japan.”

Japan Oct temperature recap

Figure 10: Japan Mean Temperature Anomalies October 2022



Source: Japan Meteorological Agency

Natural Gas – Tokyo the latest to recommend turtle-necks to save energy

First, it was France President Macron last month with his new wear turtle-necks as a way to save electricity/natural gas usage and keep furnaces at lower temperatures. This week, it was Tokyo Governor Yuriko Koike. On Friday, BBC reported “Wear turtle-necks to cut energy bills - Tokyo governor”. [\[LINK\]](#) BBC wrote “The governor of Tokyo has urged city residents to wear turtle-neck jumpers this winter to reduce energy consumption. Yuriko Koike said turtle-necks can be a tool to help reduce soaring energy bills. Workers at city hall will be told to set an example by adopting the jumper. The Japanese capital has been setting guidance for how to reduce energy use this winter amid precarious supply and rising prices. Officials at meetings on the issue have been seen side-by-side all wearing turtle-necks. Ms Koike said people should take inspiration from French President Emmanuel Macron, who has been known to like a turtle-neck, when asked whether the jumper is suitable for the workplace. “They’re warm and overall energy consumption is reduced so we can link it to lowering CO2 emissions,” she said.”

Tokyo Governor recommends turtle-necks

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Brings back memories of Jimmy Carter in the 1970s

Anyone who lived in the US in the 1970s knows what the US did post the Arab Oil Embargo to cut energy consumption. We have referenced President Jimmy Carter many many times as being the leader for energy conservation and efficiency. And we are still surprised that Biden, being a new Senator when Carter was President, didn't put the no brainer energy conservation as the first priority for energy. The Tokyo Governor wear turtlenecks is a direct reminder of Jimmy Carter's ways to cut energy consumption. It brings back memories of Jimmy Carter's first address on taking office to the nation on Feb 2, 1977 on the energy crisis. The interview opens with the wide angle view of Carter in his cardigan with a burning fireplace. And a clear part of the Carter need to save energy consumption was turning down the thermostat in the winter to reduce how much oil was burnt for furnaces. Don't forget the push to natural gas was still in a relatively early stage in the 1970s.

Figure 11: Jimmy Carter Address to Nation Feb 2, 1977



Source: C-Span

Natural Gas – Japan LNG imports continue to be hurt by LNG prices, but up 9.9% YoY

On Thursday, Japan's Ministry of Finance posted its import data for Oct. Japan' has worked in 2022 to reduce natural gas consumption in response to sky-high LNG prices and has been maximizing petroleum products and coal power generation to minimize sky-high LNG prices. It has been working. Japan Ministry of Finance released its October LNG import data Thursday [\[LINK\]](#). Japan's October LNG imports were 7.88 bcf/d, which was up 9.9% YoY but down 7.5% MoM from 8.52 bcf/d in September. Plus, it was also a cooler temperature month in Japan, which would have reduced natural gas demand. Below is our table that tracks Japan LNG import data.

**Japan Oct LNG
imports +9.9% YoY**

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Figure 12: Japan Monthly LNG Imports

| bcfd | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 21/20 | 2022 | 22/21 |
|------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------|
| Jan | 13.06 | 11.22 | 12.85 | 12.79 | 11.69 | 11.63 | 12.48 | 7.3% | 10.51 | -15.8% |
| Feb | 13.26 | 12.30 | 13.36 | 14.23 | 12.61 | 10.99 | 13.84 | 25.9% | 12.19 | -11.9% |
| Mar | 12.60 | 12.62 | 12.61 | 12.28 | 11.30 | 11.16 | 11.04 | -1.1% | 10.07 | -8.7% |
| Apr | 10.56 | 10.21 | 10.52 | 8.97 | 9.00 | 8.31 | 7.96 | -4.3% | 8.92 | 12.0% |
| May | 8.91 | 8.55 | 9.66 | 9.92 | 8.62 | 7.09 | 7.67 | 8.1% | 8.92 | 16.3% |
| June | 10.61 | 10.02 | 9.90 | 8.88 | 8.32 | 8.42 | 9.13 | 8.5% | 9.29 | 1.7% |
| July | 10.77 | 10.19 | 10.19 | 10.55 | 10.56 | 9.35 | 9.58 | 2.5% | 9.54 | -0.4% |
| Aug | 10.93 | 11.96 | 11.24 | 11.73 | 9.45 | 9.04 | 9.75 | 7.8% | 9.71 | -0.4% |
| Sept | 11.06 | 10.67 | 9.31 | 10.04 | 10.30 | 10.41 | 8.66 | -16.8% | 8.52 | -1.6% |
| Oct | 9.38 | 9.73 | 9.50 | 10.12 | 9.75 | 9.20 | 7.17 | -22.1% | 7.88 | 9.9% |
| Nov | 10.71 | 12.07 | 10.26 | 10.15 | 10.03 | 9.63 | 9.38 | -2.6% | | |
| Dec | 12.51 | 11.69 | 12.31 | 11.23 | 10.54 | 11.96 | 10.89 | -8.9% | | |

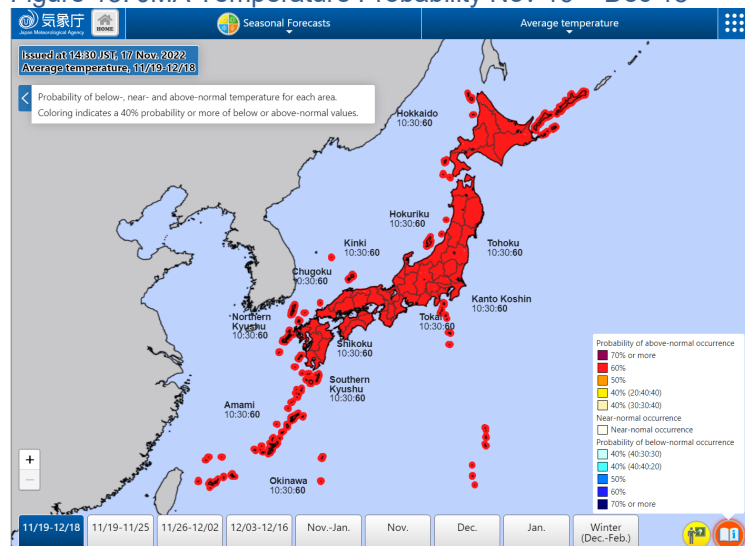
Source: Japan Ministry of Finance

Natural Gas – Japan now sees warm weather continuing thru mid Dec

As noted earlier, it's been warm in Japan in November. Every Thursday, the Japan Meteorological Agency provides an updated 30-day temperature probability outlook. The expectation has been that the warmer than normal weather would continue in November, but then to give way to colder than normal weather in December. The new weekly JMA forecast changes that view and now calls for warmer than normal weather to continue through the first half of December. Below is the JMA's Nov 17 updated 30-day outlook. [\[LINK\]](#)

Japan temperature outlook

Figure 13: JMA Temperature Probability Nov 19 – Dec 18



Source: Japan Meteorology Agency

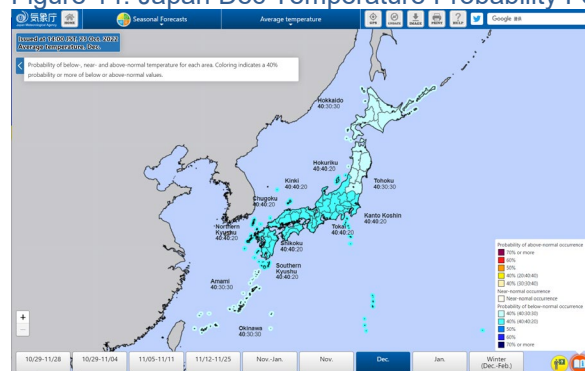
Recall JMA's Oct 25 seasonal forecasts called for colder than normal Dec/Jan

The Nov 17 updated JMA 30-day forecast calling for warmer than normal temperatures thru the first half of December is a change from the JMA's Oct 25 seasonal forecast for Nov/Dec/Jan. Here is what we wrote in the Oct 30, 2022 Energy Tidbits memo. "On Thursday, we tweeted [\[LINK\]](#) "Still early, but Japan Meteorological Agency 10/25 forecast calls for colder than normal Dec and Jan. Nov

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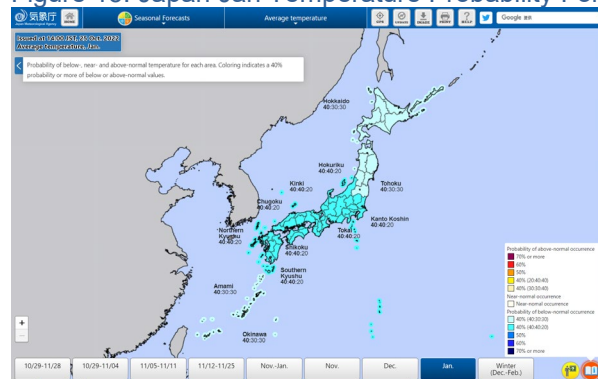
expected warmer than normal. #NatGas #LNG #OOTT”. With winter right around the corner, Japan expects a warmer end to fall with November being warmer than normal, but then switching to below normal temperatures in December and January. On Thursday, the Japan Meteorological Agency posted its seasonal forecast for Nov 2022 – Jan 2023 and overall it is a positive indicator for electricity demand as residents look to heat their homes [\[LINK\]](#). So far in 2022, Japan has been trying to maximize coal and petroleum products due to the sky-high prices of LNG. But a cold Dec/Jan should lead to increased natural gas/LNG consumption. The JMA forecasts that most of the country should expect colder than average winter temperatures, especially in the southern regions of the island. Below is the current JMA forecast for Dec 2022 and Jan 2023.

Figure 14: Japan Dec Temperature Probability Forecast



Source: JMA

Figure 15: Japan Jan Temperature Probability Forecast



Source: JMA

Natural Gas – Japan’s LNG stocks flat WoW at 121 bcf

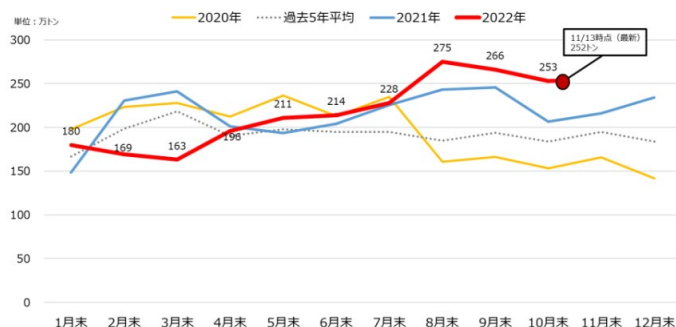
It’s been very warm in Japan, way warmer than normal and it has meant no real weather related demand for electricity and natural gas. But the risk for Japan in the winter is that they need full storage and continued LNG imports to avoid natural gas outages. That’s because Japan’s LNG stockpiles are not huge relative to LNG imports that have ranged from 7 to 14

Japan LNG stocks flat WoW

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bcf/d since Jan 1, 2021. A cold winter or interruption in LNG imports could easily lead to a shortage. LNG stockpiles held by Japanese power producers have exceeded both last year's level and the 4-year average. Japan's METI weekly LNG stocks data was released on Wednesday [LINK](#). LNG stocks at Nov 13 were ~121 bcf, flat WoW from Nov 6 but up from the 5-yr average of 104 bcf. Below is the LNG stocks graph from the METI weekly report.

Figure 16: Japan's LNG Stocks



Source: METI

Natural Gas – China's LNG imports -34.7% YoY in October

We have been warning that China's LNG imports will be less in 2022 for three key reasons - higher pipeline imports of cheaper Russian natural gas via Gazprom's Power of Siberia, increasing domestic natural gas production, and higher LNG prices. China customs posted China's October natural gas imports split by pipelines vs LNG. The customs data is at [LINK](#). The customs data reports China October LNG imports of 6.24 bcf/d, -34.7% YoY and -33.9% MoM. And China natural gas pipeline imports of 5.5 bcf/d, were +11.5% YoY and -18.5% MoM. Below are our running tables of China LNG and pipeline imports.

China LNG and pipeline imports

Figure 17: China LNG Imports

| bcf/d | 2018 | 2019 | 19/18 | 2020 | 20/19 | 2021 | 21/20 | 2022 | 21/22 |
|----------------|------|-------|--------|-------|-------|-------|-------|-------|--------|
| Jan | 8.03 | 10.20 | 27.1% | 10.31 | 1.1% | 13.15 | 27.6% | 12.10 | -8.0% |
| Feb | 6.84 | 7.46 | 9.1% | 7.26 | -2.7% | 9.52 | 31.1% | 8.34 | -12.4% |
| Mar | 5.04 | 6.28 | 24.8% | 6.49 | 3.3% | 8.74 | 34.6% | 7.17 | -17.9% |
| Apr | 5.43 | 7.27 | 34.0% | 8.16 | 12.3% | 10.77 | 32.0% | 6.96 | -35.4% |
| May | 6.39 | 6.87 | 7.6% | 8.10 | 18.0% | 10.89 | 34.4% | 7.64 | -29.9% |
| June | 6.31 | 7.25 | 14.9% | 9.27 | 27.8% | 10.76 | 16.1% | 7.72 | -28.3% |
| July | 6.40 | 7.56 | 18.1% | 7.79 | 3.1% | 8.78 | 12.7% | 7.34 | -16.4% |
| Aug | 7.26 | 8.04 | 10.8% | 9.23 | 14.8% | 10.30 | 11.6% | 7.31 | -29.0% |
| Sept | 7.00 | 8.16 | 16.7% | 9.17 | 12.4% | 10.81 | 17.8% | 9.45 | -12.6% |
| Oct | 7.13 | 4.09 | -42.6% | 7.78 | 90.0% | 9.56 | 22.9% | 6.24 | -34.7% |
| Nov | 9.59 | 10.42 | 8.7% | 10.58 | 1.6% | 11.05 | 4.4% | - | - |
| Dec | 9.75 | 10.01 | 2.7% | 11.76 | 17.5% | 11.82 | 0.5% | - | - |
| Full Year Avg. | 7.10 | 7.80 | 9.9% | 8.83 | 13.1% | 10.51 | 19.1% | 8.03 | -23.6% |

Source: Bloomberg, China Customs

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Figure 18: China Pipeline Imports

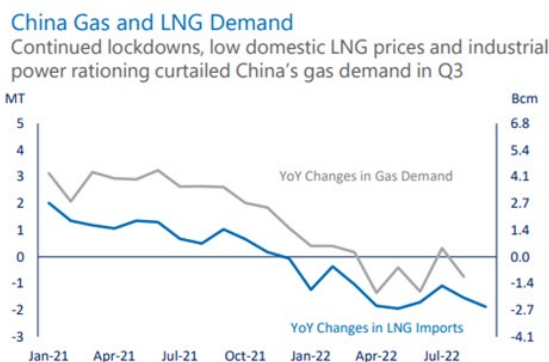
| bcfd | 2018 | 2019 | 19/18 | 2020 | 20/19 | 2021 | 21/20 | 2022 | 22/21 |
|------|------|------|--------|------|--------|------|-------|------|-------|
| Jan | 4.0 | 5.0 | 24.9% | 5.2 | 3.5% | 4.9 | -4.5% | 5.4 | 8.8% |
| Feb | 5.0 | 5.5 | 9.0% | 5.7 | 3.8% | 6.1 | 7.2% | 6.4 | 3.9% |
| Mar | 4.2 | 4.5 | 6.4% | 4.2 | -5.2% | 4.8 | 12.8% | 5.2 | 9.1% |
| Apr | 5.5 | 5.0 | -9.3% | 4.2 | -15.5% | 5.5 | 30.1% | 6.0 | 9.4% |
| May | 5.1 | 4.8 | -4.3% | 4.0 | -16.6% | 5.1 | 26.2% | 6.4 | 26.1% |
| Jun | 5.3 | 4.8 | -10.3% | 4.1 | -15.0% | 5.6 | 37.4% | 6.2 | 11.7% |
| Jul | 4.7 | 4.7 | 0.0% | 3.6 | -23.3% | 5.7 | 58.9% | 6.1 | 7.9% |
| Aug | 4.7 | 4.9 | 3.1% | 5.3 | 7.9% | 5.9 | 11.5% | 6.4 | 9.0% |
| Sep | 5.2 | 5.0 | -4.2% | 4.7 | -6.0% | 6.2 | 32.1% | 6.8 | 9.8% |
| Oct | 4.2 | 3.8 | -8.1% | 3.9 | 1.0% | 5.0 | 28.0% | 5.5 | 11.5% |
| Nov | 5.1 | 4.7 | -6.9% | 4.1 | -13.0% | 6.1 | 48.9% | | |
| Dec | 4.6 | 4.7 | 3.9% | 5.6 | 18.9% | 6.2 | 10.7% | | |

Source: Bloomberg, China Customs

1st YoY decline in China natural gas consumption in ~20 years tweet

The big YoY drop in China LNG imports has been driven firstly by the 1st YoY decline in China natural gas consumption in ~20 years. Over the past couple weeks, there were many reports on China natural gas consumption being down in 2022 for the first time in ~20 years. Here is what we wrote in last week's (Nov 6, 2022) Energy Tidbits memo. "One of the big global natural gas themes has been how sky-high LNG and global natural gas prices have led to fuel switching where possible and cuts in consumption. This is not just in Europe but also in China. We have been warning that China's LNG imports will be less in 2022 for three key reasons - higher pipeline imports of cheaper Russian natural gas via Gazprom's Power of Siberia, increasing domestic natural gas production, and sky-high LNG prices are seeing China switch to coal where possible. But the sky-high LNG prices have also meant something that hasn't happened in ~20 years – China's natural gas consumption will be down YoY in 2022. On Thursday, we tweeted [\[LINK\]](#) "1st YoY decline in China #NatGas consumption in ~20 years was the saving grace for Europe #NatGas this year. See 📌 from @Cheniere just posted Q3 call slides. #OOTT." Our tweet included the below graph from Cheniere's Q3 call slide deck.

Figure 19: China natural gas and LNG demand



Source: Cheniere

Natural Gas – TotalEnergies CEO: EU govts requested they stay in RUS LNG for now

There was no surprise to see TotalEnergies CEO Patrick Pouyanne's comments on French TV saying they are, for now, continuing with their interests in Russian LNG export projects.

TotalEnergies still working Russian LNG for now

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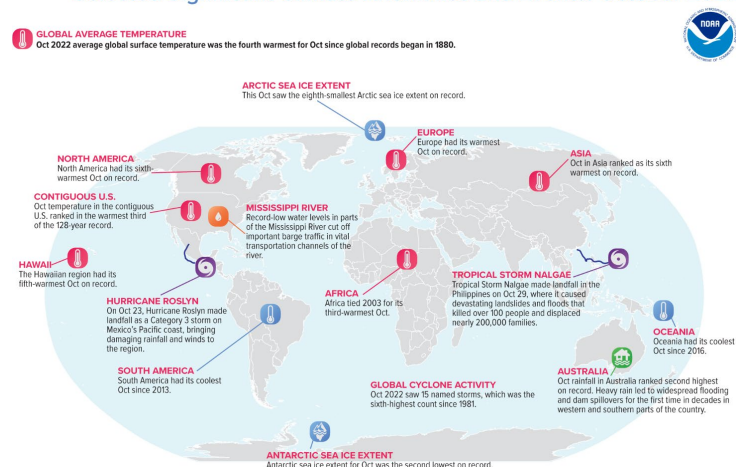
Europe needs the LNG and LNG is not yet sanctioned. TF1 reported [LINK](#) *“We are obviously applying all the sanctions, and we had said that we would gradually leave Russia,” he explained, assuring that “this is what we have done: we have left all the activities that had no connection with the supply of Europe.” TotalEnergies has nevertheless maintained a contract with a liquefied natural gas plant, of which “70% of its production” has been transported to Europe. If it has not been sanctioned by European governments, it is because Europe “needs this Russian gas,” he said. On the other hand, “as soon as European governments decide to sanction Russian gas, we will stop this contract,” continued Patrick Pouyanné. Especially since the leader assured that he had already announced, as early as September 28, that there would be no more new investments by TotalEnergies in Russia. In addition to the geopolitical risk of these investments, the company had already reached “about 10%” of its portfolio in Russia. “Today we are trying to gradually leave Russia, while ensuring the supply of Europe,” he said.”* Our Supplemental Documents package includes the TF1 report.

Natural Gas – NOAA says Europe had warmest October on record

The weather was great in October for basically all of Europe. It was warm, which in Europe means no weather related heating demand but not hot enough to drive big air conditioning consumption. It was what we call leave the windows open weather. And therefore meant that natural gas consumption for weather demand was extremely low. On Thursday, NOAA also posted its Global Climate Recap for October. [LINK](#) In NOAA’s press conference on the October recap, NOAA said *“The global surface temperature for October was 0.89 degrees Celsius or 1.6 degrees Fahrenheit above the 20th century average. This ranks as the fourth warmest October in NOAA’s 143-year record. The past seven Octobers were among the 10 warmest Octobers on record.”* And for Europe, NOAA said *“Europe actually set a record for its warmest October on record at 2.57 degrees Celsius or 4.63 degrees Fahrenheit above average. More than seven European countries independently reported their warmest Octobers on record.”*

Warmest Oct on record for Europe

Figure 20: NOAA’s global significant anomalies & climate events October 2022
Selected Significant Climate Anomalies and Events: October 2022



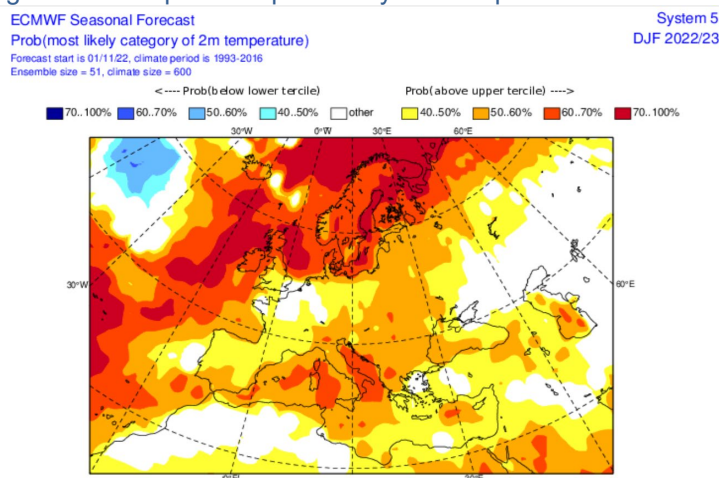
Source: NOAA

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Natural Gas – Looks like warm Oct/Nov is going to be a warm DJF in Europe and Asia

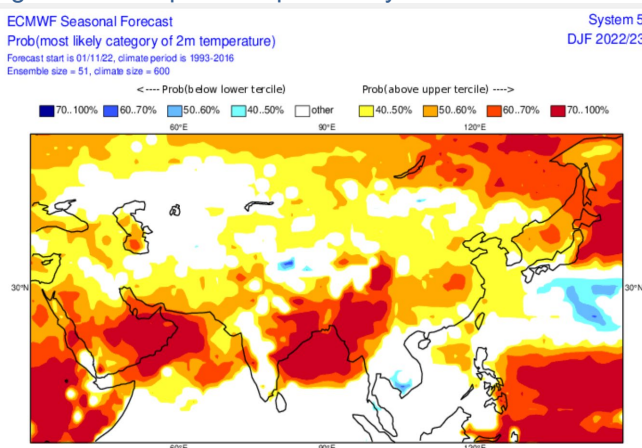
The big relief to LNG and European TTF natural gas prices and LNG/natural gas storage has been the milder than normal weather in October and the first half of November pretty well everywhere in Europe and Asia. This was critical to reduce heating demand for natural gas. Copernicus is the EU’s weather agency. Last Sunday night, we tweeted [LINK](#) “Good start to EU avoiding winter #NatGas shortage - it’s been a warm Oct/early Nov. And now @CopernicusECMWF expects much warmer than normal DJF in Europe & also in Asia. So no weather pressure on price, but, even still, TTF Dec/Jan contracts are still ~\$35/mmbtu. #LNG #OOTT.” Copernicus posted its temperature outlook for Dec/Jan/Feb and it calls for a much warmer DJF in Europe and a generally warmer than normal DJF for key parts in Asia. Our tweet included the below two Copernicus new DJF temperature maps.

Figure 21: Temperature probability for Europe for DJF



Source: Copernicus

Figure 22: Temperature probability for Asia for DJF



Source: Copernicus

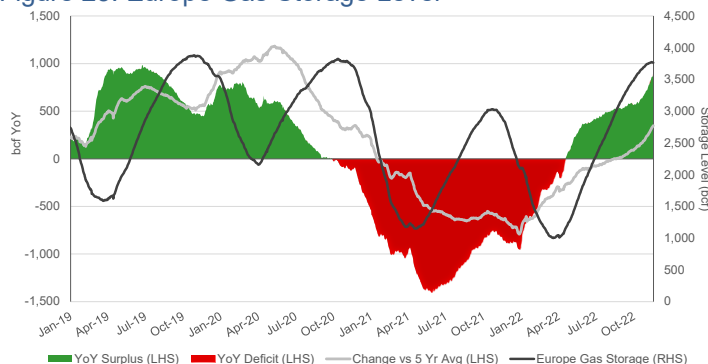
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Natural Gas – Europe storage is now +22.28% YoY ie. 95.34% full vs 73.06%

It's been a very good Oct and start to Nov for lower natural gas consumption driven by warmer than normal weather and industrial demand destruction. And that means Europe gas storage continue to build instead of being drawn down as would normally be expected in Nov. So even with Nord Stream volumes down to zero, Europe storage continues to have increasing YoY levels. Europe gas storage began the year in a YoY deficit, but the YoY Europe storage deficit changed to a YoY storage surplus, and it continues to build this week. Europe gas storage started the winter 17.86% YoY and is now a YoY surplus of 22.28%. Inventories are rising all across Europe, as is normal during spring and early summer. Europe gas storage started 2020 winter (Nov 1/20) at basically full levels at 94.66% and had dropped by 65.77% to be 28.89% at Apr/21. Europe storage levels bottomed in late Apr/22 at 29%, which was the lowest level since Apr 2018. Last winter began (Nov 1/21) with gas storage at 77.14% capacity, down 18.52% YoY. The YoY deficit has turned to surplus after months of the deficit tightening. This winter (Nov 1/22) began with gas storage at 94.94% capacity, up 17.86% YoY. Thanks to the warm weather and US LNG, storage as of Nov 17 is at 95.34%, which is +22.28% greater than last year levels of 73.06% and are +7.28% above the 5-year average of 86.77%. Below is our graph of Europe Gas Storage Level.

Europe storage now 95.34% full

Figure 23: Europe Gas Storage Level



Source: Bloomberg

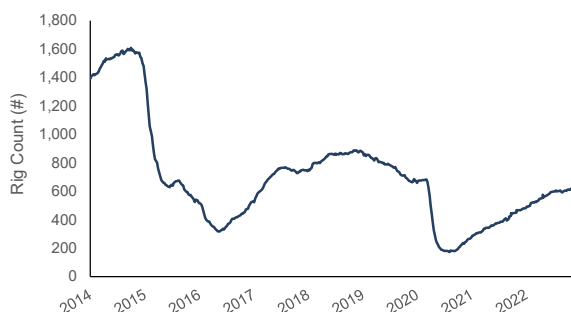
Oil – US oil rigs up +1 to 623 oil rigs at Nov 18

Baker Hughes released its weekly North American drilling activity data this morning. US Thanksgiving is next week and it doesn't show on the graph but, normally, US rigs are normally fairly flat in Nov/Dec, which would be a positive for building DUCs if frac spreads have their normally seasonal decline. This week US oil rigs were +1 to 623 oil rigs. The big changes come from the smaller basins which add +4 rigs. US oil rigs hit a 15-week low of 591 on September 9. US oil rigs are now +444 oil rigs since the Covid Sept 17, 2020 oil rigs of 179 oil rigs. And US oil rigs are +162 oil rigs YoY. US gas rigs were +2 WoW at 157 gas rigs.

**US oil rigs +1
WoW**

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Figure 24: Baker Hughes Total US Oil Rigs



Source: Baker Hughes

Oil – US frac spreads +2 to 297 spreads for the week ending Nov 18

Please note that we hadn't expected to see a frac spread update as, three weeks ago, Rossano noted he was moving the weekly frac spread update behind a pay wall. But there was an update on Friday. So at least for this week, Mark Rossano (C6 Capital Holdings) held his weekly US frac spread recap for the week ending Nov 18 on the Primary Vision network. YouTube video is at [\[LINK\]](#). For the week ending Nov 18, US frac spreads at the high point in the week were +2 to 297 spreads. Here are some of his comments on the week. Rossano called this one last push, he has been expecting one last push before move into the normal seasonal decline that happens moving into US Thanksgiving. He noted that picking up activity in more of the smaller basins as the players in these smaller basins push to get their production locked in as get to year end. And this activity confirms his view that going to see US production get to about 12.3 mmb/d. Based on what he is seeing, thinks can get to about 12.7 mmb/d in 2023, but that's really it as would need to see a meaningful jump in spreads to be able to see 13.0 or 13.1 mmb/d. But going forward, he does think US will sit in the 12.7 to 13 mmb/d range and that is where the US will be, he doesn't see much more going forward

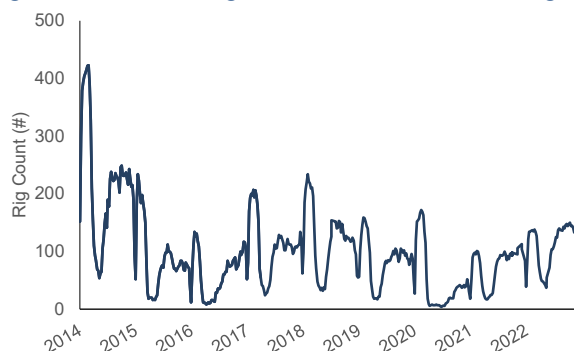
Frac spreads +2 to 297**Oil – Total Cdn rigs up +1 WoW to 201 total rigs, +33 rigs YoY**

Total Cdn rigs were +1 to 201 rigs as of Nov 18, 2022. Cdn oil rigs were +2 to 135 oil rigs. Cdn gas rigs were -1 to 66 rigs. Normally rigs are fairly flat in early Nov although there can be up weeks. Total rigs are now +93 vs the comparable Covid period of 89 rigs on Nov 20, 2020. Cdn drilling has recovered YoY, a year ago Cdn oil rigs were 102 and Cdn gas rigs were 65 for a total Cdn rigs of 167, meaning total Cdn oil rigs are +33 YoY to 135 oil rigs and Cdn gas rigs are +2 to 67 gas rigs.

Cdn rigs +1 WoW

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Figure 25: Baker Hughes Total Canadian Oil Rigs



Source: Baker Hughes

Oil – US weekly oil production flat at 12.1 mmb/d

The EIA provides weekly estimates of US oil production, which was flat at 12.1 mmb/d for the week ended Nov 11. US oil production has been range bound between 11.9 to 12.1 mmb/d since the 2nd week of May other than when it touched 12.2 mmb/d in the 1st week of August. Lower 48 production was flat WoW at 11.7 mmb/d this week and Alaska was flat WoW at 0.4 mmb/d. US oil production is up +0.705 mmb/d YoY at 12.1 mmb/d but is still down significantly at -1.0 mmb/d since the 2020 peak of 13.1 mmb/d on March 13.

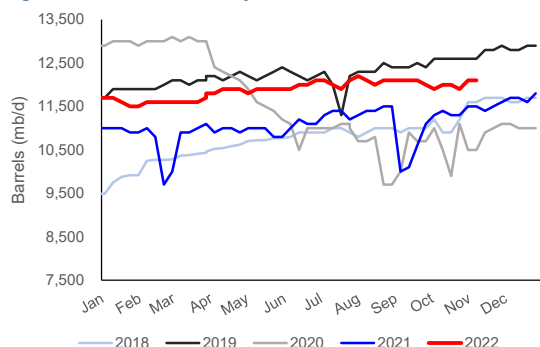
Figure 26: EIA’s Estimated Weekly US Oil Production

| 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 |
| 2020-Mar | 03/06 | 13,000 | 03/13 | 13,100 | 03/20 | 13,000 | 03/27 | 13,000 | | |
| 2020-Apr | 04/03 | 12,400 | 04/10 | 12,300 | 04/17 | 12,200 | 04/24 | 12,100 | | |
| 2020-May | 05/01 | 11,900 | 05/08 | 11,600 | 05/15 | 11,500 | 05/22 | 11,400 | 05/29 | 11,200 |
| 2020-Jun | 06/05 | 11,100 | 06/12 | 10,500 | 06/19 | 11,000 | 06/26 | 11,000 | | |
| 2020-Jul | 07/03 | 11,000 | 07/10 | 11,000 | 07/17 | 11,100 | 07/24 | 11,100 | 07/31 | 11,000 |
| 2020-Aug | 08/07 | 10,700 | 08/14 | 10,700 | 08/21 | 10,800 | 08/28 | 9,700 | | |
| 2020-Sep | 09/04 | 10,000 | 09/11 | 10,900 | 09/18 | 10,700 | 09/25 | 10,700 | | |
| 2020-Oct | 10/02 | 11,000 | 10/09 | 10,500 | 10/16 | 9,900 | 10/23 | 11,100 | 10/30 | 10,500 |
| 2020-Nov | 11/06 | 10,500 | 11/13 | 10,900 | 11/20 | 11,000 | 11/27 | 11,100 | | |
| 2020-Dec | 12/04 | 11,100 | 12/11 | 11,000 | 12/18 | 11,000 | 12/25 | 11,000 | | |
| 2021-Jan | 01/01 | 11,000 | 01/08 | 11,000 | 01/15 | 11,000 | 01/22 | 10,900 | 01/29 | 10,900 |
| 2021-Feb | 02/05 | 11,000 | 02/12 | 10,800 | 02/19 | 9,700 | 02/26 | 10,000 | | |
| 2021-Mar | 03/05 | 10,900 | 03/12 | 10,900 | 03/19 | 11,000 | 03/26 | 11,100 | | |
| 2021-Apr | 04/02 | 10,900 | 04/09 | 11,000 | 04/16 | 11,000 | 04/23 | 10,900 | 04/30 | 10,900 |
| 2021-May | 05/07 | 11,000 | 05/14 | 11,000 | 05/21 | 11,000 | 05/28 | 10,800 | | |
| 2021-Jun | 06/04 | 11,000 | 06/11 | 11,200 | 06/18 | 11,100 | 06/25 | 11,100 | | |
| 2021-Jul | 07/02 | 11,300 | 07/09 | 11,400 | 07/16 | 11,400 | 07/23 | 11,200 | 07/30 | 11,200 |
| 2021-Aug | 08/06 | 11,300 | 08/13 | 11,400 | 08/20 | 11,400 | 08/27 | 11,500 | | |
| 2021-Sep | 09/03 | 10,000 | 09/10 | 10,100 | 09/17 | 10,600 | 09/24 | 11,100 | | |
| 2021-Oct | 10/01 | 11,300 | 10/08 | 11,400 | 10/15 | 11,300 | 10/22 | 11,300 | 10/29 | 11,500 |
| 2021-Nov | 11/05 | 11,500 | 11/12 | 11,400 | 11/19 | 11,500 | 11/26 | 11,600 | | |
| 2021-Dec | 12/03 | 11,700 | 12/10 | 11,700 | 12/17 | 11,600 | 12/24 | 11,800 | 12/31 | 11,800 |
| 2022-Jan | 01/07 | 11,700 | 01/14 | 11,700 | 01/21 | 11,600 | 01/28 | 11,500 | | |
| 2022-Feb | 02/04 | 11,600 | 02/11 | 11,600 | 02/18 | 11,600 | 02/25 | 11,600 | | |
| 2022-Mar | 03/04 | 11,600 | 03/11 | 11,600 | 03/18 | 11,600 | 03/25 | 11,700 | | |
| 2022-Apr | 04/01 | 11,800 | 04/08 | 11,800 | 04/15 | 11,900 | 04/22 | 11,900 | 04/29 | 11,900 |
| 2022-May | 05/06 | 11,800 | 05/13 | 11,900 | 05/20 | 11,900 | 05/27 | 11,900 | | |
| 2022-Jun | 06/03 | 11,900 | 06/10 | 12,000 | 06/17 | 12,000 | 06/24 | 12,100 | | |
| 2022-Jul | 07/01 | 12,100 | 07/08 | 12,000 | 07/15 | 11,900 | 07/22 | 12,100 | 07/29 | 12,100 |
| 2022-Aug | 08/05 | 12,200 | 08/12 | 12,100 | 08/19 | 12,000 | 08/26 | 12,100 | | |
| 2022-Sep | 09/02 | 12,100 | 09/09 | 12,100 | 09/16 | 12,100 | 09/23 | 12,000 | 09/30 | 12,000 |
| 2022-Oct | 10/07 | 11,900 | 10/14 | 12,000 | 10/21 | 12,000 | 10/28 | 11,900 | | |
| 2022-Nov | 11/04 | 12,100 | 11/11 | 12,100 | | | | | | |

Source: EIA

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Figure 27: US Weekly Oil Production



Source: EIA, SAF

Oil – EIA shale/tight oil forecast +12.0%, +0.848 mmb/d YoY in Dec

The EIA Drilling Productivity Report Nov 2022 [\[LINK\]](#) forecast for US shale/tight oil shows a continued modest MoM increase in Nov and Dec after being fairly stuck for July-Oct. The DPR is the EIA’s forecast for production for the major shale/tight oil and gas basins for the current month (in this case Nov) and the next month (in this case Dec). (i) Shale/tight oil was fairly flat from July thru Oct but there is some modest growth forecast for both Nov and Dec. The EIA now forecasts total US shale/tight oil in Nov at 9.10 mmb/d and Dec at 9.19 mmb/d. (ii) The growth is somewhat distributed across all basins except Haynesville. The Permian and Bakken have the most significant increases of +39,000 b/d and +19,000 b/d, respectively. The Permian Dec is 5.499 mmb/d, vs 5.134 mmb/d in Feb. Eagle Ford is also forecasted up +14,000 b/d MoM in Dec, benefitting from its higher natural gas ratio and the pull for natural gas for US LNG exports. (iii) Note that shale/tight oil is approx. ~75% of total US production, so whatever the trends are for shale/tight oil are normally the trends for US oil in total. 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.

US shale/tight oil production

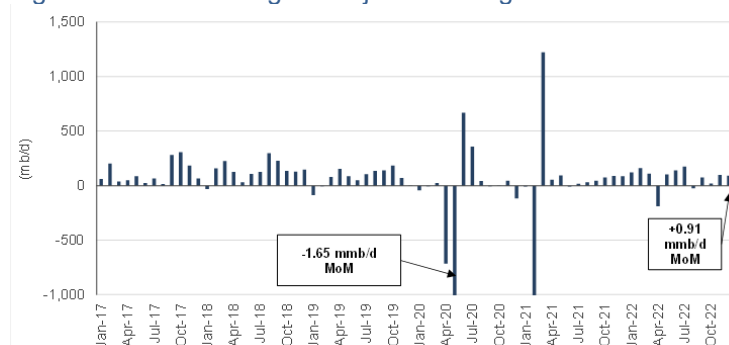
Figure 28: MoM Change – Major Shale/Tight Oil Production

| Thousand b/d | 2022 | | | | | | | | | | | | Dec YoY | Dec YoY % | Dec less Nov | |
|--------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|-----------|--------------|----|
| | Dec | Jan | Feb | Mar | Apr | May | Jun | July | Aug | Sept | Oct | Nov | | | | |
| Anadarko | 378 | 389 | 393 | 399 | 398 | 391 | 406 | 413 | 425 | 424 | 425 | 423 | 431 | 53 | 14% | 8 |
| Appalachia | 120 | 115 | 113 | 113 | 111 | 114 | 124 | 130 | 128 | 120 | 120 | 122 | 124 | 4 | 3% | 2 |
| Bakken | 1,146 | 1,184 | 1,192 | 1,172 | 1,169 | 1,172 | 1,178 | 1,173 | 1,136 | 1,183 | 1,168 | 1,182 | 1,201 | 55 | 5% | 19 |
| Eagle Ford | 1,090 | 1,104 | 1,122 | 1,123 | 1,140 | 1,149 | 1,152 | 1,180 | 1,204 | 1,224 | 1,208 | 1,223 | 1,237 | 147 | 13% | 14 |
| Haynesville | 33 | 33 | 33 | 33 | 34 | 35 | 36 | 37 | 37 | 37 | 37 | 37 | 37 | 4 | 13% | 0 |
| Niobrara | 615 | 615 | 611 | 613 | 610 | 627 | 630 | 632 | 649 | 648 | 640 | 653 | 662 | 47 | 8% | 9 |
| Permian | 4,960 | 4,996 | 5,134 | 5,138 | 5,055 | 5,131 | 5,232 | 5,367 | 5,329 | 5,347 | 5,403 | 5,460 | 5,499 | 539 | 11% | 39 |
| Total | 8,342 | 8,436 | 8,598 | 8,591 | 8,517 | 8,619 | 8,758 | 8,932 | 8,908 | 8,983 | 9,002 | 9,100 | 9,190 | 848 | 10% | 91 |

Source: EIA Drilling Productivity Report

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Figure 29: MoM Change – Major Shale/Tight Oil Production



Source: EIA Drilling Productivity Report

Oil – EIA DUC’s basically flat in October

We remind of our previously noted caveat that DUCs do not take into account potential refracs. We still believe a key risk to how much US oil production can grow in 2022 and 2023 is the need to increase rig counts (not have less frac spreads) to replenish the inventory of Drilled UnCompleted wells at higher levels and the challenge for oilfield services to add capacity to increase frac spreads and completions. The biggest problem in the past with the EIA’s Drilling Productivity Report [LINK](#) estimate of Drilled UnCompleted wells was that the data had been constantly revised and sometimes significantly. (i) However, the DUC estimates provide a clear picture of the trend that DUCs still haven’t really increased since Feb. It’s why there is the need for drilling rigs to pick up to replenish the DUC inventory if the US is to have strong oil growth in 2023. (i) It is also important to remember that a portion of the DUCs will never be completed as there are drilled wells that don’t look like they can justify the higher cost of completion. (ii) Drilled Uncompleted Wells are up 8 MoM in October to 4,408 DUCs, which compares to 4,387 DUCs in Feb. (iii) But at 4,408 DUCs, it means that a total 4,466 DUCs were worked down since the Jun/20 peak of 8,874. The largest work downs are coming from the Permian (-585 YoY) and Eagle Ford (-217 YoY). With DUCs being worked down so significantly we will need to see rig counts go up to replenish DUCs in the near future. (iii) Note that shale/tight oil is approx. ~70% of total US production, so whatever the trends are for shale/tight oil are normally the trends for US oil in total. 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. Our Supplemental Documents package includes the EIA DPR.

DUCs basically flat in Oct

Figure 30: EIA - Estimated Drilled UnCompleted Wells

| Drilled UnCompleted | 2022 | | | | | | | | | | | | Sept | Oct | Oct YoY % | Oct YoY |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------|---------|
| | Sept | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | June | July | Aug | | | | |
| Anadarko | 812 | 799 | 787 | 773 | 758 | 753 | 740 | 724 | 727 | 723 | 716 | 722 | 723 | 718 | -10% | -81 |
| Appalachia | 557 | 537 | 513 | 565 | 457 | 473 | 471 | 497 | 526 | 524 | 529 | 562 | 576 | 573 | 7% | 36 |
| Bakken | 541 | 516 | 485 | 464 | 436 | 426 | 426 | 429 | 425 | 427 | 426 | 474 | 494 | 494 | -4% | -22 |
| Eagle Ford | 833 | 796 | 760 | 685 | 683 | 653 | 642 | 612 | 598 | 611 | 620 | 593 | 582 | 579 | -27% | -217 |
| Haynesville | 396 | 392 | 386 | 372 | 369 | 371 | 395 | 419 | 441 | 466 | 483 | 513 | 535 | 546 | 39% | 154 |
| Niobrara | 375 | 372 | 362 | 354 | 343 | 331 | 317 | 320 | 310 | 328 | 345 | 362 | 393 | 414 | 11% | 42 |
| Permian | 1,812 | 1,669 | 1,537 | 1,444 | 1,482 | 1,380 | 1,302 | 1,294 | 1,244 | 1,218 | 1,180 | 1,117 | 1,097 | 1,084 | -35% | -585 |
| Total | 5,326 | 5,081 | 4,830 | 4,657 | 4,528 | 4,387 | 4,293 | 4,295 | 4,271 | 4,297 | 4,299 | 4,343 | 4,400 | 4,408 | -13% | -673 |

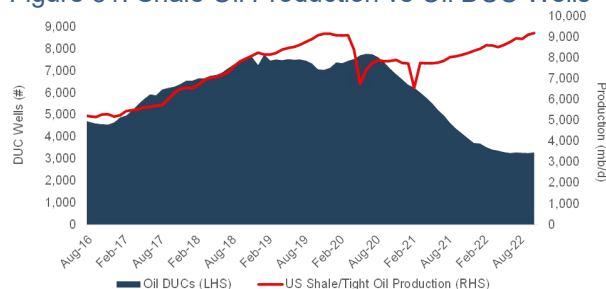
Source: EIA, SAF

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DUCs vs US oil production

We are in the camp that believes we need to see increases in US oil rigs to rebuild the inventory of DUCs. Our regular monthly graph below shows US shale/tight oil production plotted against oil DUCs. There has been a clear correlation with the drawing down of DUCs inventory with increasing shale/tight oil production.

Figure 31: Shale Oil Production vs Oil DUC Wells



Source: EIA, SAF

Oil – North Dakota Sept oil production up after disappointing July & Aug

After a disappointing two consecutive months, North Dakota Sept oil production was up MoM and is now back to March 2022 levels. On Tuesday afternoon, the North Dakota Industrial Commission posted its Director’s Cut, which includes September oil and natural gas production data [\[LINK\]](#). The NDIC reported North Dakota September oil production was 1.119 mmb/d, which was up 0.5% YoY, and up MoM vs August production of 1.075 mmb/d. This was a critical month for North Dakota oil production given North Dakota seemed surprised by July and Aug production numbers not being higher. NDIC estimated well completions were 81 in September, up from 66 in August. So it’s positive that oil production was up MoM, but there are still reminders that the Bakken will be challenged for any significant growth. Our Supplemental Documents package includes excerpts from the Director’s Cut.

North Dakota oil production

Figure 32: North Dakota Oil Production By Month

| (b/d) | 2017 | 2018 | 2019 | 2020 | 2021 | 2021/2020 | 2022 | 2022/2021 |
|-------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Jan | 981,380 | 1,179,564 | 1,403,808 | 1,430,511 | 1,147,377 | -19.8% | 1,088,613 | -5.1% |
| Feb | 1,034,248 | 1,175,316 | 1,335,591 | 1,451,681 | 1,083,554 | -25.4% | 1,089,091 | 0.5% |
| Mar | 1,025,690 | 1,162,134 | 1,391,760 | 1,430,107 | 1,108,906 | -22.5% | 1,122,640 | 1.2% |
| Apr | 1,050,476 | 1,225,391 | 1,392,485 | 1,221,019 | 1,123,166 | -8.0% | 900,597 | -19.8% |
| May | 1,040,995 | 1,246,355 | 1,394,648 | 859,362 | 1,128,042 | 31.3% | 1,059,060 | -6.1% |
| June | 1,032,873 | 1,227,320 | 1,425,230 | 893,591 | 1,133,498 | 26.8% | 1,096,783 | -3.2% |
| July | 1,048,099 | 1,269,290 | 1,445,934 | 1,042,081 | 1,076,594 | 3.3% | 1,072,632 | -0.4% |
| Aug | 1,089,318 | 1,292,505 | 1,480,475 | 1,165,371 | 1,107,359 | -5.0% | 1,075,307 | -2.9% |
| Sept | 1,107,345 | 1,359,282 | 1,443,980 | 1,223,107 | 1,114,020 | -8.9% | 1,119,379 | 0.5% |
| Oct | 1,183,810 | 1,392,369 | 1,517,936 | 1,231,048 | 1,111,910 | -9.7% | | |
| Nov | 1,194,920 | 1,375,803 | 1,519,037 | 1,227,138 | 1,158,622 | -5.6% | | |
| Dec | 1,182,836 | 1,402,741 | 1,476,777 | 1,191,429 | 1,144,999 | -3.9% | | |

Source NDIC, NDPA

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Signs of a maturing basin? Record # of wells, but not record production

Our Oct 16, 2022 Energy Tidbits highlighted comments from NDIC Director Lynn Helms on the disappointing North Dakota oil production. On Oct 15, we tweeted [\[LINK\]](#) “#Bakken. “we’re at a record number of [ND] producing wells (in Aug) but not record [oil] production” says ND’s Helms. He expects an increase in Sept. Jul/Aug were below June. Not a good sign if Sept/Oct don’t get back to June levels. Thx @bistrib. #OOTT”. That Helms theme was a reminder that North Dakota is a maturing basin. It doesn’t mean there won’t be growth, but there will have to be a pickup in wells drilled and completed. The Helms comment will be there every month now that there are record number of wells but not record production. This month, the NDIC noted that Sept was another new all time high number of producing wells at 17,759 wells (15,438 from Bakken and 2,321 from legacy conventional pools). As noted above production in Sept was 1,119,379 b/d from this 17,759 wells. Sept 2022 production was +5,359 b/d YoY vs 1,114,020 b/d in Sept 2021 that had a then new all-time high number of production wells at 17,041 wells. So Sept 2022 had an additional +718 producing wells YoY that led to an incremental 5,359 b/d of oil production YoY.

Oil – North Dakota crude by rail up MoM to 81,693 b/d in Sept

The North Dakota Pipeline Authority posted its monthly update “November 2022 Production & Transportation” [\[LINK\]](#). Please note that we always go 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 Sept was a low of 66,693 b/d and a high of 96,693 b/d for an average of 81,693 b/d. This is above the Aug average of 68,611 b/d and below the July average of 88,344 b/d. Below is a chart from the NDPA monthly update showing the crude by rail volumes since 2014. Our Supplemental Documents package includes excerpts from the NDPA monthly update.

**North Dakota
CBR up MoM in
September**

Figure 33: Estimated North Dakota Rail Export Volumes



Source: North Dakota Pipeline Authority

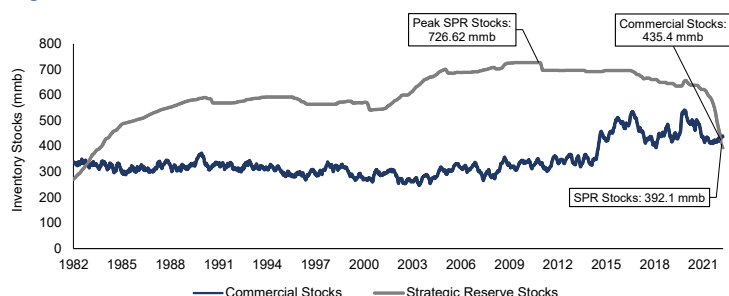
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Oil – US SPR reserves now 43.2 mmb less than commercial crude oil reserves

Oil in US Strategic Petroleum Reserves (SPR) moved below total US commercial crude oil reserves in the Sept 16 week for the first time since 1983, with the deficit slightly narrowing this week. The EIA’s new weekly oil data for Nov 11 has SPR reserves at 392.12 mmb vs commercial crude oil reserves at 435.36 mmb. The below graph highlights the difference between commercial and SPR stockpiles.

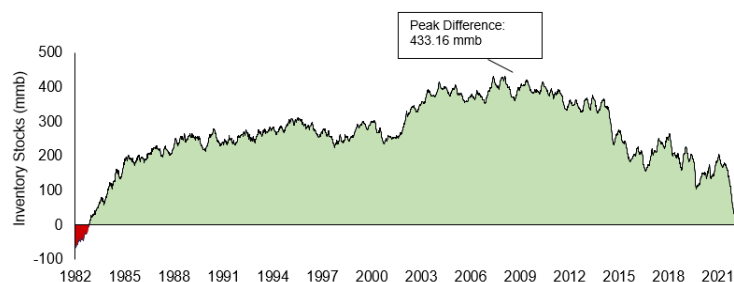
SPR reserves remain lower

Figure 34: US Oil Inventories: Commercial & SPR



Source: EIA

Figure 35: US Oil Inventories: SPR less commercial



Source: EIA

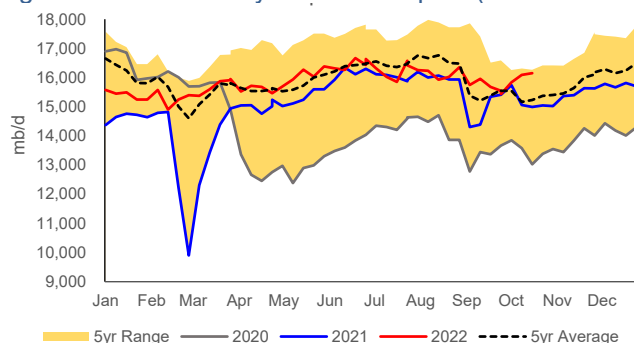
Oil – Refinery inputs +0.063 mmb/d WoW to 16.152 mmb/d

It’s Nov, which is normally the start of the seasonal increase in crude oil inputs to refineries as they have finished their normal Sept/Oct seasonal refinery maintenance period as refineries change from summer to winter fuel blends. Crude oil input into refineries tends to slightly increase in Nov and Dec. On Wednesday, the EIA released its estimated crude oil input to refinery data for the week ended Nov 11. The EIA reported crude oil inputs to refineries up +0.063 mmb/d WoW to 16.152 mm/d, which is +0.754 mmb/d YoY from 15.397 mmb/d for the week ended Nov 12, 2021. Note last year’s week ended Nov 12, refineries continued to recover from the impacts of Covid and Hurricane Ida and we observed inputs increase as refineries progress through regularly schedules seasonal maintenance. Total products supplied (i.e., demand) decreased WoW, down -0.179 mmb/d to 21.087 mmb/d, and Motor gasoline was down -0.269 mmb/d at 8.742 mmb/d from 9.011 mmb/d last week. The 4-week average for Motor Gasoline was down -0.496 mmb/d YoY to 8.836 mmb/d.

Refinery inputs up WoW

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Figure 36: US Refinery Crude Oil Inputs (thousands b/d)



Source: EIA

Oil – US “net” oil imports down -1.236 mmb/d WoW at 1.697 mmb/d

US “NET” imports were down -1.236 mmb/d to 1.697 mmb/d for the Nov 11 week. US imports were down -0.895 mmb/d to 5.559 mmb/d. US exports were up +0.341 mmb/d to 3.862 mmb/d. The WoW decrease in US oil imports was driven Top 10 with a decrease of -0.941 mmb/d and “other” posting a small increase of +0.046 mmb/d. Some items to note on the by country data. (i) Canada was down this week by -0.159 mmb/d to 3.076 mmb/d. (ii) Saudi Arabia was down -0.308 mmb/d to 0.211 mmb/d this week. (iii) Colombia was down -0.198 mmb/d WoW to 0.143 mmb/d. (iv) Ecuador was slightly down this week -0.001 mmb/d to 0.101 mmb/d. (v) Iraq was down -0.362 mmb/d to 0.141 mmb/d. (vi) Mexico was up +0.025 mmb/d to 0.528 mmb/d.

US “net” oil imports down WoW

Figure 37: US Weekly Preliminary Oil Imports by Major Countries

| (thousand b/d) | Sep 9/22 | Sep 16/22 | Sep 23/22 | Sep 30/22 | Oct 7/22 | Oct 14/22 | Oct 21/22 | Oct 28/22 | Nov 4/22 | Nov 11/22 | WoW |
|----------------|----------|-----------|-----------|-----------|----------|-----------|-----------|-----------|----------|-----------|------|
| Canada | 2,937 | 3,868 | 3,775 | 3,298 | 3,300 | 3,372 | 3,483 | 3,410 | 3,235 | 3,076 | -159 |
| Saudi Arabia | 425 | 489 | 422 | 398 | 370 | 230 | 325 | 533 | 519 | 211 | -308 |
| Venezuela | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mexico | 484 | 855 | 598 | 539 | 759 | 747 | 509 | 748 | 503 | 528 | 25 |
| Colombia | 288 | 212 | 72 | 360 | 242 | 214 | 215 | 218 | 341 | 143 | -198 |
| Iraq | 343 | 120 | 202 | 275 | 109 | 130 | 220 | 134 | 503 | 141 | -362 |
| Ecuador | 199 | 319 | 191 | 203 | 136 | 134 | 201 | 0 | 102 | 101 | -1 |
| Nigeria | 232 | 0 | 0 | 0 | 0 | 29 | 42 | 81 | 119 | 181 | 62 |
| Kuwait | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Angola | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Top 10 | 4,908 | 5,863 | 5,260 | 5,073 | 4,916 | 4,856 | 4,995 | 5,124 | 5,322 | 4,381 | -941 |
| Others | 884 | 1,084 | 1,189 | 874 | 1,147 | 1,052 | 1,185 | 1,081 | 1,132 | 1,178 | 46 |
| Total US | 5,792 | 6,947 | 6,449 | 5,947 | 6,063 | 5,908 | 6,180 | 6,205 | 6,454 | 5,559 | -895 |

Source: EIA

Oil – sounds like it was Ukraine missiles, not Russian missiles, that hit Poland

Oil spiked \$3 on Tuesday when the first reports came out such as the AP “*breaking: a senior U.S. intelligence official says Russian missiles crossed into NATO member Poland, killing two people*”. The fear was that if this was a Russian missile strike on Poland that this would trigger NATO Article 5 that considers an attack on one NATO member as an attack on all NATO members. The fear being that this would be an escalating event. But the initial reports of a Russian missile were later thrown out by Biden. We tweeted [\[LINK\]](#) ““unlikely in the minds of the trajectory that it was fired from russia” says #Biden just now. #OOTT”. Our

Missiles hit Poland

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tweet included the Biden live quote. Then Thursday, Poland President Duda held a press conference. We tweeted [\[LINK\]](#) “see 📌 *Breaking; @mariatad says Poland President Duda says no early indications that this was directly aimed at Poland from Russia. Do not see the intention to hit from Russia to hit Poland. This was confirmed by NATO. #OOTT.*” Zelensky came out saying his military told him it wasn’t Ukrainian missiles. Later, Biden was asked about Zelensky’s comments and he shot those down. Biden said “that’s not the evidence’ the US is seeing. So it seems like it was somehow Ukrainian missiles and not Russian missiles. That is, unless you believe the US and NATO just don’t want to say it was Russian missiles.

Figure 38: Missiles hit Poland



Source: CNN

Oil – Russian produced 9.98 mmb/d oil in 1st half Nov, 0.498 mmb/d below Nov quota

There is no real change to the view that Russia looks to be producing well below its OPEC+ quota for November up to mid-November. There is always a bit of mystery in Russia oil and gas data. But we do tend to get some reasonable data and insights from Kommersant reports. On Friday, Kommersant reported [\[LINK\]](#) “Russia in the first half of November increased oil and condensate production by 1% compared to last month, to 1.48 million tons per day.” Note that this is for crude oil plus condensate. Kommersant did not provide the b/d or the oil vs condensate mix. But if we assume that condensate was 8% of the total as it did in September, the 1.48 million tons per day would be roughly equal to 9.98 mmb/d of crude oil and 0.87 mmb/d for a total 10.85 mmb/d oil + condensate. At 9.98 mmb/d of crude oil, Russia would be producing 0.498 mmb/d less than its Nov quota of 10.478 mmb/d. Russia’s Oct quota was 11.004 mmb/d. Our Supplemental Document package includes the Kommersant report.

Russia oil production 9.98 mmb/d

Oil – OPEC MOMR, small cut in demand forecast, narrowing oil stocks deficit

On Monday, OPEC released its Monthly Oil Market Report at ~5:10 am MT. OPEC’s message was to the negative, albeit a modest negative from reduced demand forecasts and a narrowing of the oil stocks deficit. (i) YoY demand growth lowered for 2022 by 0.1 mmb/d to 99.57 mmb/d, and for 2023 by 0.1 mmb/d to 101.82 mmb/d. This now means 2022 YoY growth is +2.55 mmb/d and 2023 is +2.24 mmb/d. 2023 is above pre-Covid 2019 of 100.20 mmb/d. (ii) China demand. The MOMR continued on theme that it’s still uncertain how China moves out of Covid. The Nov MOMR continued the uncertainty on a post Covid recovery. In

OPEC MOMR

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Nov MOMR, they write *“The global growth has clearly entered into a period of significant uncertainty and mounting challenges. This includes high inflation levels and the consequences of monetary tightening by major central banks, high sovereign debt levels in many regions and ongoing supply chain issues. Moreover, geopolitical risks persist and developments related to the COVID-19 pandemic, mainly in the Northern Hemisphere and China, remain a key uncertainty”*. (iiv) Non-OPEC supply. Immaterial decreases to YoY growth for 2022 of +1.90 mmb/d to 65.58 mmb/d (was +1.93 mmb/d to 65.60 mmb/d), and for 2023 of +1.54 mmb/d (was +1.53) to 67.12 mmb/d (was 67.13 mmb/d). (iv) OPEC Secondary Sources for Oct -210,000 b/d MoM to 29.484 mmb/d. For OPEC10 (the countries in the quota), they produced 26.689 mmb/d in Oct, well below the quota of 26.753 mmb/d. (v) One difference in Direct Communications (what the OPEC countries report) is that Saudi says it produced 10.957 mmb/d, which is right in line with their quota of 11.004 mmb/d for Oct. (vi) Note the one significant difference vs the IEA OMR below is their views of MoM changes in global oil stocks from Aug to Sept. OPEC estimates OECD inventories at September 30 had another MoM narrowing of the deficit in “crude only” stocks -100 mmb (vs August -133), product stocks -118 mmb (vs August -140) below 2015-2019 average. Our Supplemental Documents package includes excerpts from the OPEC MOMR Nov.

Oil – IEA OMR “oil markets remain finely balanced going into the winter months”

On Tuesday, the IEA released its monthly Oil Market Report for Nov at 2am MT. They only release very limited public info, but Bloomberg provided detailed tables and added color from the report. So big thanks, as usual, to the Bloomberg team. The messaging from IEA was different than OPEC as the IEA was more bullish on the changes in their oil views. (I) We tweeted [\[LINK\]](#) *“Wonder what #Oil does if China demand surprises or Putin shuts in oil? @IEA OMR “Oil markets remain finely balanced going into the winter months” “OECD total oil stocks fell below 4,000 mb for the 1st time since 2004”. #OOTT.”* The IEA says oil markets remain “finely balanced”, which looks like code for no margin for error. Especially as they also high the low oil stocks. (ii) The other positive was a modest increase in oil demand. (i) 2022 oil demand growth increased by 0.2 mmb/d to 99.8 mmb/d in 2022 and 0.1 mmb/d to 101.4 mmb/d in 2023. (ii) 2022 is still below pre-Covid of 100.4 mmb/d in 2019. (ii) China demand drops in addition to risks in European and developing economies. The EIA wrote *“demand growth will slow to 1.6 mb/d in 2023, down from 2.1 mb/d this year, as mounting economic headwinds impede gains. The GDP outlook has worsened and 4Q22 global oil use will contract (-240 kb/d) compared with last year. China’s persistently weak economy, Europe’s energy crisis, burgeoning product cracks and the strong US dollar are all weighing heavily on consumption.”* Nov OMR has China 2022 at 15.0 mmb/d, up 0.2 mmb/d vs Oct OMR of 14.8 mmb/d. (iv) Non-OPEC supply YOY growth is unchanged for 2022, but 2023 was increased +0.1 mmb/d. Nov OMR non-OPEC supply is +1.8 mmb/d to 65.5 mmb/d for 2022, and +0.6 mmb/d to 66.1 mmb/d for 2023. (v) Changes to call on OPEC for 2022 were +0.1 mmb/d to 28.9 mmb/d (from 28.8) and for 2023 at 29.8 mmb/d (unchanged). (vi) OPEC Oct production was +170,000 b/d to 29.80 mmb/d led by UAE +80,000 b/d, Libya +80,000 b/d MoM, Saudi +70,000 b/d, MoM and Venezuela +40,000 b/d MoM. Nigeria was +50,000 b/d MoM to 1.01 mmb/d and below Angola of 1.05 mmb/d. (vii) Saudi of 11.03 mmb/d for Oct is above what OPEC MOMR reported as Direct Communications from Saudi of 10.96 mmb/d. (viii) OECD crude oil inventories on September 30 were 198.0 mmb below the five-year average vs 243.0 mmb at August 31. The IEA wrote, *“global observed inventories fell by 14.2 mb in September as OECD and non-OECD stocks plunged by 45.5 mb and 19.3 mb,*

IEA Oil Market Report

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respectively, but were partially offset by a surge in oil on the water of 50.6 mb. OECD industry oil stocks declined by 8 mb, while government stocks drew by 37.4 mb. OECD total oil stocks fell below 4 000 mb for the first time since 2004.” Our Supplemental documents package includes the IEA release and the Bloomberg reports.

Figure 39: IEA Global Demand Forecast By OMR Report Month

| mmb/d | 2020 | 2021 | 21-20 | Q1/22 | Q2/22 | Q3/22 | Q4/22 | 2022 | 22-21 | Q1/23 | Q2/23 | Q3/23 | Q4/23 | 2023 | 23-22 |
|---------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Nov 22 | 91.0 | 97.7 | 6.7 | 99.4 | 98.7 | 100.3 | 100.7 | 99.8 | 2.1 | 99.6 | 100.5 | 102.3 | 103.0 | 101.4 | 1.6 |
| Oct 22 | 91.0 | 97.7 | 6.7 | 99.4 | 98.5 | 100.0 | 100.6 | 99.6 | 1.9 | 99.5 | 100.4 | 102.1 | 102.9 | 101.3 | 1.7 |
| Sep 22 | 91.0 | 97.7 | 6.7 | 99.5 | 98.4 | 99.9 | 100.9 | 99.7 | 2.0 | 100.2 | 101.0 | 102.6 | 103.3 | 101.8 | 2.1 |
| Aug 22 | 91.0 | 97.6 | 6.6 | 99.4 | 98.5 | 100.0 | 100.8 | 99.7 | 2.1 | 100.3 | 101.1 | 102.5 | 103.3 | 101.8 | 2.1 |
| July 22 | 91.0 | 97.5 | 6.5 | 99.3 | 97.8 | 99.4 | 100.2 | 99.2 | 1.7 | 99.8 | 100.8 | 102.0 | 102.7 | 101.3 | 2.1 |
| June 22 | 91.0 | 97.5 | 6.5 | 99.3 | 98.2 | 99.8 | 100.4 | 99.4 | 1.9 | 100.5 | 101.1 | 101.9 | 102.7 | 101.6 | 2.2 |
| May 22 | 91.0 | 97.5 | 6.5 | 98.8 | 98.2 | 100.0 | 100.4 | 99.4 | 1.9 | | | | | | |
| Apr 22 | 91.0 | 97.5 | 6.5 | 98.5 | 98.3 | 100.1 | 100.5 | 99.4 | 1.9 | | | | | | |
| Mar 22 | 91.0 | 97.5 | 6.5 | 99.0 | 98.8 | 100.2 | 100.6 | 99.6 | 2.1 | | | | | | |
| Feb 22 | 91.0 | 97.4 | 6.4 | 98.9 | 100.1 | 101.7 | 101.6 | 100.6 | 3.2 | | | | | | |
| Jan 22 | 91.0 | 96.4 | 5.4 | 97.8 | 99.3 | 100.9 | 100.8 | 99.7 | 3.3 | | | | | | |
| Dec 21 | 91.0 | 96.2 | 5.2 | 97.9 | 99.1 | 100.8 | 100.3 | 99.5 | 3.3 | | | | | | |
| Nov 21 | 91.0 | 96.3 | 5.3 | 98.5 | 99.2 | 100.6 | 100.3 | 99.7 | 3.4 | | | | | | |
| Oct 21 | 91.0 | 96.3 | 5.3 | 98.6 | 99.1 | 100.5 | 100.2 | 99.6 | 3.3 | | | | | | |

Source: IEA, SAF

IEA's big warning on diesel, tight markets are expected to continue

The IEA's Nov OMR contains a big warning on diesel. With approaching embargos on Russian oil products and crude, global oil balances will face pressure with diesel markets already being exceptionally tight. The IEA wrote, “*diesel prices and cracks (differential to crude oil price) surged to record levels in October, and are now 70% and 425% higher, respectively, than year-ago levels while benchmark Brent prices increased just 11% during the same period. Distillate inventories are at multi-decade lows.*” It is important to note that a diesel market deficit is not a new thing and has been this way before Russian's invasion of Ukraine. Key drivers of the tight market include reduced refining capacity due to Covid-19, demand increasing with reopening post-Covid, and lower Chinese product exports. To compete for non-Russian barrels EU countries will need to outbid traditional buyers on Middle East, India, and US cargos which will have an upward pressure on pricing. Until refining capacity increases, the clearing of imbalances will be from demand destruction. The IEA writes, “*demand is forecast to expand by 2.1 mb/d in 2022 before slowing to 1.6 mb/d next year. Growth will come from jet fuel and LPG/ethane for petrochemicals. But global diesel/gasoil growth is forecast to ease from 1.5 mb/d in 2021, to 400 kb/d in 2022 before posting a small decline in 2023 under the weight of persistently high prices, a slowing economy and despite increased gas-to-oil switching.*”

Oil – Saudi use of oil for electricity is now in seasonal decline ie. more oil for export

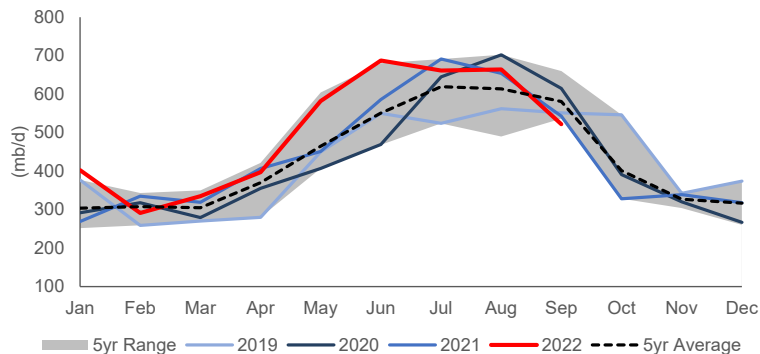
The key theme for the next six months is that Saudi will be able to export more oil as it uses less oil for electricity as the peak hot summer months are over. Oil used for electricity declined to 522,000 b/d in Sept, which is normally the start of the seasonal decline. A reminder a normal peak to trough decline of ~400,000 b/d. Saudi used 142,000 b/d less oil MoM in Sept for electricity ie. volumes freed up for export or to add to inventories. If Saudi sees the normal seasonal decline of ~400,000 b/d, it should mean Saudi's oil exports shouldn't decline anywhere near as much as their new lower quotas. Saudi's OPEC quota are being reduced: Aug 11.004 mmb/d. Sept 11.030 mmb/d. Oct 11.004 mmb/d. Nov/Dec

Saudi to have more oil for export

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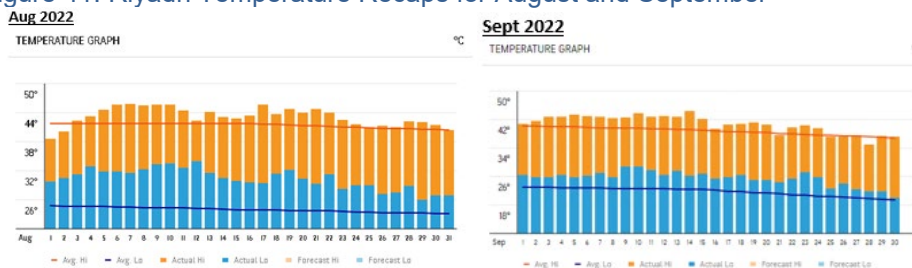
10.478 mmb/d. There is one additional wildcard that isn't in the JODI data but could lead to more Saudi oil for export -the JODI data doesn't include how much fuel oil Saudi imports and we saw reports in Q2 that Saudi was importing some Russian fuel oil via Fujairah terminal. The JODI data for Saudi Arabia oil supply and demand for September was updated on Thursday. Saudi used less oil for electricity in September vs August. This is attributed to the cooler temperatures experienced throughout September. September saw varying temperatures that were close to the higher average range for most of the month. It is important to note that the higher range is still a lower temp compared to previous months. September was 522,000 b/d (vs September 2021 of 543,000 b/d) and August was 664,000 b/d (vs August 2021 of 654,000 b/d). Below are the AccuWeather Temp maps for Riyadh for August and September. Careful they are different scales but look for oil for electricity to decrease as we move out of peak season.

Figure 40: Saudi Arabia Direct Use of Crude Oil For Electric Generation



Source: JODI

Figure 41: Riyadh Temperature Recaps for August and September



Source: AccuWeather

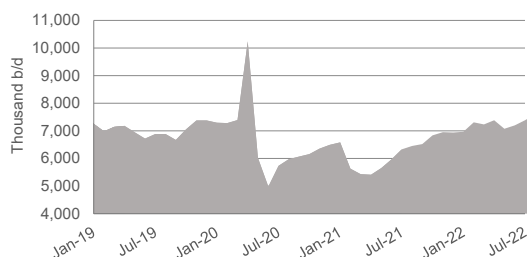
Oil – Saudi oil exports up 120,000 b/d to 7.721 mmb/d in September

Saudi oil production in Sept was down -10,000 b/d MoM to 11.041 mmb/d. But there were additional oil volumes freed up for export or to add to inventory with Saudi direct use of oil for electricity down -142,000 b/d MoM, and Saudi refinery intake of oil down -108,000 b/d MoM. Saudi oil exports used part of these freed up volumes and were up +120,000 b/d MoM. Saudi oil production in Sept was 11.041 mmb/d, a little above quota of 11.004 mmb/d. Saudi oil exports were +120,000 b/d MoM to 7.721 mmb/d in Sept 2022.

Saudi oil export data for Sept

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Figure 42: Saudi Arabia oil exports (mb/d)



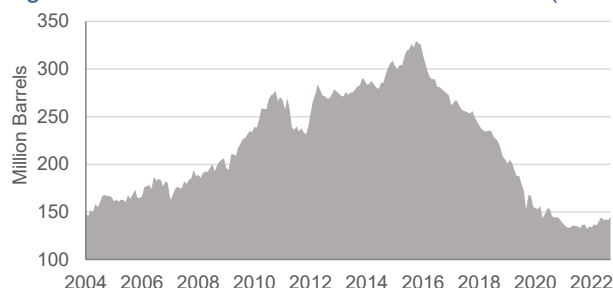
Source: JODI

Oil – Saudi oil inventories increased MoM, up +3.171 mmb barrels MoM

The JODI data also reported Saudi oil inventory increased +3.171 mmb MoM to 144.774 mmb at Sept 30. As noted above, there additional oil barrels freed up from less oil used for electricity and less oil input to refineries. This provided the oil for increased oil exports and increase oil for inventories. Inventories are now above the recent high of 144.4 mmb at May 31, but still remain at relatively low levels staying below 150 mmb.

**Saudi oil
inventory data**

Figure 43: Saudi Arabia Crude Oil Inventories (mmb)



Source: JODI

Oil – US confirms MBS, as Prime Minister, is immune from suits in US courts

It got a lot of headlines, but wasn't a surprise to see the US State Dept comments on Friday regarding Saudi Crown Prince MBS immunity from suits against him in US courts. As a reminder, MBS was also appointed Prime Minister in late Sept. The US State Department transcript for the Friday brief briefing wrote "QUESTION: "... I want to ask you about a different DOJ issue, the one that arose last night. And I'm just wondering if you can explain to us in layman's terms why, exactly, the Saudi MBS case is different in terms of sovereign immunity than cases that had been brought – civil lawsuits and criminal prosecutions - against other foreign leaders and other foreign governments." State Department Principal Deputy Spokesperson Patel "Sure, Matt. So what this stems from is that Prime Minister - Prime Minister bin Salman is immune from suit in U.S. courts while he holds the office of prime minister. He is the head of government. It has nothing to do with the merits of this case. The immunity determination is a legal one. The United States has consistently and across administrations applied these principles to heads of states, heads of governments, and foreign ministers while they are in office. This is an unbroken practice and it is also something that we expect others to affront to the United States as well. And the normal practice of U.S.

**MBS is immune
from suits in US
courts**

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Government has been to file a suggestion of immunity upon request by a federal court for heads of state and government. And specifically to your question, when a foreign state, as opposed to foreign officials of the foreign state, is sued in U.S. courts, sovereign immunity is determined by the courts under the provisions of the Foreign Sovereign Immunities Act. Because the sovereign immunity of a foreign state is governed by FSIA, the U.S. does not file suggestions of immunity in civil actions brought against foreign states. That, however, does not address the immunity of a head of government which is at issue in this case."

QUESTION: "Okay. So the difference is that this is a suit that's filed against him personally"

MR PATEL: "That is my understanding." QUESTION: "-- rather than against the Saudi

Government? MR PATEL: "Correct." QUESTION: "So does that mean that if the suit was filed against the Saudi Government, you wouldn't weigh in with an opinion?" MR PATEL: I will let the Department of Justice speak to the specific legal mechanisms"

Saudi King Salman gave up the Prime Minister part of his job to MBS

Here is what we wrote in our Oct 2, 2022 Energy Tidbits. "On Tuesday, the Saudi Press Agency announced [\[LINK\]](#) "The Custodian of the Two Holy Mosques King Salman bin Abdulaziz Al Saud issued today three royal orders as follows: First: 1- His Royal Highness Prince Mohammed bin Salman bin Abdulaziz Al Saud, the Crown Prince, shall be the Prime Minister; as an exception to the provision of Article (56) of the Basic Law of Governance, and the relevant provisions contained in the Law of the Cabinet." Note that the splitting off of the Prime Minister role from the King's rule required an exception to the law. MBS is taking over the Prime Minister office from the King and becomes head of state for Saudi Arabia. There was a good timing point raised by The Guardian that also answered a question we had wondered in June as to what MBS got from Biden. The Guardian wrote [\[LINK\]](#) "But the timing of the decision was seen by critics of the Saudi government as almost certainly linked to a looming court-ordered deadline next week. The Biden administration had been asked by a US judge to weigh in on whether Prince Mohammed ought to be protected by sovereign immunity in a case brought by the fiancée of Khashoggi, Hatice Cengiz. Such protection is usually granted to a world leader, such as a prime minister or a king. In July the administration sought a delay in filing its response to the court, which had initially been sought by 1 August. John Bates, a district court judge, agreed to extend the deadline to 3 October. Among other issues, he called on the administration to state whether it believed Prince Mohammed ought to be granted immunity under rules that protect countries' head of state."

Oil –US says Iran likely conducted the drone attack on the tanker offshore Oman

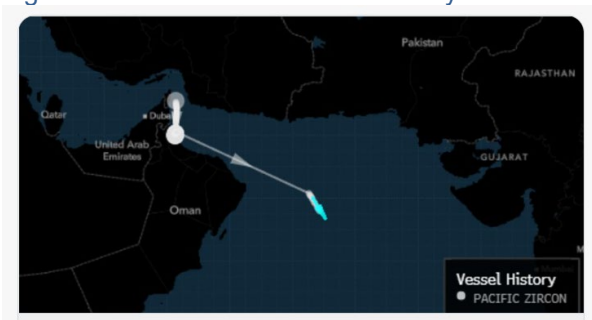
It seems like markets moved a few years ago to a view that missile/drone attacks in the Middle East aren't potentially game changing events. On Wednesday morning, AP reported "In a statement, Eastern Pacific Shipping said the Pacific Zircon, carrying gas oil, had been "hit by a projectile" some 150 miles (240 kilometers) off the coast of Oman. "We are in communication with the vessel and there is no reports of injuries or pollution. All crew are safe and accounted for," the company said. "There is some minor damage to the vessel's hull but no spillage of cargo or water ingress." A tanker being hit by a projectile and then blamed on Iran didn't seem to have any significant impact on oil prices to end the week. Later on Wednesday, US National Security Advisor Jake Sullivan issued a statement [\[LINK\]](#) "We condemn in the strongest possible terms the November 15 attack against a commercial

**US says Iran
conducted the
drone attack**

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tanker, the MV Pacific Zircon, that was transiting in international waters off the coast of Oman. Upon review of the available information, we are confident that Iran likely conducted this attack using a UAV, a lethal capability it is increasingly employing directly and via its proxies throughout the Middle East and proliferating to Russia for use in Ukraine.” And his statement concluded “We will work with partners and allies, including as part of the International Maritime Security Construct, to hold Iran accountable and respond through appropriate means.”

Figure 44: Pacific Zircon vessel history



Source: Bloomberg

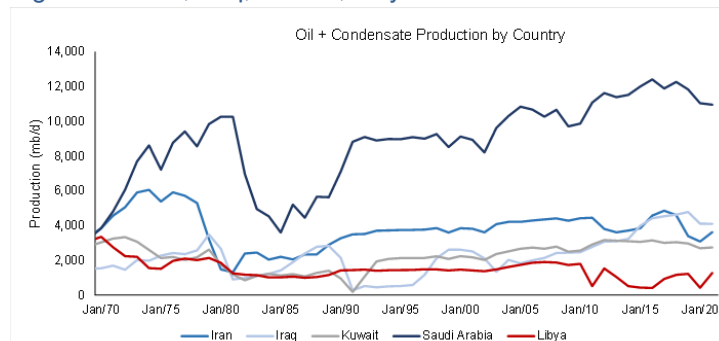
Oil – Iraq targets to get to 7 mmb/d oil capacity in 2027

On Wednesday, Reuters reported [\[LINK\]](#) “Iraq plans to increase its oil production capacity to around 7 million barrels per day in 2027, head of state-owned oil marketer SOMO Alaa Alyasri told Reuters on Wednesday. Iraq’s current crude production capacity is close to 5 million barrels per day (bpd), but it produced 4.651 mln bpd in October, according to SOMO. This is in line with its production quota under the OPEC+ agreement. The capacity increase will come from Iraq’s giant fields currently undergoing development including Rumaila, managed by a joint venture of BP Plc (BP.L) and PetroChina Co Ltd (601857.SS), as well as from Lukoil’s West Qurna 2, Alyasri said.” Iraq is different than Iran and Libya that are producing at approx. half of their 1970’s peak before both countries were hit by decades long sanctions. Iraq is producing probably 50% higher than its 1970’s peak. Iraq’s ramp up to oil production to its current levels was expected. Back in our June 29, 2014 Energy Tidbits, we noted how Iraq was producing about 3.2 to 3.3 mmb/d and was expected to add 1.2 mmb/d by the end of 2019. The key at that time was that Iraq’s growth was to be driven by supermajors. And we believe that is the key if Iraq is to hit its target to get to 7 mmb/d. It needs to have supermajor capital and project management to take its production to continued new record levels. Our Supplemental Documents package includes the Reuters report.

Iraq targets to get to 7 mmb/d

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Figure 45: Iran, Iraq, Kuwait, Libya & Saudi Arabia oil + condensate production



Source: BP

Oil – China local govts aren't allowing reopening as fast as China leadership expected

It looks like the Chinese leadership hope for the country to get behind their 20 optimized measures to help reopen the country while still fighting Covid isn't working. Or, at least the local governments aren't following the wants of the leadership. And our concern is that until China can get in lockstep, it will slow the reopening. Early Friday morning, we tweeted [\[LINK\]](#) "Negative to #Oil. Seems China leadership hope to ease Covid restrictions "while maintaining healthy economic growth" isn't being followed by local govt. Communist party now says "20 rules" not optimized measures ie. time to follow the rules. Adds risk to speed of reopen. #OOTT." On Friday, People's Daily (news agency for the central committee of the Chinese communist party) report [\[LINK\]](#) makes it sound like the local governments aren't doing what the Chinese leadership wanted when they introduced their 20 optimized measures on Friday Nov 11 that were seen as measures to reduce Covid restrictions for reopening China. It was the big news that moved markets, including oil on Nov 11. We titled last week's (Nov 13, 2022) Energy Tidbits memo "May be Gradual, But China's 20 Optimized Measures Look to be a Pivot Towards Reopening From Covid." But the People's Daily report is pointing to local governments not jumping on board. First thing to note is that People's Daily refers to them as "20 rules" and not 20 optimized measures ie. these rules are meant to be followed. They also wrote "However, some strict anti-pandemic policies such as city-wide lockdown, despite saving many people's lives, have slowed economic growth of many cities and regions, dealing a blow to many people's livelihoods and reducing their incomes. Perhaps there is a need to make the prevention and control measures more specific and targeted, so as to minimize their impact on economic growth or people's livelihoods. That's why the introduction of the new pandemic-prevention rules, popularly called the "20 rules", on Nov 11 are a timely step toward fine-tuning the measures to contain the novel coronavirus, whose strains are becoming more infectious but less deadly. How to implement the new rules, however, is an even bigger challenge for local authorities amid the resurgence of cases in many places. To begin with, local governments need to explore ways to implement the new rules " And "Second, local governments should follow the new 20 rules both in letter and spirit. Though it's a huge test for local authorities to control the spread of the highly infectious variants while maintaining economic growth, they should consider doing away with the not-fully-scientific practice of locking down whole cities or counties on the basis of just a few confirmed cases. According to the new 20 rules, local authorities should introduce targeted prevention and control measures but avoid upgrading them (that is, making them stricter) unnecessarily. And

China local govts hold back reopening

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those local authorities not following the new rules in spirit should be held accountable for unnecessarily harming people's livelihoods, because lockdowns and/or large-scale quarantining are especially harmful to the economy and low-income people. Because both the condition on the ground and the variants of the virus are constantly changing, gradual and progressive adjustments should be made to ensure the targeted measures prevent the further spread of the virus. Hopefully, by strictly and rightly following the new 20 rules, the local governments will improve their approach to containing the pandemic, and figure out better ways to protect people's lives and livelihoods, while maintaining healthy economic growth." Sounds like local governments aren't doing what China leadership wants to be done. And that means, the reopening is not going as fast as China leadership wanted and that would be expected by markets. Our Supplemental Documents package includes the People's Daily report.

Nov 11, China's 20 optimized measures drove markets & oil up

Markets rallied last Friday (Nov 11) on the reports of China's 20 optimized measures that were viewed as the first real signs China's leadership wanted to reopen. Whereas, above, we note that it looks like local governments aren't cooperating with the intention of the 20 optimized measures. But, here is what we wrote in last week's (Nov 13, 2022) Energy Tidbits memo. "As of our 7am MT news cut off, we have not seen any China state media reports that would contradict the takeaway from the big report by the Global Times on Friday morning. If anything, it seems like Chinese authorities are doing their best to try to not say they are reopening. We recognize that China is still, as of yet, hasn't oved off its official Covid Zero approach, but, the Global Times Friday early afternoon (local time) report put a big jump up in oil. Global Times is part of the China Communist Party media, so this report was coming right from the Communist party. And the Global Times report clearly shows where China is relaxing is Covid restrictions, and, just as importantly, China looks like it is open to a "broad spectrum of vaccines and drugs." ie. open to more foreign vaccines to more than just foreigners. Early Friday morning, we tweeted [\[LINK\]](#) "Must Read 📌. Not speculation, China communist party media. Authorities release 20 measures to relax Covid restrictions ie. shortened quarantines, at home vs centralized quarantine AND urge development of "broad spectrum of vaccines & drugs". No surprise, Brent #Oil +\$2.90. #OOTT". Global Times report "China shortens quarantine period for intl arrivals, cancels 'circuit breaker' for inbound flights" [\[LINK\]](#) "Chinese authorities on Friday released 20 optimized measures to further enhance scientific and precise work of epidemic prevention and control, one day after the Chinese leadership held a meeting to hear a report on the COVID-19 response, and discussed and arranged the 20 measures. The newest steps include shortened quarantine period for international arrivals and close contacts of confirmed cases from 7+3 (seven days of centralized quarantine and three days of health." There were other measures in the 20 optimized measures. Global Times also reported "The latest measures also called for promotion of mass vaccination in China, especially the administration of booster shots among the elderly group. The measures also urged accelerated research and development of broad spectrum vaccines and drugs. The measures vowed to deal with excessive and one-size-fits-all measures seriously, banning unreasonable steps to lock down schools, suspend traffic or clinical service. Such violations would be punished seriously according to regulations and laws, read the

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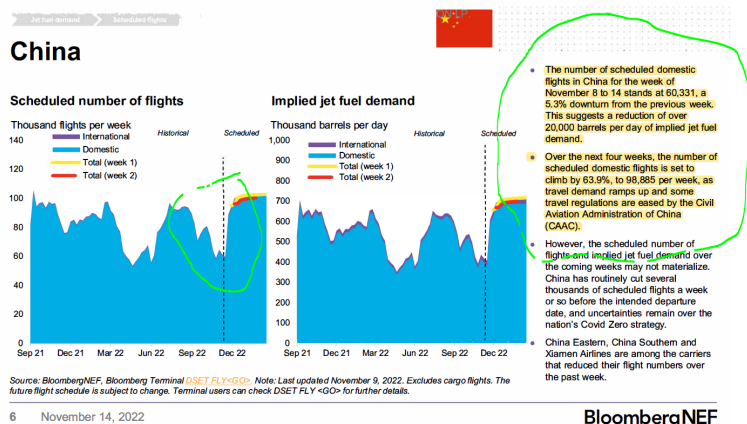
measures.” Yesterday, *Global Times* report “Strict COVID prevention and control must be combined with optimized measures; ‘strenuous efforts on both’: Chinese authorities” [\[LINK\]](#) didn’t pull back on the 20 optimized measures. Rather it seemed like they were trying to not say they were moving to a reopening phase even if they are, albeit modestly. Yesterday, it is tried to say they can be strict on Covid and implement the 20 optimizing measures. China stressed that they must continue Covid measures combined with the optimized measures. It is not a giving up of Covid measures. *Global Times* reported “At a press conference held by the State Council Joint Prevention and Control Mechanism against COVID-19 on Saturday, Mi Feng, a spokesperson from the China’s National Health Commission (NHC) reiterated that the 20 measures are designed to optimize the country’s ninth edition of diagnostic and treatment protocols for COVID-19, to make the implementation of the measures more science-based and precise. “They certainly do not mean we can slacken our response or even simply end COVID restrictions and lie flat.” Our Supplemental Documents package includes the *Global Times* optimized measures report.

Oil – Chinese domestic flights back to a WoW decrease

The modest pickup in China scheduled domestic air flights for the Nov 1-7 week wasn’t sustained. Rather scheduled air flights for Nov 8-14 were down 5.3% WoW. On Monday, we tweeted [\[LINK\]](#) “Key China reopening test is coming. Will next 2-3 weeks show a sustained pickup in China domestic air flights in response to 20 optimized (relaxed) Covid measures? For now, domestic air flights still stuck, -5.3% WoW to 60,333 for Nov 8-14. Thx @BloombergNEF Claudio Lubis. #OOTT.” The next few weeks should be a good test to see how the Chinese react to the 20 optimized measures announced on Nov 11 that reduce Covid restrictions, or if implied by the People’s Daily Nov 18 report, local governments approach keeps holding back domestic air travel. So the question is will we start to see a pick up in Chinese scheduled domestic air flights? Did the 20 optimized measures provide the incentive to fly? But for now, domestic air flights are stuck. And last week were down. Scheduled domestic airflights were -5.3% WoW to 60,333 flights for the Nov 8 to 14 weeks. The prior Nov 1-7 week was +10.2% WoW, but the prior week was -8.4% WoW. The number of scheduled domestic air flights is supposed to increase by 63.9% to 98,885 per week. Our tweet included the below BloombergNEF graph from its Aviation Indicators Weekly report.

Scheduled
China air flights

Figure 46: China Scheduled # of flights & Implied jet fuel demand Nov 8-14 week



BloombergNEF

Source: BloombergNEF

Oil – Vortexa crude oil floating storage 86.16 mmb as of Nov 18, +2.16 mmb WoW

There was a big upward revision to last week's Nov 11 storage level of 73.03 mmb, which looked like a big positive if it held below 80 mmb. But it was revised up +10.97 mmb so it wasn't an outlier. We are referencing the Vortexa global crude oil floating storage data posted on the Bloomberg terminal as of 10am MT yesterday. Note that these estimates get revised over the course of the week and the revisions can go back months. We do not check daily for the revisions, so our comments today on the new estimates are compared to the prior weeks Vortexa estimates posted on Bloomberg on Nov 12 at 11am MT. (i) As of 10am MT yesterday, Bloomberg posted Vortexa crude oil floating storage estimate Nov 18 at 86.16 mmb, which is +2.16 mmb WoW vs upwardly revised Nov 11 of 84.00 mmb. Note Nov 11 of 84.00 mmb was revised +10.97 mmb vs 73.03mmb posted on Bloomberg at 11am MT on Nov 12. (ii) Probably shouldn't have been surprised to see a big upward revision to Nov 11 and also lesser, but upward revisions for the prior two weeks. The revisions from the estimates posted yesterday at 10am MT vs the estimates posted on Bloomberg at 11am on Nov 12 were: Nov 11 revised +10.97 mmb. Nov 4 revised +4.53 mmb. Oct 28 revised +4.28 mmb. Oct 21 revised -0.24 mmb. Oct 14 revised -0.37 mmb. Oct 7 revised -0.60 mmb. (iii) If you put aside the outliers in Oct 28, and Sept 23, we would pick a range of 85-90 mmb. (iv) Also remember Vortexa revises these weekly storage estimates on a regular basis and we do not track the revisions through the week. (v) Nov 18 estimate of 86.16 mmb is -134.30 mmb vs the post-Covid peak on June 26, 2020 of 220.46 mmb. (vi) Note that the below graph goes back 3 years and not just 2 years as floating oil storage was in the big ramp up period in Q2/20 as Covid started to have a huge impact. Nov 18 estimate of 86.16 mmb is +31.11 mmb vs pre-Covid Nov 18 of 55.05 mmb. Nov 18 estimate of 86.16 mmb is -22.26 mmb YoY vs Nov 19, 2021 of 108.42. (vii) Below are the last several weeks of estimates posted on Bloomberg as of 10am yesterday, 11am on Nov 12, and 11am on Nov 5.

Vortexa crude
oil floating
storage

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Figure 47: Vortexa Floating Storage posted on Bloomberg Nov 19 at 10am MT



Source: Bloomberg, Vortexa

Figure 48: Vortexa Estimates Posted Nov 19 10am MT, Nov 12 11am MT, Nov 5 11am MT

| Posted Nov 19, 10am MT | | | | | Nov 12, 11am MT | | | | | Nov 5, 11am MT | | | | |
|-------------------------|----|----|----|-----|-------------------------|----|----|----|-----|-------------------------|----|----|----|-----|
| FZWVST VTXA Inde | | | | | FZWVST VTXA Inde | | | | | FZWVST VTXA Inde | | | | |
| 11/17/2019 - 11/18/2022 | | | | | 11/10/2019 - 11/11/2022 | | | | | 11/03/2019 - 11/04/2022 | | | | |
| ID | 3D | 1M | 6M | YTD | ID | 3D | 1M | 6M | YTD | ID | 3D | 1M | 6M | YTD |
| Date | | | | | Date | | | | | Date | | | | |
| Last Px | | | | | Last Px | | | | | Last Px | | | | |
| Fr 11/18/2022 86163 | | | | | Fr 11/11/2022 73025 | | | | | Fr 11/04/2022 79612 | | | | |
| Fr 11/11/2022 83996 | | | | | Fr 11/04/2022 85848 | | | | | Fr 10/28/2022 102.199k | | | | |
| Fr 11/04/2022 90384 | | | | | Fr 10/28/2022 102.944k | | | | | Fr 10/21/2022 96010 | | | | |
| Fr 10/28/2022 107.216k | | | | | Fr 10/21/2022 94914 | | | | | Fr 10/14/2022 88505 | | | | |
| Fr 10/21/2022 94673 | | | | | Fr 10/14/2022 87931 | | | | | Fr 10/07/2022 85558 | | | | |
| Fr 10/14/2022 87563 | | | | | Fr 10/07/2022 84311 | | | | | Fr 09/30/2022 91891 | | | | |
| Fr 10/07/2022 83714 | | | | | Fr 09/30/2022 90252 | | | | | Fr 09/23/2022 107.74k | | | | |
| Fr 09/30/2022 88639 | | | | | Fr 09/23/2022 105.552k | | | | | Fr 09/16/2022 92314 | | | | |
| Fr 09/23/2022 105.268k | | | | | Fr 09/16/2022 89540 | | | | | Fr 09/09/2022 85715 | | | | |
| Fr 09/16/2022 89773 | | | | | Fr 09/09/2022 84530 | | | | | Fr 09/02/2022 80070 | | | | |
| Fr 09/09/2022 82131 | | | | | Fr 09/02/2022 79960 | | | | | Fr 08/26/2022 87045 | | | | |

Source: Bloomberg, Vortexa

Oil – BNEF, Mobility up WoW in major areas, Covid still impacting China’s mobility

We are big fans of the BloombergNEF weekly indicators reports as they provide updates on WoW changes, but also remind that WoW changes do not necessarily mark a trend. On Thursday we tweeted [\[LINK\]](#), “#Oil. Covid still the China story. #BNEF “congestion levels pick up everywhere except China” Nov 13, China 20 optimized measures easing Covid. Increased Covid cases = no pickup in China congestion levels for week ended Nov 16. Thx @BloombergNEF C Lubis, W Tan, P Geurts #OOTT.” On Thursday, BloombergNEF posted its Global Road Traffic Indicators which included a WoW increase in mobility across the globe, with the exception of China which posted a decline. Over the previous weeks TomTom trends moved lower relative to 2019, but the three major regions increased WoW, but again China is an outlier. So, it’s worth keeping an eye on these indicators as they are happening at the same time as places like the US have seen lower gasoline prices. TomTom congestion index showed Europe up slightly at 0.3%, Asia Pacific up 1.9%, China down 2.3%, and North America up 1.2% from last week. Europe and North America are bullish and subject to drivers responding to rising cost, including high gasoline prices. China’s mobility data

Mobility up globally WoW, except China

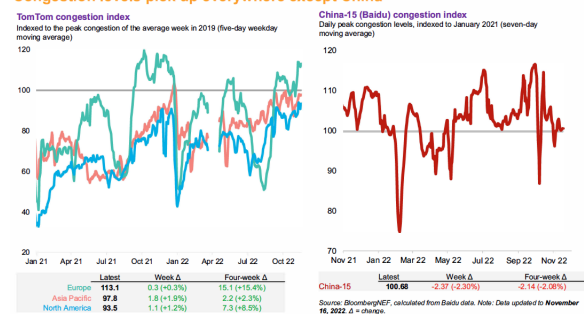
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continues to highlight the impacts of easing and tightening of the zero-covid policy and lockdowns throughout the country. Our Supplemental Documents package includes excerpts from the BNEF Global Road Traffic Indicators report.

Figure 49: BloombergNEF Mobility Indicators

Comparing the two mobility indicators

Congestion levels pick up everywhere except China



Oil – Thanksgiving holiday travel expected to reach 98% of pre-pandemic levels

There is no question that the US is still in their big post Covid travel push. The AAA Travel released their 2022 Thanksgiving Holiday Travel Forecast [\[LINK\]](#) on November 15. They expect 54.6mm Americans to travel this Thanksgiving, which is a YoY increase of 1.5%, bringing volumes to 98% of pre-pandemic levels. Share of car travel is up 0.4% from 2021 levels to 49mm people or 89.1% of total. Don't forget, airfares are also up, but most would have booked Thanksgiving weekend air travel months ago before the recent big airfare price increases. Air travel volumes will hit levels just shy of 2019 with an increase of 330,000 travelers expected to take to the skies Thanksgiving weekend. In fact, the percentage of people traveling by air will surpass 2019 levels with 8.3% of travelers choosing air travel as their preferred mode (it was 7.5% in 2019). Our Supplemental Documents package includes the AAA release.

Thanksgiving holiday travel expected up

Oil & Natural Gas – TIPRO Texas oil natural and gas jobs up MoM in Oct

Employment continues to increase in the Texas oil and gas sector. The Texas Independent Producers and Royalty Owners Association (TIPRO) updated their employment figures for the Texas upstream sector for October [\[LINK\]](#). The release noted that employment for October totalled 207,000 marking an increase of 2,800 jobs from the September numbers. The release stated, "Texas upstream employment in October 2022 represented the addition of 36,500 positions compared to October 2021, including an increase of 8,100 in oil and natural gas extraction and 28,400 jobs in the services sector." There has been strong job posting data for October in upstream, midstream, and downstream sectors, showing a continued demand for talent in the Texas oil and natural gas industry. From the release "TIPRO once again noted strong job posting data for upstream, midstream and downstream sectors for the month of October. According to the association, there were 11,904 active unique jobs postings for the Texas oil and natural gas industry in October, including 3,742 new job postings added in the month." Our Supplemental Documents package includes the TIPRO release.

TIPRO October jobs update

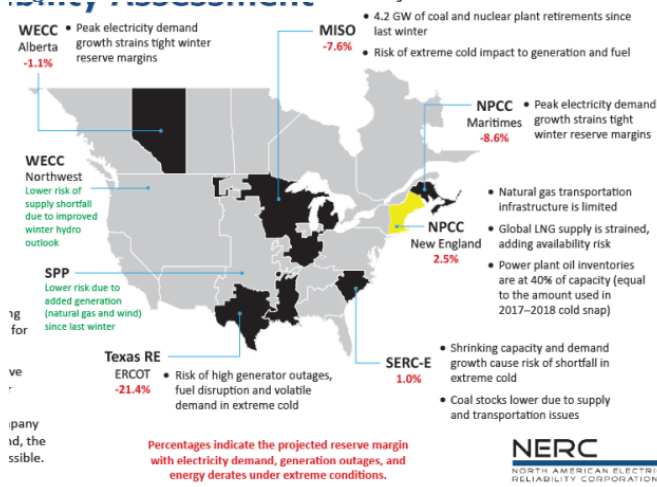
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Electricity – NERC’s warning on winter electricity risks during extreme weather

On Thursday, NERC (North American Electricity Reliability Corporation) posted its 2022-2023 Winter Reliability Assessment [LINK](#) with an opening “warns that a large portion of the North American bulk power system is at risk of having insufficient energy supplies during severe winter weather.” Its key finding was “A large portion of the North American BPS is at risk of insufficient electricity supplies during peak winter conditions (Figure 1). Higher peak-demand projections, inadequate generator weatherization, fuel supply risks, and natural gas infrastructure are contributing to risks seen in the following areas:” NERC then identified the risk areas being Texas (ERCOT), Midcontinent ISO (MISO), SERC-east, WECC-Alberta and NPCC-Maritimes. In light of the past, Texas would get the most headlines. NERC warned “Texas RE-ERCOT: The risk of a significant number of generator forced outages in extreme and prolonged cold temperatures continues to threaten reliability where generators and fuel supply infrastructure are not designed or retrofitted for such conditions. Furthermore, a U.S. Environmental Protection Agency (EPA) decision regarding compliance with hazardous coal ash disposal regulations is expected before the end of 2022 that could impact the availability of two coal-fired generation units (combined total of 1,477 MW) in the last weeks of winter. These units could be important resources during extreme conditions, and an EPA decision can provide flexibility in scheduling outages for plant improvements. Demand volatility in Texas from extreme cold temperatures also contributes to energy shortfall risks.” Our Supplemental Documents package includes excerpts from the NERC report.

NERC’s winter reliability assessment

Figure 50: NERC winter electricity risk areas



Source: NERC

Energy Transition – Did COP27 admit there needs to be an energy “TRANSITION”?

It’s has to be impossible for anyone, no matter where you are on the climate change spectrum, to not read today’s UNFCCC “Decision -/CP.27. Sharm el-Sheikh Implementation Plan” and not realize that the energy transition is going to take way longer, be a bumpy/rocky road and cost hugely more than what was inferred by western leaders. Earlier this morning the UNFCCC posted the 10-pg decision. [LINK](#). It’s a pretty easy read. Here are a few of they key takeaways: (i) need to read the words carefully. We warn on this every year to read

Energy Transition will be hugely expensive

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the words, look at what they are implying, and also the qualifiers (outs) on any type of commitment. (ii) A transition is needed. Earlier this morning, we tweeted [\[LINK\]](#) "WOW! Must read 📌 #30, did @UNFCCC #COP27 sneak in an admission there has to be an Energy TRANSITION? Step 1: transform to a "LOW-CARBON" economy. Sept 2: try to reach #NetZero in 2050. #Oil #NatGas will be needed for way longer than #EnergyTransition aspirations. #OOTT." They don't come out and say directly we were wrong in thinking we get the world to jump from an energy mix today driven by fossil fuels to one without fossil fuels. Rather #30 says "Highlights that about USD 4 trillion per year needs to be invested in renewable energy up until 2030 to be able to reach net zero emissions by 2050, 18 and that, furthermore, a global transformation to a low-carbon economy is expected to require investment of at least USD 4–6 trillion per year." (iii) Very very expensive. We have to believe the massive investment for the energy transition is shocking to everyone. Our first tweet this morning on COP27 was [\[LINK\]](#) "Hmmm! #cop27egypt @UNFCCC implementation plan. need \$4T/yr in renewable energy "and that, furthermore, a global transformation to a LOW-CARBON economy is expected to require an investment of at least \$4-6T per year". Sounds like #NatGas #Oil will be needed for 2020s. #OOTT. The \$4T for renewable energy has to be more than expected. And then the buzz words of transforming to a "low-carbon" economy needs at least a further \$4-6T per year. Low-carbon doesn't mean wind, solar, etc, but has to refer to natural gas for sure, likely oil as it is less carbon than coal, oil and gas with carbon capture, etc. They just don't want to say natural gas. (iv) Another example of not wanting to say the words natural gas. #10 "the importance of enhancing a clean energy mix, including low-emission and renewable energy". (v) asking countries to accelerate unabated coal phaseout. Note "calls upon parties", which is asking them. #13 "calls upon parties to Including accelerating efforts towards the phasedown of unabated coal power and phase-out of inefficient fossil fuel subsidies." (vi) reminder the qualifier that countries have to decide on what they can do by using the "in line with national circumstances" qualifier. #10 says "Stresses the importance of enhancing a clean energy mix, including low-emission and renewable energy, at all levels as part of diversifying energy mixes and systems, in line with national circumstances and recognizing the need for support towards just transitions". (vii) Developed countries already behind on their \$100b pledge. The big disappointment from developing countries is that they could not get anything firm in terms of a commitment from developed countries for loss and damage of the harm done to date from climate change. It was discussed but there was no determination of a structure and big items like who would be eligible to get paid out. Some wanted developing countries as known back in the 90's ie. So that would include china, Saudi arabia, and others. The other reality check is how could they can get anything firm, when the developed countries haven't delivered on their prior \$100b commitment. #33 said "expresses serious concern that the goal of developed country Parties to mobilize jointly USD 100 billion per year by 2020 in the context of meaningful mitigation action and transparency on implementation has not yet been met and urges developed country Parties to meet the goal". (viii) There is much more in the 10-pg release. Our Supplemental Documents package includes the 10-pg release.

No wonder politicians didn't want to say how much Net Zero would cost

As noted above, we have to believe the at least \$8-10T per year is needed is a shock to everyone no matter where you are on the energy transition spectrum. We have always said the energy transition would cost way more than expected. And western leaders knew it would cost more but didn't want to say it so they wouldn't lose

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support for it and against oil companies. An example is our June 27, 2021 Energy Tidbits memo that was titled “*Biden Either Doesn’t Estimate or Won’t Say How Many \$ Trillions To Get US to Carbon Neutral*”. Here is what we then wrote “*Energy Transition – Biden has no idea how many \$ trillions to get US to carbon neutral We think Energy Secretary Granholm may have inadvertently taken away the credibility for the Biden administration to shoot down any views that the energy transition will make energy very expensive in the future. We recognize that Senate and House hearings with Biden cabinet members, in this case Energy Secretary Granholm, are basically used by the questioners to make their political point. However, in this case, we tweeted on an exchange between Rep Senator Kennedy and Granholm. Kennedy’s problem is that the Biden’s push to reduce emissions won’t mean much if China and India don’t similarly step up. But linked to that was the exchange that caused us to tweet [LINK] “US can’t control what CN IN actually spend to be #CarbonNeutral, but politics aside, shouldn’t #Biden admin have a rough estimate of how many \$trillions to get US to carbon neutral? How can anyone say #EnergyTransition won’t cost more? #NatGas #OOTT”. The exchange starts with Kennedy asking Granholm how many trillions it will cost to get the world to carbon neutral, she doesn’t have a number, he asks hundreds of trillions and she replies “it would be a lot, for sure” with a smile. We don’t think we are been bias by saying most people think she is a well liked person and we suspect she probably that might be enough to change questions. However, it was Kennedy so he comes back asking how much the energy department thinks it will cost to make the US carbon neutral? Granholm replies, “again, it would be a lot”, Kenney asks “hundreds of trillions?”, Granholm “I don’t know about hundreds of trillions but it would a lot of money”, Kennedy “it’d be in the trillions”, Granholm “Yes”, Kennedy “mid trillions?”, Granholm “I don’t know”. We recognize Kennedy is trying to play at gotcha you in getting Granholm to commit to an estimate but, the more we thought about it, we thought it was a good question – shouldn’t the Biden administration have some even really rough idea of what they think it will cost? Because without some rough cost with many unproven assumptions, how can they continue to argue that estimates or even calls that the energy transition will be expensive are incorrect or based on old thinking? Didn’t Granholm take away their credibility to say that in the future. The gotcha you question may not have worked the way Kennedy wanted, but really did work in a different way.*

Its understandable, but a little scary that Biden has no idea what it will cost The clear reminder from the Granholm comments is that the Biden administration has no idea how much this energy transition will cost the US, who will be required to pay up to get there and what it means to the cost of energy relative to today. No one can or at least should not disagree with the ambition to reduce global emissions. But it is a little scary to be committed to a path with no idea of what it costs. Maybe this is okay for the US, but think about how countries in the world can commit to a similar path? Maybe there is an estimate but the only reason we can think she would not disclose it is if it was very high. But, if we take her at face value, there isn’t one and, to be fair to Granholm and the Biden administration, any estimate of how much it will cost to get to carbon neutral would require many far from confident assumptions. Just think about the comments from John Kerry (that he tried to backtrack) that half

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of the ability to get there will come from technologies still to be developed. So what could Granholm assume?"

How will EU frame COP27 as not a bad decision?

We have a 7am MT news cut off so we aren't seeing all the EU reaction to the COP27 decisions and how they are framing their words to portray it was a success. And how much credit they will be taking for getting to the final deal. Earlier yesterday morning, EU made a threat to COP27 delegates. We tweeted [\[LINK\]](#) "Will EU's Humpty Dumpty threat work? @TimmermansEU "EU would rather have no decision than a bad decision" at #COP27. It should, BUT, gotta believe best case is a carefully crafted text that keeps the aspiration alive but has lots of outs for countries? Thx @business. #OOTT." We didn't believe that EU would walk away without signing on to an agreement. So the question will be how will EU frame the final result.

Energy Transition – UK say EVs will have to pay their share to maintain roads

Climate change side was negative on UK Chancellor Hunt's mini-budget on Thursday for multiple reasons. But one item in particular caught their ire was Hunt saying EVs will no longer be exempt from Vehicle Excise Duty starting April 2025. We don't recall seeing any other situations where western governments, either at state or national levels, have formally stepped up to make EVs pay some share of the massive amounts of money needed to maintain an aging road system. We believe this will be a big dilemma for governments that have relied on taxes on gasoline and/or on ICE vehicles to fund directly (or indirectly in the case of the UK Vehicle Excise Duty) the cash for maintaining roads. Do they continue to exempt EVs (that don't emit, but are much heavier so tougher on roads) from paying to keep roads maintained and therefore keep climate change supporters. Or do they try to figure out how to make sure there is cash to maintain an aging road system and thereby risk climate change support. We believe this dilemma is coming to western governments everywhere, including in the US and Canada. On Thursday morning, we tweeted [\[LINK\]](#) "Who has to pay to maintain roads? UK @Jeremy_Hunt since EVs est to be 50% of sales by 2025, "to make our motoring system fairer, I have decided that from Apr 2025, #EVs will no longer be exempt from Vehicle Excise Duty". This battle will come to US/Can eventually. #OOTT." Hunt said "And, because the OBR forecasts half of all new vehicles will be electric by 2025...to make our motoring tax system fairer I have decided that from April 2025 electric vehicles will no longer be exempt from Vehicle Excise Duty."

UK to get EVs to pay a fairer share

Energy Transition – Japan reportedly looking at increasing taxes on EVs

A key reason why we believe all western governments will be looking at this EV issue is that, in an era of expected lower growth and continued high energy prices, governments don't have all the excess cash to do everything want to do and will be forced to look at what they can afford to do or else cause big financial issues. On Friday, we tweeted [\[LINK\]](#) "Seems others will follow UK having EVs pay more for roads. Japan looking at increasing tax on #EVs. Do govts realize can't do all they want to do, but only what they can do or their economies blow up? ie. need affordable energy #Oil for longer? #OOTT It didn't take long to see reports of other developed countries looking at increasing taxes on EVs to get them to pay some fairer share." It looks like Japan could also be taking specific action to increase taxes on EVs. On Thursday, Nikkei Asia report "Japan to weigh raising tax on EVs as it fears revenue decline" [\[LINK\]](#) noted "Japan is mulling charging local tax on

Japan also looking at EVs

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electric vehicles amid fears of a potential drop in revenue — which may come as bad news for giants like Toyota Motor Corp. (OTC:TOYOF) and Elon Musk’s Tesla Inc. (NASDAQ:TSLA). What Happened: Japanese policymakers floated a plan of raising EV taxes to tackle a difficult financial situation as customers moved away from more heavily taxed gasoline vehicles, reported Nikkei Asia. Japan’s local automobile taxes have a class component based on engine size that ranges up to 110,000 yen (\$789) a year. However, that is set at 25,000 yen for EVs and fuel cell vehicles, making it the least-taxed among autos, apart from minicars. The officials at Japan’s Ministry of Internal Affairs and Communications, which looks after local taxes, said one possible change could be taxing electric cars based on motor power — an approach similar to some European nations.” Our Supplemental Documents package includes the Nikkei Asia report.

Energy Transition – Massive electricity will be needed for highway EV charging

We know it’s not going to happen, but we really wish western leaders would listen to what they need to hear and not just to what they want to hear. Or at least their advisors will tell what they need to hear and not just what they know the leaders want to hear. One area that no one is listening to is the massive electricity requirements to set up highway charging for electric passenger cars and medium/heavy trucks. Because if they were listening, they would be worried about how much it will cost and if it’s even possible to provide the level of charging that will be expected. On Monday, we tweeted [\[LINK\]](#) “WOW! Bet most don’t appreciate that a SINGLE large passenger/truck highway charging plaza will be ~equivalent to the electric load of a small town. SINGLE 20-fast charger #EV highway play = load of an outdoor stadium. Thx @nationalgrid. #NatGas #OOTT[\[LINK\]](#)”. We included the below National Grid graphic. But think of this, a single large passenger/truck highway charging plaza will require the equivalent electricity load of a small town. That is for a single charging plaza. This wasn’t an anti-EV report by a fossil fuel or anti-climate change group. Rather it was from the National Grid. There will be \$trillions or some massive amount of capital needed over the next 10 to 20 years. We really don’t believe politicians appreciate how much electricity is needed for charging. The National Grid analysis shows that every single typical highway charging station will require massive electricity, especially if the highway station charges passenger vehicles and trucks. A single highway passenger only charging electricity needs will be equal the same as an outdoor stadium. A single large highway passenger + truck charging electricity needs will be equal to a small town. And then throw on top of that, there will be a massive need for connection of the large highway charging stops to a high voltage transmission systems, assuming there is a high voltage nearby to hook into. Anything above the 5 MW distribution limit will require access to high voltage transmission. And the scale of the increased energy demand from highway charging sites is off the charts. It’s hard to see a scenario that this can be done. Attached are a couple of the key National Grid exhibits. Our Supplemental Documents package includes excerpts from the National Grid report. [\[LINK\]](#)

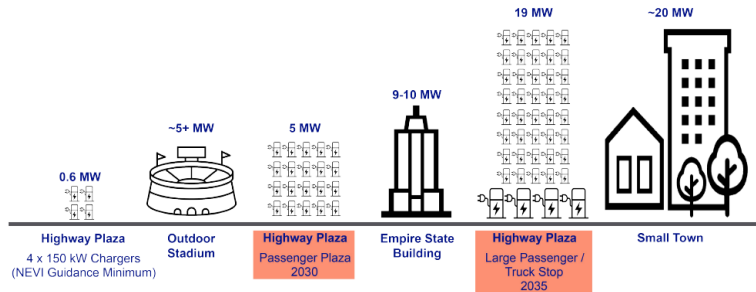
**Massive highway
EV charging
requirements**

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Figure 51: Comparative peak loads for illustrative charging sites vs other major users

For perspective, the Mixed Use Traffic Plaza and Passenger Plaza will each require about 5 MW of charging capacity by 2030—about the amount of power used by an outdoor professional sports stadium. By 2035, the nameplate charging capacity required at the Large Passenger/Truck Stop site will be roughly equivalent to the electric load of a small town (Figure 21). Note that the other large energy users' loads depicted in the figure below are approximate based on a range of loads.

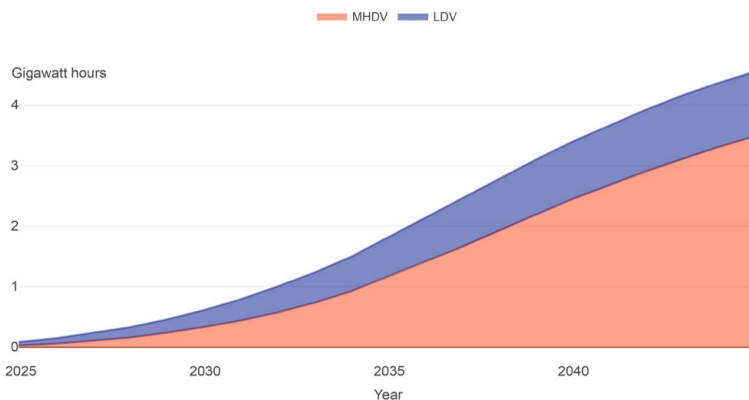
Figure 21. Comparative Peak Loads for Illustrative Sites and Other Major Users³⁵



Source: National Grid

Figure 52: Average daily energy demand across all highway charging sites

Figure 22. Average Daily Energy Demand Across All Sites



Source: National Grid

Energy Transition – IATP reminds livestock is the biggest methane emissions source

As of our 7am MT news cut off, we haven't seen the final COP27 communique, but one of the big themes that seems to be in agreement is the focus to cut methane emissions from the oil and gas industry. We have yet to see the COP27 delegates focus on the largest methane emissions group in the world - livestock. Livestock emissions are more than oil and gas. On Tuesday, the Institute for Agriculture & Trade Policy posted its report "*Emissions Impossible: How emissions from big meat and dairy are heating up the planet*". [\[LINK\]](#). We tweeted [\[LINK\]](#) "#Methane emissions are much more than #Oil #NatGas. @IATP report "How emissions from big meat and dairy are heating up the planet", livestock contribute 32% of

Livestock is the biggest methane emissions group

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#Methane emissions, single largest source of anthropogenic methane emissions. #OOTT.
 The IATP first chapter is “the urgency of addressing livestock methane” and writes “*Animal agriculture contributes 32% of the world’s methane emissions, making it the single largest source of human-made methane emissions. Although animal agriculture has started to get more attention for its contribution to climate change, the emissions of big meat and dairy companies remain below the radar for urgent climate action. Animal agriculture is responsible for 57% of emissions linked to agricultural production, which accounts for an estimated 37% of all global emissions. Even if the world immediately stopped using all fossil fuels, scientists say that current emissions from the global food system would make it impossible to limit warming to 1.5°C and difficult even to realise the 2°C target.*”

Figure 53: Livestock contribute 32% of global methane emissions



Source: Institute for Agriculture & Trade Policy

UN warned Ruminants (cows, etc) almost 2x methane emissions vs oil & gas

No one should be surprised by the IATP report highlighting livestock as the single largest source of global human caused methane emissions. Just like no one should be surprised that the sector continues to fly under the radar for western governments. Rather it is easy for western leaders to keep oil and gas as the #1 methane enemy. Our May 9, 2021 Energy Tidbits wrote “*This week, the UN Environment Programme published their major report – “Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions” [LINK](#). The US starts right at the start and reminds that methane is way worse the CO2 “Methane, a short-lived climate pollutant (SLCP) with an atmospheric lifetime of roughly a decade, is a potent greenhouse gas tens of times more powerful than carbon dioxide at warming the atmosphere”. We have been highlighting for years how the Cdn oil and gas sector has been reducing methane emissions going back to when one of our friends was in the Encana group doing so. The reality is that fossil fuels are the easy target for governments even if they were already reducing methane emissions. And the first set of measures recommended by the UN are against fossil fuels “Oil, gas and coal: the fossil fuel sector has the greatest potential for targeted mitigation by 2030. Readily available targeted measures could reduce emissions from the oil and gas sector by 29–57 Mt/yr and from the coal sector by 12–25 Mt/yr. Up to 80 per cent of oil and gas measures and up to 98 per cent of coal measures could be implemented at negative or low cost. (Section 4.2)”. We understand why fossil fuels are the easiest to go after, but the UN report also reminds of the leading cause of methane emissions. For example, ruminants (ie. cattle, etc) cause 73% more methane emissions than oil and gas. Its why we tweeted [LINK](#) “Interesting data from @UNEP global #Methane*

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emissions report. worst are Freshwaters 159 mt/yr, Wetlands 145, Ruminants (cattle etc) 115, #Oil & #NatGas 84. Termites 9 are ~= to all offshore oil & gas. Fortunately, oil & gas will keep doing more. #OOTT". Below is the table we created to rank the US methane sources table.

Figure 54: Sources of Methane 2017

| Sources of Methane Ranked (2017) | | NATURAL SOURCES | MAGNITUDE (MT/YR) | ANTHROPOGENIC SOURCES | MAGNITUDE (MT/YR) | SINKS | MAGNITUDE (MT/YR) |
|----------------------------------|-------------------|--------------------------|-------------------|--------------------------------|-------------------|---------------------|-------------------|
| Source | Magnitude (MT/yr) | | | | | | |
| Freshwaters | 159 | Wetlands | 145 [100-183] | Coal mining | 44 [31-63] | Soils | 40 [37-47] |
| Wetlands | 145 | Termites | 9 [3-15] | Oil and gas industry | 84 [72-97] | Total chemical loss | 531 [502-540] |
| Ruminants (Cattle, goats, etc.) | 115 | Oceans | 6 [4-10] | Landfill and waste | 68 [64-71] | Total loss | 571 [540-585] |
| Oil and gas industry | 84 | Geological | 45 [18-65] | Ruminants | 115 [110-121] | | |
| Landfill and waste | 68 | Wild animals | 2 [1-3] | Rice cultivation | 30 [24-40] | | |
| Geological | 45 | Freshwaters | 159 [117-212] | Biomass burning | 16 [11-24] | | |
| Coal mining | 44 | Permafrost soils | 1 [0-1] | Industry | 3 [0-8] | | |
| Rice cultivation | 30 | | | Biofuels | 13 [10-14] | | |
| Biomass burning | 16 | | | Transport | 4 [1-13] | | |
| Biofuels | 13 | | | | | | |
| Termites | 9 | | | | | | |
| Oceans | 6 | | | | | | |
| Transport | 4 | | | | | | |
| Industry | 3 | | | | | | |
| Wild animals | 2 | Total natural | 367 [243-489] | Total anthropogenic | 380 [359-407] | | |
| Permafrost soils | 1 | Total natural (top-down) | 232 [194-267] | Total anthropogenic (top-down) | 364 [340-381] | | |

Source: UN Environment Programme

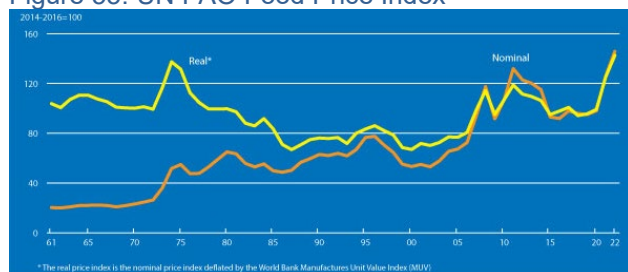
Capital Markets – UN FAO Food Price Index virtually unchanged in October

There were essentially no changes in the UN global food price index for October 2022. The UN wrote, “The FFPI’s virtually unchanged from September, with the price indices of all the covered commodity groups, except cereals, down month-on-month. An upturn in the Cereal Price Index countered drops in the indices for vegetable oils, dairy, meat and sugar.” It was +2.0% YoY, but that is down huge from the all-time record YoY highs of +33.6% YoY seen in March 2022. On Nov 11, the UN posted its monthly update of its FAO Food Price Index [LINK](#) titled “FAO Food Price Index virtually unchanged in October, with higher world cereal prices almost offsetting lower prices of other food commodities” Note this is on a Real price basis. The FFPI averaged 135.9 points for October 2022, which was -0.3% MoM and up 2.0% YoY. The FFPI reported a drop in all index’s MoM in October, except cereal. The Vegetable oil index was down -1.6% MoM, marking another retreat from April’s all time high. The Sugar Price Index was down -0.6% MoM and the Dairy Price Index was down -1.7% MoM though still +15.4% YoY. The Meat Price Index was down -1.4% MoM, driven by global supply and impacts of currency. Below is the all time FFPI graph. Our Supplemental Documents package includes the UN FAO Food Price Index update.

UN food price index +2.0% YoY

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Figure 55: UN FAO Food Price Index



Source: UN

Demographics – Canmore Alberta’s living wage is very high

This is basically a repeat of Alberta living wage for 2021 for key cities/towns in that in 2022, Canmore, Alberta is once again a very expensive place to live. We realize that most readers won’t know about Canmore, Alberta. It is a popular weekender destination as it’s in the Canadian Rockies and only 1 hour from Calgary on the Trans Canada highway so well plowed roads on a divided highway with two lanes each direction. Canmore’s rapidly increasing problem is not going to be much different than other similar towns in other provinces. We suspect Canmore Alberta isn’t alone in the increasing cost of living crisis for normal income people. We say normal as it isn’t only a lower income problem. But Canmore is hurt because it is a desirable weekender place for Calgary and that drives up real estate and other prices. And that means locals suffer, especially those in the service industry. It also means that Canmore has a labour problem that has only worsened in the last year. The Alberta Living Wage Network posted its “2022 Living Wage Numbers” [\[LINK\]](#) on “living wages are an important tool in figuring out what it costs to live in a city and with the current affordability crisis, it’s clear that more needs to be done to help people make ends meet.” Canmore’s Living Wage is \$32.75 for each parent in a household with 2 children, which is down 12.4% YoY from the 2021 Living Wage of \$37.40. This compares to Living Wages of \$22.40 in Calgary, \$22.35 in Cochrane (~35 min from Canmore & just NW of Calgary), and even more than \$22.50 in Fort McMurray. Our Supplemental Documents package includes excerpts from the Living Wage report.

Canmore’s very high living wage

Demographics – High income Canadians make a lot less in 2020

On Wednesday, Statistics Canada (StatsCan) reported how the Covid-19 pandemic had significant impacts on high-income Canadians in 2020 [\[LINK\]](#). StatCan wrote, “The patterns of income growth were quite different for individuals in the very highest parts of the income distribution. Overall, Canadians with the highest incomes from 2019 to 2020 experienced the largest declines in average income. Average total income of Canadians in the top 1% of income fell by \$5,500 to \$512,000. Individuals in the top 0.1% saw average total income fall by \$67,800 from 2019 to 2020, while those in the top 0.01% experienced the largest drop of \$506,800 during the same period.” The top 1% experienced a salary drop of \$2,200 (to \$315,700) and the top 0.1% a \$13,000 drop (to \$1,002,300). Dividend income also decreased for high-income Canadians. Top 1% dividend income decreased \$10,500 (to \$77,300), top 0.1% decreased \$82,600 (to \$348,600), and top 0.01% decreased \$592,900 (to \$1,543,400).

High income Cdns

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

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 20 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
on Twitter**

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 and often comment on sports.

Cdns in the hunt in the final rounds at PGA and LPGA tournaments today

One of the advantages of working on Saturdays is that we don't have to listen to business channels but can leave sports on in the background. And that means golf IF our Cdn pros are in the hunt. Going into today's final round of the PGA's The RSM Classic sits Adam Svensson at T2 -13, one shot off the leader after Svensson shot a 62 on Saturday. And Taylor Pendrith is T6 -12, after shooting a 65 on Saturday. Going into today's final round of the LPGA's CME Group Tour Championship, Brooke Henderson is T2 -9 after shooting a -7 under on Saturday, but is 6 strokes off the lead.

Humpty Dumpty

Our tweet yesterday on COP27 noted did EU's Humpty Dumpty threat work? Our reference to Humpty Dumpty was on the basis that if COP27 fell apart with no decision and broke apart, it would be more difficult to put back together the climate change ambition. For those who don't remember or know Humpty Dumpty rhyme. *"Humpty Dumpty sat on a wall. Humpty Dumpty had a great fall. All the king's horses and all the King's men Could not put Humpty together again."*

Rick Flair 'To be the man, you gotta beat the man'

We were listening to the political talk in the run up to Donald Trump's Tuesday announcement that he was going to run for President in 2024. And how some Republicans are finally openly saying he should not run. But potential challengers like Ron Desantis, Nikki Haley aren't directly saying so. The closest to saying it was Mike Pence saying there will be better choices. One of the Republican commentators was saying that at some point in time, these potential challengers have to step up and say they are going against him. And cited the well used Rick Flair (pro wrestler) phase *"to be the man, you gotta beat the man"*.

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Frank Abagnale says every scam has one of these two red flags

The FTX debacle was the business news story last weekend so, no surprise, there were a lot of pieces on fraud. Last Sunday night, CNBC tweeted a short Dec 5, 2019 video [\[LINK\]](#) of Frank Abagnale “*The real ‘Catch Me If You Can’ con artist says every scam involves these red flags*”. He was portrayed by Leonardo DiCaprio in the 2002 movie “*Catch Me If You Can.*” From 21 to 26 (late 1960s), Abagnale successfully passed himself as a then Pan American World Airways pilot, attorney, doctor and other professions. Abagnale says he wrote \$2.5 million of bad checks and this was 50 years ago. He was ultimately arrested and convicted. He was released on parole after serving 2 years of a 12 year sentenced and then in late 70’s started his life as a security consultant. In the Dec 5, 2019 video, Abagnale says that every scam, no matter how sophisticated or how amateur, there are two red flags. The first red flag is that some point, you will be asked for money and the money has to be immediately ie give bank account data, credit card, etc. and any time someone asks you for money and it’s immediate, that’s a big red flag. The other red flat is that at some point in the conversation, you will be asked for personal information ie. someone may pretend from a bank fraud dept, have a long call with you and then as the call is ending, the caller asks just to make sure you actually have your card in your possession, read the three numbers on the back.

Figure 56: Frank Abagnale and Leonardo DiCaprio



Source: CNBC

Did you know NFL policy is no alcohol on team planes or buses?

We didn’t until we saw the Friday/Saturday reports on how the NFL is reviewing the situation that may have led up to Tennessee Titans offensive coordinator Todd Downing getting a DUI charge early Friday morning following the Titans flight back after they beat the Packers on Thursday Night Football. NBC Pro Football Talk reported [\[LINK\]](#) “*Downing was pulled over at 3:49 a.m. CT. It appears that the team plane landed at 2:11 a.m. CT at the Nashville airport. Any investigation by the league will have to explore where he drank enough alcohol before 3:49 a.m. CT to be allegedly above the legal limit of 0.08 percent BAC.*” Later Friday, NBC Pro Football Talk provided an update “*The league sent a memo to its teams Friday threatening “significant discipline” for violating the policy. “In light of recent events, clubs are reminded that league policy prohibits alcoholic beverages, including beer, in the locker rooms, practice or office facilities, or while traveling on team buses or planes at any time during the preseason, regular season or postseason. This applies to all players, coaches, club personnel, and guests traveling with your team,” the league*

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wrote, via NFL Media. "This policy has been in place for many years. Making alcohol available at club facilities or while traveling creates significant and unnecessary risks to the league, its players, coaches and others. Violations of this important policy will be taken seriously and will result in significant discipline. "Each club should ensure that its travel arrangements do not include providing alcohol service at any time and should also take appropriate steps to confirm that alcohol (whether beer or any other alcoholic beverage) is not available at its facility. Please direct all further questions on this subject to Management Council of Football Operations." The memo came 24 hours after the DUI arrest of Titans offensive coordinator Todd Downing following his team's win over the Packers in Green Bay. Coach Mike Vrabel would not say whether alcohol was available on the team plane."

Massive lake effect snow dump in western New York

Unbelievable snow dump over a short period in western New York The videos and pictures are crazy. And it's even hard for us in Alberta to understand the impact of lake effect snow and the massive dump of snow that falls in a very short period. Couldn't help reach out to an old friend who grew up in Toronto region in the 60's/early 70's, and lived in Buffalo for decades before moving to Florida a couple years ago to ask what is like to be in one of these massive lake effect snow dumps. There was 6 feet of snow confirmed in parts of western New York. He said it is unbelievable because it happens so fast. It's not accumulated snow over a couple weeks, it happens in a couple of days. And it's basically around the clock snow clearing to try to keep less than a few inches of snow on your property. And that has to be done frequently to make sure there isn't too much snow for your snow blower to work. But most people don't have snow blowers and have to shovel! The Buffalo Bills were supposed to play the Cleveland Browns today at home in Orchard Park, NY, but the game was moved to Detroit. Below is a picture of man shoveling the 20 inches of snow on his driveway as of Friday evening.

Figure 57: Driveway snow clearance on Friday in Orchard Park, NY



Source: Buffalo News

Qatar's bait and switch, bans beer sales at stadiums 2 days before World Cup

There are a lot of annoyed (to be polite) fans who made the trek to Qatar to take in the World Cup matches who were shocked by FIFA's Friday announcement [\[LINK\]](#)

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“Following discussions between host country authorities and FIFA, a decision has been made to focus the sale of alcoholic beverages on the FIFA Fan Festival, other fan destinations and licensed venues, removing sales points of beer from Qatar’s FIFA World Cup 2022 stadium perimeters.” Note this is not just in the stadium, but also the stadium’s perimeters. It’s not just the fans, think about Anheuser-Busch who reportedly paid \$100 million for their product sales. Below is their initial tweet (that was deleted) on the FIFA announcement. The World Cup starts today in Qatar with the first match being Qatar vs Ecuador starting at 9am MT today.

Figure 58: Budweiser’s deleted tweet on Qatar’s ban of beer sales at stadium



Source: AOL

US\$250/night gets 2 single beds & small washroom container room in Qatar

We were watching CTV National News 30-min shows early yesterday morning and they ran a clip on the “hotel” accommodations for US\$250/night constructed out of smaller shipping containers in the desert outside of Doha for World Cup fans. They are containers that were converted to have two single beds, a toilet and sink. We couldn’t see from the video or other pictures on line if a shower is included. But they highlighted that there is a small air conditioner, a coffee maker and a mini-fridge. We haven’t been able to find out if alcohol is allowed in these fan accommodations.

Figure 59: Hotel container boxes at Qatar’s World Cup



Source: Daily Star

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