

IICEC Energy Market Newsletter

15 May, 2017



Special Feature on the Atlantic Council Summit

The Atlantic Council Summit (27-28 April 2017) hosted world leaders and top business leaders for the 8th time in Istanbul. The agenda included the opportunities and challenges for the economy, energy and national security. Dr. Fatih Birol, Executive Director of the International Energy Agency (IEA) provided the keynote address for the first day of the Summit and Turkish President Recep Tayyip Erdoğan provided the keynote address on the second day. More than 500 high-level international government and business leaders attended.

Istanbul: A Key Energy Player in the Region

Dr. Fatih Birol, also IICEC's Honorary Chairman, noted that hosting the Summit in Istanbul was appropriate due to Turkey's role in

the region as a key energy player. Birol noted that Turkey is in the center of 70% of the world's hydrocarbon reserves.

Energy Market Changes

Birol noted profound changes and uncertainties in global energy landscape. U.S. tight oil and shale gas has transformed the global energy scene. Growth of tight oil and shale gas, is not only changing energy markets but also redefining the parameters of energy geopolitics. To put it in context, between 2009 and 2016, the increase in U.S. oil and shale gas has transformed the global energy scene. Between 2009 and 2016, the increase in US oil production and shale oil production exceeded Iraq's or Iran's total production. Birol continued that we are witnessing a second revolution in the LNG market, becoming more transparent and competitive. In Europe, this is an important

discussion. About 75% of the European existing contracts with the major pipeline exporters are coming to an end in the next five years. In the last seven years, 14 new countries in Europe, Asia and elsewhere started to import LNG.

Renewable Energy

Birol also noted the significance of renewables growth saying that “Last year more than half of the global electricity demand growth has been met by renewable installations, especially wind and solar. They are becoming a major resource in almost every country in the world. Last year more than half of the global electricity demand growth has been met by the renewable installations, especially wind and solar. The cost of renewables went down very much. For instance, cost of solar dropped by 80% in five years.” Birol noted that Turkey has huge potential in both solar and wind in addition to hydro and others and is developing important projects.ⁱ

Good News on Climate Change

Birol pointed out that the CO₂ emissions remained flat for the third straight year signaling a continuing decoupling of emissions and economic activity: “In 2014, 2015 and 2016, CO₂ emissions did not increase even though global economy grew more than 3%”; “[t]hese three years of flat emissions in a growing global economy signal an emerging trend and that is certainly a cause for optimism, even if it is too soon to say that global emissions have definitely peaked.”

Turkey

Birol noted that there is strong potential of LNG coming to the markets and many good steps were taken in the right direction about it. This is a historical change for countries like Turkey to make the most of it by developing new LNG terminals. At the same time, the pipelines that transit Turkey are essential, for example, the Trans Anatolian Pipeline Project to support the established consumer groups to the West.

Turkey is taking a step to switch to a significant technology, which is nuclear energy. Birol hopes that the new plants will be completed in the shortest amount of time and in the safest and economic way. Choosing the right technology, choosing the correct partner and the terms of the contract/agreement are keys to success, Birol noted. New contracts should be the projects that don't place burdens on Turkey, but lift it economically. If Turkey is careful to develop the right technologies with rational contracts, Birol believes that switching to clean energy will be a big gain for Turkey, benefiting not only her energy security but also the environment.

President Erdoğan's Keynote Speech

In his keynote speech on the second day, President Erdoğan said Turkey and the U.S. have achieved high-level cooperation in the past and called for stronger cooperation between the allies given the current regional crises. President Erdoğan expressed Turkey's “Vision 2023” as being one of the top 10 economies in the world with per capita income increased up to \$25,000, and 1 trillion in terms of foreign trade. The President stressed the importance of energy in his wide-ranging address. For example, he said: “Turkey has always believed that energy is a great instrument to achieve peace because consumption of energy ... is about welfare [and] that's why we need to share energy.” President Erdoğan also noted Turkey's ‘win-win’ approach for Turkey and its neighbors. Regarding the United States, the President believed that Turkey and the U.S. can cooperate in terms of energy as well, because our strategy in terms of energy is based on a tripod, on three pillars, and these are supply safety, localization, and predictability and predictable markets. But Turkey needs “to develop her own resources” and the President described Turkey's oil and gas projects in the Black Sea and the Mediterranean as well as renewable and nuclear energy project.ⁱⁱ

Dr. FATİH BİROL meets with President TAYYİP ERDOĞAN

Following the Atlantic Summit, Dr. Fatih Birol had a meeting with President Erdoğan where their discussion included many of the important issues brought up at the Atlantic Council Summit.



In the News: Oil production from U.S. Permian Basin Continues to Increase

The United States' largest onshore oil producing basin is expected to increase output by another 100 kb/d in May 2017, according to the U.S. Energy Information Administration (EIA).ⁱⁱⁱ The Permian Basin, which covers more than 75k square miles in western Texas and southeastern New Mexico, will likely reach 2.4 mb/d this month, based on upstream investments and rising rig counts. Production

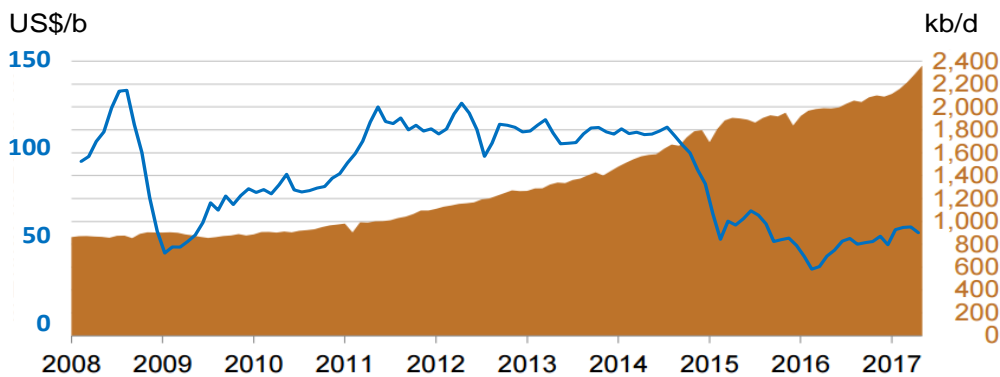
averaged 2.3 mb/d in April. Considered to be the crown jewel of the U.S. upstream oil sector, the Permian Basin has remained relatively resilient to the low oil price environment since the second half of 2014. Between January 2016 and March 2017, oil production in the Permian Basin increased in all but three months, even as domestic crude oil prices fell (see Figure 1). As production in other regions fell throughout most of 2015 and 2016, the Permian provided a growing share of U.S. crude oil production.

The Permian has a significant amount of drilled but uncompleted wells (DUCs), averaging more than 1,700 in 2017.^{iv} These wells may be quicker to bring online than newly drilled wells.

With rising oil prices over the past year, the Permian continued to be attractive to landowners and drillers. In 2016, investment into land acquisition in the Permian Basin represented roughly 39% of all deals nationally. At around \$28 billion, investment levels were more than triple their level in 2015.^v In April, the number of rigs in the Permian Basin reached 340, or 40% of the 857 total oil and natural gas-directed rigs operating in the United States.

More than half of the rigs that have been added in the Permian are concentrated in a relatively small area. Oil production from this sweet spot averaged 882 kb/d as of November 2016 and accounted for approximately 42% of total Permian Basin oil production (2.1 mb/d) in that month. More rigs will continue to be moved to this area and will continue to increase U.S. oil production.

Figure 1. Permian Oil Production and U.S. Oil Price



Oil Market

(see Technical Appendix for more data)

The Brent oil price fell steadily since mid-April, currently down more than \$7.10 from April's high of \$56.23. Current and projected estimates of U.S. crude production, combined with a significant increase in Libyan production, is weighing on prices. The number of active oil rigs in the United States climbed to 703 this week, the sixteenth straight weekly increase. The Brent-WTI spread was \$2.90 as of May 10, \$0.56 higher than the 2017 average. OECD product markets have been heavily influenced by the widening WTI-Brent spread which closed many arbitrage opportunities, especially in northwest Europe, in recent weeks.

U.S. commercial crude inventories fell by 5.2 mb during the week of May 5. OECD stocks fell by 17.2 mb in March, after a sizeable build in January due to a seasonal drop in refinery runs. Chinese commercial stocks fell by 2.2% from March to April, after falling 1.4% from February to April due to high refinery runs.

Public statement from Saudi Arabia and Russia make clear that both producers support extending their coordinated production cuts beyond 2017.

It is likely that the cut will last at least through the first quarter of 2018. A joint committee of ministers from OPEC and non-OPEC countries agreed to review extending oil production cuts at the May 25 meeting. Libya's crude production reached 800 kb/d in May, the highest level in more than two years.

Natural Gas & LNG

(see Technical Appendix for more data)

Turkey has been one of the most important European customers for U.S. LNG exports in 2017. Of Europe's share, Turkey imported 39% of U.S. LNG, second only to Spain at 40%. With lower natural gas prices in all markets, transport costs figure more importantly in the destination of U.S. LNG cargos: 51% go to nearby Latin America, 26% to Europe, 16% to the Middle East or North Africa and only 7% to

Asia.^{vi} In addition to transport costs, seasonally weak demand in Europe and Asia also contributed to the large share of U.S. exports to Latin America.

European natural gas hubs appear to be providing the marginal price for the global gas market, with European prices influencing spot cargo destinations. Meanwhile, Europe's gas supply contracts with Russia's Gazprom are increasingly linked to trading hubs with fewer sales indexed to oil products in 2016. Asian LNG prices are expected to be down 10% from April to May, while U.S. prices are up slightly due to colder weather.

Economics

Asia: Economies of Japan and China remained strong through April. In Japan, real wages fell by 0.8%, the largest rate in nearly two years. Meager nominal pay increases and only a slight rise in consumer prices, will put pressure on the central bank's current quantitative easing program. Businesses have been reluctant to raise wages despite a tight labor market. Meanwhile, Japanese companies are ramping up capital spending, encouraged by increased profits.^{vii} In China, economic activity picked up pace in early 2017 due mostly to increased construction activity. The IMF forecasted average GDP growth of 6.6% for 2017, reflecting China's transition from an export and investment-based economy to one based on domestic consumption.^{viii} The transition will have short and long-term impacts on the global economy, as China currently imports 40% of the world's metals and 10% of oil.

Europe: The Eurozone economy continues to expand, driven by the manufacturing sector. IHS Markit's Manufacturing Purchasing Managers' Index for the Eurozone jumped to 56.7 in April from March's 56.2, reaching its highest level since April 2011. Manufacturing growth in Germany, France and Italy, the bloc's three biggest economies, was up near a six-year high, while Spanish activity accelerated.^{ix} The Eurozone has thrived since the start of the year, driven by growth in PMI, higher

employment, output and new orders. Investment goods and consumer goods surged 7% and 20.5%, respectively.^x Meanwhile, France elected Emmanuel Macron as president, a political moderate, former investment banker who promised to overhaul the labor market and eliminate unnecessary regulation.

Turkey: Consumer confidence in Turkey's economy advanced in April, according to government data.^{xi} The Economic Confidence Index increased by 3.6% to 99.5 points since March, driven by a 5.1% increase in the retail trade confidence index. Turkey's Deputy Prime Minister said that the economy will see better conditions this year, the result of promised new reforms. The reforms would reduce the current account deficit and speed economic growth. The IMF reported that economic growth for the first quarter of 2017 was near 2%, down from the average growth of 6% between 2002 and 2007.^{xii}

United States: Jobs growth remains solid, though labor force participation remains an issue.^{xiii} 211,000 jobs were created in April, up from a disappointing March, while the unemployment rate fell to 4.4%, its lowest since May 2007. Economists surveyed before the release from the Bureau of Labor Statistics were expecting payroll growth of 185,000 and for the jobless rate to hit 4.6%. The labor force participation rate, however, has been volatile in recent months as people are not rushing to take part. Meanwhile, wage growth has not accelerated despite falling unemployment. The Federal Reserve is likely to hike its benchmark interest rate by a quarter of a point in June, as the central bank called weakness during the first quarter transitory and likely to change.

Geopolitics & Supply

Iran: The Islamic Republic plans to increase crude production capacity by 3 mb/d to promote and stabilize its role in OPEC and the global market, according to the national oil company.^{xiv} While no target date was provided, the NIOC was reported to be considering \$80 billion on deals with upstream

contractors in the next two years. Since the lifting of international sanctions in January 2016, NIOC has signed at least 24 MOUs for upstream developments. Oil production in March was 3.8 mb/d, though is likely to fall in May based on recent tanker data.

Iraq: Crude exports fell considerably from March to April, from an estimated 3.77 mb/d to an expected 3.252 mb/d.^{xv} According to the oil ministry, Iraq shipped 3.2 mb/d from the south and only 22 kb/d from the north, a considerable drop. Meanwhile, a 2 mb tanker delivered to Egypt as part of new one-year agreement for Iraq to supply Egypt with 12 mb.^{xvi} So far in 2017, Iraq's compliance with the production cuts has averaged 65%.

Libya: Crude production is estimated at nearly 800 kb/d for the first week of May 2017.^{xvii} This represents the highest recorded output in more than two years. Following numerous closures of various oil facilities by rebel militias including key oil fields, pipelines, and ports, crude output fell below 500 kb/d as recently as March.

Russia: Russia publicly supports extending oil supply cuts for OPEC and other key producers beyond 2017, according to the energy ministry.^{xviii} Following the statements last week, oil prices closed the day 1.5% higher. Oil production in March was down 250 kb/d from October, as Russia plans to reach its full reduction quota of 300 kb/d by the end of May.^{xix}

Saudi Arabia: Crude tanker loadings show 670 kb/d drop from October 2016 to April 2017. Until recently, falling Saudi crude production had not impacted export volumes, with the balance coming from storage. Oil production fell slightly in March to 9.93 mb/d, with exports unaffected. Meanwhile, the kingdom publicly supports extending oil supply cuts beyond 2017, likely through the first quarter of 2018 due to seasonal demand switching.^{xx}

Venezuela: Increased tensions with the United States following President Maduro's announced plan to rewrite the constitution could result in oil-related sanctions that

would decimate Venezuela's oil sector.^{xxi}

The Sanctions would force the Venezuelan oil company, PDVSA, to sell to other buyers and would force Citgo, the PDVSA-refinery that operates in the U.S. Gulf Coast, to buy crude on the spot market. Venezuela sent 741 kb/d of crude to the United States in 2016, roughly 30% of its production.

Renewables

China: Wind and solar energy could receive up to \$780 billion investment between 2016 and 2030.^{xxii} China has committed to reducing its dependence on fossil fuels and increase the share of non-fossil sources in its total energy consumption by at least 15% by 2020 and 20% by 2030. According to a recent study, wind and solar in China could replace as much as 300 million tons of coal per year. By 2030, these renewable sectors are estimated to be worth \$240 billion.

India: According to the government, India added twice as much renewable energy capacity than thermal power capacity in the financial year 2016-2017.^{xxiii} A significant milestone for a rapidly growing energy consumer, more than 7 gigawatts of coal generation capacity was added, while more than 14 gigawatts of renewables were added, a close split between solar and wind. The overall capacity in solar and wind as well as the annual growth both represented historic highs for India.

United States: Utility-scale solar installations, both photovoltaic and thermal technologies, grew at an average rate of 72% per year between 2010 and 2016, faster than any other generating technology.^{xxiv}

Utility-scale solar generation has been increasing as a result of the rapid growth in capacity; however, solar's share of utility-scale electricity generation is 0.9%, about half of its share of capacity. Meanwhile, the United States added 3.4 GW of small-scale solar generating capacity across all three end-use sectors in 2016 (residential, commercial, and industrial), ending the year with more than 13.1 GW of installed capacity.

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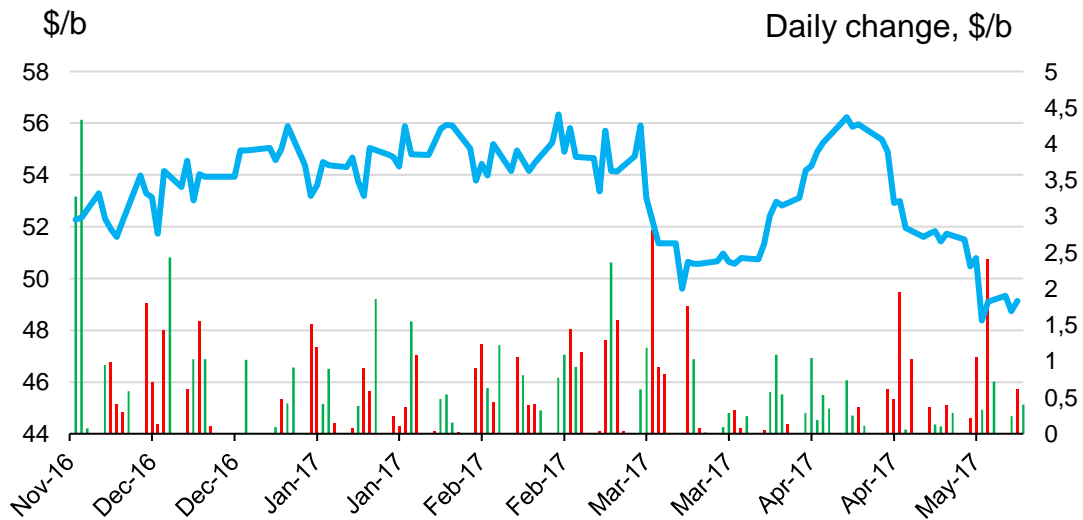
Technical Appendix

1. Oil Market

Oil Supply and Prices

- **The Brent oil price fell to \$49.13 on May 10, down more than \$7.10 from April's high of \$56.23, as Libyan production comes back online, U.S. crude production continues to grow and concerns arise over slowing demand.** Libyan output reached a two-year high and U.S. EIA raised its U.S. oil production forecast for both 2017 and 2018, with U.S. output expected to average 9.3 mb/d this year and nearly 10 mb/d next year. The number of active oil rigs in the United States climbed to 703 this week, the sixteenth straight weekly increase.
- **OPEC output fell for the fourth straight month in April, as Saudi Arabia continues to produce at least 100 kb/d below its target of 486 kb/d.** Iraqi production was also down, while Iran's output increased, though by less than previous months. Public statements from Saudi Arabia and Russia make clear that both producers support extending their coordinated production cuts beyond 2017.

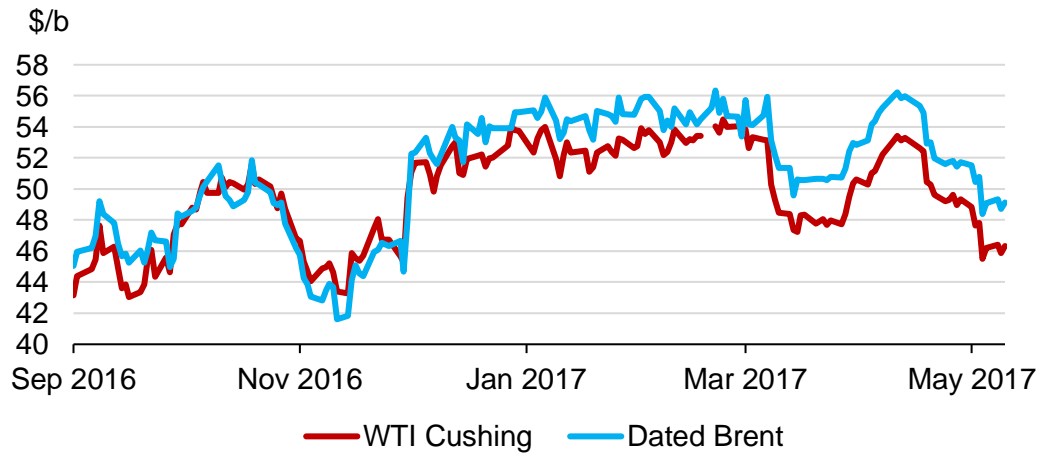
Figure 2. Brent Crude Oil Price since OPEC Announced Cut



- **During April 2017, the Brent-WTI spread averaged \$2.69 up from March's \$2.51 and has since increased to \$2.80 on May 10 (Figure 3).** It currently stands at \$0.56 higher than the 2017 average of \$2.24. The widening spread helps U.S. drillers looking to export to the global market. Increased U.S. crude production continues to weigh on prices despite continued OPEC supply compliance.

- **U.S. weekly crude production grew for the 11th straight week, reaching 9.29 mb/d as of April 28**, according to EIA. U.S. oil production began to grow in the fourth quarter of 2016 after declining over the first three quarters of last year. Average production for 2016 (8.9 mb/d) was below 2015 (9.4 mb/d), though still 1.3 mb/d higher than the average for 2011-2015.

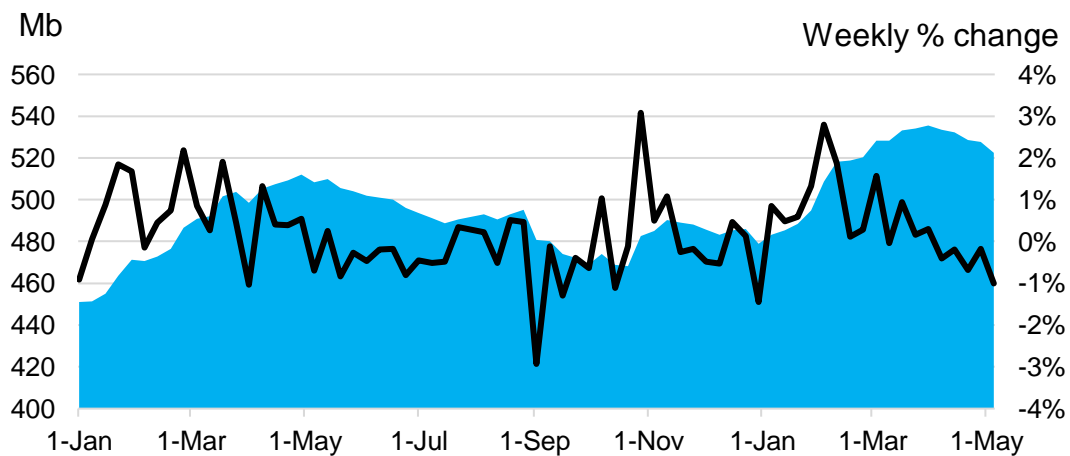
Figure 3. Benchmark Crude Prices



Crude Storage

- **U.S. commercial crude inventories fell by 5.2 mb during the week of May 5 after falling by 1.0 mb during the last report period.** At 522.5 mb, U.S. crude oil inventories are in the upper half of the five-year average range for this time of year. Crude imports averaged over 7.6 mb/d, down 644 kb/d from the previous week. For the last four weeks, crude oil imports averaged 8.2 mb/d, 5.0% above the same four-week average last year.

Figure 4. Weekly U.S. Crude Oil Stocks

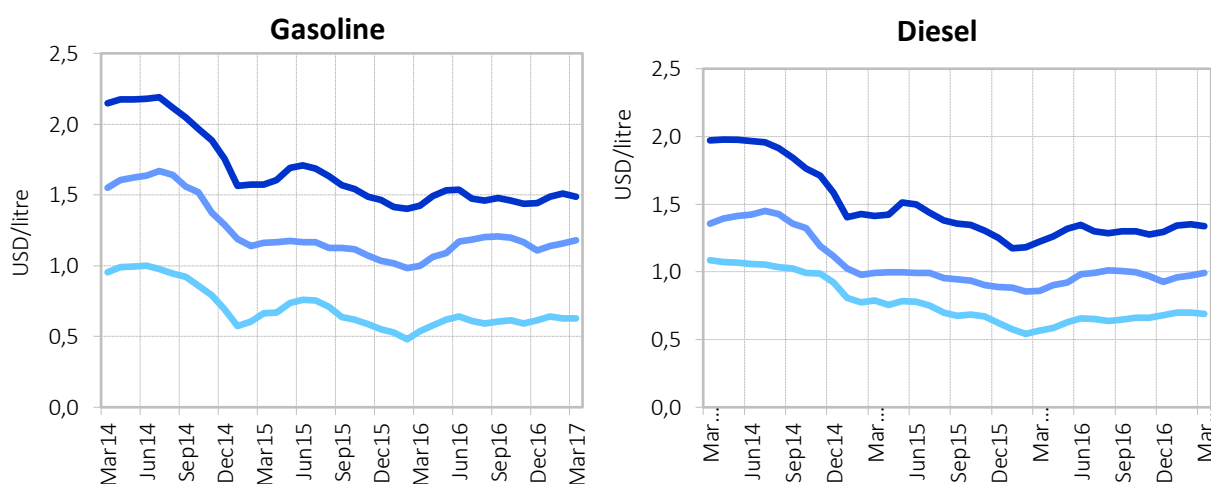


- **OECD stocks fell by 17.2 mb in March, after a sizeable build in January due to a seasonal drop in refinery runs, according to the IEA.** Together, this implies a total stock increase of 38.5 mb in 1Q2017.
- **Chinese commercial stocks fell by 2.2% from March to April, after falling 1.4% from February to April.^{xxv}** The April level represents the lowest in nearly four years. The stock draw represents increased demand from refineries as crude runs were nearly at record levels in March.

Select Product Markets:

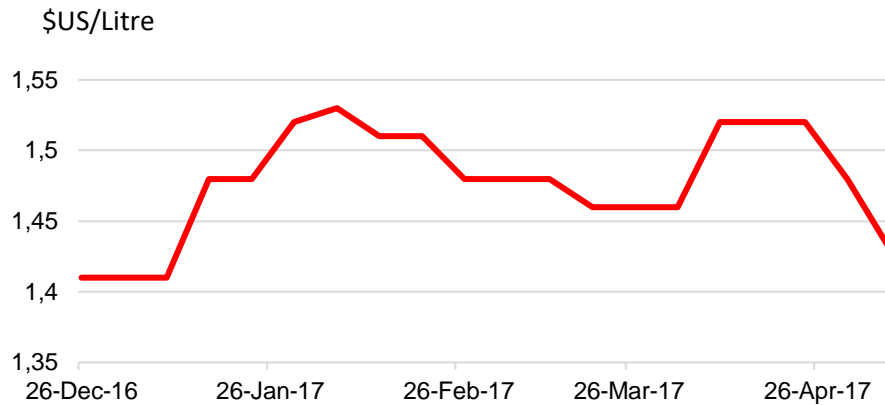
- **Product markets throughout the OECD have been influenced by the widening WTI-Brent spread which closed many arbitrage opportunities, especially in northwest Europe at the end of April.** U.S. gasoline prices fell to \$3.37/gallon this week after reaching \$2.41 on April 24. This brings U.S. gasoline down to the lowest level on a seasonal basis in at least eight years.^{xxvi} Most oil product prices fell in March, reflecting improved supply balances throughout the OECD. Middle distillate prices were the strongest performers in March due to lower output from refiners and higher seasonal demand. Rotterdam diesel barge prices averaged \$62.21/b, down \$3.91/b from February.

Figure 5. Select Monthly Product Prices in Europe, Japan, and North America
(from top to bottom: Europe, Japan and North America)



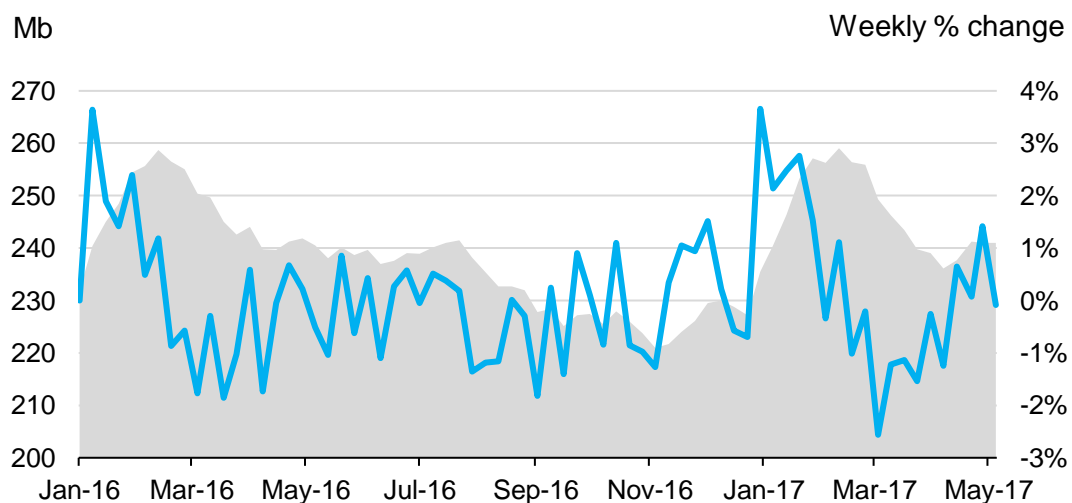
- **Gasoline prices in Turkey** are shown in Figure 6, with prices back near their average for January. Prices have been influenced by changes in the value of the lira, which experienced volatility throughout the first quarter of 2017. After a slow start to the year, the lira was supported by recent doses of monetary tightening by the central bank.

Figure 6. Weekly Average Gasoline Prices in Turkey



- For the week ending May 5, U.S. crude oil refinery inputs averaged 16.8 mb/d, down 418 kb/d from the previous week.^{xxvii} Gasoline stocks were up 3.4 mb at the end of April, however. Gasoline production increased due to higher refinery utilization capacity. U.S. gasoline stocks fell by 200 kb last week, but remain in the upper limit of the average five-year range. Total commercial petroleum inventories fell by 3.6 mb.

Figure 7. Weekly U.S. Gasoline Stocks and % Change



2. Natural Gas & LNG

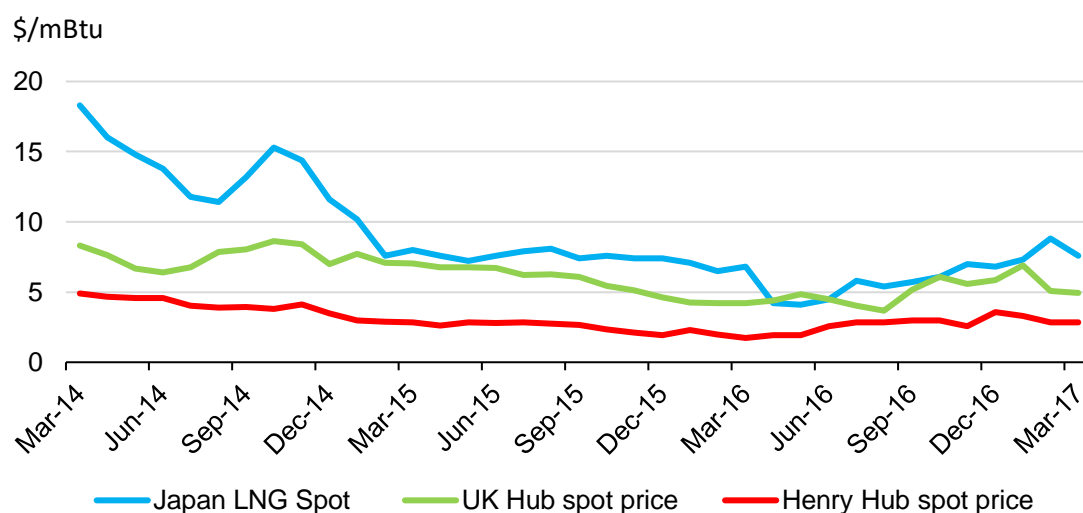
Supply and Price

- Despite LNG supply outages in Russia and Australia last month, as well as slightly higher oil prices in April, Asian LNG prices are likely to be down 10% from April to May. According to Platts estimates, Asian LNG will average \$5.45/mBtu this month. Front-month gas prices at the UK NBP will average

\$4.977/mBtu, with the Asia-NBP spread narrowing to \$0.49/mBtu from \$0.63/mBtu in April.^{xxviii}

- **European natural gas hubs appear to be providing the marginal price signal for the global gas market, with European prices influencing spot cargo destinations.**^{xxix} European prices have been providing a price floor to Asian prices. As U.S. LNG export capacity grows, however, it is likely that Henry Hub will become increasingly influential on global gas pricing.
- **EIA's Short-Term Energy Outlook slightly raised its forecast for Henry Hub prices in the second- and third-quarters of 2017, as domestic consumption and exports began slightly outpacing production since last year.** Henry Hub prices are forecasted to increase by \$0.12/mBtu and \$0.15/mBtu above April's Outlook.
- **U.S. natural gas prices increased at most locations last week, supported by forecasts for cooler weather.** The Henry Hub spot price increased by \$0.07 in the last week, while Chicago Citygate increased by \$0.01. Maintenance on a U.S. gas export pipeline to Canada resulted in a larger domestic supply, as dry gas production remained constant. Pipeline deliveries to U.S. LNG terminals increased last week, averaging 10% higher than the previous week.^{xxx}

Figure 8. Select Natural Gas Prices



- **Europe's gas supply contracts with Russia's Gazprom are increasingly linked to trading hubs in Europe with fewer sales indexed to oil products in 2016.**^{xxxi} Gazprom continues to support oil indexation, though buyers are increasingly winning concessions in their contracts to include hub indexation. In 2016, Gazprom supplied a record of 178.3 bcm of gas to Europe, though it sold 2 bcm of gas in northwest Europe via auction and has said that negotiations on price are underway with some of its customers.

- **Gazprom announced this week that it began laying pipelines for the Turkish Stream natural gas system.**^{xxxii} Turkish Stream was signed into agreement by Presidents Putin and Erdogan in October 2016. The estimated \$12.7 billion project will initially allow for the export of 15.75 bcm/y of gas from Russia to Turkey, with an eventual doubling of capacity.



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References

- ⁱ<https://www.iea.org/newsroom/news/2017/march/iea-finds-co2-emissions-flat-for-third-straight-year-even-as-global-economy-grew.html>
- ⁱⁱ<http://www.atlanticcouncil.org/news/transcripts/turkish-president-recep-tayyip-erdogan-at-the-atlantic-council-s-istanbul-summit>
- ⁱⁱⁱ<https://www.eia.gov/todayinenergy/detail.php?id=30952>
- ^{iv} <https://www.eia.gov/petroleum/drilling/#tabs-summary-3>
- ^v <http://www.reuters.com/article/us-usa-oil-permian-insight-idUSKBN15G3F6>
- ^{vi} U.S. LNG export data provided by the Rapidan Group.
- ^{vii} <http://asia.nikkei.com/Politics-Economy/Economy/As-Japan-s-economy-upshifts-workers-ask-Where-s-my-raise>
- ^{viii}<http://economictimes.indiatimes.com/news/international/business/chinas-continues-to-decelerate-amid-transition-to-consumption-based-economy-imf/articleshow/58591451.cms>
- ^{ix} <http://www.nasdaq.com/article/europe-economyeuropean-factories-started-second-quarter-at-lively-pace-20170502-00256>
- ^x<http://www.irishtimes.com/business/economy/german-factory-orders-grow-as-europe-s-largest-economy-gains-speed-1.3075185>
- ^{xi} <http://aa.com.tr/en/economy/turkey-economic-confidence-index-higher-in-april/806237>
- ^{xii}<http://money.cnn.com/2017/04/17/investing/turkey-economy-referendum-erdogan/>
- ^{xiii} <http://www.cnbc.com/2017/05/05/nonfarm-payrolls-april-2017.html>
- ^{xiv} <https://www.platts.com/latest-news/oil/dubai/irans-nioc-plans-to-boost-crude-oil-output-capacity-26730426>
- ^{xv} <http://www.reuters.com/article/iraq-oil-exports-idUSL8N1I904G>
- ^{xvi} <http://www.reuters.com/article/iraq-oil-egypt-idUSL8N1I63X3>
- ^{xvii}<https://www.bloombergquint.com/markets/2017/05/09/oil-holds-gains-as-u-s-crude-stockpiles-seen-extending-decline>
- ^{xviii}<https://www.bloomberg.com/news/articles/2017-05-08/russia-backs-saudi-proposal-to-extend-opec-oil-cuts-beyond-2017>
- ^{xix} <http://www.platts.com/latest-news/oil/tokyo/russia-cuts-250000-bd-to-comply-with-oil-output-26717617>
- ^{xx} <http://www.reuters.com/article/us-oil-production-saudi-idUSKBN18408L>
- ^{xxi}<https://www.bloomberg.com/news/articles/2017-05-08/venezuela-braces-for-double-whammy-if-u-s-imposes-oil-sanctions>
- ^{xxii}<http://www.climateactionprogramme.org/news/renewables-in-china-to-attract-782-billion-investment-by-2030>
- ^{xxiii} <https://cleantechnica.com/2017/05/01/india-added-twice-much-renewables-capacity-coal-capacity-2016-17/>
- ^{xxiv}<https://www.eia.gov/todayinenergy/detail.php?id=31072>
- ^{xxv} <http://www.nasdaq.com/article/china-endmarch-crude-oil-stocks-hit-4yr-low-products-stocks-fall-20170428-00230>
- ^{xxvi} <http://timesofindia.indiatimes.com/business/international-business/europe-gasoline/naphtha-cracks-slump-as-u-s-supply-closes-arbitrage/articleshow/58404126.cms>
- ^{xxvii} <http://ir.eia.gov/wpsr/wpsrsummary.pdf>
- ^{xxviii} <https://www.platts.com/latest-news/natural-gas/tokyo/jkm-monthly-may-delivery-lng-averages-5454mmbtu-27814408>
- ^{xxix} <http://www.hellenicshippingnews.com/europe-a-global-gas-price-signal-but-us-influence-set-to-rise/>
- ^{xxx} <https://www.eia.gov/naturalgas/weekly/>
- ^{xxxi} <https://www.platts.com/latest-news/natural-gas/london/russias-gazprom-concedes-shrinking-share-of-natural-26722157>
- ^{xxxii} <https://www.rt.com/business/387528-gazprom-turkish-stream-start-construction/>