IICEC Energy Market Newsletter
14 April, 2017

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1. *Summary*

Oil Market

- Oil benchmark prices increased over the last two weeks, as OPEC and non-OPEC producers consider extending the agreement to cut production. Prices, which have increased by more than $5/b since March 27, are also supported by tensions in Syria, the oil supply market outlook in the United States, supply outages in Libya and the North Sea and increased compliance from Russia on oil production cuts.
- The story continues that increases in U.S. crude production, rig counts, and storage levels suggest that production cuts from OPEC and non-OPEC producers are not having the desired effect in reducing global oversupply.
- Prices for transportation fuels are increasing in most regional markets ahead of the summer driving season. European gasoline exports are expected to increase significantly to the United States. U.S. gasoline stocks have shed 16 mb since early February.

Natural Gas & LNG

- Europe is likely to receive its first shipments of U.S. LNG this summer due to the competitiveness of U.S. gas prices and Europe's need to replenish gas storage, with stocks at their lowest level since 2013.
- New supply from Australia and Angola helped push down LNG spot prices in Asia, ending an upward trend that began last December when an outage in Australia led to a tighter market.
- LNG producers are exploring ways to unlock new markets with smaller, more flexible contracts. France's Total and Japan's JERA, the world's largest LNG importer, are set to strike a deal with flexible volumes based on Asian LNG spot prices.

Economics

- Economic indicators are positive for the United States, the Eurozone, Japan and China. The U.S. economy remains healthy despite disappointing job growth data for March. The Eurozone is thriving even though Britain triggered its exit from the EU. Japan's economy is strengthening while China's industrial profits soared. Turkey's economic growth estimates were strong for fourth quarter 2016 notwithstanding mixed economic data.

Geopolitics & Supply

- U.S. airstrikes against Syrian military targets have increased tensions between many oil producers and consumers. OPEC and non-OPEC producers will discuss extending their supply cuts at their May meeting. OPEC compliance remains high despite the fact that output increased from Iran and Iraq in February. Saudi Aramco discounted its oil prices to northwest Europe, which may renew tensions with Russia over market-share there.

Renewables

- Global renewable energy capacity increased by 8% in 2016, despite 23% drop in investment, according to the United Nations.

2. In the News: U.S. Oil Production is Poised for Growth, Based on Upstream Investments

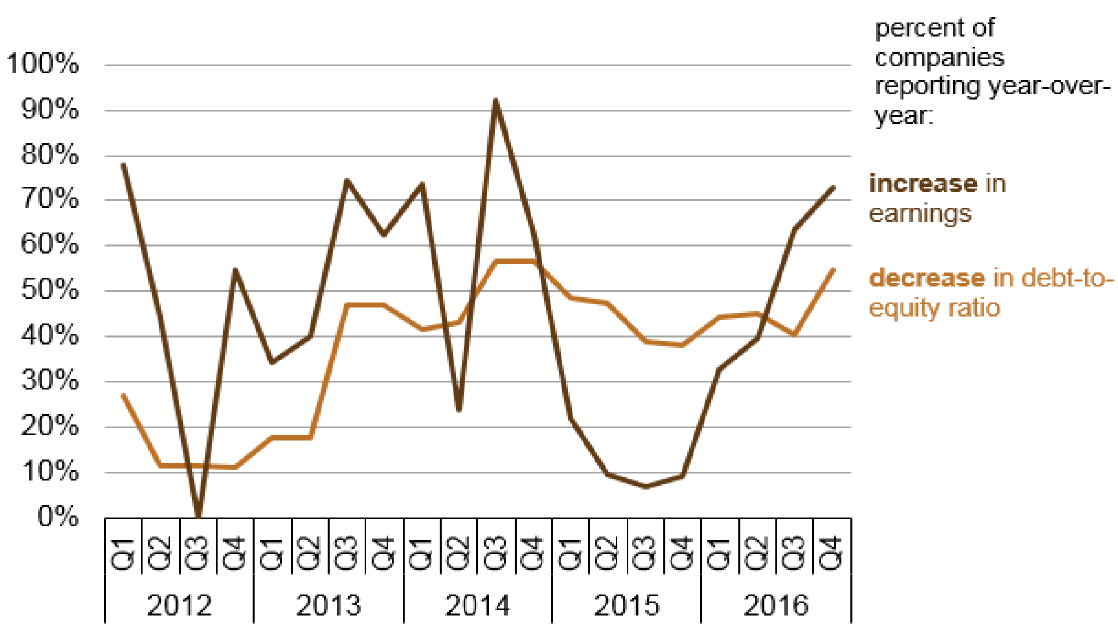
As OPEC and non-OPEC producers remain near their compliance target cut of 1.8 million barrels day (mb/d)[1], U.S. oil production continues to grow. So far in 2017, U.S. crude production averaged nearly 9.02 mb/d, up 0.25 mb/d from 2016. U.S. oil production is poised to continue to grow over the near-term, as U.S. oil producers increased capital investment in the fourth quarter of 2016 (4Q2016), according to the U.S. Energy Information Administration. Capital expenditure for a group of 44 U.S. onshore-focused oil producers increased by 72% ($4.9 billion) between 4Q2015 and 4Q2016, the largest year-on-year increase for those firms since 2012.[i]

Market conditions for U.S. oil producers became more favorable as West Texas Intermediate (WTI) front-month futures prices averaged $7.13/b higher in Q42016 compared to Q42015. Higher oil prices contributed to higher earnings for producers, which influenced some companies to increase their investment budgets. A majority of these producers also experienced a decline in debt-to-equity ratios, according to EIA, suggesting that U.S. producers are financially healthier than they were in 2015 and the beginning of 2016 (Figure 1).

While there is a time lag between oil prices and capital expenditures, there is another lag between investments and drilling and production. Steady U.S. drilling since 4Q2016 suggest that capital investments are reaching the drilling sector, with the U.S. active oil-directed rig count at 652, up from 525 last quarter. Meanwhile, the number of short positions in futures and option contracts held by producers, which provides a measure for the amount of future production oil companies have hedged, increased since crude oil prices rose above $50/b in 4Q2016. Financial hedging reduces the effect of a fall in revenue if prices were to decline.

These indicators suggest that U.S. oil companies are continuing to increase capital expenditures in exploration and development and support continued production growth in the United States.

Figure 1. Quarterly financial metrics for onshore-focused U.S. oil producers



[1] The group cut an estimated 1.76 mb/d in February.

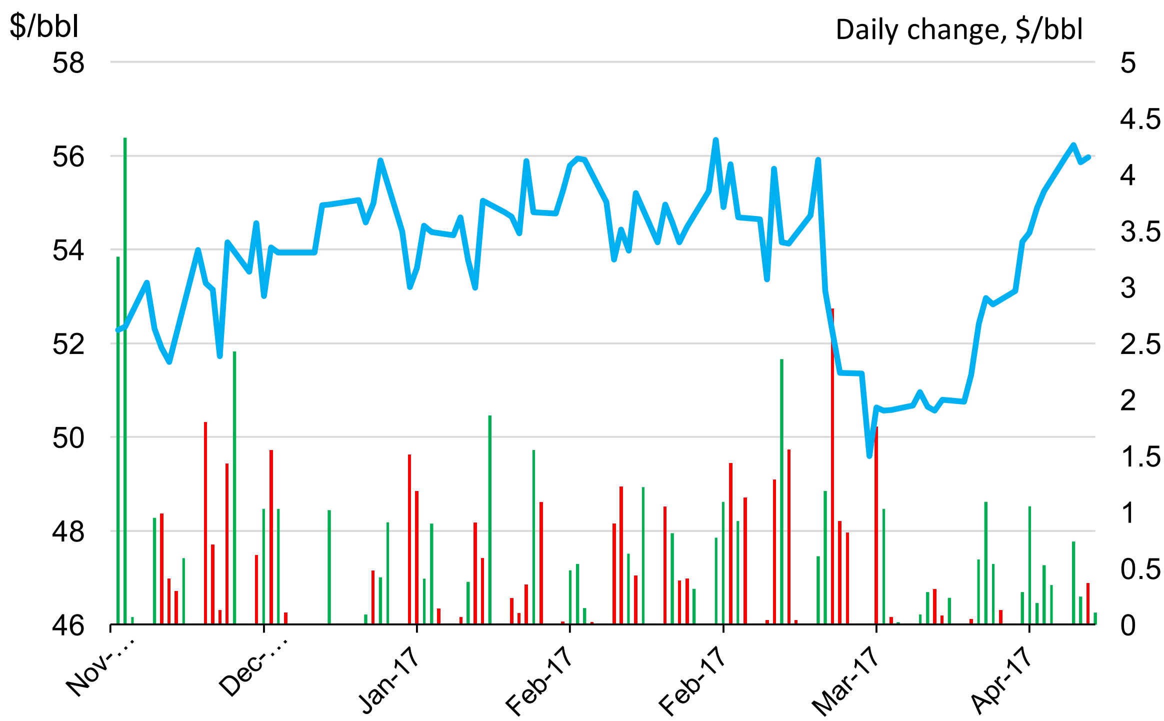
3. Oil Market

Oil Supply and Prices

- **The Brent benchmark oil price has increased significantly since March 27—up $4.90 as of April 12—**driven mainly by the prospect that OPEC and non-OPEC producers will extend their production cuts, by U.S. airstrikes in Syria, and by the U.S. oil production outlook.[ii] Meanwhile, oil supply outages in Libya and the North Sea, and increased compliance from Russia on oil production cuts, have also contributed to Brent's increase since March 27. OPEC ministers will meet on May 25 to decide whether to extend the production accord, despite the fact that not all producers (especially Russia) have met their targets. According to public sources, Russia successfully reduced monthly crude output by another 20 kb/d, with its total reduction around 120 kb/d for February (40% of compliance). Libya's production fell by more than 150 kb/d, as conflict between the government and rebel militias contributed to shut-ins at key oil facilities. Production was halted last week at Britain's 180 kb/d Buzzard Field, the result of unplanned repair work at an onshore processing terminal.

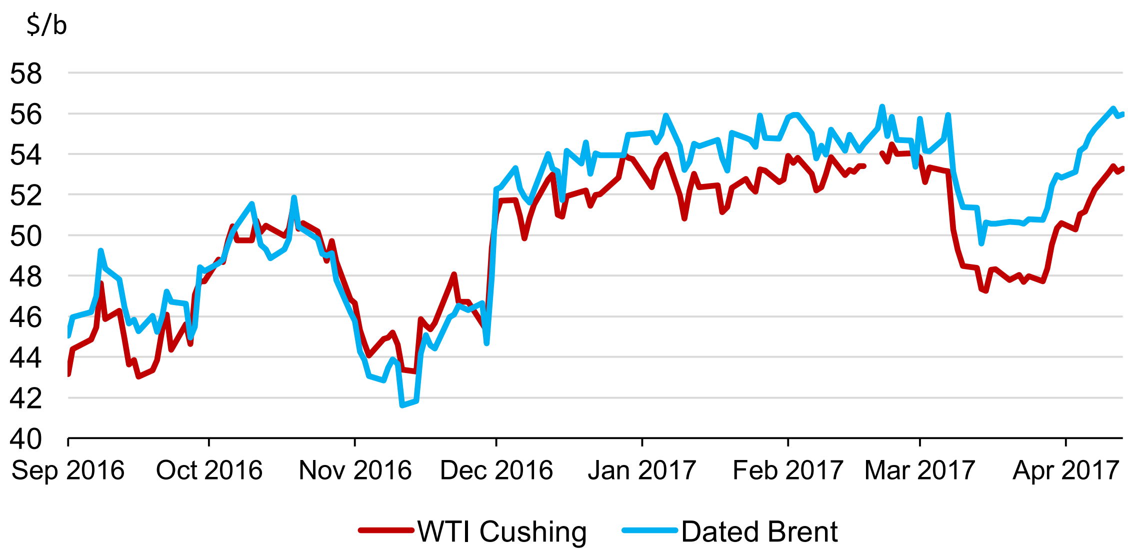
- **Recent data suggest that non-OPEC countries will represent an increasing share of China's crude imports.[iii]** The world's largest oil consumer increased oil imports by 2.2 mb/d between 2012 and 2016, while non-OPEC countries' share increased from 34% to 43%. China will continue to import more from non-OPEC suppliers, including Russia, Oman and Brazil, as price differentials are likely to remain competitive and the relatively low price of Brent allows long-distance arbitrage from some suppliers.

Figure 2. Brent Crude Oil Price since OPEC Announced Cut



- **On March 27, the Brent-WTI spread was $3.02 and has since shrunk to $2.83 as of April 12.** It remains more than a $1.00 higher than the 2017 average of $1.78. A widening Brent-WTI spread encourages U.S. drillers as export markets become more attractive.

Figure 3. Benchmark Crude Prices[ix]



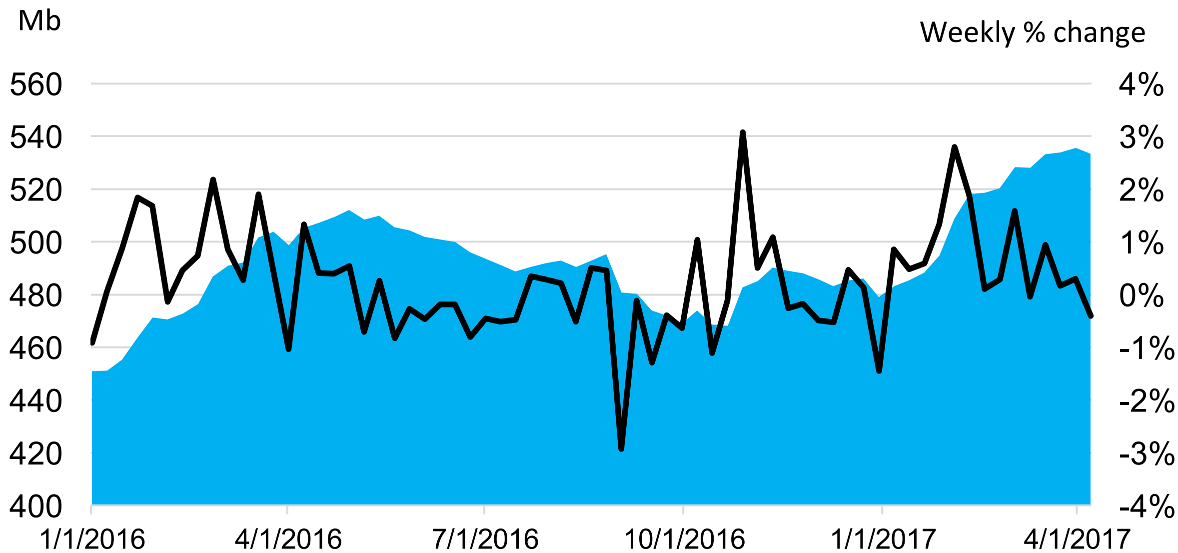
- **U.S. weekly crude production grew for the eighth straight week, reaching 9.235 mb/d as of April 7, up 289 kb/d since January**, according to the Energy Information Administration (EIA). U.S. oil production began to grow in the fourth quarter of 2016 after declining over the first three quarters of 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.

Crude Storage

- **After five months of inventory draws, OECD stocks increased by 48 mb in January to top the symbolic 3000 mb mark, according to the IEA.** The build was largely due to increased production in the United States, higher imports, and lower refinery runs. The January build, it is important to note, erased around 40% of the cumulative drop in OECD stocks between July and December 2016.

- **U.S. commercial crude inventories fell by 2.2 million barrels last week, after increasing by 1.6 million barrels the previous week.** At 533.4 mb, U.S. crude oil inventories are near the upper limit of the average range for this time of year. Imports were up by 28 kb/d from the previous week, though remain 3.0% above the same four-week period last year.

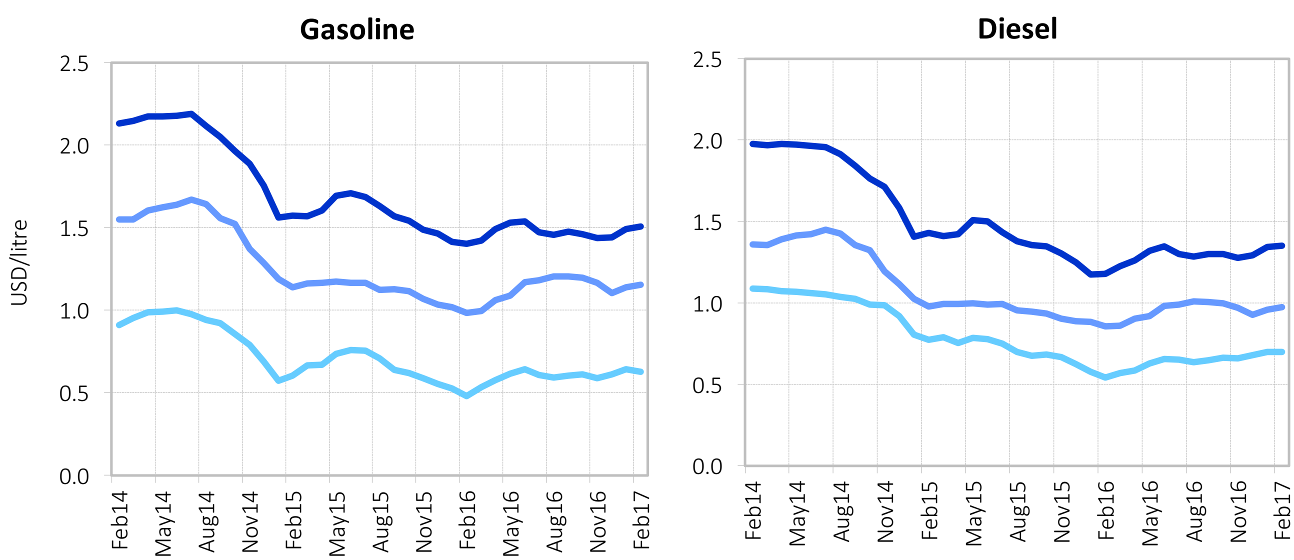
Figure 4. Weekly U.S. Crude Oil Stocks



Selected Product Markets

- **Regional prices for transportation fuels are increasing ahead of the summer driving season.** European spot prices for gasoline and middle distillates were strong performers last month, due to steady demand from West Africa and the Middle East, as well as the upcoming switch to summer-grade fuels. In the United States, average gasoline prices were up \$0.045/g from last week and \$0.277/g up from this time last year. In the U.S. East Coast, average gasoline prices were up nearly \$0.30/b.

Figure 5. Select Monthly Product Prices in Europe, Japan, and North America

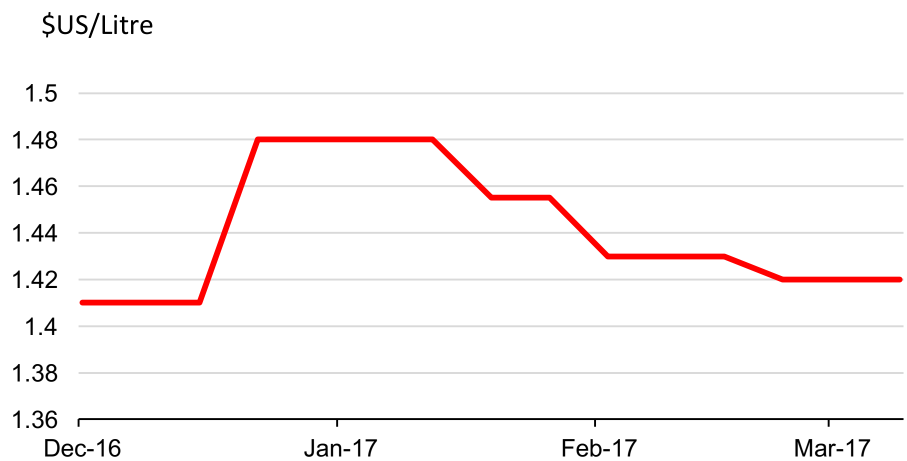


- **As of April 6, at least 16 ships carrying gasoline blending components off the shores of northwest Europe were waiting for an expected price spike for summer-quality fuel in the United States.** Gasoline price margins in Europe remain near their lowest seasonal level since 2009. Until recently, European exports to the United States were limited as the U.S. East Coast was oversupplied with winter gasoline. However, U.S. gasoline stocks have shed some 17 mb since early February (Figure 7). To fill the ships, gasoline stocks in the Amsterdam-Rotterdam-Antwerp hub fell nearly 25% in March.

- **Japan's refining sector is undergoing significant change due to multiple rounds of new regulation from the Ministry of Economy, Trade, and Industry (METI).**[iv] Japanese refineries are preparing to cut 340 kb/d of crude distillation capacity to comply with regulations that require refiners to raise the country-wide average residue cracking ratio to 50% from 45%. METI is also considering new regulations to cut sulfur emissions from maritime fuels. According to the ministry, the regulations are designed to increase Japan's security of oil supply and support the environment.

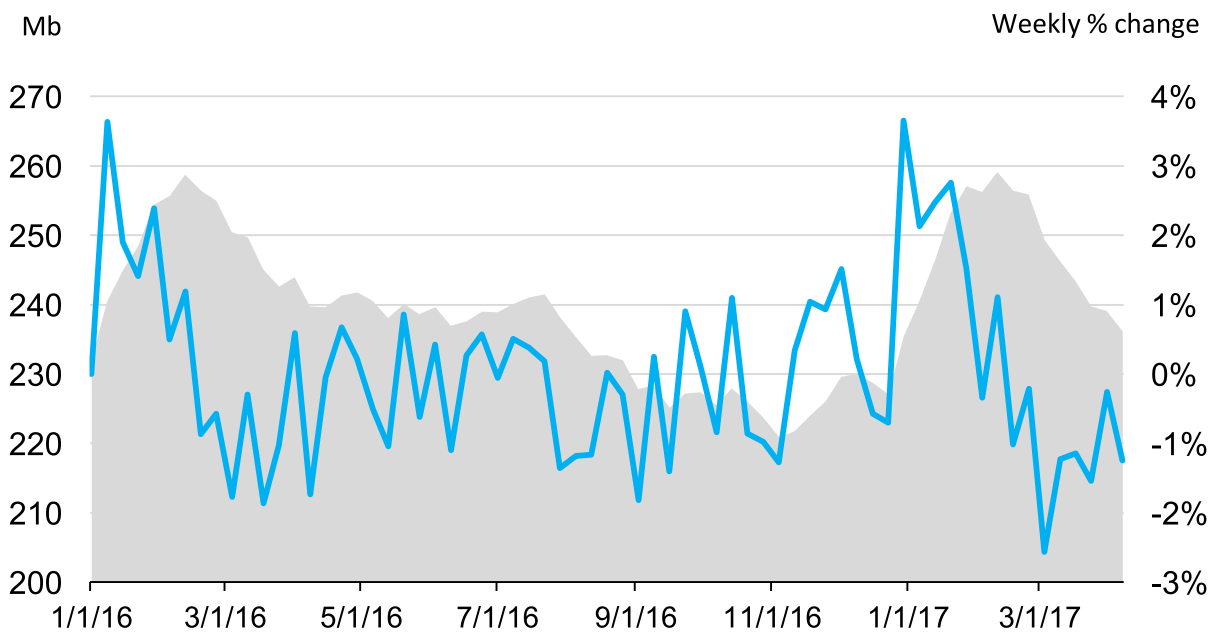
- **Gasoline prices in Turkey** are shown in Figure 6, with prices holding firm since March 20 when prices reflected movements in the $/TL exchange rate. Since mid-January, average gasoline prices fell by $0.06

Figure 6. Weekly Average Gasoline Prices in Turkey



- **For the week ending April 7, U.S. total gasoline stocks experienced 3.0 mb, but remain in the upper half of the average range for this time of year.** Stocks fell by more than 20 mb since early February as storage holders cleared inventories for summer-grade fuel. U.S. refiners are in the process of switching to summer-quality gasoline, which has a lower volatility than winter-grade gasoline to limit evaporative emissions that normally increase with warm weather and cause unhealthy ground-level ozone.

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

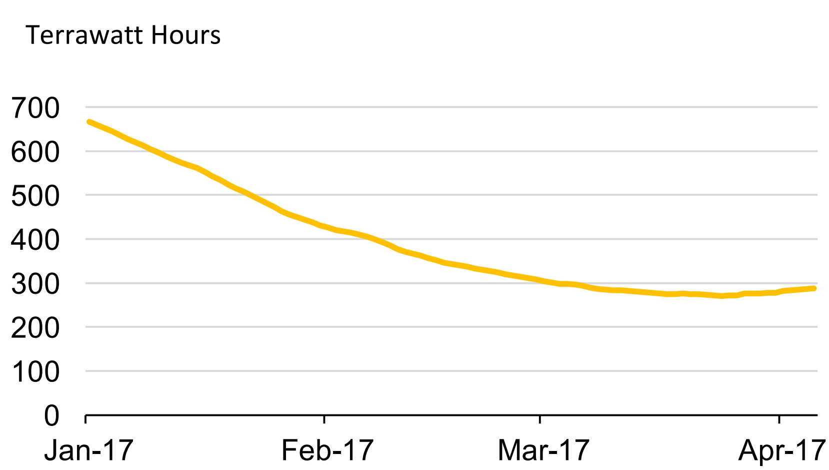


4. Natural Gas & LNG

Supply and Price

- **Europe is likely to receive its first shipments of U.S. LNG this summer** due to the competitiveness of U.S. gas prices and Europe's need to replenish gas storage, with stocks at their lowest level since 2013. Summer demand for gas could increase by as much as 10 billion cubic meters (bcm) compared to the five-year average due to the demand for gas storage replenishment. According to Cheniere Energy's managing director of commercial operations, the company expects to sell U.S. produced LNG into Europe by May.

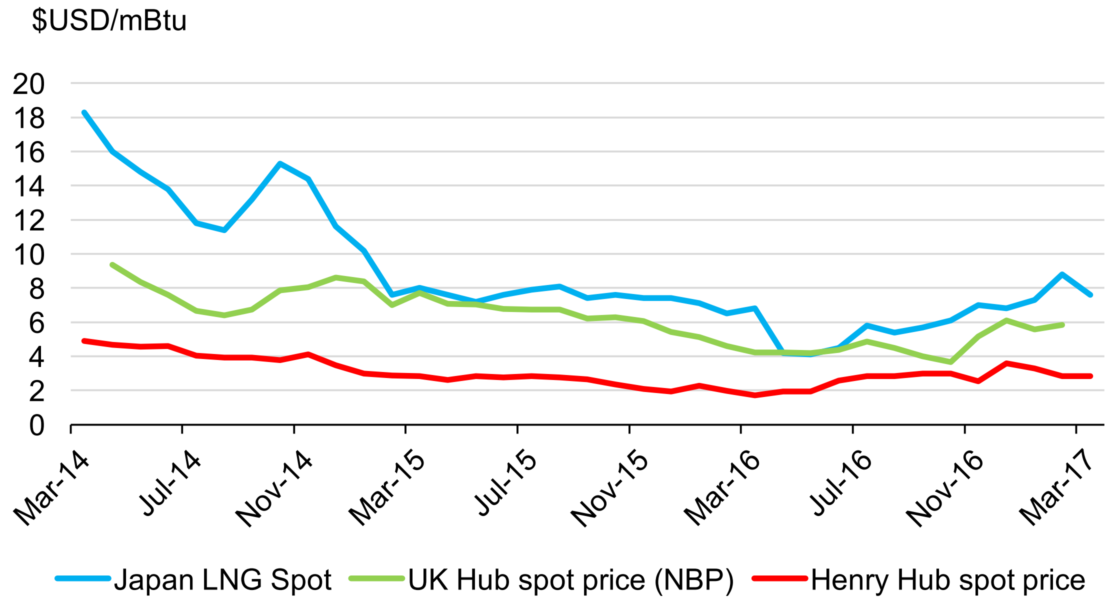
Figure 8. European Gas Storage Levels



- **Japan LNG spot prices moved steadily downward last month, reversing an upward trend that began last December.** At that time, supply outages in Australia and the Middle East contributed to a tighter market. Since then, new supply from Australia and Angola helped push down spot LNG prices in Asia. A further slide in prices is expected with summer demand approaching. Asian LNG prices may fall below $5 per million British thermal units (mBtu), down from around $7.6/mBtu in March, unless recent increases in Brent oil prices continue.[v]

- **U.S. natural gas prices increased last week as temperatures in most regions were more seasonable.** Henry Hub spot price increased by $0.18 and Chicago Citygate increased $0.21. U.S. gas production remained flat, while consumed remained flat last week after falling significantly the previous week due to moderate temperatures in the U.S. Northeast.

Figure 9. Select Natural Gas Prices



- **Russian gas export to Europe increased 3.3% (500 mcm) in March, driven by increased sales to Turkey, Serbia, and Bulgaria.**[vi] According to Russia's Gazprom, exports to Turkey increased by 51% last month. Gazprom has been quietly increasing its share of the European gas market, reaching a record level of 34% in 2016, which amounted to 179.3 bcm. Russia's oil-linked pipeline gas has remained highly competitive against LNG imports.

- **World's top LNG buyers sign agreement to cooperate on LNG purchases.** Three of the world's top Liquefied Natural Gas (LNG) buyers—Korea's KOGAS, Japan's JERA, China's CNOOC signed an agreement in March to "cooperate in the joint procurement of LNG." Together, these three companies represent roughly one-third of global LNG demand. It appears that the buyers aim to extract concessions from producers that would provide flexibility in contracts, such as the right to re-export to third parties.[vii]

- **LNG producers are exploring ways to unlock new markets with smaller, more flexible contracts.** France's Total and Japan's JERA—the world's largest LNG importer—are set to strike a deal with flexible volumes based on Asian LNG spot prices—a departure for contracts usually pegged to Brent oil prices.[viii] Other producers, including Woodside, are seeking ways to initiate new small-scale LNG import terminals to service smaller markets.

- **Turkey accelerated efforts to complete the Trans Anatolian Natural Gas Pipeline (TANAP) project by the end of June.[ix]** The pipeline will connected gas fields in Azerbaijan to Europe. The project contributes to Turkey's role as an energy hub in the region. The $3.2 billion pipeline will connect with two other pipeline systems, the South Caucasus Pipeline and the Trans-Adriatic Pipeline (TAP), which is under construction.

5. Economics

- **United States: U.S. economy remains positive despite disappointing job growth.** Economists anticipated a gain of 180,000 jobs in March, though only 98,000 were added last month.[x] Questions were raised about whether improving business sentiment is translating into meaningful action by employers. U.S. unemployment rate was 4.5% in March, the lowest level in almost a decade and down 0.2% in February. On March 15, the Fed raised U.S. interest rates by 25 basis points in recognition of a stronger U.S. economy. Rising U.S. oil prices in recent weeks has since boosted market-based measures of inflation and other commodity prices. As described "In the News", capital spending in the energy sector is also increasing.

- **Europe: Eurozone economy is enjoying its best period of economic activity since 2011.[xi]** IHS Markit's survey of private sector firms in the 19-country block hit a six-year high in March driven by higher employment, output and new orders. The overall Eurozone PMI accelerated to 56.4 last month from 56, comfortably above the 50 that divides growth from contraction. France and Germany – the bloc's two biggest economies – accounted for the bulk of the growth with the PMI at 70-month highs in both member states. Markit's survey, which closely tracks official GDP numbers, suggest the single currency area is enjoying its best quarter of growth in six years. Meanwhile, on March 29, Britain's Prime Minister Theresa May triggered the United Kingdom's exit, no later than April 2019.

- **Turkey: The Turkish Statistical Institute (TUIK) economic growth estimates were strong for fourth quarter 2016, though other indicators remain mixed**.[xii] Following a contraction in 3Q2016, the Turkish economy rebounded strongly by 3.5%. This put overall growth rate at 2.9% for the year. According to TUIK, Turkey's GDP amounted to $857 billion. Average per capita income was $207 lower than 2015. Other economic indicators remained mixed as the jobless rate averaged near 11% last year, rising fast in the last quarter; and the Turkish lira has experienced sharp depreciation since the end of 2016, hitting a record low against the U.S. dollar in January.[xiii]

- **Asia: Japan's economy is strengthening while China's industrial profits soar.** The inflation picture in Japan turned positive in February, as the consumer price index (CPI) rose by 0.2% year-on-year.[xiv] Inflation excluding energy was up by 0.1% year-on-year. Japan's industrial production was also strong in February, as production expanded by 2% from January—the fastest rate of increase in eight months—and 9.7% year-on-year.[xv] In China, CPI cooled more than expected in February to its slowest pace since January 2015 (0.8%), as prices increased for steel and other raw materials, which boosted profits for industrial companies worldwide.[xvi] China's producer price index (PPI) jumped 7.8% in

February, year-on-year, largely driven by proactive fiscal policies, market speculation, and overcapacity reduction policies.

6. Geopolitics & Supply

- **OPEC: The producer group supply commitment is holding and may be extended.** According to IEA, OPEC compliance was around 91% for February, down from 105% in January. A joint committee of ministers from OPEC and non-OPEC countries agreed to review extending oil production cuts at the May 25 meeting.

- **Non-OPEC: The group continues to increase output, with growing U.S. production offsetting other declines.**

- **Iran: Recent surveys estimate that the Islamic Republic's crude production increased by 10 kb/d from February to 3.77 mb/d in March.**[xvii] The Ministry of Petroleum reported that exports of crude and other liquids were 3.05 mb/d last month, the highest level since 1979. On March 14, the oil minister stated that Iran would cap production at 3.8 mb/d –roughly the current level—in the second half of 2017. Iran has been seeking more investment for its undeveloped oil and gas fields. The government issued strong condemnation of U.S. airstrikes against military targets in Syria last week.

- **Iraq: Oil production exceeded 4.5 mb/d in February, with exports topping 3.87 mb/d.**[xviii] According to the Oil Minister last week, Iraq plans to increase production to 5 mb/d by the end of the year. The ministry is in talks with multiple oil majors to develop two new fields in southern Iraq with potential production around 500 kb/d. So far in 2017, Iraq's compliance with the production cuts has averaged 65%. For the government, the focus remains on the fight to liberate Mosul from ISIS.

- **Libya: After a week-long disruption, oil production was around 660 kb/d at the beginning of April.**[xix] A group of militias blocked access to a pipeline that services Libya's largest oil field, which caused force majeure to be declared at the Zawiya export terminal. The oil facilities, including the 220 kb/d Sharara oil field, began operating on April 2.

- **Russia: According to the Energy Minister, Russia cut crude production by 200 kb/d, or 66% of its promised reduction.**[xx] Russian officials have repeatedly announced that the 300 kb/d cut would be gradual and only met by the end of the six-month period. Much of Russia's oil upstream oil market is controlled by public companies, which limits the government's control of production. Oil production averaged 11.11 mb/d in February, representing only 40% of its promised cut.

- **Saudi Arabia: The kingdom lowered its official selling prices last week for grades to northwest Europe, a market dominated by Russia.** Saudi Aramco began sending discounted crude to Europe in the last few years as it pursued a strategy to control market share. This most recent price maneuver, which lowered the price of Saudi crude to Europe below regional benchmarks there, may result in renewed tensions with Russia ahead of the producer group's May meeting to discuss their production strategy. The European market has seen oil demand increase steadily since 2015.

- **Syria: Suspected chemical attacks led to U.S. airstrikes, growing tensions in the region.** A suspected chemical attack last week in northwest Syria resulted in 89 deaths. Reports that the Syrian government carried out the attacks with support from Russia led the United States to retaliate by striking Syrian military targets with cruise missiles. U.S. Secretary of State Tillerson declared that Russia, a key ally in Syria, had failed in its commitment to the international community by failing to uncover and destroy Syria's chemical weapons stockpiles, per previous commitments to do so.[xxi]

- **Venezuela: Venezuela is preparing to make a $2.05 billion bond payment in mid-April.** To generate some cash for the payment, the state oil company, PDVSA, increased bond sales last week.[xxii] Meanwhile, the cost of insuring Venezuela's debt against default increased to the highest level since December 2016 after the Supreme Court—controlled by President Maduro's socialist government—continued its move to take control of the opposition-dominated National Assembly. Venezuela's foreign reserves stand at $10.4 billion, according to the central bank data. A further $3.5 billion in bond payments will be owed by the end of the year.

7. Renewables

- **Global: The world added a record amount of renewable energy in 2016 despite a sharp drop in investment,** the UN said last week, largely due to falling costs of clean energy.[xxiii] New renewable energy, excluding large hydro projects, added 138.5 gigawatts of power in 2016, up 8% percent from 2015. The new capacity came despite investment falling to $241.6 billion, 23% lower than the previous year and the lowest since 2013. Led by wind and solar power, the new capacity is about equal to the world's 16 largest power producing facilities combined.

- **United States: Energy-related carbon dioxide (CO_2) emissions in 2016 totaled 5,170 million metric tons, 1.7% below their 2015 levels, after dropping 2.7% between 2014 and 2015.[xxiv]** These recent decreases are consistent with a decade-long trend, with energy-related CO_2 emissions 14% below the 2005 level in 2016. Both oil and natural gas consumption were higher in 2016 than in 2015, while coal consumption was significantly lower. Consistent with changes in fuel consumption, energy-related CO_2 emissions in 2016 from petroleum and natural gas increased 1.1% and 0.9%, respectively, while coal-related emissions decreased 8.6%. We expect these trends to continue despite the recent regulatory review of the prior Administration's Clean Power Plan. The Clean Power Plan, proposed in 2014, could have retired many existing coal plants and encouraged renewable energy and efficiency in order for U.S. States to meet their CO_2 emission targets. However, the Clean Power Plan was never implemented since it was stayed by the U.S. Supreme Court in response to ongoing lawsuits in the lower courts.

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