

IICEC Energy Market Newsletter

2 October, 2017



IICEC 8th International Energy and Climate Forum will be held on 13 October 2017 at Conrad Hotel Istanbul

IICEC 8th International Energy and Climate Forum titled “Global Energy Investments: What’s Next?” will take place in Conrad Hotel Istanbul on **October 13th, 2017**. The opening addresses will be delivered by **Güler Sabancı**, Founding Chairman of the Board of Trustees, Sabancı University; **Prof. Carmine Difiglio**, Director, IICEC; **Dr. Fatih Birol**, Executive Director, IEA and Honorary Chairman, IICEC. After the opening addresses, keynote speeches will be given by **His Excellency Berat Albayrak**, Minister of Energy and Natural Resources, Republic of Turkey (tbc); **His Excellency Jan Szyszko**, Minister of Environment, Republic of Poland; and **His Excellency Mirko Šarović**, Minister of Foreign Trade and Economic Relations, Bosnia and Herzegovina.

The Forum will consist of two panels. The first panel “Global Energy Policies” will be moderated by **Dr. Fatih Birol**, and the speakers are: **Murat Yavuz Ateş**, Ambassador, Deputy Undersecretary for Economic Affairs, Ministry of

Foreign Affairs; **HE Christian Berger**, Ambassador of the European Union to Turkey; **Prof. Jason Bordoff**, Founding Director, Center on Global Energy Policy Columbia University, USA; **Jefferson Edwards**, GM, Global Gas & LNG Market Development, Shell; **Ladislav Paszkiewicz**, Senior VP Strategy & Climate, TOTAL; **Dev Sanyal**, Executive Vice President of Regions and Chief Executive of Alternative Energy, BP; **Dr. Vitaliy Yermakov**, Head of Center for Energy Policy Research, Energy Institute of Higher School of Economics, Russia.

The afternoon session will begin with the Member of Parliament & President of the Grand National Assembly of Turkey Industry, Energy, Natural Resources, Information and Science Commission **Ziya Altunyaldız**’s keynote speech. After the keynote speech the second panel, “Technological Future of Energy” moderated by Prof. Difiglio, will be held with the following speakers: **Luay Al-Khatteeb**, Executive Director, Iraq Energy Institute; **Dr. Tareq Emtairah**, Director of the Energy Department, UNIDO; **Hans Jørgen Koch**, CEO, Nordic Energy Research; **Paddy Padmanathan**, President and CEO, ACWA Power; **Dr. Hans-Holger Rogner**, Senior Scientist, International Institute for Applied Systems Analysis (IIASA).

Natural Gas & LNG

China Becoming Key LNG Market Balancer in Asia:

For months, new liquefaction capacity and weak demand led lowered gas prices in Asia and caused many importers to successfully renegotiate long-term contracts with suppliers. While demand projections remain weak for Japan and Korea (two of the world's largest importers) for this coming winter, LNG demand in China should continue to keep the market in balance. China alone purchased 35% of the 82% of incremental LNG volumes in Asia in the first half of 2017.ⁱ

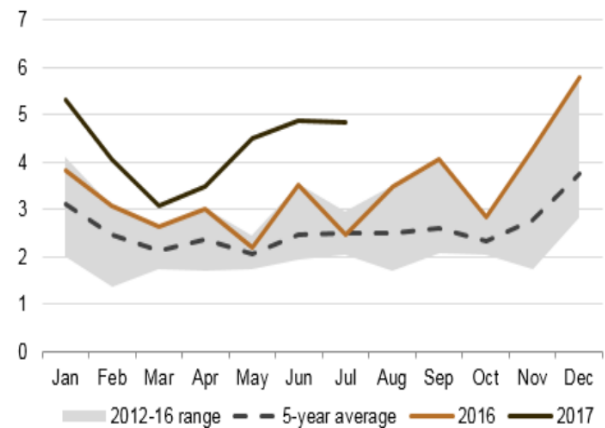
China's gas sector has grown significantly in the last year. Overall consumption increased by 15% compared to 2016 levels, driven by coal-to-gas switching in the power generation and industrial sectors to meet environmental policy targets set in China's 2013 Air Pollution Prevention and Control Action Plan, increased demand by gas-fired power plants, and increased consumption in the transportation sector.ⁱⁱ Nearly all targets set in this plan are for the end of 2017, and local governments are making efforts to comply by the deadline.

Across the gas sector, LNG was by far the fastest growing source of supply compared to domestic production and pipeline imports. Between 2015 and 2016, domestic production grew by 3%, pipeline imports by 13%, while LNG imports increased by 33%. This amounted to an average of 4.3 billion cubic feet per day (Bcf/d).ⁱⁱⁱ According to the U.S. Energy Information Administration, strong growth in LNG imports reflected their cost-competitiveness compared to pipeline imports, particularly in China's coastal provinces, which account for the majority of natural gas consumption.

During the first seven months of 2017, average landed pipeline import prices in China averaged about \$5.30 per mBtu, about \$1.80 lower than landed LNG import prices. Transport of this landed pipeline gas adds about \$3.75/mBtu to the import price. LNG regasification facilities are located closer to major Chinese consuming centers in eastern provinces. LNG regasification

costs only add about \$1.00/mBtu to the landed LNG import price of \$7.10/mBtu. Consequently, during 2017, LNG imports have been competitive with pipeline imports.

Figure 1. China LNG Imports, 2012-2017^{iv}



Turkish Demand for U.S. LNG to Drop with Qatar-BOTAS Deal:

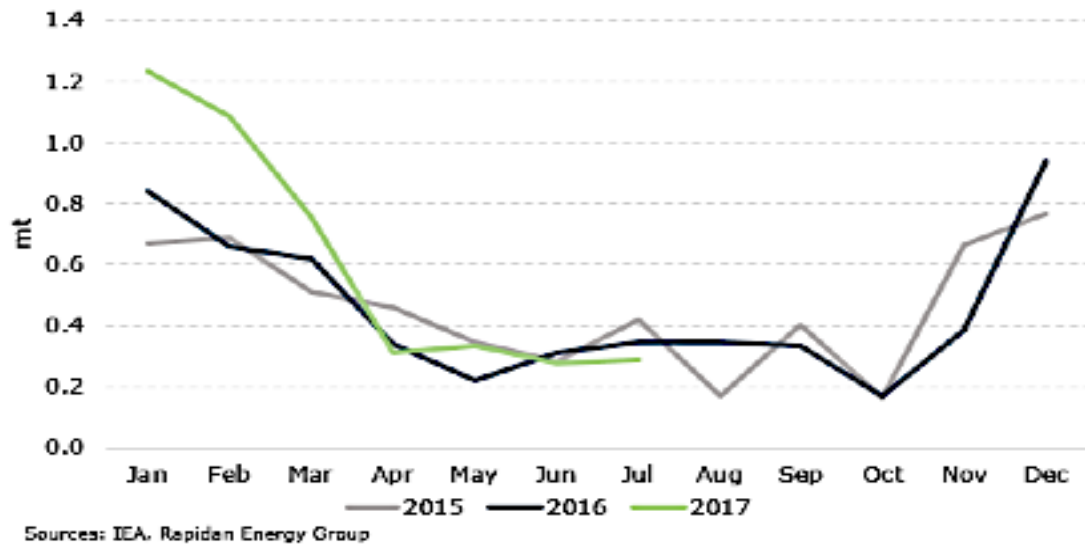
The 3-year gas supply deal will reduce Turkey's spot market purchases of U.S. LNG. The Qatar-BOTAS supply will start in October so the new supplies will help meet high seasonal demand from November through March (see Figure 2, next page). As reported in previous *IIEC Energy Market Newsletters*, Qatar is planning an expansion of its natural gas development and LNG exports after a long hiatus of gas development and LNG market expansion.

The Qatar Qatar-BOTAS deal is among several new contracts that Qatar has signed with countries in Asia, Europe, and the Middle East.

Gas Markets are Tightening:

Gas markets in Asia and Europe are tightening ahead of winter. Prices for LNG spot cargoes for Japan, the world's top buyer, hit a five-month high in last month. There is some evidence of LNG hoarding due to concerns that trade could be disrupted if the North Korean crisis worsens. While it may be a coincidence, Asian spot LNG prices spiked right after North Korea fired its second ballistic missile over Japan (15 September).

Figure 2. Seasonal Turkish LNG Import



Pipeline exports to Europe from Russia and Norway are at records highs, and Russia continues to send gas to Europe through the Ukraine. This is expected to continue this winter. The Polish Foreign Minister says the country plans to completely diversify away from Russian gas supplies by 2022.

The Australian Energy Market Operator announced this week that the country's east faced a natural gas supply shortfall in 2018, but suggested that the gap could be filled by diverting uncontracted exports to the local market.

Longer-Term Outlook: The currently over-supplied LNG market is expected to tighten. LNG demand is expected to double by 2035. While production plants in operation or under construction will add to the global supply, aging facilities and shrinking resources in key regions will lead to a tighter market.

The South Korean government plans to replace its planned coal-fired power plant fleet with LNG-supplied natural gas turbines in a bid to cut pollution. South Korea also plans to eliminate 2.2 million diesel vehicles by 2020.

Oil Market

Tight Oil Production May be Moving to Argentina: Tight oil production (using hydraulic fracturing) has been a U.S. phenomenon (with some Canadian production) due to a variety of geological and other factors. Outside of North America, it has been known for some time that Argentina has tight oil geology that is similar to what exists in the United States. The Vaca Muerta shale play is similar to the Texas Eagle Ford play and has recently attracted significant investment by international oil companies in joint ventures with Argentina's YPF oil company. YPF reports promising results from exploratory drilling (involving long laterals). Whether significant production will ensue in the current low-price environment is yet to be seen. One important difference between Argentina and the United States, at the beginning of its shale boom, is that the United States already possessed significant mid-stream infrastructure, something Argentina lacks. In addition, the small independent producers responsible for U.S. shale had a greater appetite for risk and innovation than can be expected from the international oil majors.

Oil Prices: Crude prices are now firmly above their level before the OPEC-Russian output-cut

agreement in late 2016. Brent oil prices have surged in the last month, closing yesterday at \$52.22 per barrel, the highest closing since April. The Brent-WTI spread in September has averaged \$5.67/b. The drastic jump in the spread began after hurricanes Harvey and Irma disrupted the U.S. oil sector, and continues as the North American market rebalances.

Oil Trade and Demand: U.S. crude exports increased to an all-time high of 1.49 mb/d, up 563 kb/d from the previous week, which was up 591 kb/d from the week before. U.S. crude imports averaged 7.4 mb/d, up by 59 kb/d from the previous week.¹ Weekly production reached 9.547 mb/d last week, roughly the level achieved during the month of August prior to the Hurricane Harvey's landfall.

According to revised IEA data, year-on-year global total oil demand growth remained strong in 2Q17, at 2.3 mb/d—up from previous estimates of 1.8 mb/d. Demand in India and China both slowed year-on-year in July, while demand grew in both the United States and parts of Europe.

Stocks: OECD industry stocks remained flat in July near 3.016 mb, though they are trending downward compared to the five-year average.

Renewables

France: The government plans to invest 20 billion euros in an energy “transition plan”, including 9 billion toward energy efficiency, 7 billion for renewables, and 4 billion for cleaner vehicles. The investments are part of a 57-billion-euro investment plan for 2018-2022 to “profoundly transform the country” according to the Prime Minister.^v

Global: Google plans to reach its 100% renewable energy goal in 2017.^{vi} According to Google, reaching the 100% renewable purchasing goal means buying on an annual basis the same number of megawatt-hours (MWh) of renewable energy—both physical

energy and its corresponding renewable energy certificates (REC)—as the amount of electricity consumed for global operations. Whether or not such schemes (RECs) will promote a meaningful growth of renewable energy, or constitute only paper transactions without significant physical consequences, is yet to be seen. If taken up by more industries, they could be a more significant financial incentive to supply renewable energy adding to government regulations or subsidies that support renewable energy.

While developed countries have long been leaders in renewable power generation, emerging markets are likely to soon overtake them in terms of total installed solar and wind generating capacity.^{vii} Falling costs and increased competition with other fuels due to energy policies are contributing to the projections. The largest growth areas, according to Moody's, will be China, the Middle East and North Africa.

India: The New and Renewable Energy Secretary said this week that India plans to exceed its 175 GW renewables target due to falling solar and wind prices.^{viii} According to Minister Kumar, “renewable energy is the only way to meet the energy demand of 1.25 billion people in [India]. India set the goal of reaching 175 GW of grid-scale renewables by 2020. Estimates suggest the country is currently around 22% of that goal.^{ix}

Economics

Turkey: Turkey's economy grew by 5.1% in the second quarter of 2017, slightly lower than some estimates but more than double first quarter performance.^x The Prime Minister announced this week that Turkey will target annual economic growth of 5.5% throughout 2017-2020.^{xi}

Europe: Economic activity in the Eurozone increased at the fastest pace in more than two years in the third quarter.^{xii} IHS Markit's index of private-sector activity jumped to a four-month

¹ The fact that the U.S. is both exporting and importing large volumes of crude oil can be mostly explained by the fact that

U.S. exports are light (API gravity) oil while its imports are typically heavy oil, mostly from Canada and Latin America.

high of 56.7 from 55.7 in August. Both services and manufacturing strengthened, with a gauge for the latter reaching a level not seen in more than six years. The latest annualized growth in the 19 country Eurozone show the single currency bloc growing at 2.3%. Eurozone unemployment has fallen to the lowest level since 2009.

Asia: Japan's government maintained its moderately optimistic view of the economy in its recent market assessment.^{xiii} The Bank of Japan's policy board voted last week to maintain an interest rate of -0.1%. Meanwhile, Prime Minister Abe ordered his cabinet to create new economic stimulus measures worth nearly \$18 billion by the end of the year.^{xiv} Abe said the package should focus on subsidizing education, child-care costs, and boosting corporate investments to improve productivity. In China, after slow growth in July, data for factory output, investment, and retail sales appeared to slow further in August.^{xv} Industrial output grew 6% from a year earlier, the slowest pace this year, while retail sales expanded 10.1%, down from 10.4% in July. Fixed asset investment in urban areas increased 7.8% in 2017—the slowest pace since 1999. Government policy to ease credit expansion and reduce excess capacity are the key drivers of the slowdown.

United States: The U.S. Federal Reserve announced this week that the economy is strong enough to begin reducing its \$4.5 trillion balance sheet in October, gradually unwinding a massive stimulus program.^{xvi} Hiring is strong, consumers continue to spend and business investment is picking up, as the Fed projects 2.4% growth this year. The U.S. economy grew in the second quarter by 3%, the fastest rate in two years.^{xvii} This is more than double the first quarter and better than initial estimates for the quarter.

Geopolitics & Supply

OPEC: Revised data show that crude output in August fell by 210 kb/d, the first monthly reduction since March, according to the IEA. Total output was 32.67 mb/d, which equated to 82% compliance with the target. Output from Libya fell 140 kb/d after militia groups forced

close oil fields and pipelines. Output also fell slightly from Saudi Arabia, UAE, Gabon, Venezuela, Iraq and Algeria. This week, the OPEC and non-OPEC Joint Ministerial Monitoring Committee concluded its meeting with no change on the current direction.

Iraq: Total crude production fell 10 kb/d to 4.48 mb/d in August, which translates to a compliance rate of roughly 40%. Northern Iraq exports were around 540 kb/d, according to IEA. These exports are likely to be affected as a result of the recent referendum in the Northern Iraq Kurdish Region as it becomes increasingly isolated.

Saudi Arabia: Crude output eased slightly to 10 mb/d in August. The kingdom has produced below its compliance target every month since the deal was announced in January. According to IEA, preliminary tanker traffic data suggest that exports were roughly 6.6 mb/d, or 300 kb/d below June's official number.

Iran: August's production rose by 100 kb/d to 3.79 mb/d compared to July.^{xviii} The increase was in part due to increased demand for Iranian crude in Europe and Korea after output fell in other OPEC suppliers. Meanwhile, Iran's oil minister said this week that the Islamic Republic supports an extension of the supplier production quota.^{xix}

Libya: After increasing to over 1 mb/d in July, revised estimates show production fell by 140 kb/d in August due to the forced closing of three oil fields and an attack on a primary oil export pipeline, according to IEA. A combined 360 kb/d was shut in for several weeks. According to local officials, the three oil fields resumed production as of the first week of September. Libya has remained exempt from the OPEC cuts and will continue to be exempt through March 2018.

Nigeria: Output was 1.66 mb/d in August, the highest level from a low of 1.4 mb/d this year.^{xx} Nigeria is also exempt from the OPEC coordinated production quotas, which has dulled the impacts of OPEC's coordinated cuts. Other OPEC ministers suggest that Nigeria will be forced to comply with the reduction quotas

during the next round of negotiations in early 2018.

Venezuela: Oil production fell slightly to 2.02 mb/d as the country continues to face deep economic and political turmoil.^{xxi} According to IEA, it is becoming more difficult for the national

oil company to pay for daily operations, repay IOCs, and import critical diluent required to process heavy oil produced in the Orinoco region.

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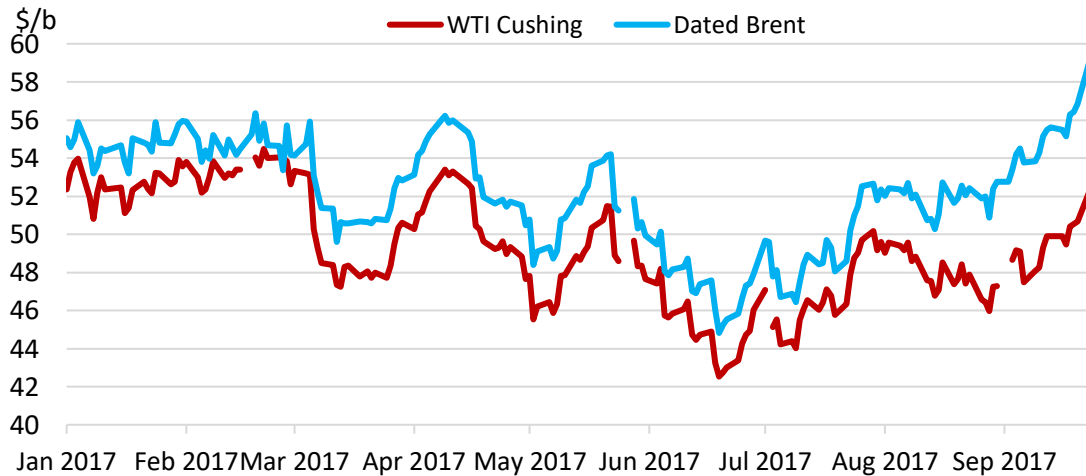
Technical Appendix

1. Oil Market

Oil Supply and Prices:

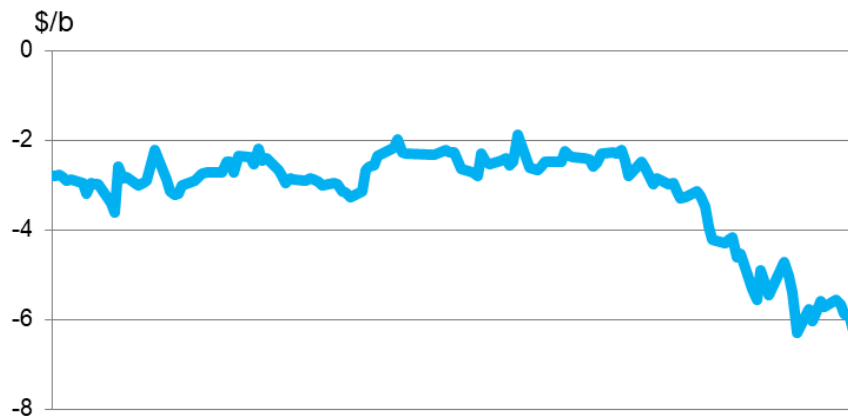
- **Brent oil prices have surged in the last month, closing this week at \$52.22 per barrel, the highest closing since April (Figure 2).** The rally has been driven, in part, by improved demand in the northern hemisphere and expectations that major producers will extend output cuts throughout 2018. American output slowed slightly in recent weeks and its rig count has also plateaued, falling for the fifth time in six weeks.^{xxii}

Figure 3. Benchmark Crude Prices



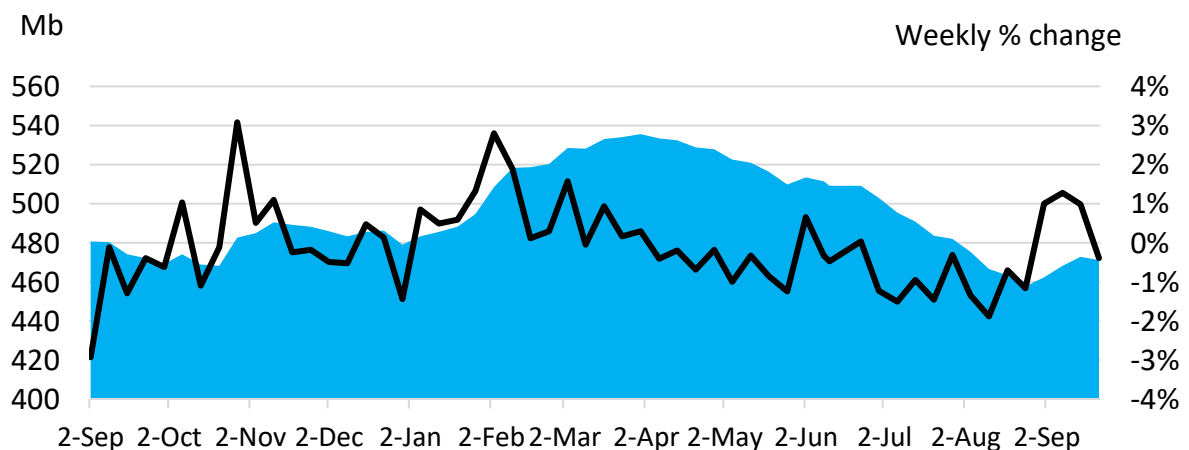
- **Crude prices are now firmly above their level before the OPEC output cut agreement in late 2016.** According to IEA, money managers built impressive long positions in crude futures contracts, signifying their optimism, even if this reversed sharply in late August.
- **U.S. weekly crude production has recovered since a reduction of around 800 kb/d following Hurricane Harvey.** Weekly production reached 9.547 mb/d last week, roughly the level achieved during the month of August prior to the Hurricane's landfall.
- **The Brent-WTI spread in September has averaged \$5.67/b, up significantly from August \$3.81/b and July's \$2.41/b (Figure 3).** The drastic jump in the spread began after hurricanes Harvey and Irma disrupted the U.S. oil sector, and continues as the North American market rebalances.

Figure 4. WTI-Brent Crude Price Differentials

**Crude Storage:**

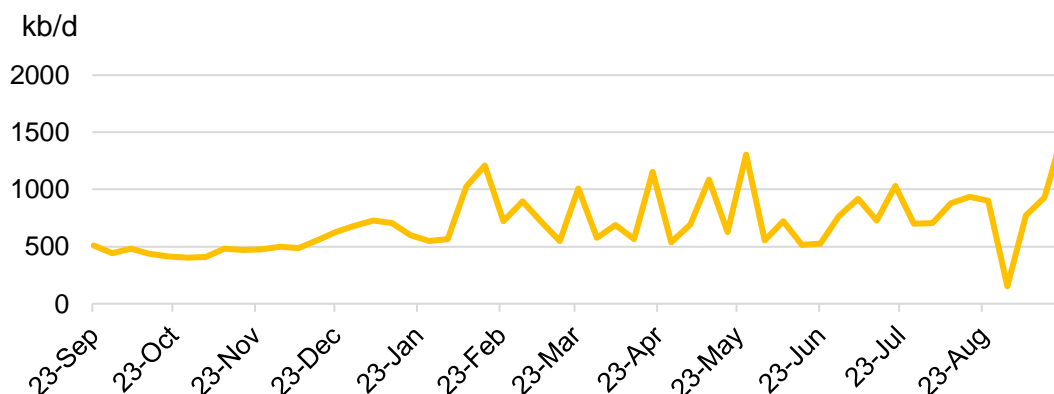
- **OECD industry stocks remained flat in July near 3.016 mb, though they are trending downward compared to the five-year average, according to IEA.** Hurricane Harvey reduced oil product stocks and contributed to a build on crude stocks, though it will take weeks for the full impact to be felt by the market.
- **U.S. commercial crude inventories increased fell by 1.8 mb from the previous week, ending a growth trajectory for the month (Figure 4).^{xxiii}** At 471 mb, U.S. crude oil inventories are in the upper half of the range for this time of year, based on the five-year average.

Figure 5. Weekly U.S. Crude Oil Stocks



- **U.S. crude imports averaged 7.4 mb/d, up by 59 kb/d from the previous week.** U.S. crude exports increased to an all-time high of 1.49 mb/d, up 563 kb/d from the previous week, which was up 591 kb/d from the week before (Figure 5).

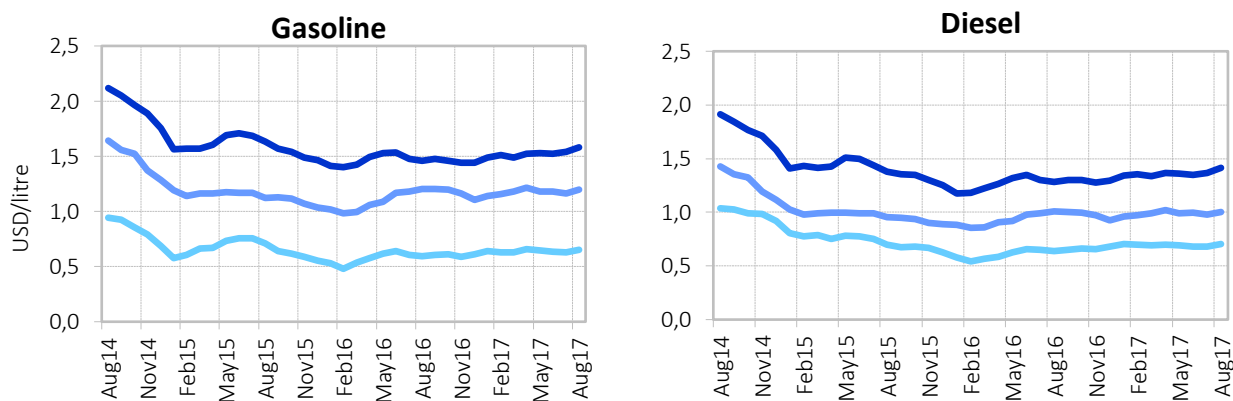
Figure 6. Weekly U.S. Exports of Crude Oil



Select Product Markets:

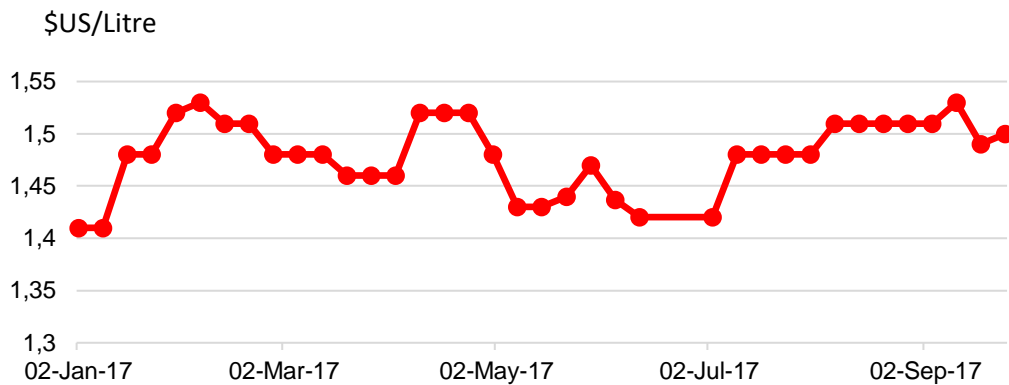
- **According to revised IEA data, year-on-year global total oil demand growth remained strong in 2Q17, at 2.3 mb/d—up from previous estimates of 1.8 mb/d.** Demand in India and China both slowed year-on-year in July, while demand grew in both the United States and parts of Europe (Figure 6).

Figure 7. Select Monthly Product Prices in Europe, Japan, and North America



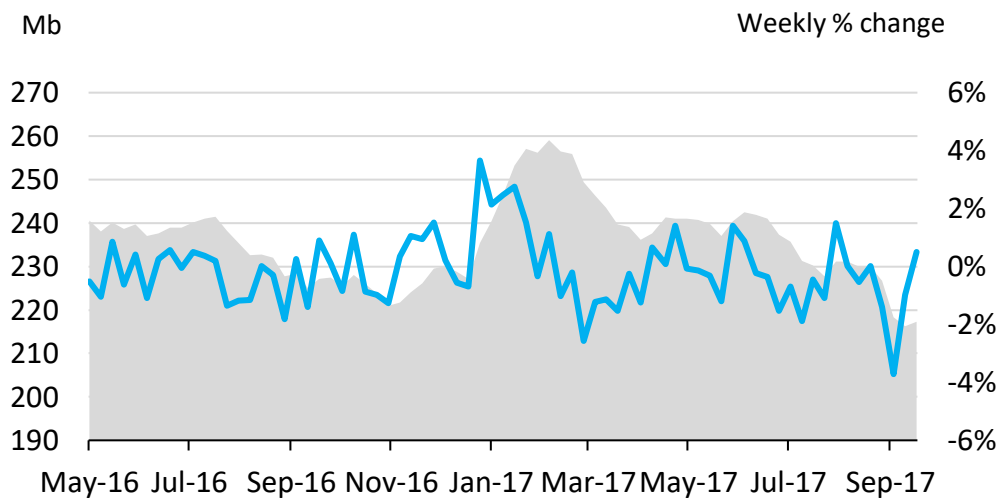
- **Gasoline prices in Turkey** are shown in Figure 7, with prices increasingly steadily since July, driven by increased Brent oil prices.

Figure 8. Weekly Average Gasoline Prices in Turkey



- **For the week ending September 22, U.S. crude oil refinery inputs averaged 16.2 mb/d, up by 1.0 mb/d from last week.** Gasoline production fell as a result of Hurricane Harvey, while refineries operated at 77.7% of their operable capacity.
- **U.S. gasoline stocks increased by 1.1 mb, and they remain in the upper limit of the five-year average for this time of year.** The national average retail regular gasoline price decreased to \$2.583 per gallon on September 25, \$0.051 lower than last week and \$0.359 higher than a year ago.

Figure 9. Weekly U.S. Gasoline Stocks and % Change



2. Natural Gas & LNG

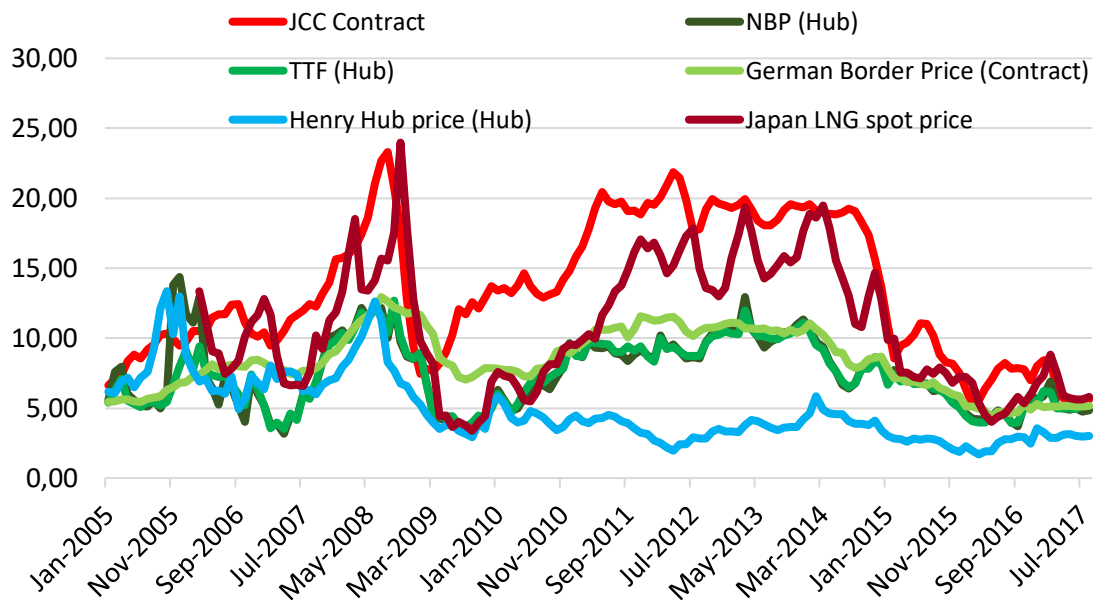
Prices:

- **Prices for LNG spot cargoes for Japan, the world's top buyer, hit a five-month high in August (Figure 7).^{xxiv}** The average contract price was \$5.80 per mBtu. Meanwhile, European natural gas markets are also tightening ahead of winter, with potential for price spikes due to nuclear power outages in France, and supply constraints in the United Kingdom due to storage capacity maintenance.^{xxv} Pipeline

exports to Europe from Russia and Norway are at records highs, and Russia continues to send gas to Europe through Ukraine—which is expected to continue this winter.

- **Weekly U.S. natural gas spot prices increased \$0.15 to \$3.14/mBtu on September 20, as temperatures increased in the eastern half of the United States.**

Figure 10. Select Monthly Natural Gas Prices (mBtu)



Supply:

- **The Australian Energy Market Operator announced this week that the country's east faced a natural gas supply shortfall in 2018, but suggested that the gap could be filled by diverting uncontracted exports to the local market.**^{xxvi} The government will decide by November 1 about enacting the Australian Domestic Gas Security Mechanism, which allows LNG exports to be suppressed in the east to supply to the local market. The supply gap is projected to be between 4-9% of demand for LNG in that region. Another report to the government suggested that opening the market to allow gas volumes to be bought and sold competitively would be another possible outcome. Long-term supply contracts from the LNG exports have prevented this type of market development.
- **Qatar recently has signed multiple new contracts of various terms with countries in Asia, Europe, and the Middle East.** Qatar signed a three-year sales agreement with Turkey's Botas for 1.5 million tons of LNG (discussed in the main body of the Newsletter).^{xxvii} A 15-year contract was signed with Bangladesh for 2.5 million tons per year, delivered from Qatar's floating storage and regasification unit near Bangladesh.^{xxviii}
- **Russia's Gazprom signed a 12 year LNG supply deal with Ghana's national energy company (GNPC).**^{xxix} According to Gazprom, the agreement is the first stage in a planned series of partnerships between Gazprom and GNPC, with both companies working to develop the infrastructure and services required to manage and market the

projected gas flows from the region. Meanwhile, Gazprom approved the establishment of a joint-venture with Turkey's Botas for the construction of the overland section of the 31 bcm Turkish Stream gas pipeline system.^{xxx}

- **The U.S. Department of Energy announced a proposed rule to expedite the approval of small-scale LNG exports from the United States.**^{xxxi} The proposed rule provides that DOE will grant applications that meet two criteria: the application proposes to export no more than 0.14 bcf/d and the proposed export qualifies for a categorical exclusion under DOE's NEPA regulations. The small-scale LNG export market involves exports of small volumes of natural gas from the United States primarily to countries in the Caribbean, Central America, and South America. Meanwhile, five LNG vessels (combined carrying capacity of 17 Bcf) departed Sabine Pass this week, while one vessel (3.8 Bcf) was loading at the terminal.^{xxxii}

Demand:

- **High LNG output relative to demand is likely to weaken, as LNG demand is expected to double by 2035.**^{xxxiii} While production plants in operation or under construction will add to the global supply, aging facilities and shrinking resources in key regions will lead to a tighter market. According to Cedigaz, global LNG capacity is expected to peak at 387 million tons a year by 2021-2022, while demand for LNG in China, India, Bangladesh, Indonesia, the Philippines, and Vietnam is expected to continue to grow beyond that time frame.
- **Japanese LNG buyers paid an average of \$5.80/mBTU for spot cargoes that were contracted in August, up 3.6% from \$5.60/mBTU in July, Ministry of Economy, Trade and Industry data showed this week.**^{xxxiv} METI also published the average price of all cargoes, including contracted supplies, delivered to Japan in August, which stood at \$5.60/mBTU, unchanged from July. Demand from end-users and traders pushed up the price, while support also came from expectations that a hot summer could drive some end-users to return to the spot market before winter.
- **The South Korean government plans to replace coal-fired power plants under construction (less than 10% constructed) with LNG-based power turbines in a bid to cut pollution, and seek to eliminate 2.2 million diesel vehicles by 2020.**^{xxxv} To meet a global cap of 0.5% sulfur emissions in 2020 for vessel fuels, the government will support the switch from fuel oil to LNG. The government plans to spend \$6.4 billion by 2022 to bring down fine dust emissions. The Ministry of Trade, Industry and Energy said that these anti-pollution measures would boost demand of LNG for electricity generation and transportation, while reducing diesel consumption.
- **Polish Foreign Minister says the country plans to completely diversify away from Russian gas supplies by 2022.**^{xxxvi} The current supply contract expires in 2022 and Poland plans to import gas from other, politically safe, directions and to distribute the gas it imports to its neighbors. Poland currently maintains an LNG import terminal in the country's north, which was only utilized at 22% of its capacity in 2016.^{xxxvii} Meanwhile, a new gas line from Norway via Denmark is planned to come online by 2023.

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