ENERGY LOGISTICS & DISTRIBUTION

Industry In-Sight™

SUMMER / FALL 2018




JORDAN KNAUFF & COMPANY

ENERGY EQUIPMENT & INFRASTRUCTURE ALLIANCE

The Voice of the Energy Supply Chain

ENERGYBUILDERS

IN THIS REPORT

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All charts in this report are updated to the latest information available at the time of publication. Due to differing reporting dates for various data used throughout the report, all charts are not updated to the same ending period.

INTRODUCTION ... About This Report

We are pleased to offer this periodic report which provides a comprehensive compilation of energy information, insights and data. It aggregates critical planning and forecasting information from a myriad of sources into one resource for energy supply chain analysts and decision-makers.

The energy supply chain is an increasingly complex network of upstream, midstream and downstream providers of construction, equipment, materials and services. As shale gas-oil and renewable energy continue to expand in the U.S., additional infrastructure is needed to connect the new sources to the current network of pipelines, storage and transmission stations. Current and new members of the supply chain will need to expand in order to build and service the additional infrastructure.

We define the Energy Logistics & Distribution Industry as any energy production, transportation and storage activities that take place from the well-head to the refinery or gas processing plant through delivery to the end user. Industry members include: producers and distributors of oil and natural gas, natural gas liquids, refined fuels and propane; energy storage and pipeline operators; oil and gas field services; producers and distributors of lubricants, oils, greases and fluids; service contractors, capital equipment manufacturers; materials suppliers; as well as logistics, transportation and maintenance providers.

Segments covered in this Industry In-Sight™ include:

- Crude oil and refined products, natural gas, liquefied natural gas (LNG), natural gas liquids including propane and heating/fuel oil, as well as drilling activity.
- Renewables, including solar, wind, hydropower and ethanol.
- Logistics, including storage and terminals, pipelines, trucking, shipping and rail.
- Economic and financial data pertinent to the Energy Logistics & Distribution Industry.

It is our intention that this publication will provide value in the following areas:

- **Aggregate Information** – The Data Center provides comprehensive statistics on the Energy Logistics & Distribution Industry including, among others: prices (domestic and international), production, consumption, inventory, imports/exports, LNG terminals, drilling activity, solar and wind capacities, energy consumption by sector and source, tank and underground storage capacities and utilization, pipeline mileage and trucking conditions. In all, the report offers more than 70 individual charts covering these topics and more. All charts in this report are updated to the latest information available at the time of publication.
- **Input to Business Decisions** – As a relevant and informative reference for use when contemplating decisions that will have a meaningful impact on your business. Accordingly, we welcome any input, feedback and suggestions to help us include meaningful and timely topical content in future publications. We especially would like to receive suggestions for ideas on Hot Topics in the Energy Logistics & Distribution Industry.
- **Identification of Opportunities** – The breadth of information provided will enable owners and operators of energy logistics businesses to track developments in energy segments outside of their day-to-day focus.
- **Public and Transaction Comparables by Segment** – This section provides the tracking of a cross-section of publicly-traded companies and transactions in various segments of the Energy Logistics & Distribution Industry. The data include operating metrics, such as revenues and EBITDA (earnings before interest, taxes, depreciation and amortization); and valuation analyses such as total enterprise value / latest twelve months revenues and total enterprise value / latest twelve months EBITDA.

Thank you for taking the time to review this Energy Logistics & Distribution Industry In-Sight™. Our goal is to provide the most comprehensive and beneficial information possible. Please forward your feedback and suggestions to any member of the Jordan Knauff & Company or Energy Equipment and Infrastructure Alliance team members listed on the last two pages of this report.

INTRODUCTION

Who is the Energy Equipment & Infrastructure Alliance (EEIA)?

EEIA ... The Voice of the Energy Supply Chain

The energy supply chain is over 120,000 companies in sixty industries, annually contributing more than $170 billion to the U.S. economy, with hundreds of thousands of workers in communities throughout every state of the union. They provide construction, well services, capital equipment, supplies, logistics, professional services and technology in support of energy operations. They build energy infrastructure including production sites, transmission infrastructure, pipelines, storage facilities, processing plants and export terminals.

The shale energy revolution is transforming prosperity, security and quality of life in America. In a few short years, it has brought rising employment, income and opportunity to workers and businesses of all sizes and in all fifty states, often to communities that until recently have known limited prospects for growth. It has given Americans a cleaner environment, lower energy costs, renewed national competitiveness and energy security.

Creating a supportive public and policymaker environment for this miracle depends on active public engagement by energy supply chain stakeholders -- the non-oil and gas companies where energy-driven jobs and opportunities are greatest.

EEIA is that voice. We mobilize and lead the North American supply chain in pursuit of government policies that support full development of our energy resources, while protecting public health, safety and the environment. We also work for widespread public support for energy development.

The Energy Equipment & Infrastructure Alliance (EEIA) is active on all fronts: federal and state legislative, regulatory, judicial and public opinion. Our strength is based upon the supply chain's enormous fifty-state contributions to jobs, economic growth and community prosperity. We conduct economic research that measures and reports the facts about the energy supply chain's tremendous contributions to the American economy.

We are an organization of leading supply chain companies, trade associations and labor organizations. We are the voices of the businesses and workers of America's energy miracle.




INTRODUCTION

Who is Jordan Knauff & Company (JKC)?

JKC was founded in 2001 to undertake a distinct mission: to assemble and maintain a staff of top-notch investment banking personnel and offer their knowledge and experience to provide the best available investment banking services to middle-market companies, the entrepreneurs that lead them and the financial entities that transact with them. JKC has been active within the Energy Logistics & Distribution Industry as operators, investors, board members and investment bankers prior to the firm's founding in 2001.

On a combined basis, over the course of their careers our employees have completed over 200 transactions as investors, owners, operators, buyers, sellers and investment bankers of middle-market businesses across a variety of industries. The majority of our firm's broad transaction experience has been with private companies owned by one shareholder, a partnership, a family or private equity investors.

Experience has taught us that the owners and executives of middle-market businesses tend to have very different needs and goals in capital transactions from those that are common to capital events related to larger companies. Our personnel apply their considerable expertise to accomplish important goals: delivery of successful outcomes for our clients. Pursuant to that, we direct and manage all aspects of the capital transaction process, assist our clients with the management of important constituents (employees, customers, vendors and lenders), act as a teammate to other important client advisors (legal counsel, accountant, tax advisor) and collaborate with transaction counsel in the negotiations with the parties on the other side of the transaction.

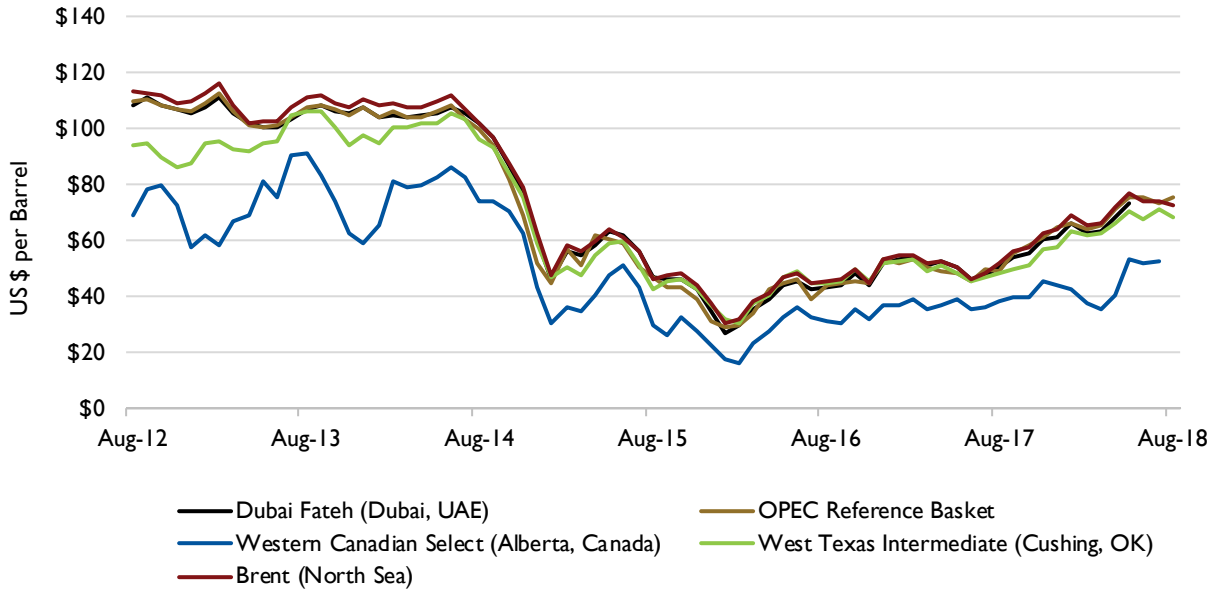
The Services We Provide

- Sell Companies: Generate a liquidity event on behalf of the owner(s) through whole, majority, or minority sale of assets, stock or units.
- Raise Capital: Representation of companies, management teams and entrepreneurs in the raising of senior debt, mezzanine debt or equity capital. Proceeds may be used for a variety of reasons, including, among others, recapitalizations, funding of growth, funding of acquisitions or liquidity for owners and investors.
- Acquisition Advisory: Assistance in sourcing and closing acquisitions -- whether it be a single transaction or a series of acquisitions as part of a consolidation strategy in an Industry Development Project™ (IDP) - a proprietary method for assisting private equity groups, companies or private investors that want to pursue multiple non-auction transactions within a single industry.
- Strategic Business Services: A suite of services for middle-market business owners and executives. Comprised of three components – Company Specific Valuation, Capital Road Map® and Strategic Industry Analysis – these services can be packaged together or used on an à la carte basis.

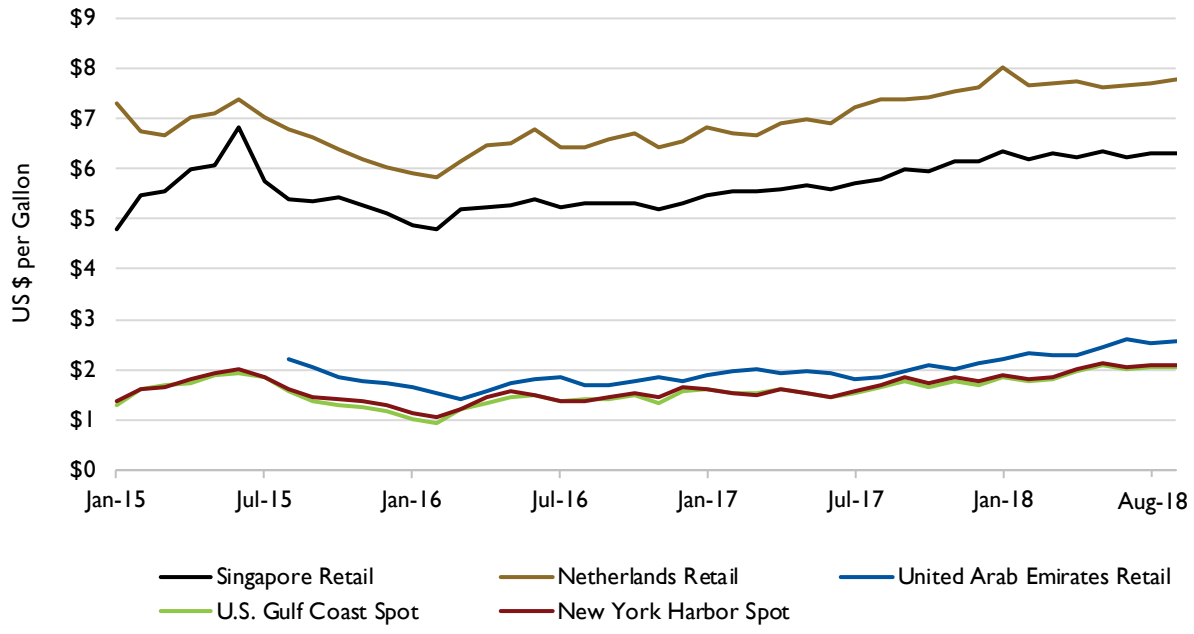
DATA CENTER

OIL

CRUDE OIL PRICES (MONTHLY AVERAGE) (1)



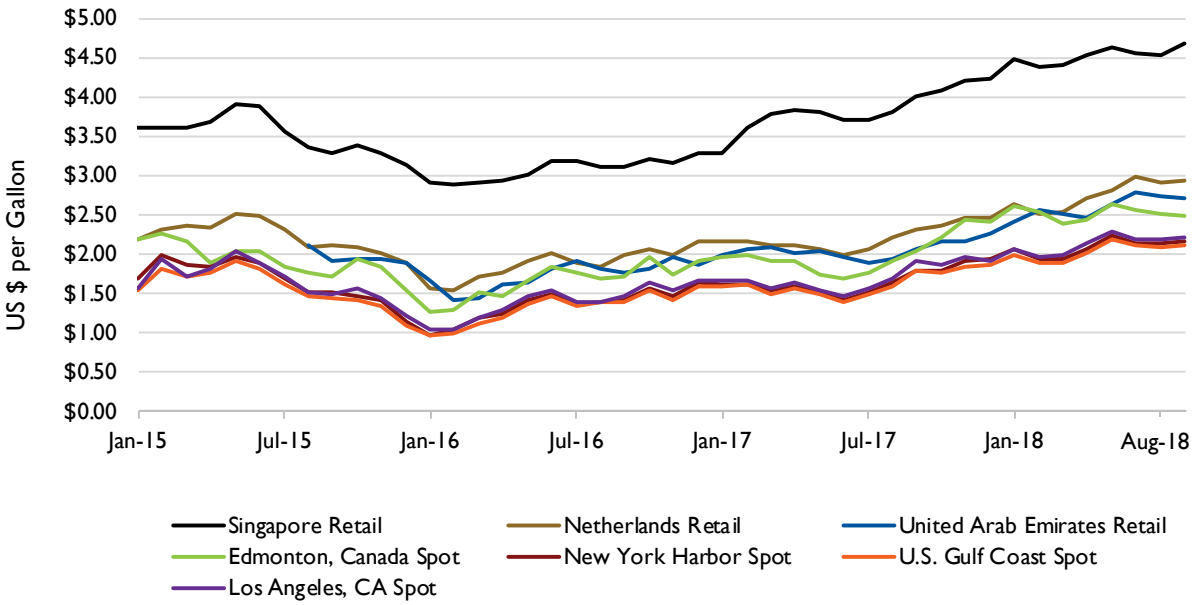
GASOLINE PRICES (MONTHLY AVERAGE) (2)



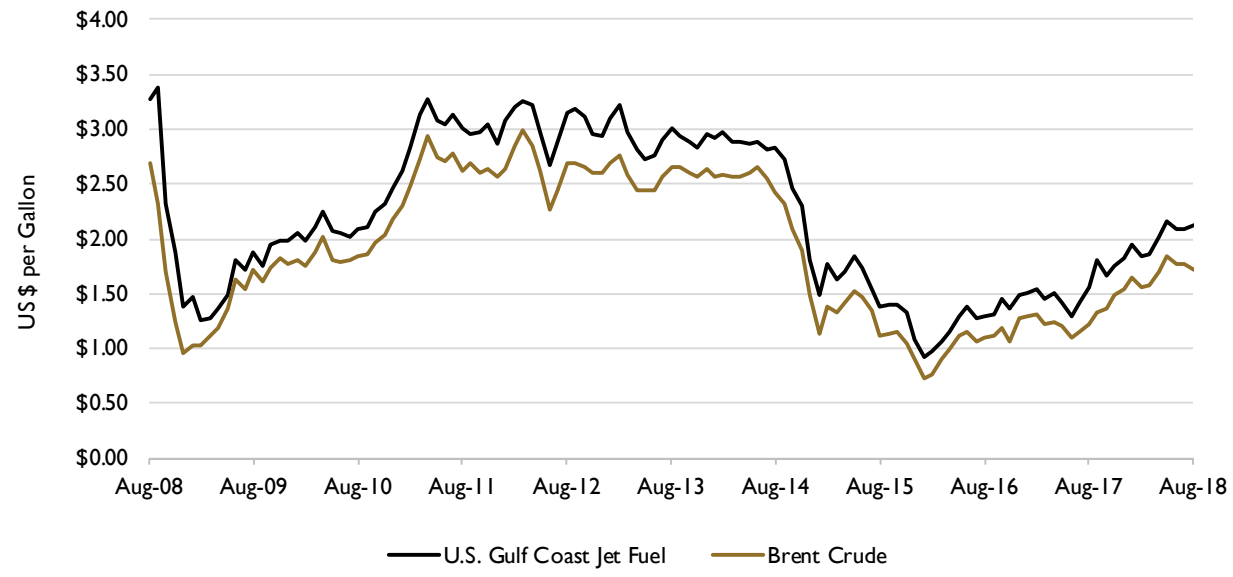
DATA CENTER

OIL

DIESEL PRICES (MONTHLY AVERAGE) (3)



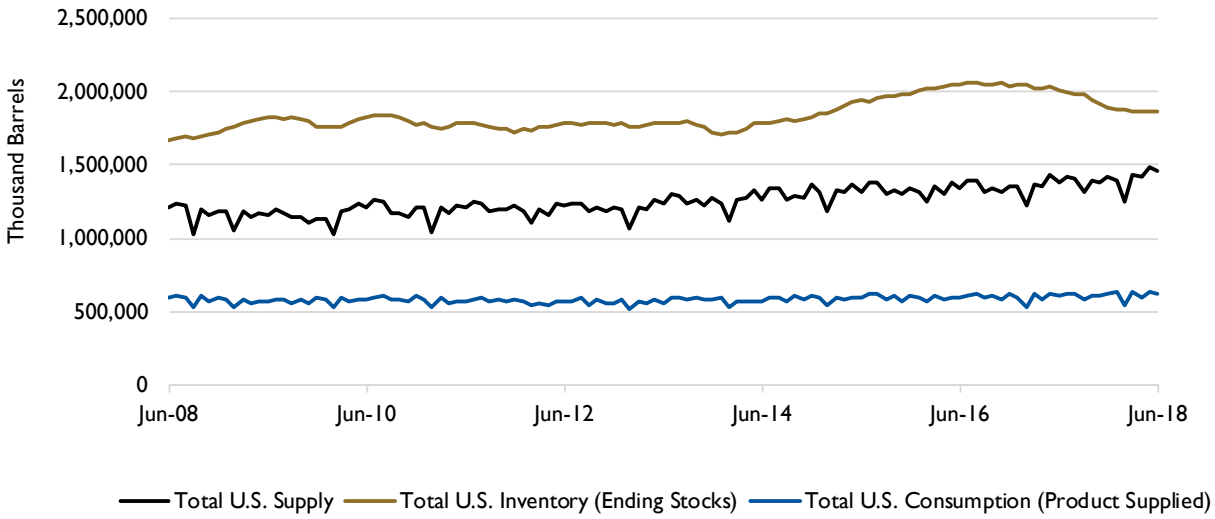
JET FUEL PRICES (MONTHLY AVERAGE) (4)



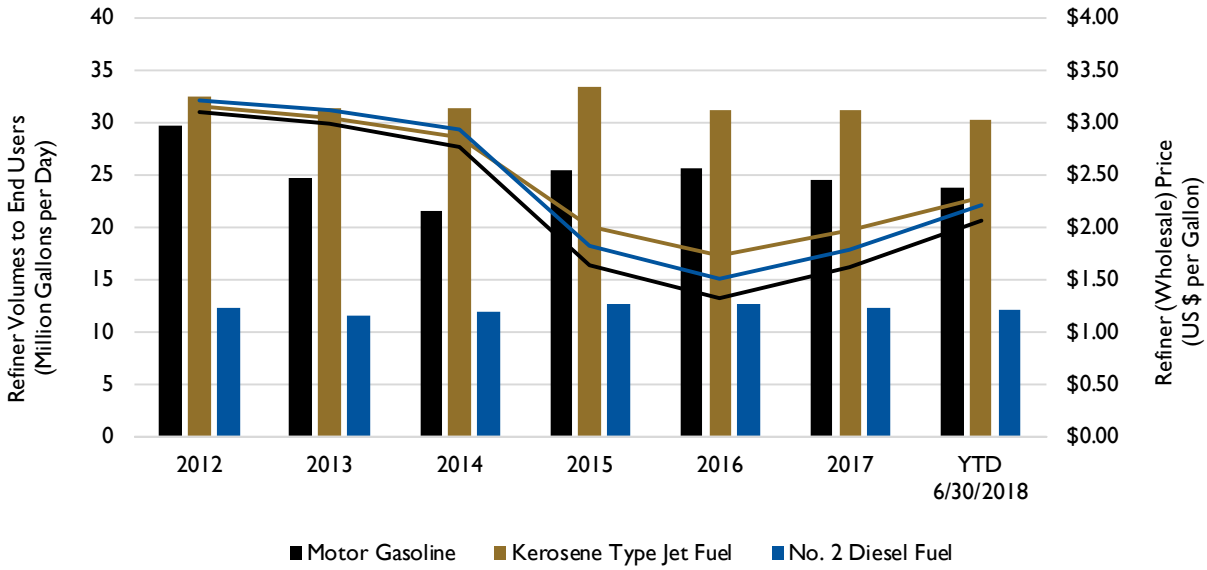
DATA CENTER

OIL

U.S. Crude Oil and Petroleum Products Supply, Inventory and Consumption (Monthly) (5)



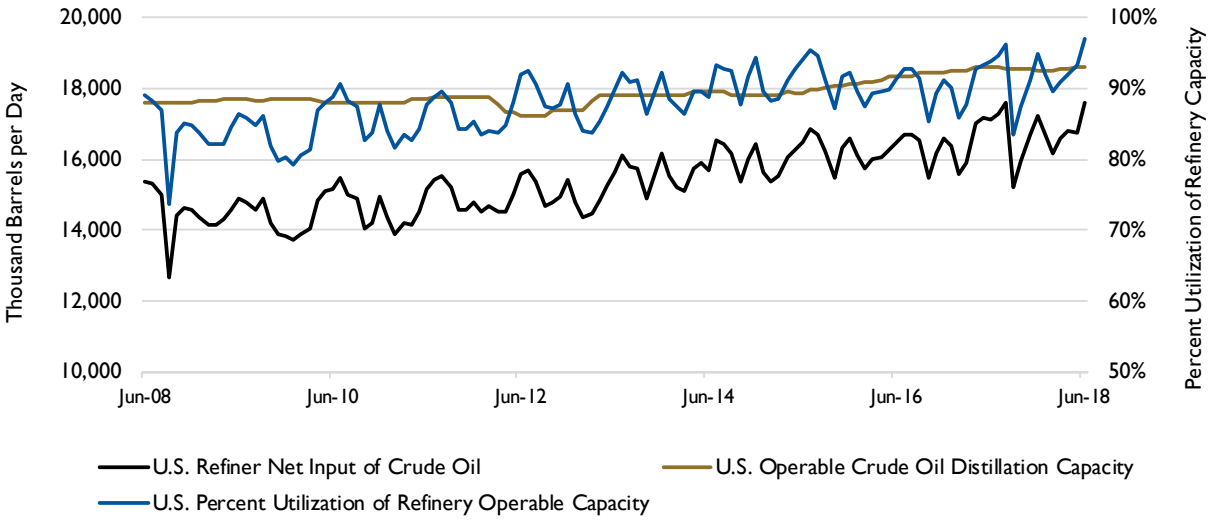
U.S. Refinery Volumes and Wholesale Prices of Petroleum Products (Annual Average) (6)



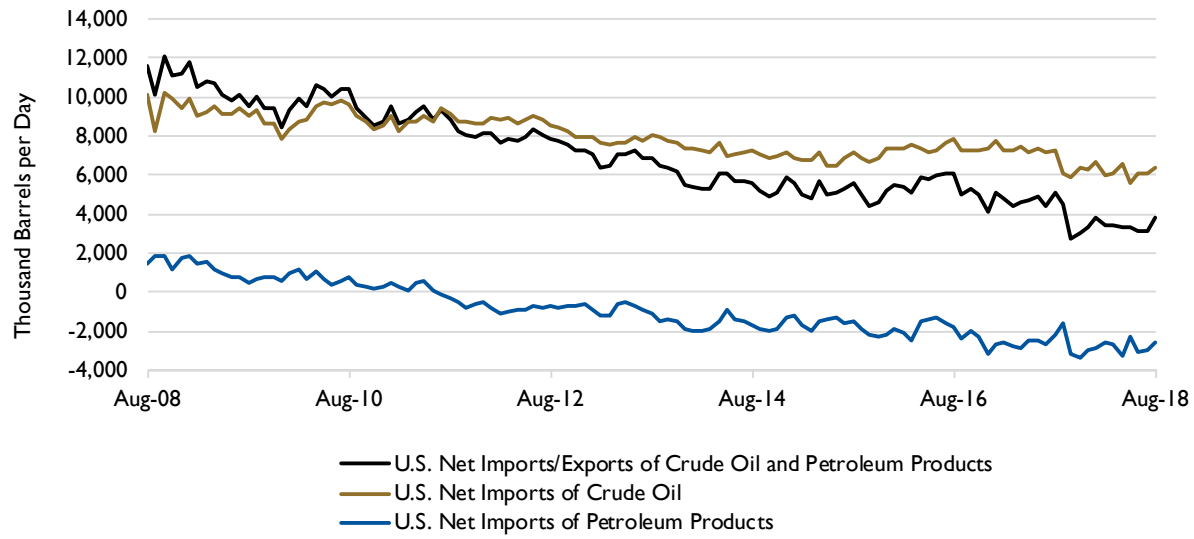
DATA CENTER

OIL

U.S. Crude Oil Refinery Input, Distillation Capacity and Refinery Utilization (Monthly Average) (7)



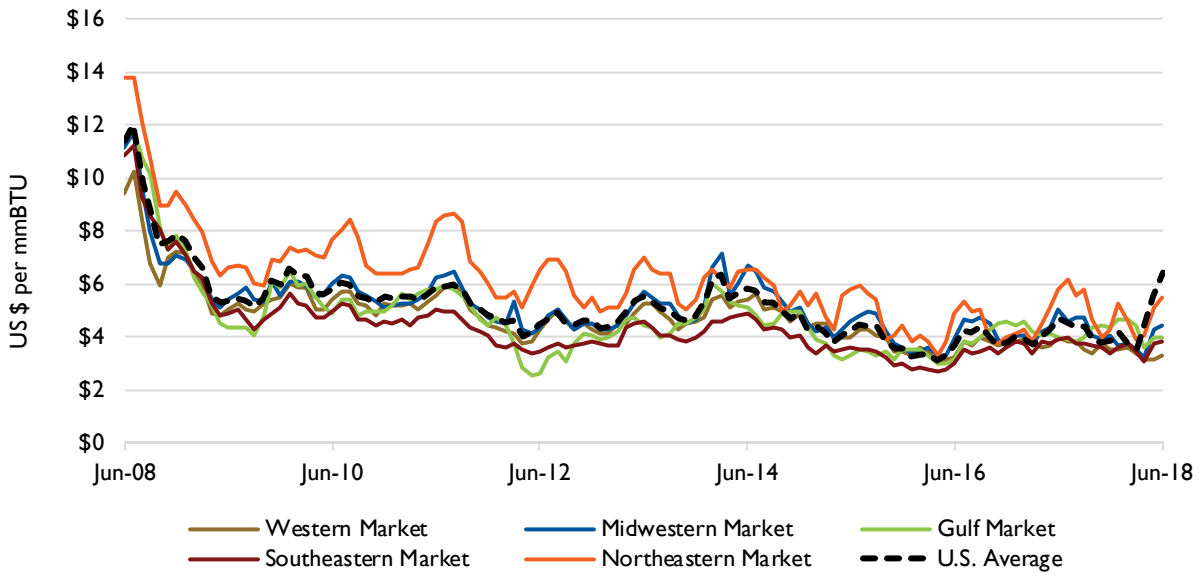
U.S. Crude Oil and Petroleum Products Imports and Exports (Monthly Average) (8)



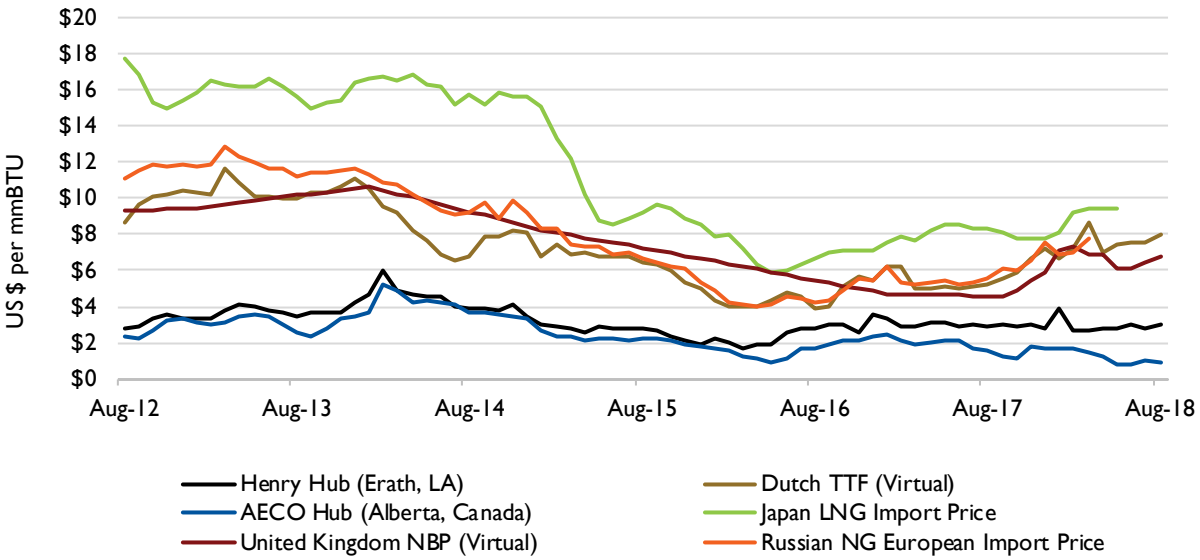
DATA CENTER

NATURAL GAS

DOMESTIC NATURAL GAS CITYGATE PRICES PER REGION (MONTHLY AVERAGE) (9)



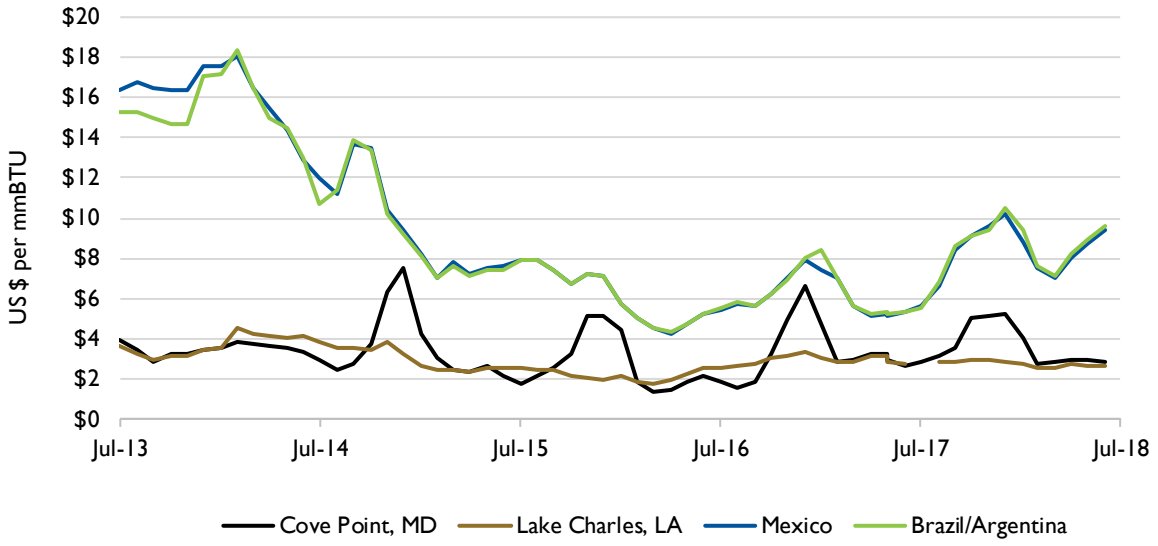
INTERNATIONAL NATURAL GAS PRICES (MONTHLY AVERAGE) (10)



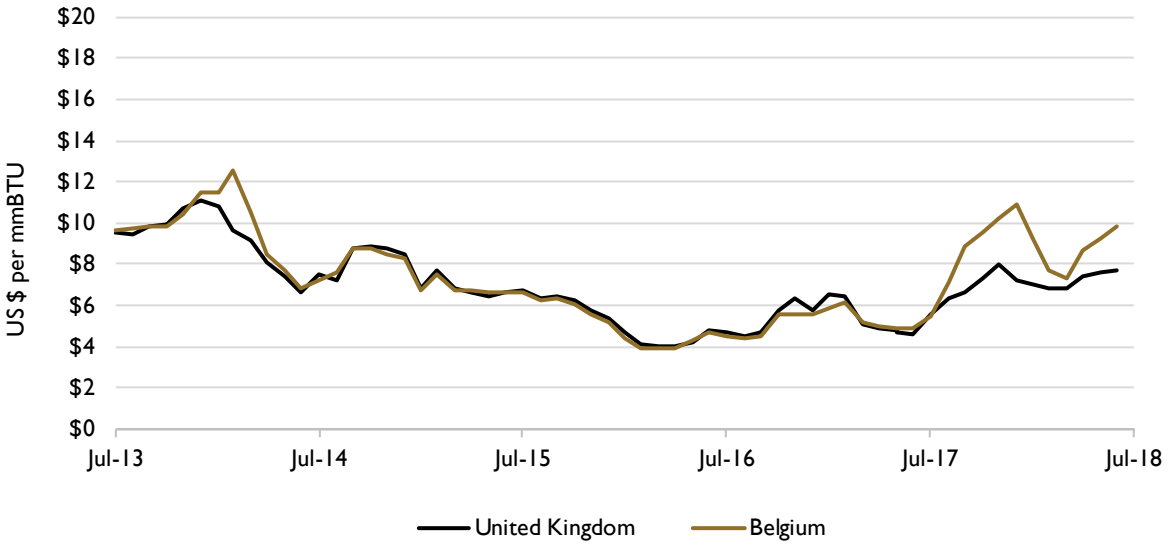
DATA CENTER

NATURAL GAS

AMERICAS LIQUEFIED NATURAL GAS PRICES (MONTHLY AVERAGE) (11)



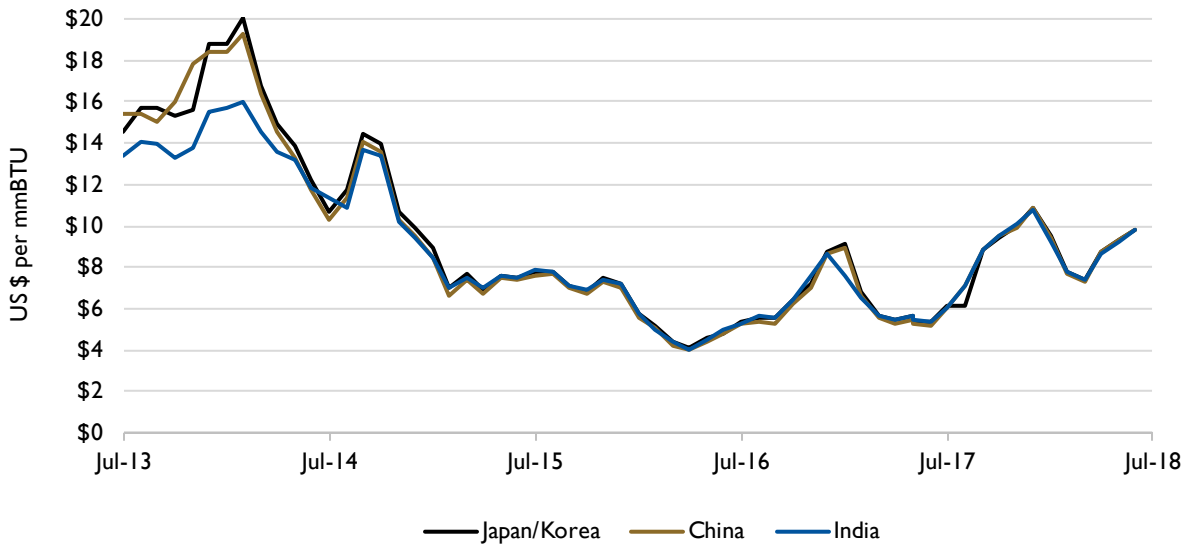
WESTERN EUROPE LIQUEFIED NATURAL GAS PRICES (MONTHLY AVERAGE) (12)



DATA CENTER

NATURAL GAS

ASIA LIQUEFIED NATURAL GAS PRICES (MONTHLY AVERAGE) (13)

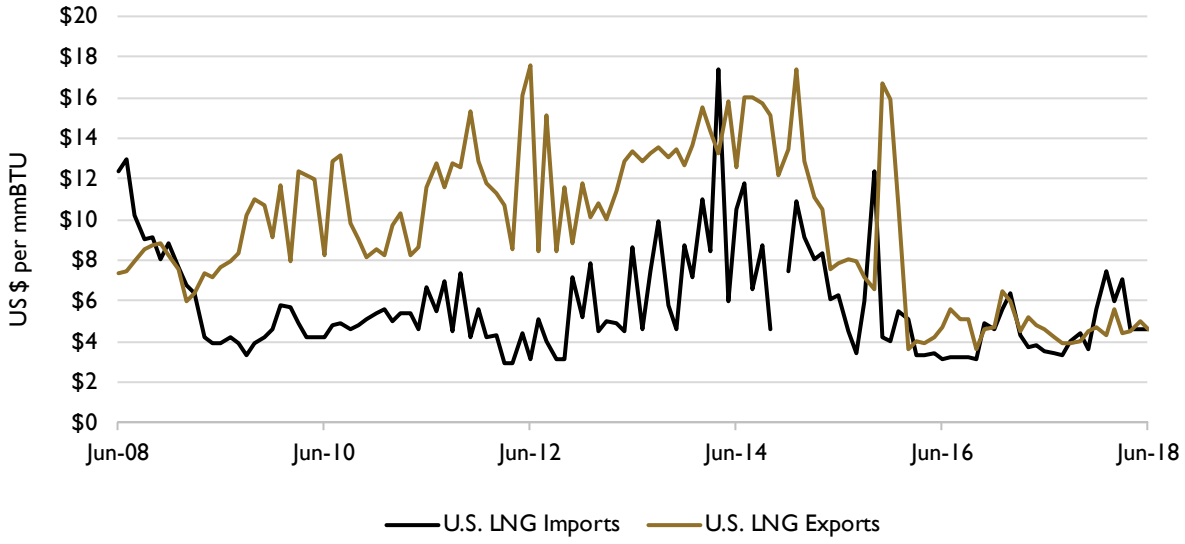


WORLD LIQUEFIED NATURAL GAS PRICES MAP (MONTHLY AVERAGE) (14)

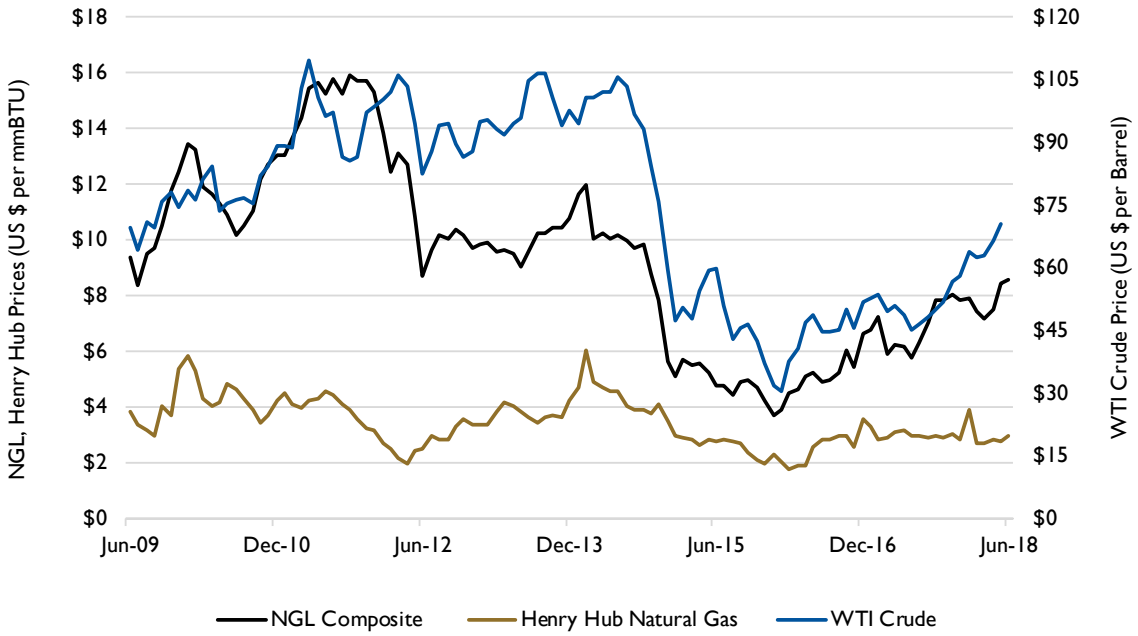
DATA CENTER

NATURAL GAS

U.S. IMPORT / EXPORT LIQUEFIED NATURAL GAS PRICES (MONTHLY AVERAGE) (15)



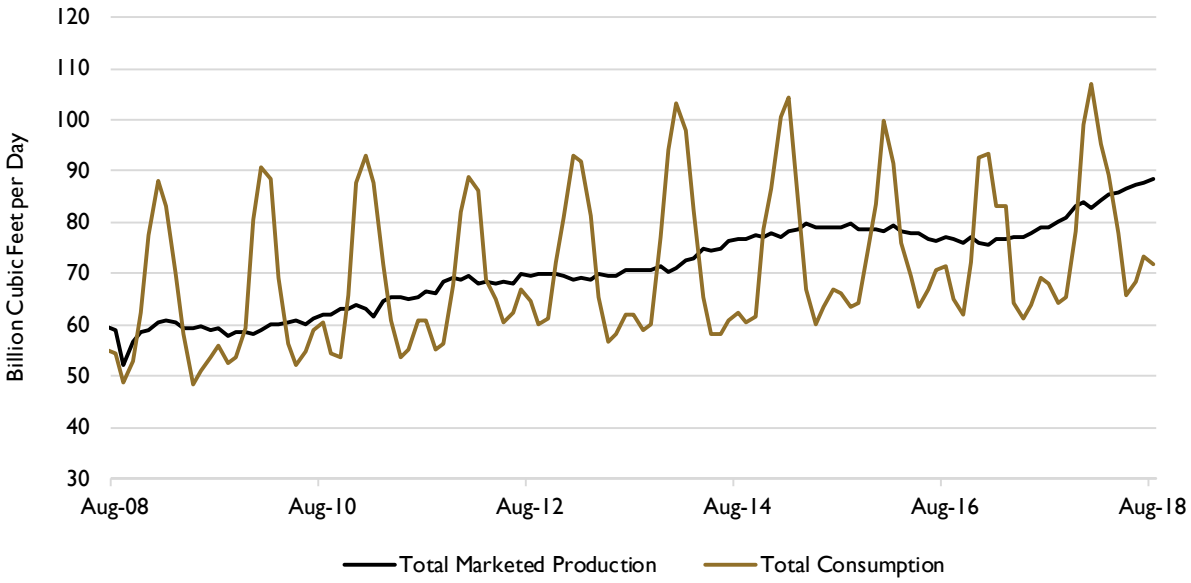
NATURAL GAS PLANT LIQUIDS PRICES (MONTHLY AVERAGE) (16)



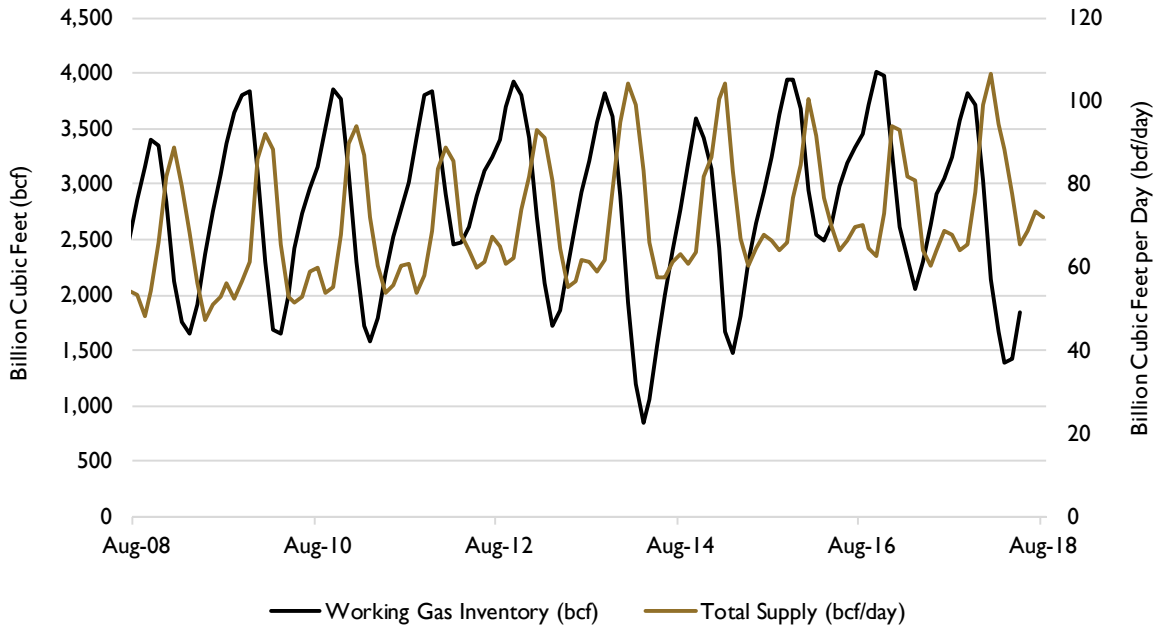
DATA CENTER

NATURAL GAS

U.S. Natural Gas Production and Consumption (Monthly) (17)



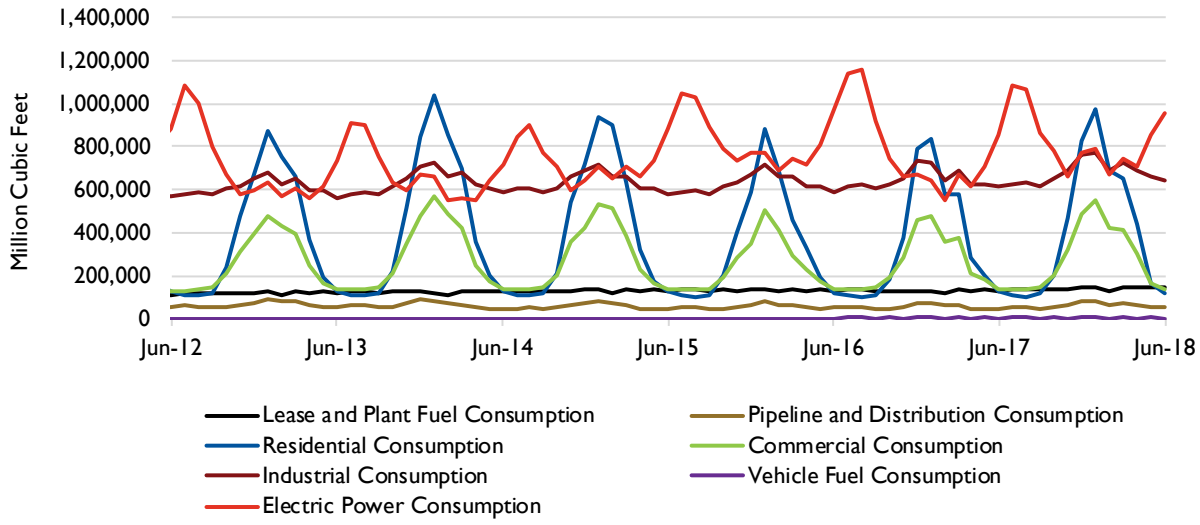
U.S. Natural Gas Supply and Inventory (Monthly) (18)



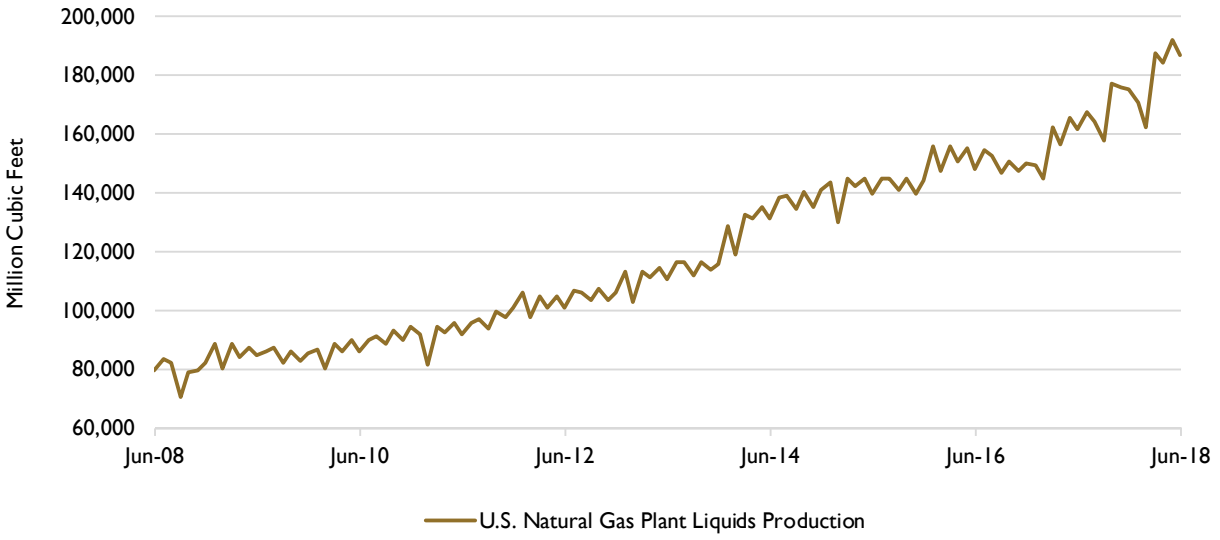
DATA CENTER

NATURAL GAS

U.S. Natural Gas Consumption by End Use (Monthly) (19)



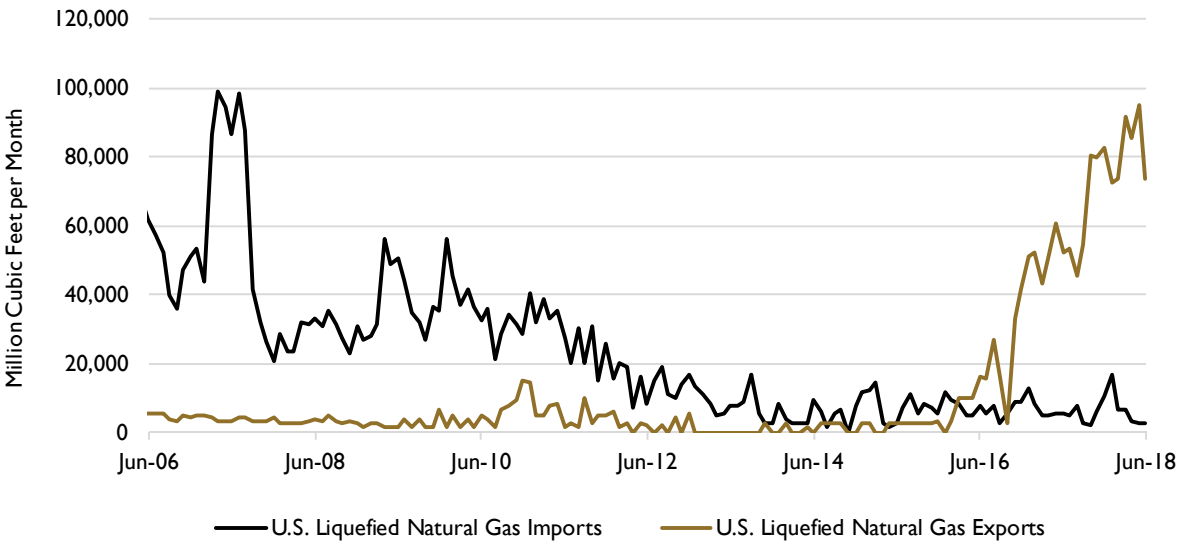
U.S. Natural Gas Plant Liquids Production (Monthly) (20)



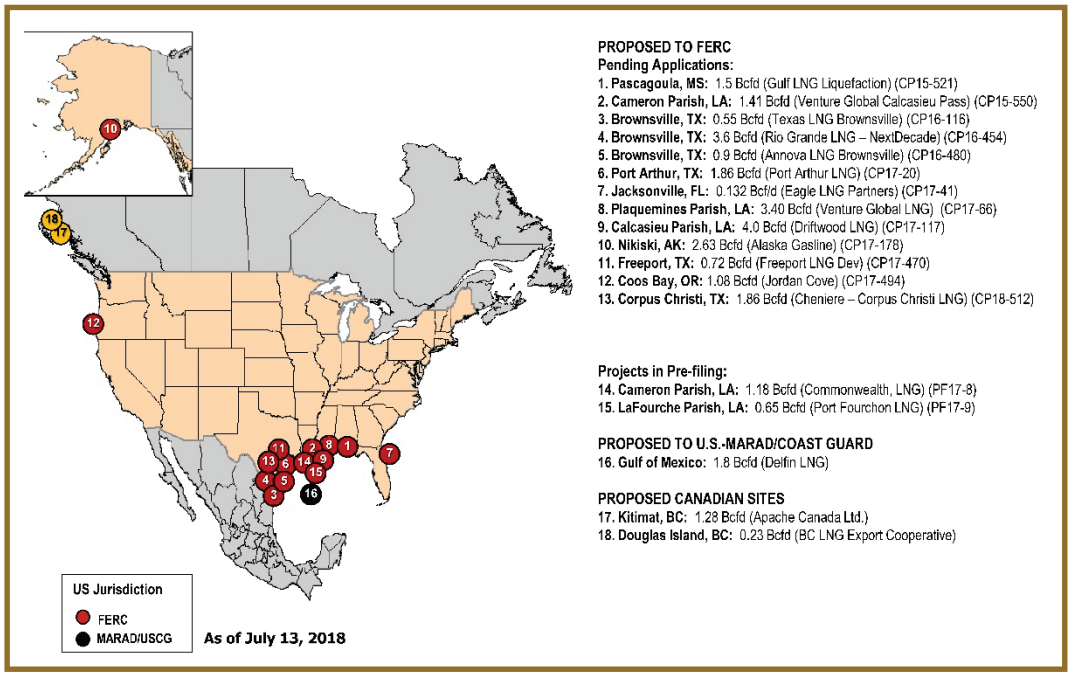
DATA CENTER

NATURAL GAS

U.S. LIQUEFIED NATURAL GAS IMPORT AND EXPORT VOLUMES (MONTHLY) (21)



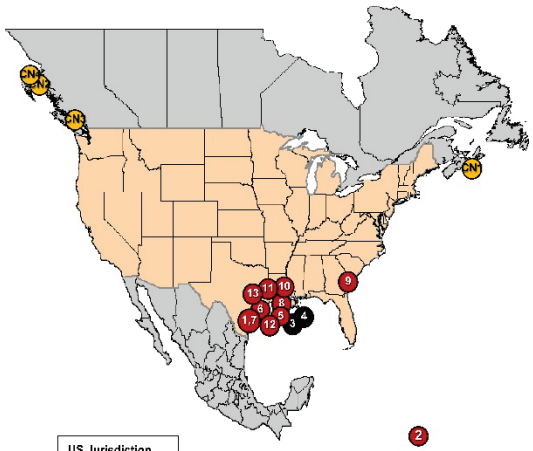
NORTH AMERICAN LNG EXPORT TERMINALS – *PROPOSED* (22)



DATA CENTER

NATURAL GAS

NORTH AMERICAN LNG IMPORT/EXPORT TERMINALS – *APPROVED* (23)



Import Terminals

U.S.

APPROVED - UNDER CONSTRUCTION - FERC
1. **Corpus Christi, TX:** 0.4 Bcfd (Cheniere – Corpus Christi LNG) (CP12-507)

APPROVED – NOT UNDER CONSTRUCTION - FERC
2. **Salinas, PR:** 0.6 Bcfd (Aguirre Offshore GasPort, LLC) (CP13-193)

APPROVED - NOT UNDER CONSTRUCTION - MARAD/Coast Guard
3. **Gulf of Mexico:** 1.0 Bcfd (Main Pass McMoRan Exp.)
4. **Gulf of Mexico:** 1.4 Bcfd (TORP Technology-Bienville LNG)

Export Terminals

U.S.

APPROVED - UNDER CONSTRUCTION - FERC
5. **Hackberry, LA:** 2.1 Bcfd (Sempra–Cameron LNG) (CP13-25)
6. **Freeport, TX:** 2.14 Bcfd (Freeport LNG Dev/Freeport LNG Expansion/FLNG Liquefaction) (CP12-509) (CP15-518)
7. **Corpus Christi, TX:** 2.14 Bcfd (Cheniere – Corpus Christi LNG) (CP12-507)
8. **Sabine Pass, LA:** 1.40 Bcfd (Sabine Pass Liquefaction) (CP13-552)
9. **Elba Island, GA:** 0.35 Bcfd (Southern LNG Company) (CP14-103) ★

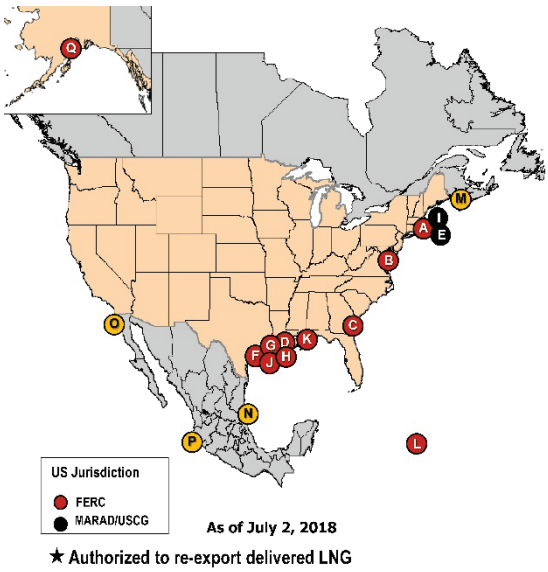
APPROVED – NOT UNDER CONSTRUCTION - FERC
10. **Lake Charles, LA:** 2.2 Bcfd (Southern Union – Lake Charles LNG) (CP14-120)
11. **Lake Charles, LA:** 1.08 Bcfd (Magnolia LNG) (CP14-347)
12. **Hackberry, LA:** 1.41 Bcfd (Sempra - Cameron LNG) (CP15-560)
13. **Sabine Pass, TX:** 2.1 Bcfd (ExxonMobil – Golden Pass) (CP14-517)

Canada

APPROVED – NOT UNDER CONSTRUCTION
CN1. Port Hawkesbury, NS: 0.5 Bcfd (Bear Head LNG)
CN2. Kitimat, BC: 3.23 Bcfd (LNG Canada)
CN3. Squamish, BC: 0.29 Bcfd (Woodfibre LNG Ltd)
CN4. Prince Rupert Island, BC: 2.74 Bcfd (Pacific Northwest LNG)

★ Trains 5 & 6 with Train 5 under construction

NORTH AMERICAN LNG IMPORT/EXPORT TERMINALS – *EXISTING* (24)



★ Authorized to re-export delivered LNG

Import Terminals

U.S.
A. Everett, MA: 1.035 Bcfd (GDF SUEZ - DOMAC)
B. Cove Point, MD: 1.8 Bcfd (Dominion - Cove Point LNG)
C. Elba Island, GA: 1.6 Bcfd (El Paso - Southern LNG)
D. Lake Charles, LA: 2.1 Bcfd (Southern Union - Trunkline LNG) ★
E. Offshore Boston: 0.8 Bcfd (Excelerate Energy – Northeast Gateway)
F. Freeport, TX: 1.5 Bcfd (Cheniere/Freeport LNG Dev.)★
G. Sabine, LA: 4.0 Bcfd (Cheniere/Sabine Pass LNG)★
H. Hackberry, LA: 1.8 Bcfd (Sempra - Cameron LNG)
I. Offshore Boston, MA: 0.4 Bcfd (GDF SUEZ – Neptune LNG)
J. Sabine Pass, TX: 2.0 Bcfd (ExxonMobil – Golden Pass) (Phase I & II)
K. Pascagoula, MS: 1.5 Bcfd (El Paso/Crest/Sonangol - Gulf LNG Energy LLC)
L. Peñuelas, PR: 0.3 Bcfd (EcoElectrica)

Canada
M. Saint John, NB: 1.0 Bcfd (Repsol/Fort Reliance - Canaport LNG)

Mexico
N. Altamira, Tamulipas: 0.7 Bcfd (Shell/Total/Mitsui – Altamira LNG)
O. Baja California, MX: 1.0 Bcfd (Sempra – Energia Costa Azul)
P. Manzanillo, MX: 0.5 Bcfd (KMS GNL de Manzanillo)

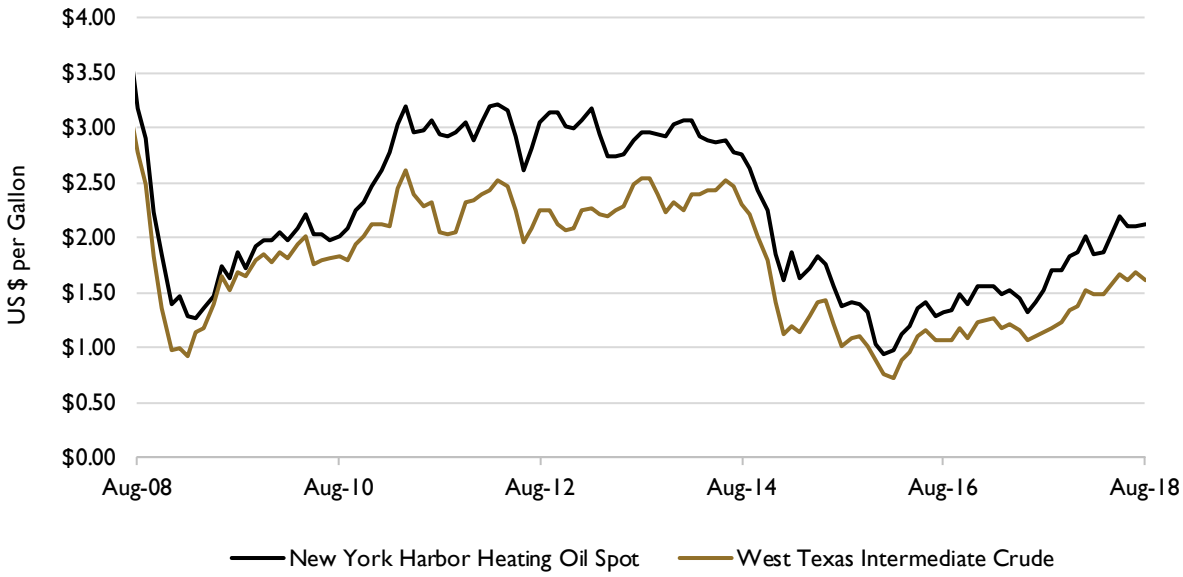
Export Terminals

U.S.
B. Cove Point, MD: 0.82 Bcfd (Dominion–Cove Point LNG) (CP13-113)
G. Sabine, LA: 2.8 Bcfd (Cheniere/Sabine Pass LNG – Trains 1, 2, 3 & 4)
Q. Kenai, AK: 0.2 Bcfd (ConocoPhillips)

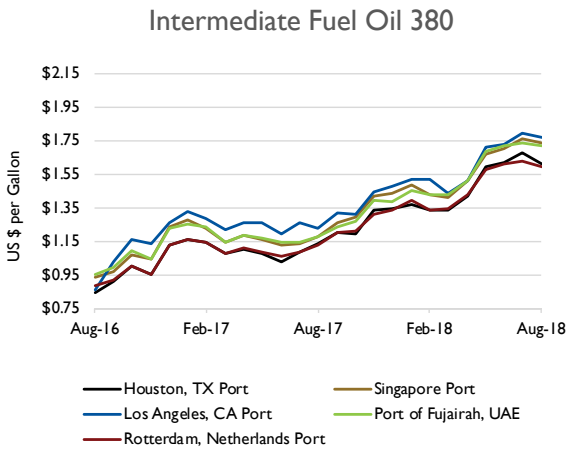
DATA CENTER

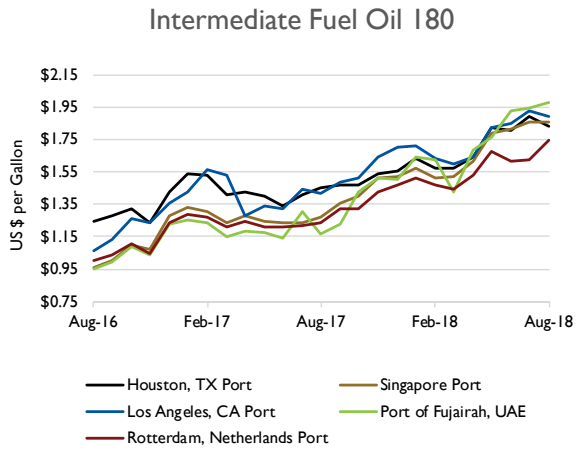
PROPANE AND HEATING/FUEL OIL

HEATING OIL PRICES (MONTHLY AVERAGE) (25)



INTERMEDIATE FUEL OIL AKA "BUNKER FUEL" PRICES (MONTHLY AVERAGE) (26)

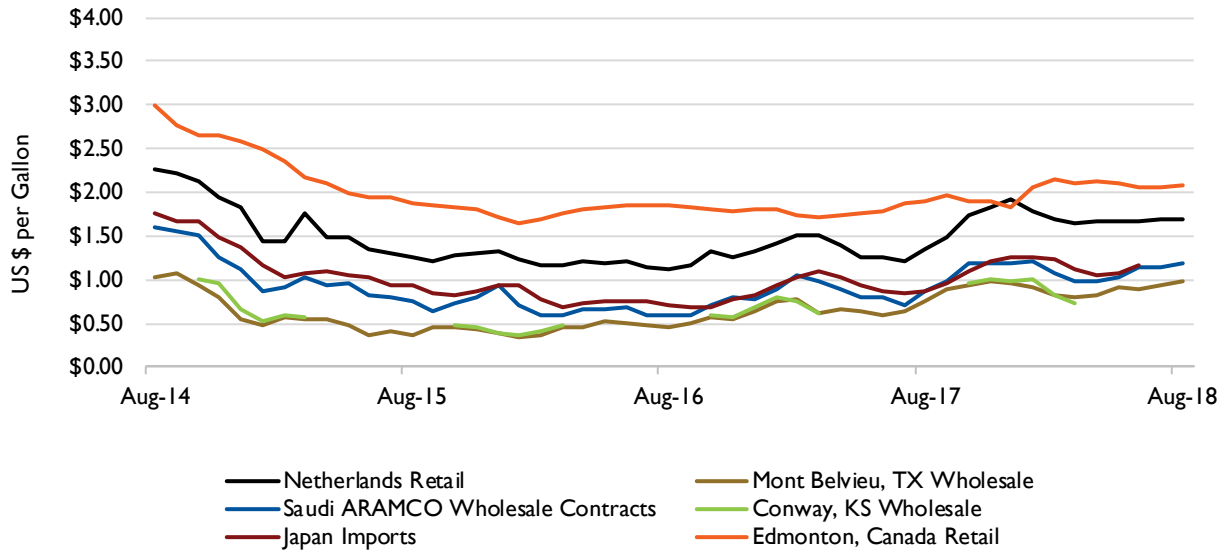




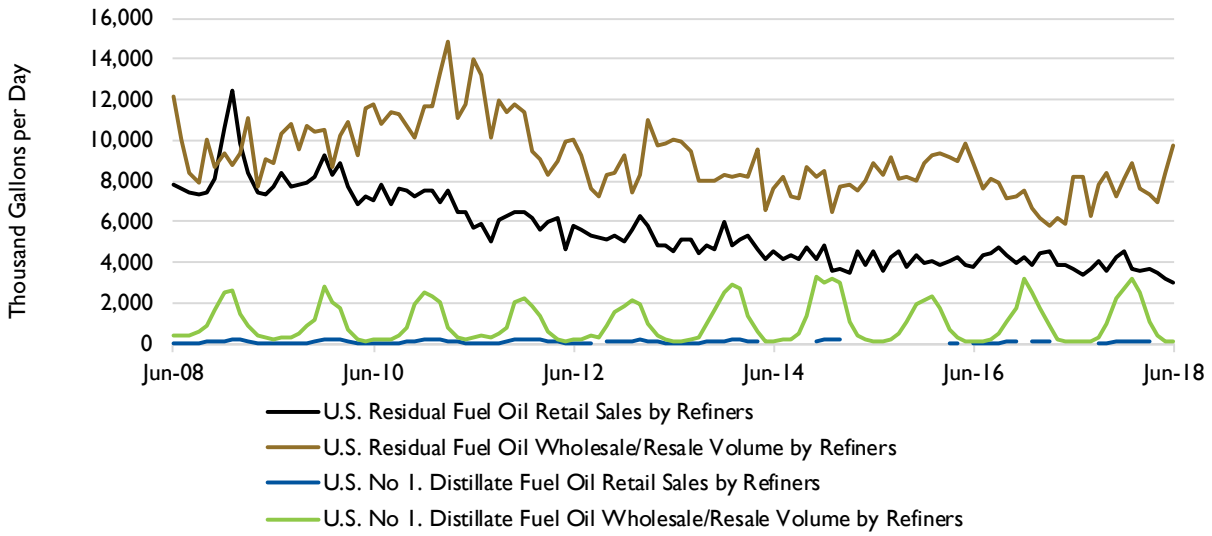
DATA CENTER

PROPANE AND HEATING/FUEL OIL

PROPANE PRICES (MONTHLY AVERAGE) (27)



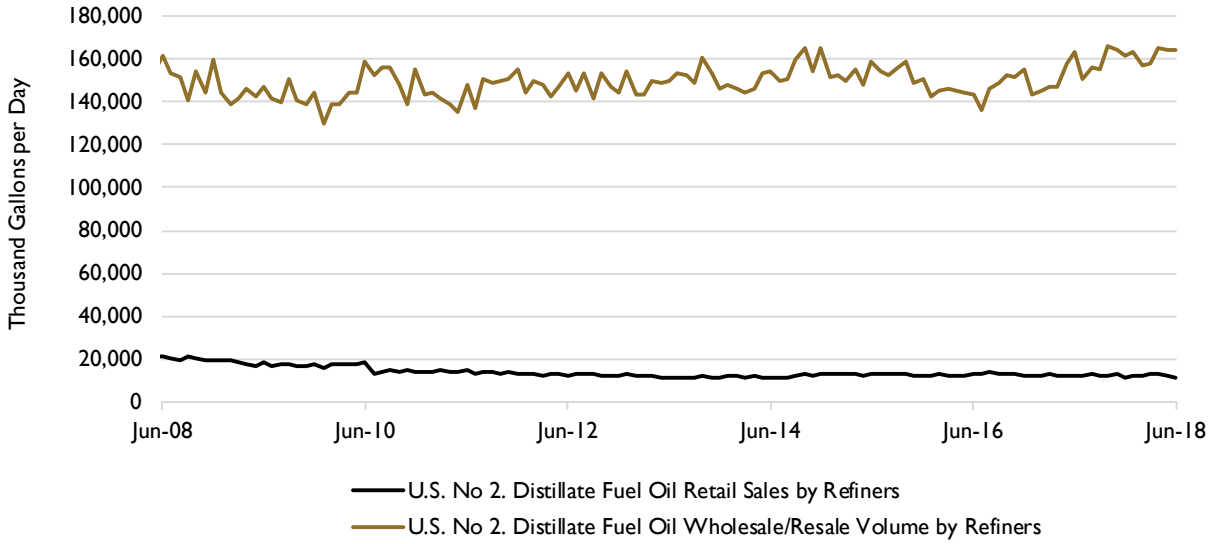
NO. 1 DISTILLATE FUEL OIL, RESIDUAL FUEL OIL WHOLESALE, RETAIL SALES VOLUME BY REFINERS (MONTHLY) (28)



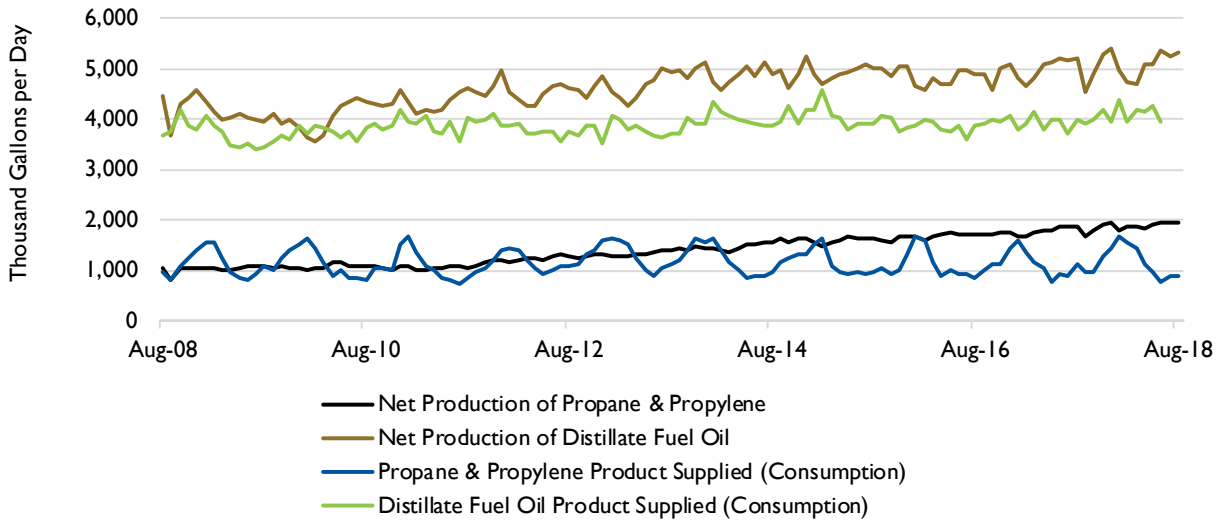
DATA CENTER

PROPANE AND HEATING/FUEL OIL

No. 2 Distillate Fuel Oil Wholesale, Retail Sales Volume by Refiners (Monthly) (29)



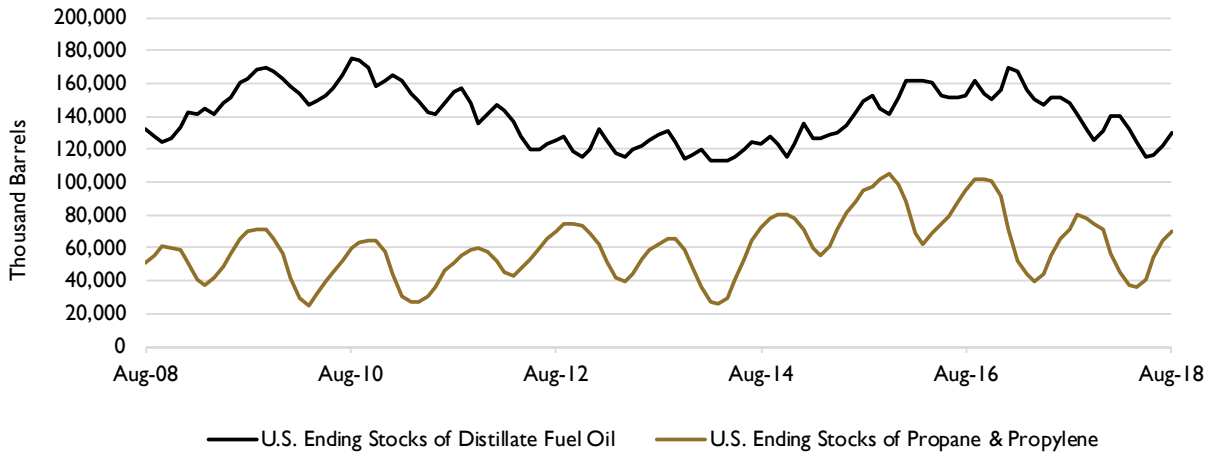
Propane & Propylene and Distillate Fuel Oil Production and Consumption (Monthly) (30)



DATA CENTER

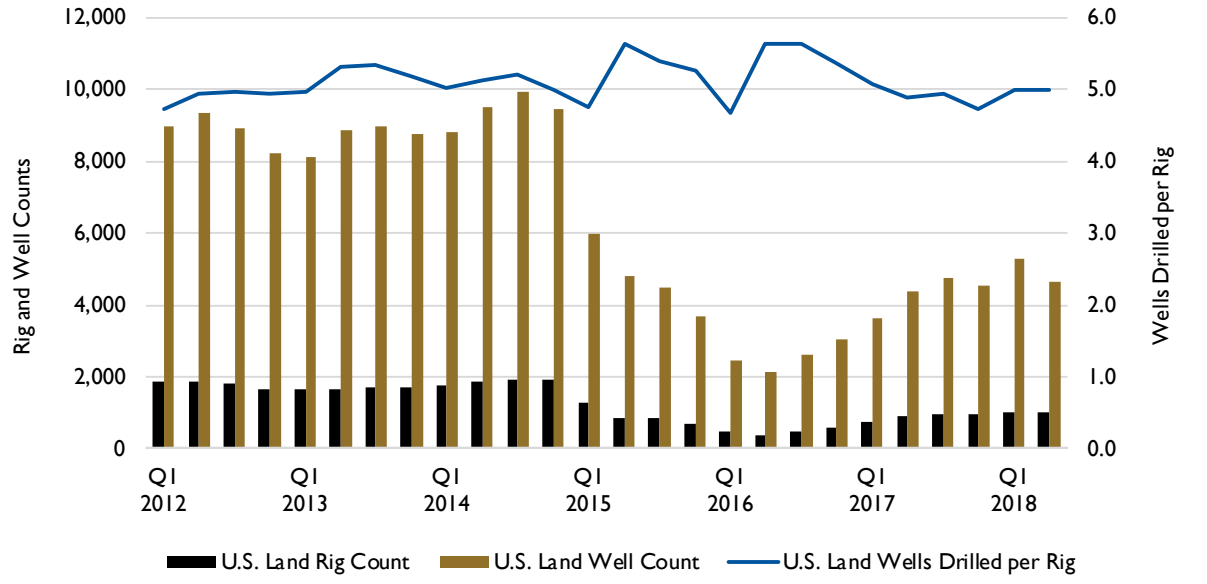
PROPANE AND HEATING/FUEL OIL

U.S. Ending Stocks of Propane & Propylene and Distillate Fuel Oil (Monthly Average) (31)



DRILLING ACTIVITY

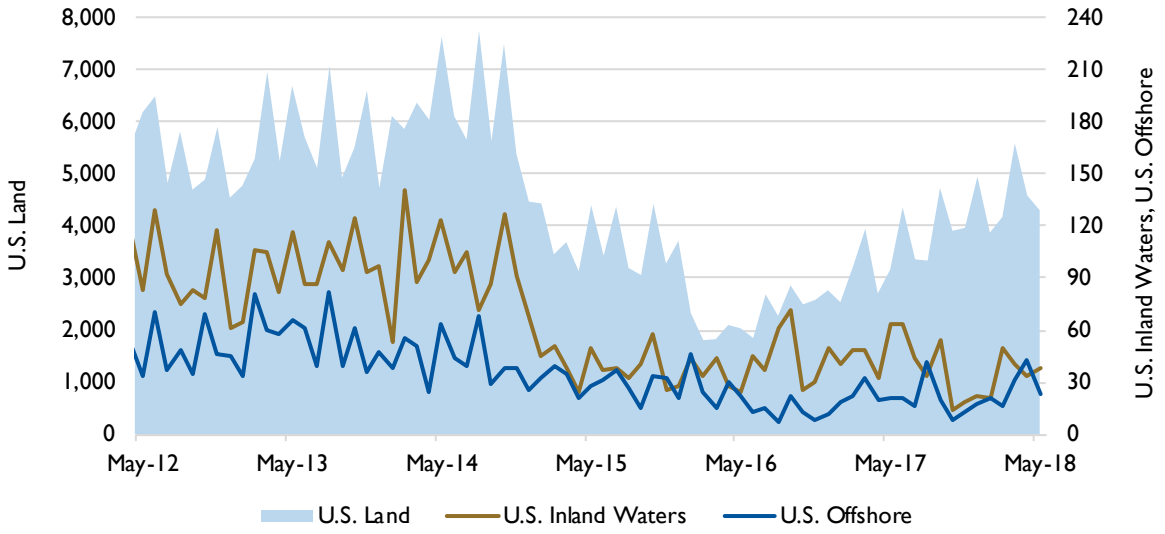
U.S. Land Well Count, Rig Count and Wells per Rig (Quarterly) (32)



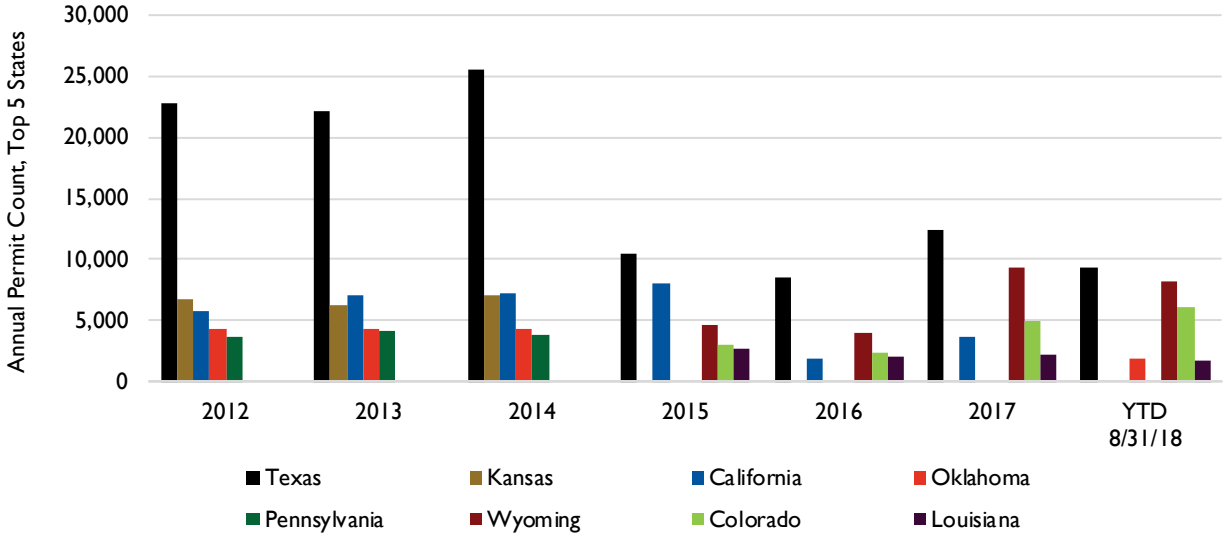
DATA CENTER

DRILLING ACTIVITY

U.S. DRILLING PERMITS (MONTHLY) (33)



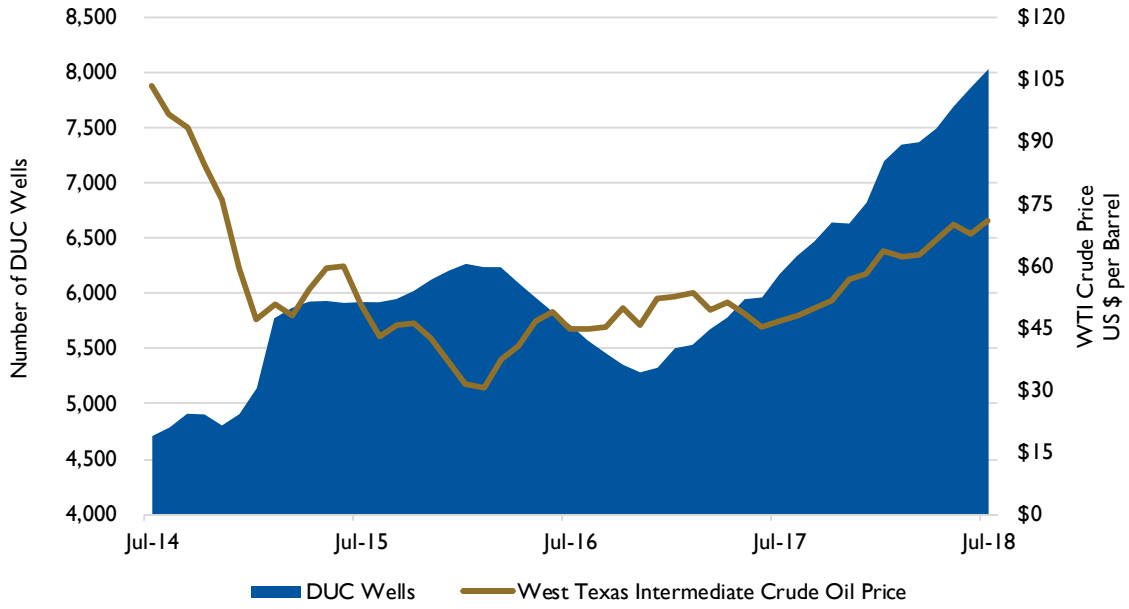
U.S. DRILLING PERMITS, TOP 5 STATES (ANNUAL) (34)



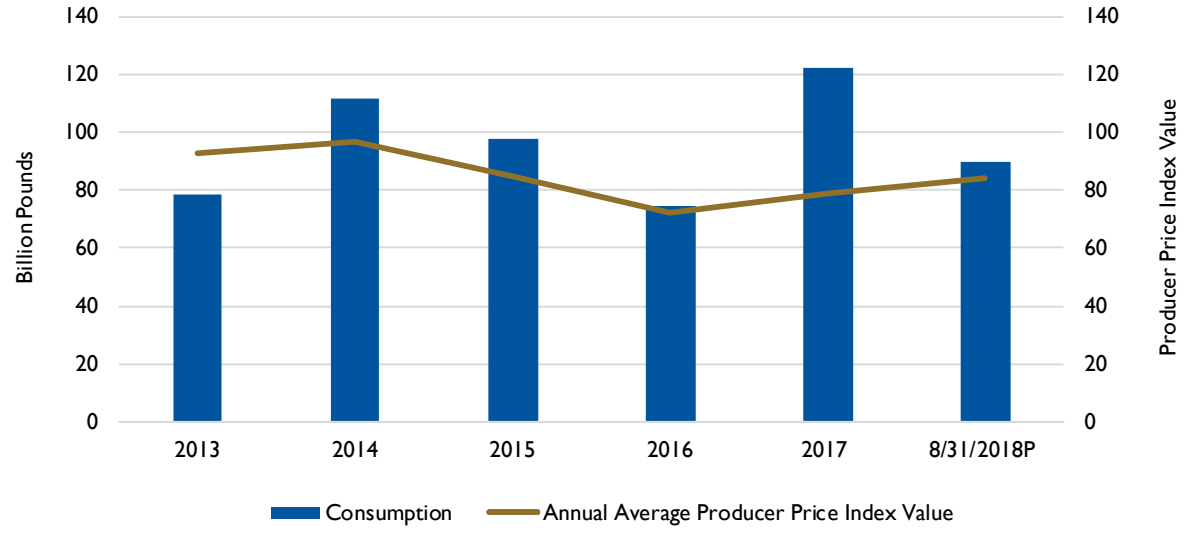
DATA CENTER

DRILLING ACTIVITY

DRILLED BUT UNCOMPLETED (DUC) WELLS VS. CRUDE OIL PRICE (MONTHLY) (35)



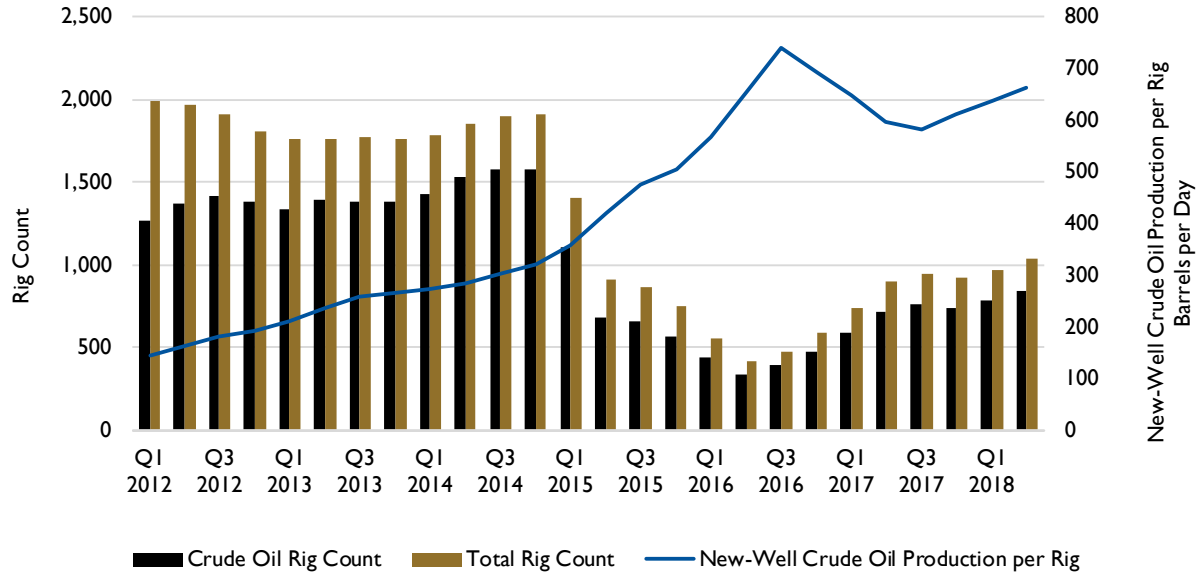
HYDRAULIC FRACTURING SAND CONSUMPTION AND PRODUCER PRICE INDEX (ANNUAL) (36)



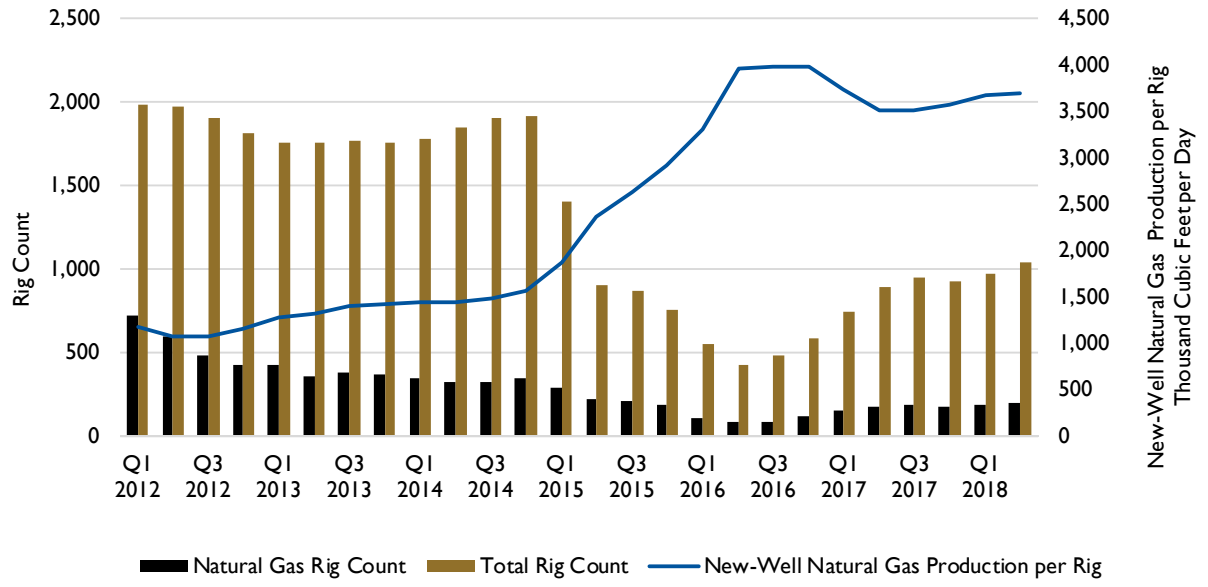
DATA CENTER

DRILLING ACTIVITY

CRUDE OIL PRODUCTION, RIG COUNT AND PRODUCTION PER RIG (QUARTERLY) (37)



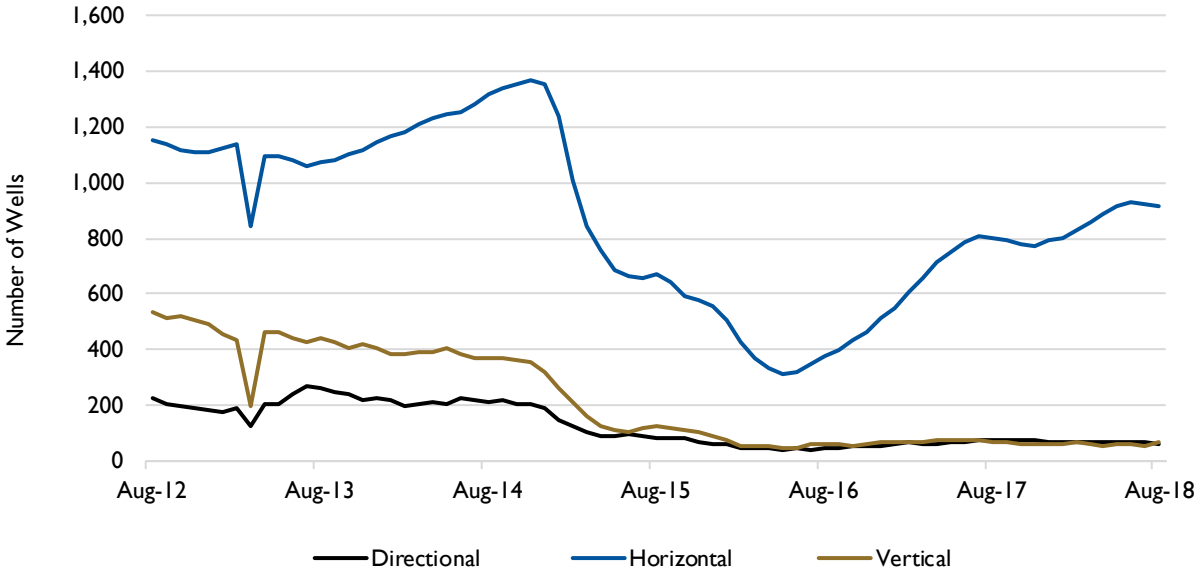
NATURAL GAS PRODUCTION, RIG COUNT AND PRODUCTION PER RIG (QUARTERLY) (38)



DATA CENTER

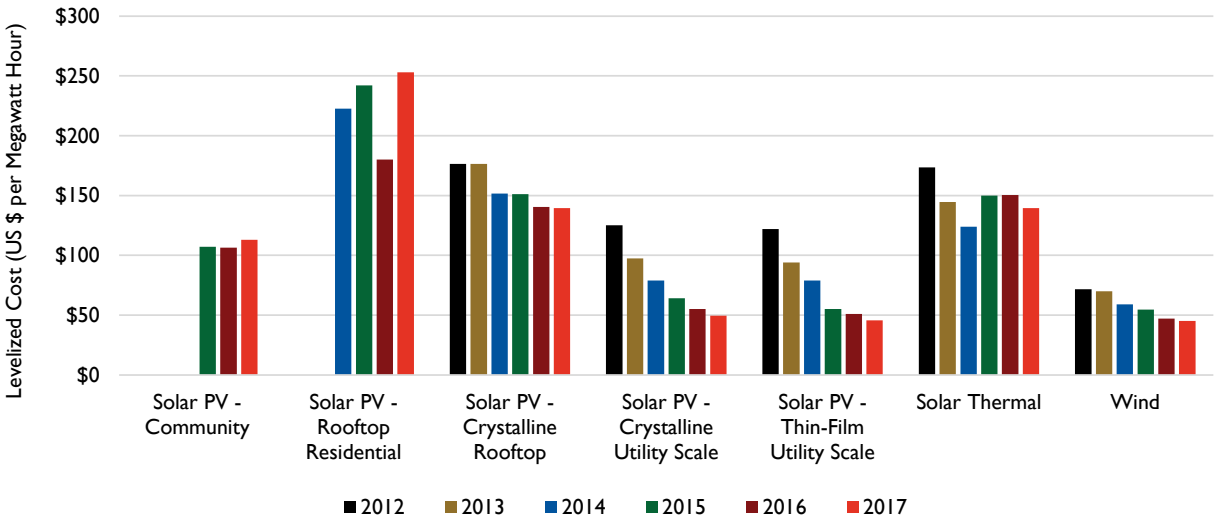
DRILLING ACTIVITY

U.S. DRILLING RIGS BY TYPE (MONTHLY) (39)



RENEWABLES

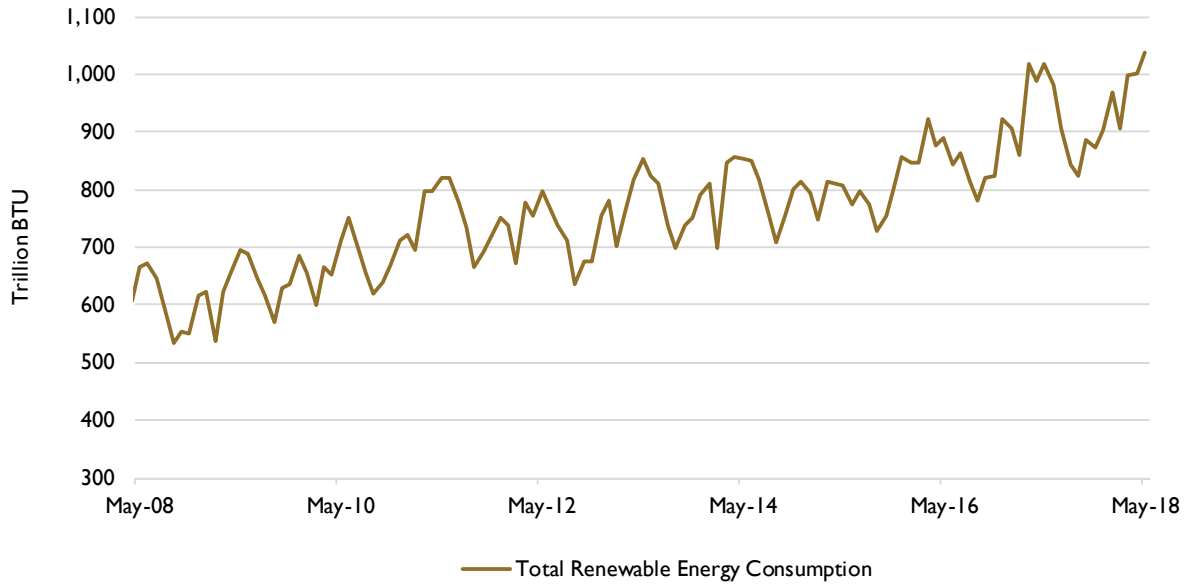
WIND AND SOLAR PRICES (ANNUAL AVERAGE) (40)



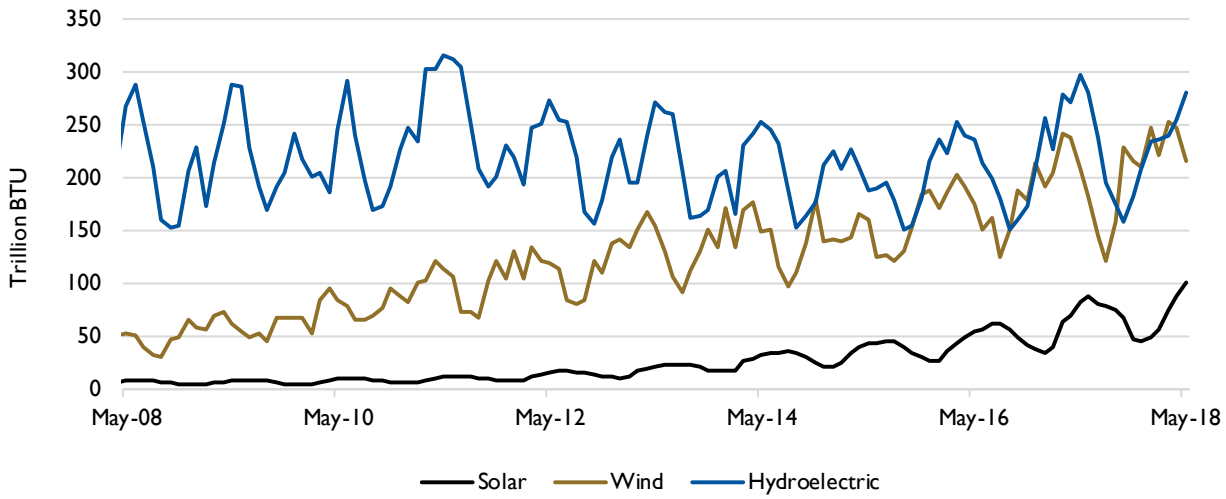
DATA CENTER

RENEWABLES

U.S. TOTAL RENEWABLE ENERGY CONSUMPTION (MONTHLY) (41)



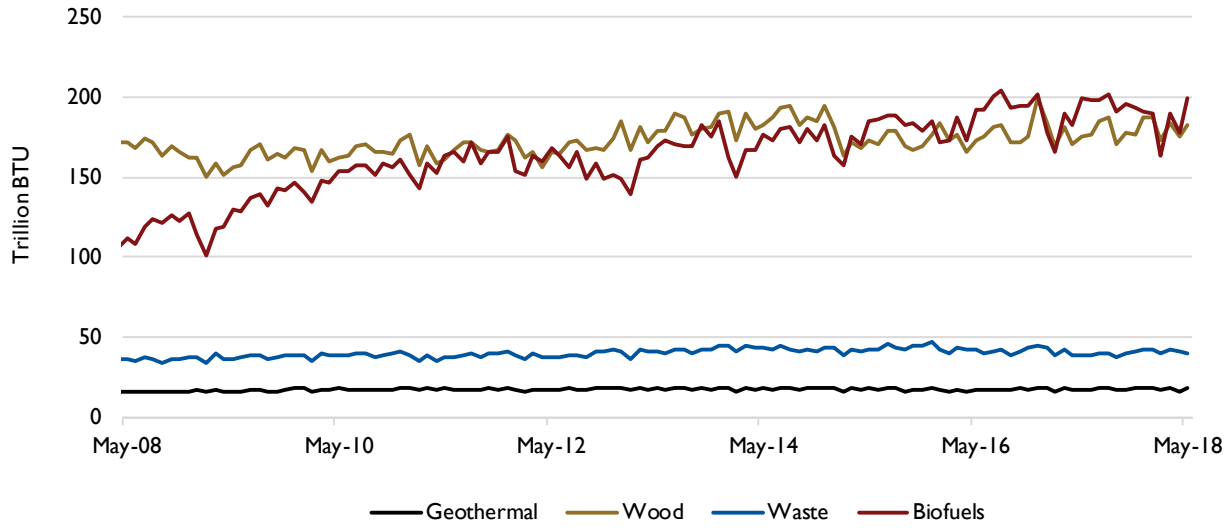
U.S. SOLAR, WIND AND HYRDOELECTRIC ENERGY CONSUMPTION (MONTHLY) (42)



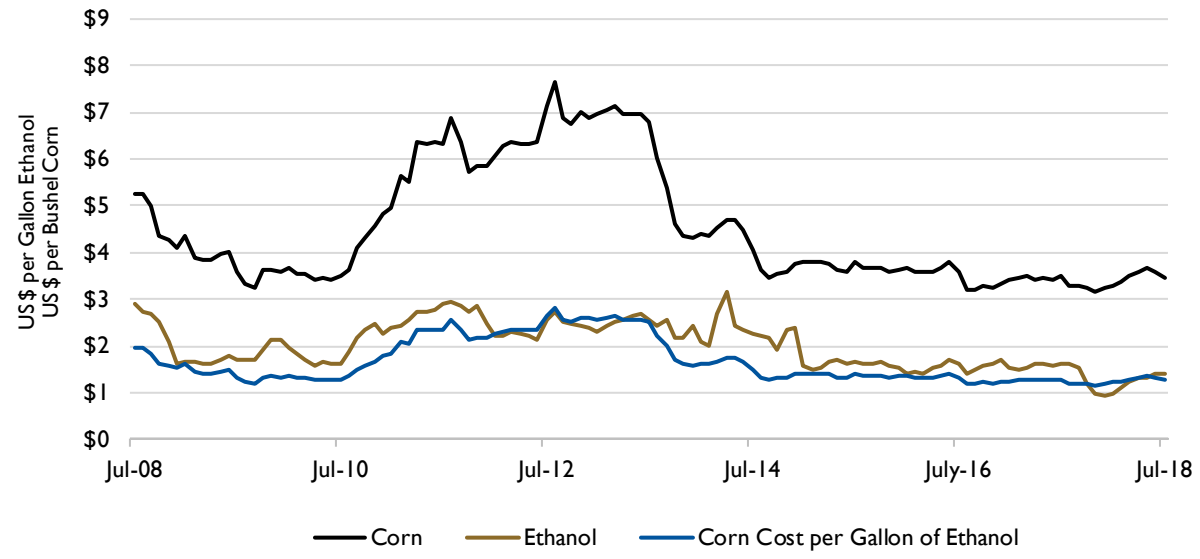
DATA CENTER

RENEWABLES

U.S. Wood, Waste, Biofuels and Geothermal Energy Consumption (Monthly) (43)



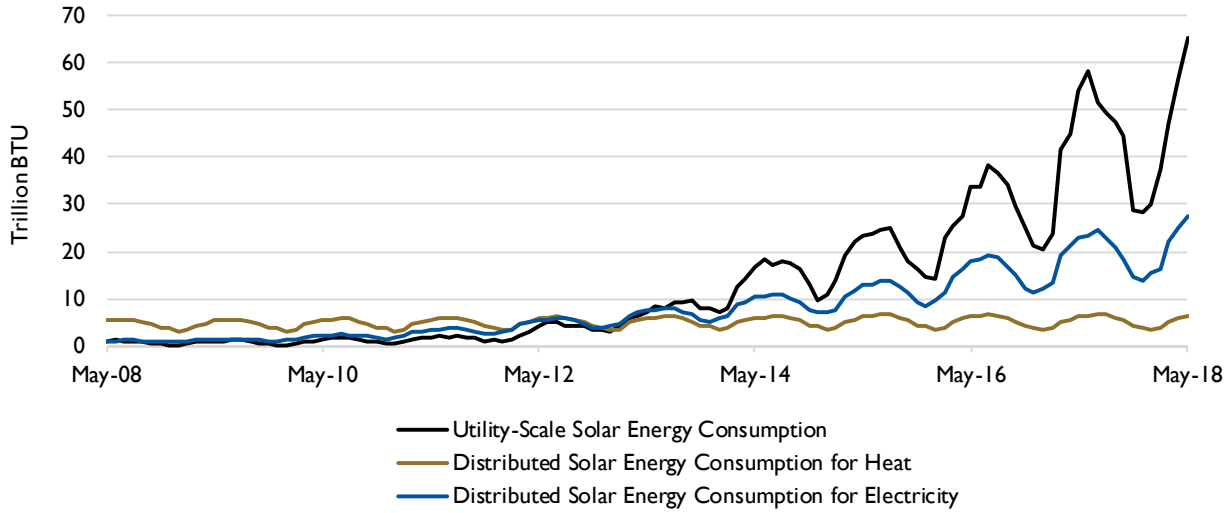
Corn and Ethanol Prices and Corn Cost per Gallon of Ethanol (Monthly Average) (44)



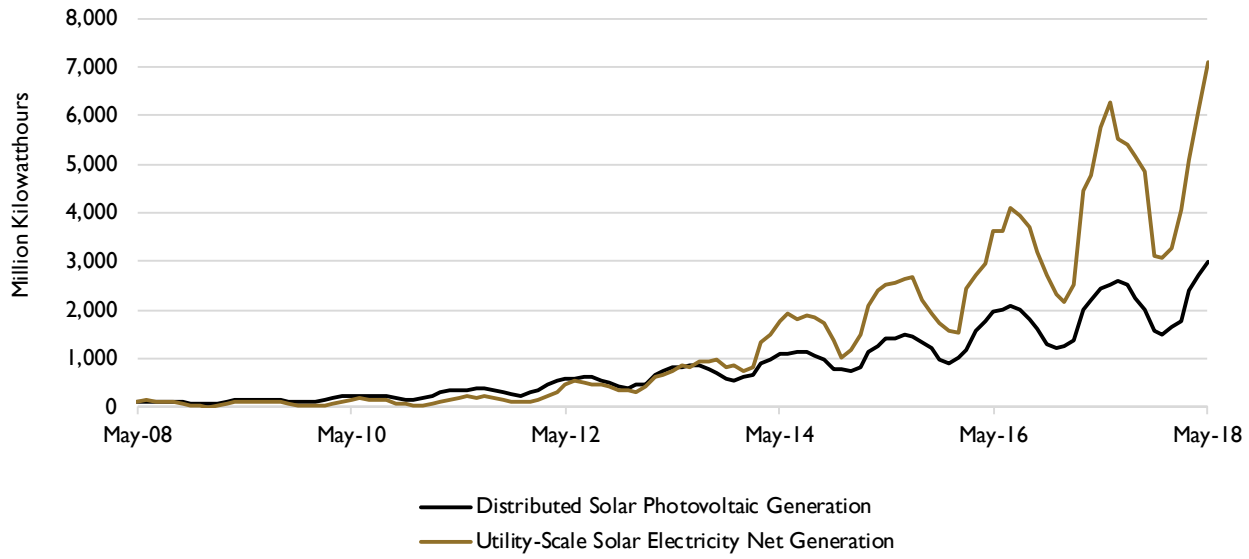
DATA CENTER

RENEWABLES

U.S. Solar Energy Consumption (Monthly) (45)



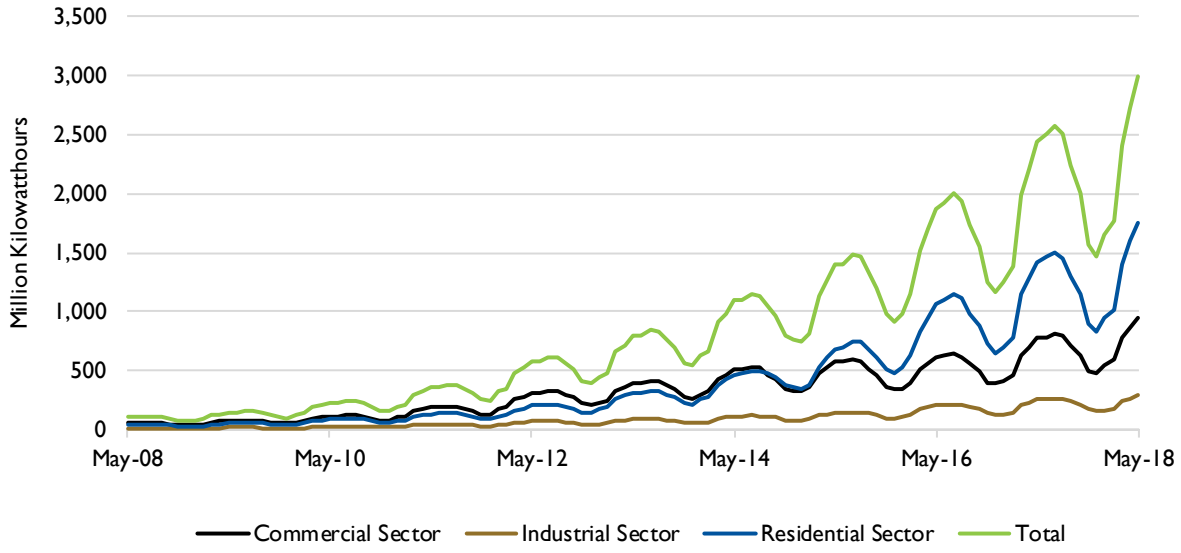
U.S. Solar Energy Net Generation (Monthly) (46)



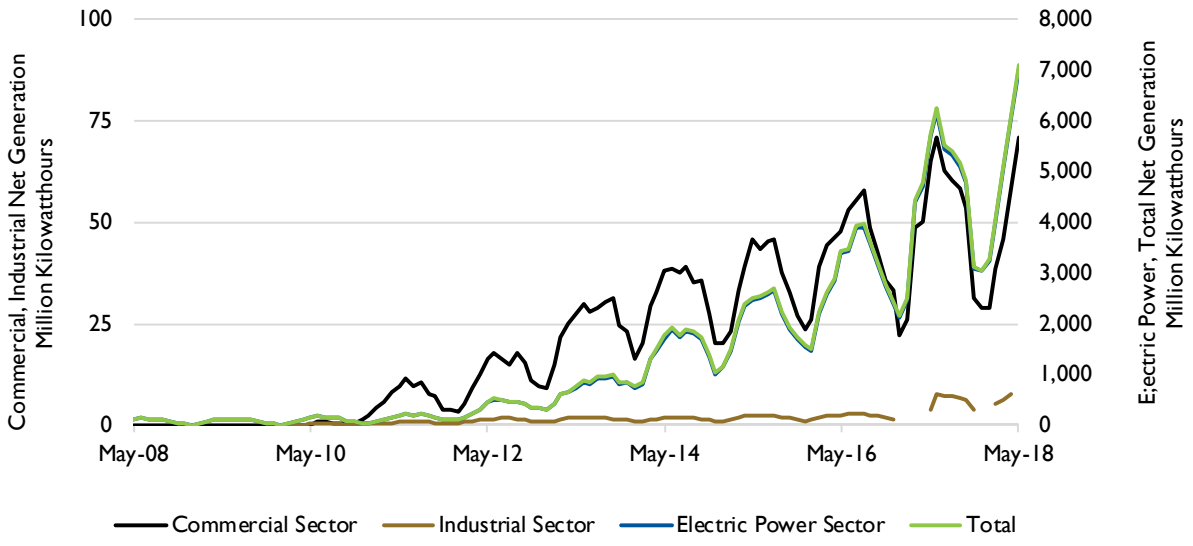
DATA CENTER

RENEWABLES

DISTRIBUTED SOLAR PHOTOVOLTAIC GENERATION BY SECTOR (MONTHLY) (47)



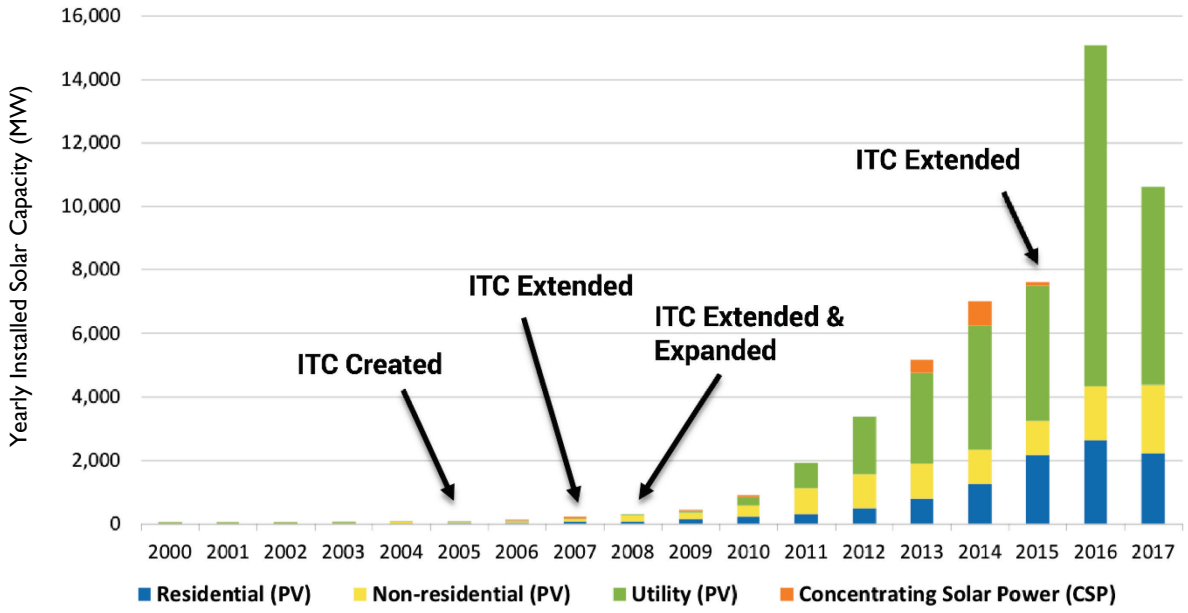
UTILITY-SCALE SOLAR ELECTRICITY NET GENERATION BY SECTOR (MONTHLY) (48)



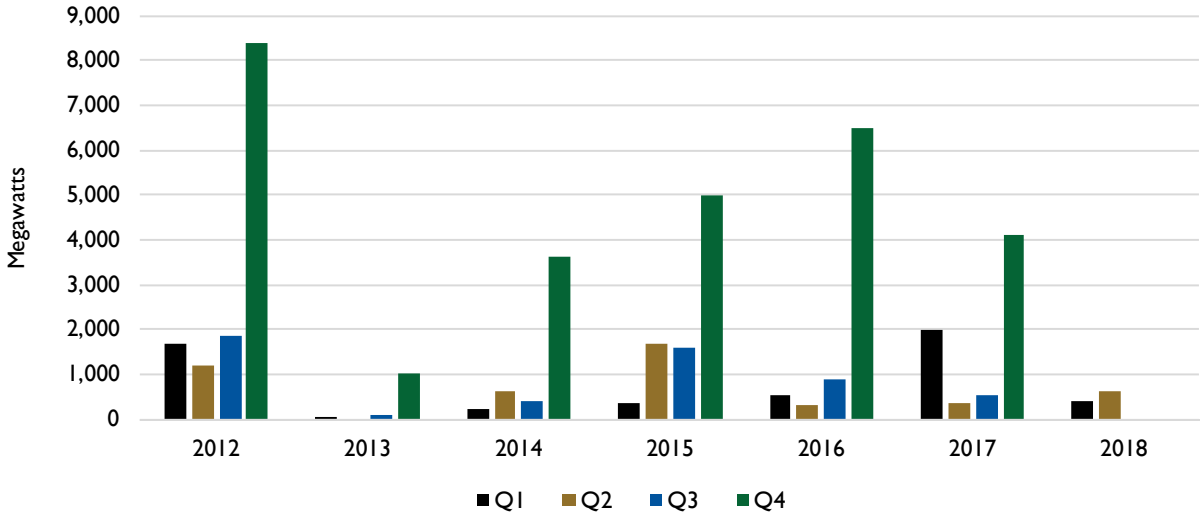
DATA CENTER

RENEWABLES

U.S. Solar Capacity Installations (Annual) (49)



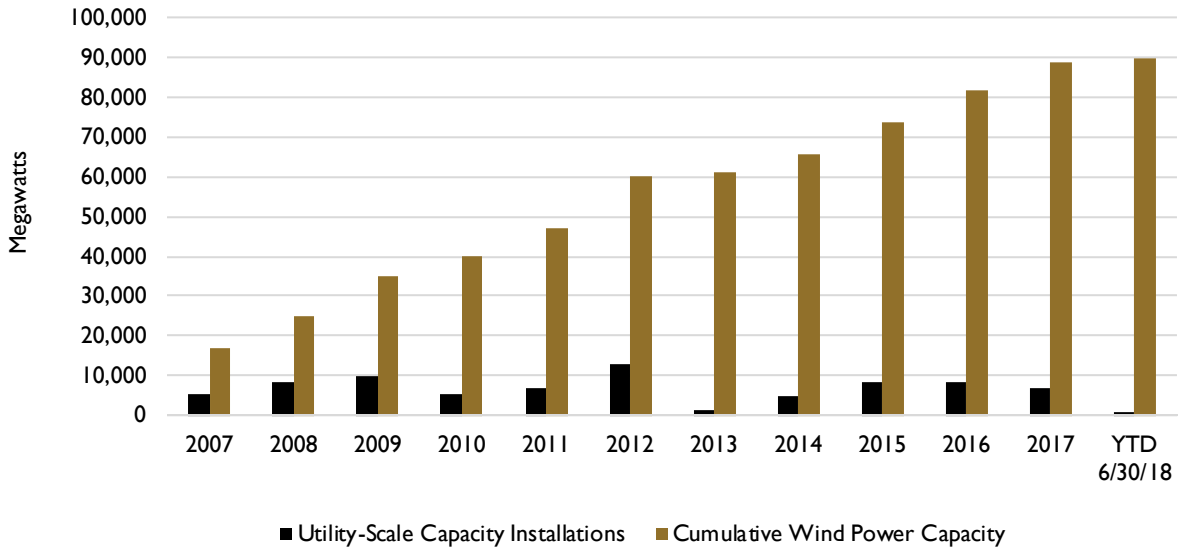
U.S. Wind Power Capacity Installations (Quarterly) (50)



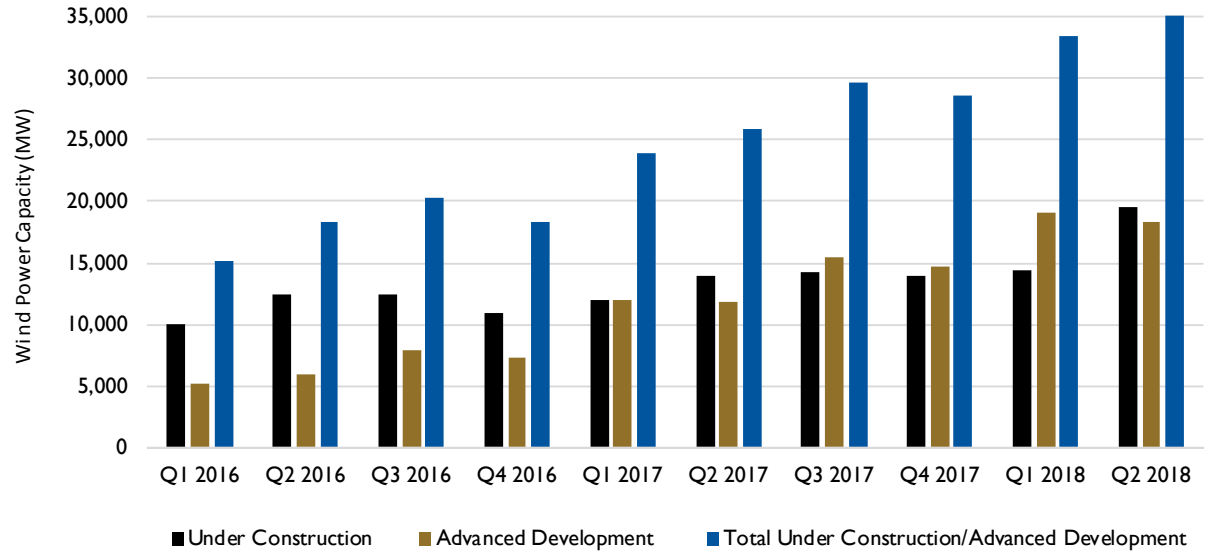
DATA CENTER

RENEWABLES

UTILITY-SCALE WIND POWER CAPACITY INSTALLATIONS (ANNUAL) (51)



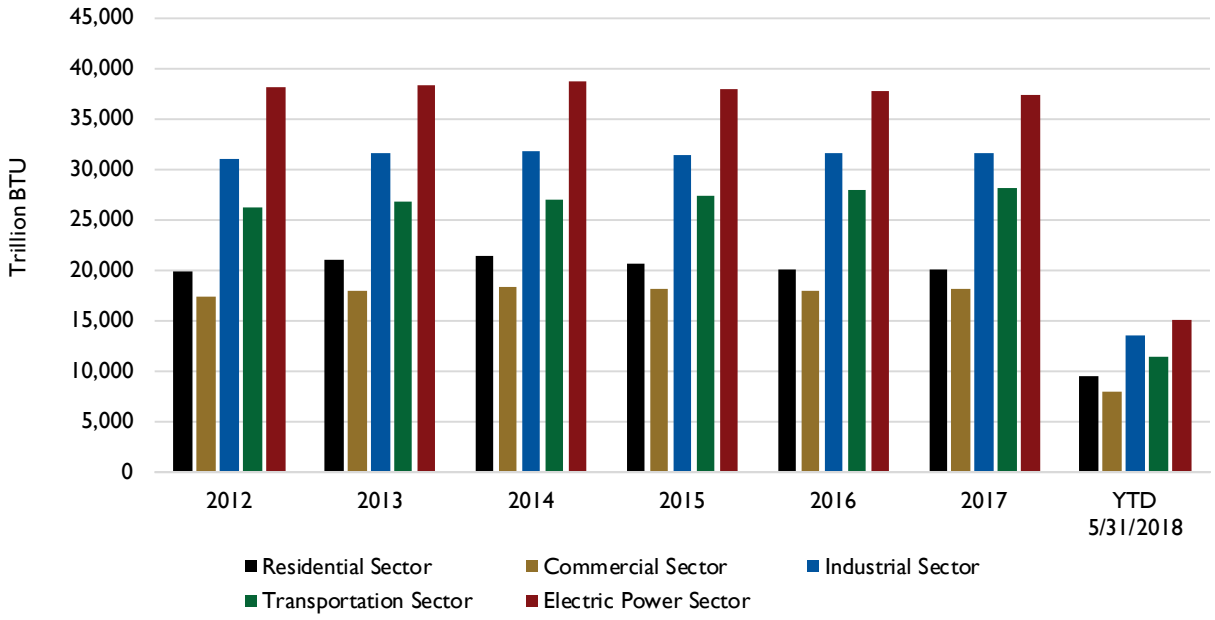
WIND POWER UNDER CONSTRUCTION OR IN ADVANCED DEVELOPMENT (QUARTERLY) (52)



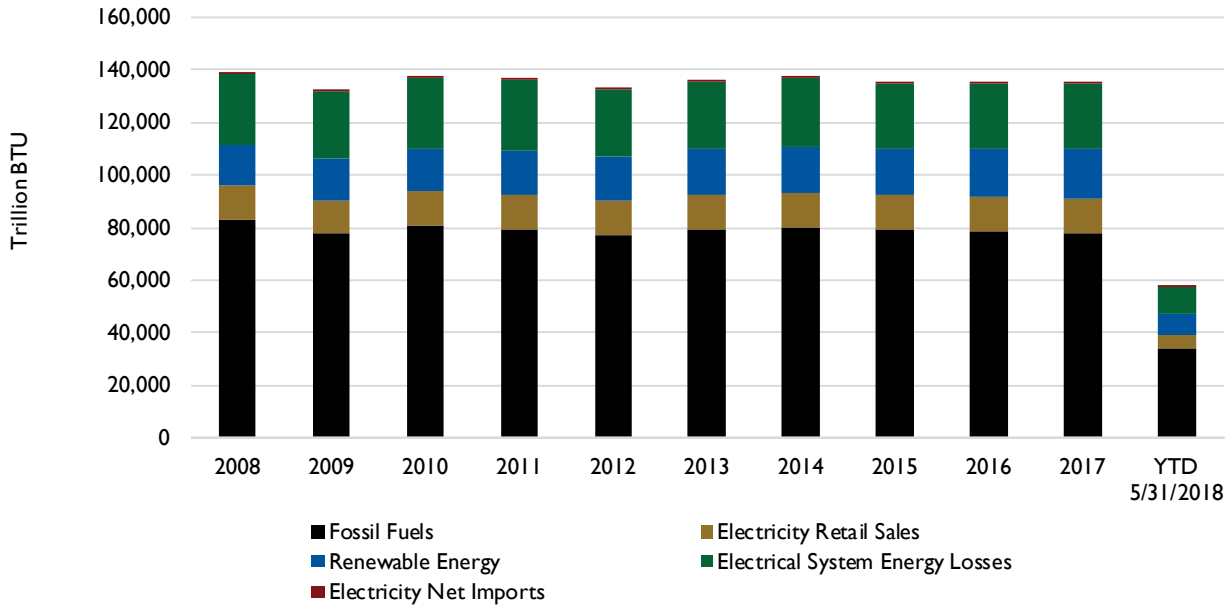
DATA CENTER

U.S. AGGREGATED ENERGY CONSUMPTION

ENERGY CONSUMPTION BY SECTOR (ANNUAL) (53)



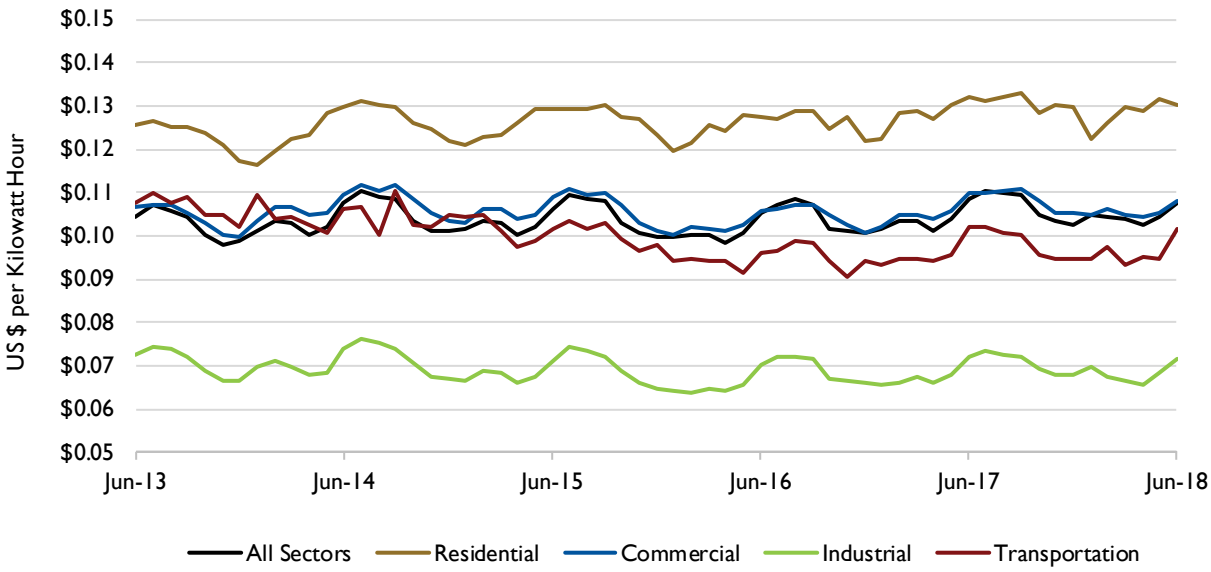
ENERGY CONSUMPTION BY SOURCE (ANNUAL) (54)



DATA CENTER

U.S. AGGREGATED ENERGY CONSUMPTION

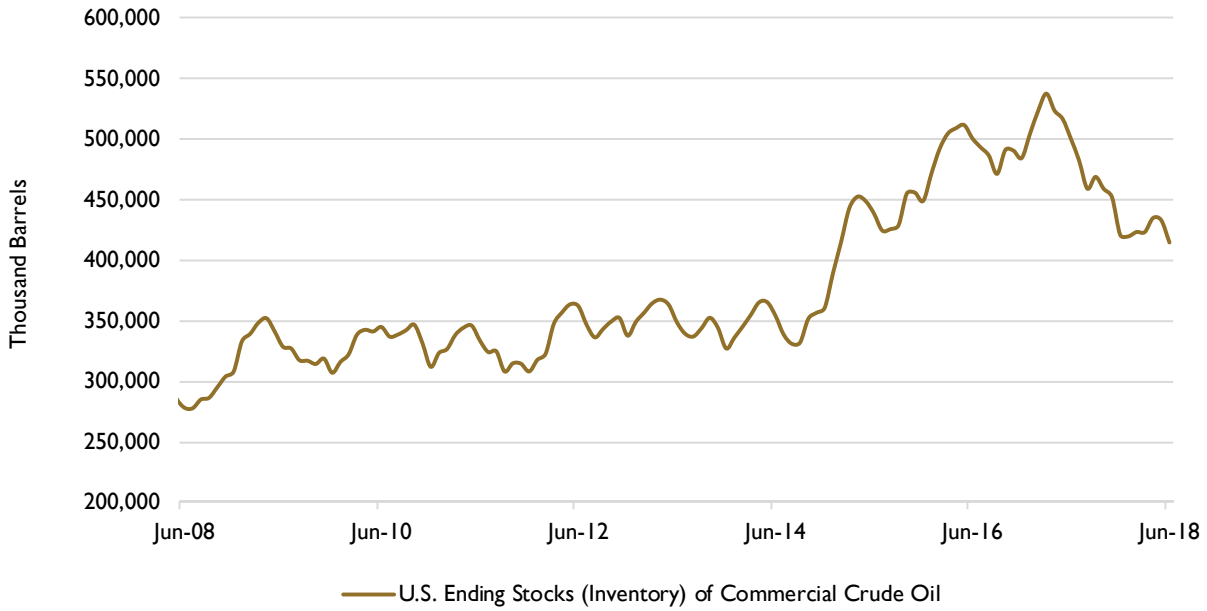
ELECTRICITY PRICES BY SECTOR (MONTHLY AVERAGE) (55)



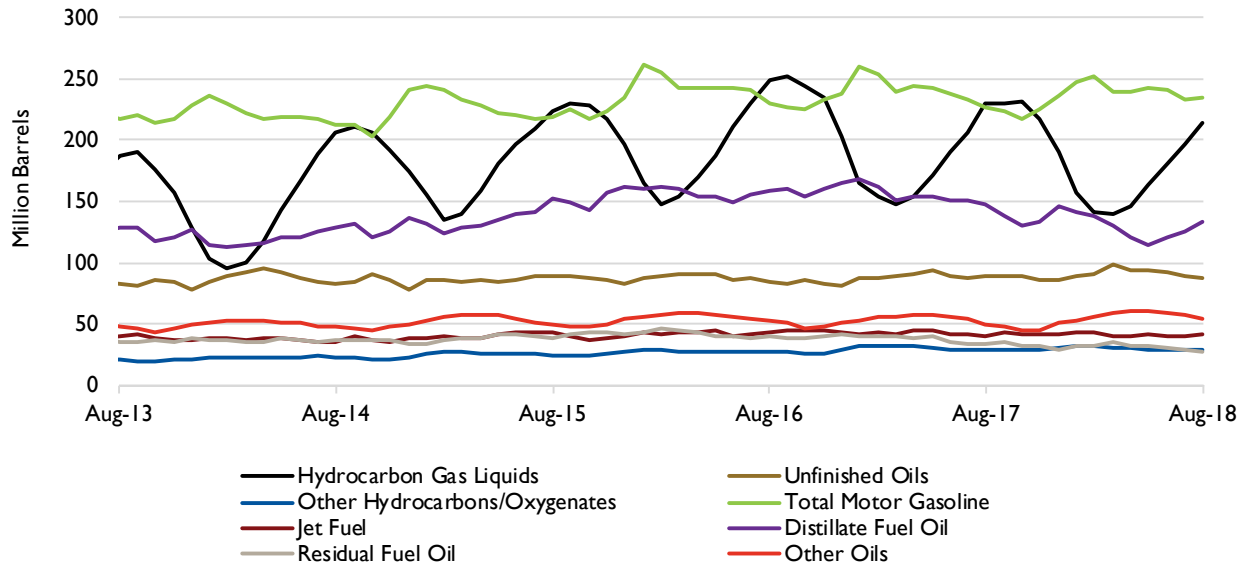
DATA CENTER

LOGISTICS - STORAGE AND TERMINALS

COMMERCIAL CRUDE OIL INVENTORY (MONTHLY) (56)



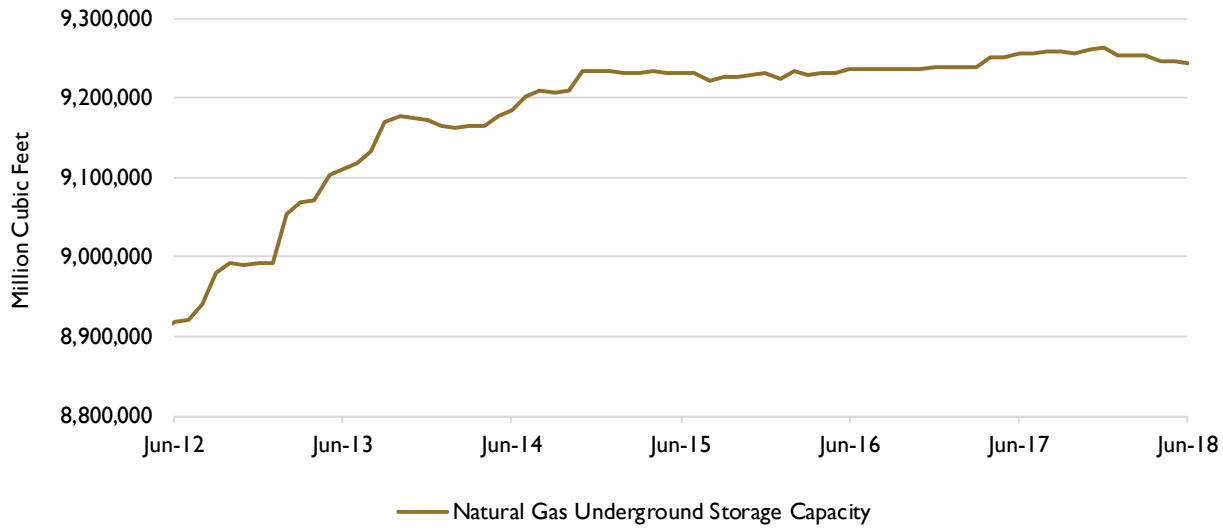
PETROLEUM AND OTHER LIQUIDS COMMERCIAL INVENTORY (MONTHLY) (57)



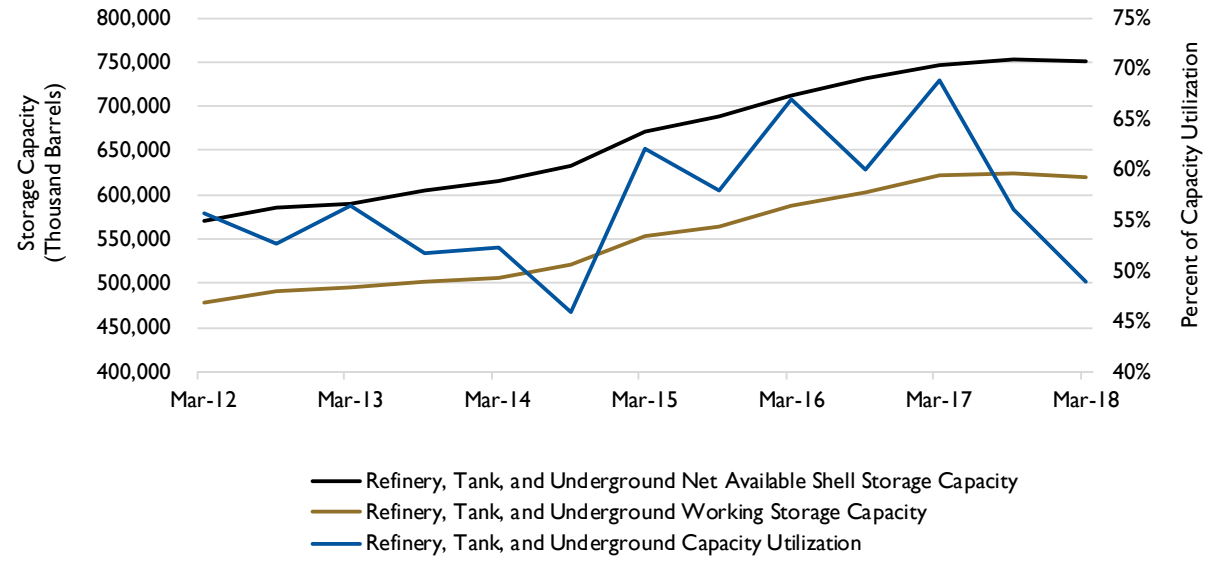
DATA CENTER

LOGISTICS - STORAGE AND TERMINALS

NATURAL GAS UNDERGROUND STORAGE CAPACITY (MONTHLY) (58)



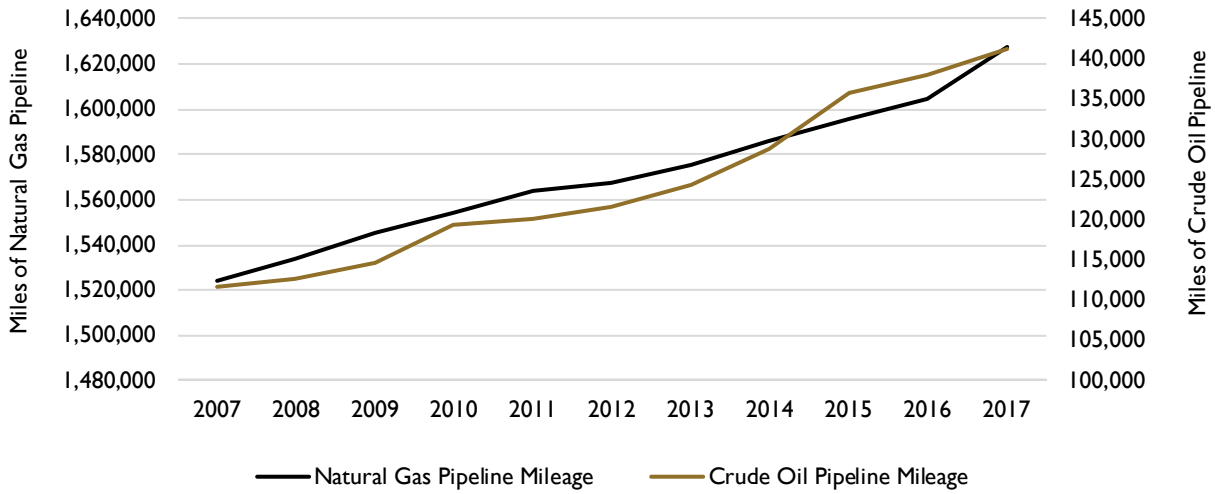
COMMERCIAL CRUDE OIL REFINERY, TANK AND UNDERGROUND STORAGE CAPACITY AND UTILIZATION (MONTHLY) (59)



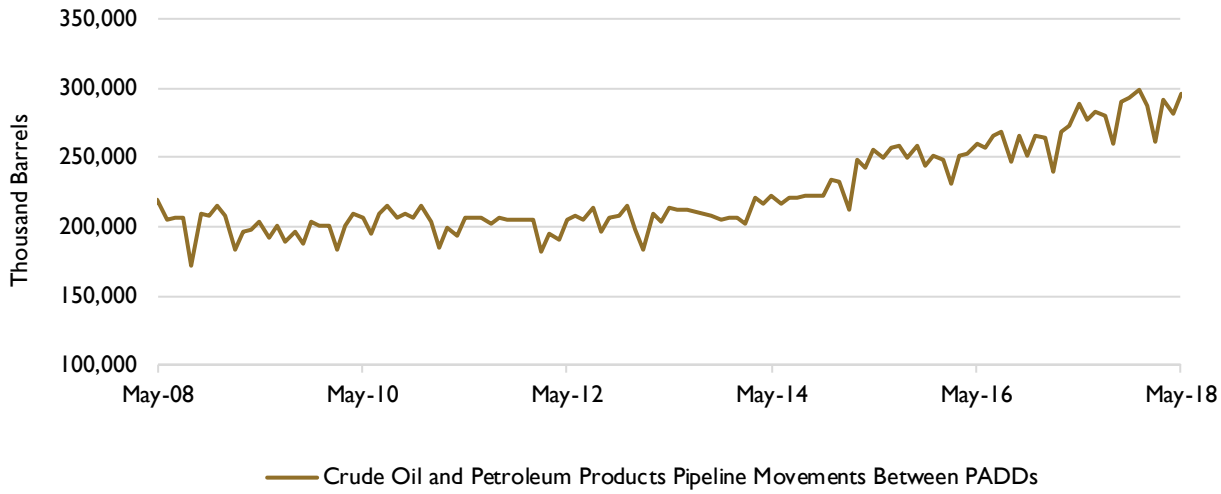
DATA CENTER

LOGISTICS - PIPELINES

CRUDE OIL AND NATURAL GAS PIPELINE MILEAGE (ANNUAL) (60)



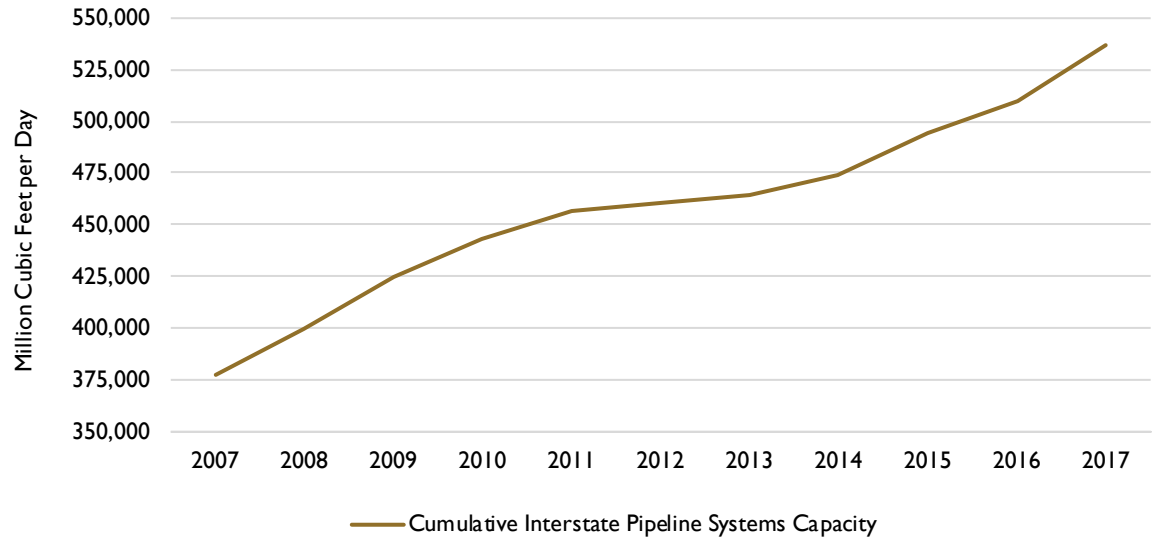
CRUDE OIL AND PETROLEUM PRODUCTS PIPELINE MOVEMENTS BETWEEN PETROLEUM ADMINISTRATION FOR DEFENSE DISTRICTS (PADDS) (MONTHLY) (61)



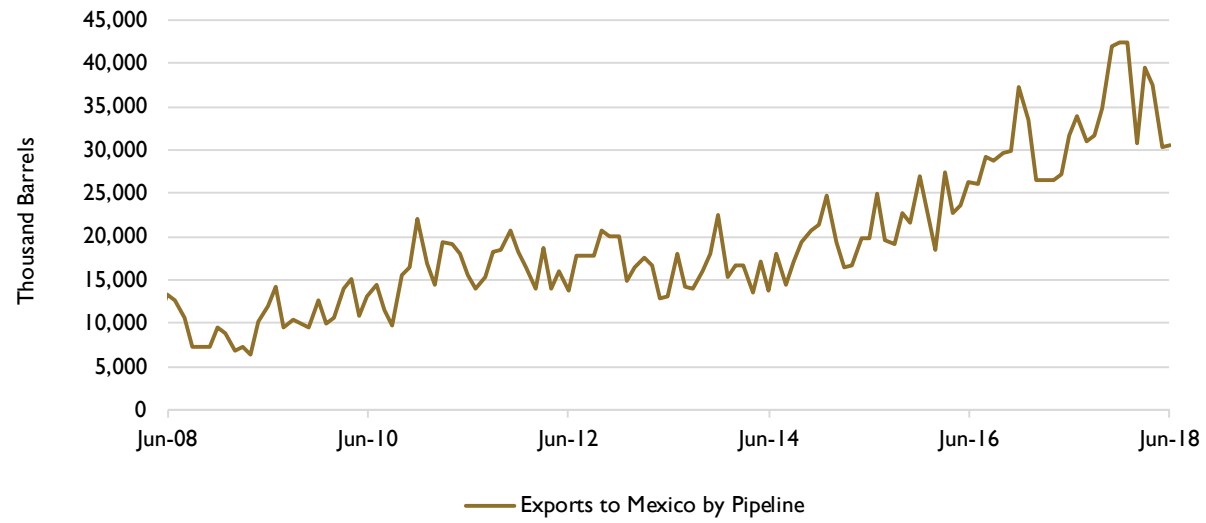
DATA CENTER

LOGISTICS - PIPELINES

NATURAL GAS CUMULATIVE INTERSTATE PIPELINE SYSTEMS CAPACITY (ANNUAL) (62)



CRUDE OIL AND PETROLEUM PRODUCTS EXPORTS TO MEXICO (MONTHLY) (63)

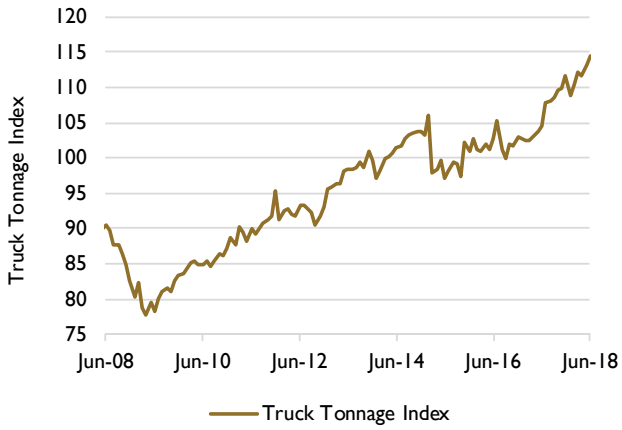


DATA CENTER

LOGISTICS - TRUCKERS

TRUCK TONNAGE INDEX (MONTHLY) (64)

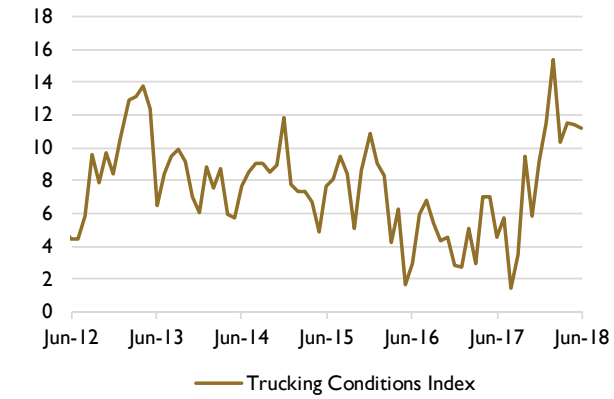
MEASURES GROSS TONNAGE OF FREIGHT



HEAVY TRUCK SALES (MONTHLY) (65)

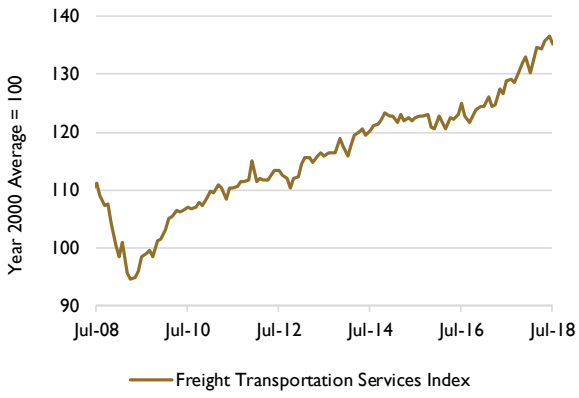
TRUCKING CONDITIONS INDEX (MONTHLY) (66)

INCLUDES FRIGHT VOLUMES, RATES, FLEET CAPACITY, BANKRUPTCIES, FUEL PRICE AND FINANCING



FREIGHT TRANSPORTATION SERVICES INDEX (MONTHLY) (67)

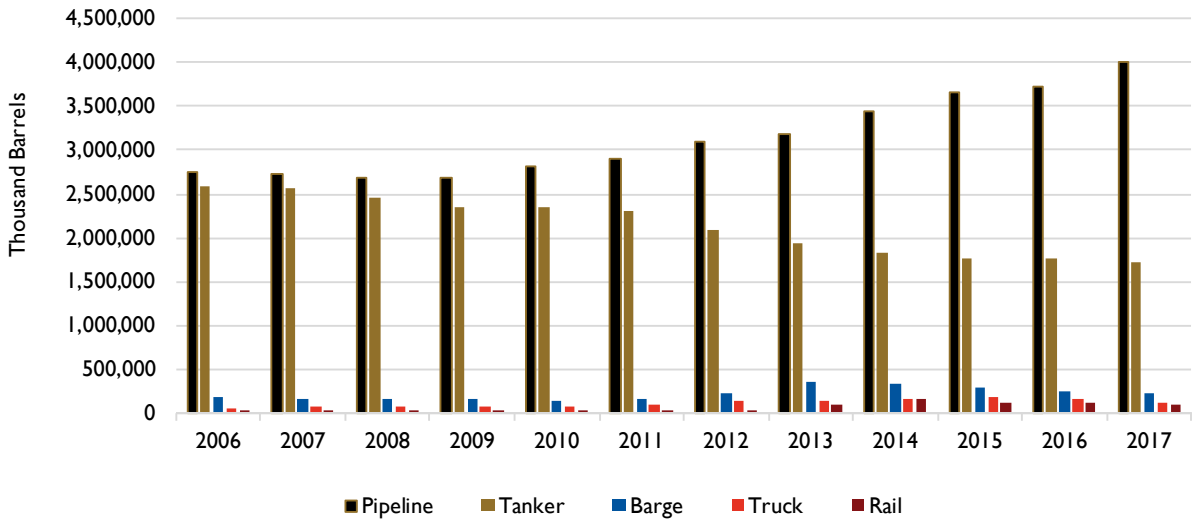
INCLUDES TRUCKING, RAIL, WATERWAYS, PIPELINES AND AIR FRIGHT



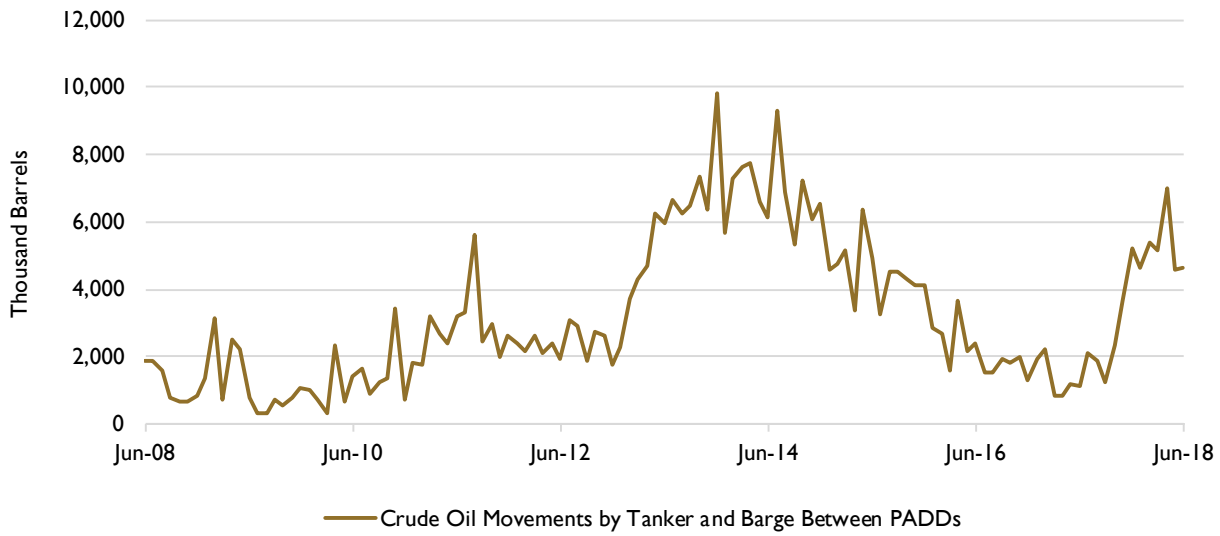
DATA CENTER

LOGISTICS - SHIPPING

CRUDE OIL REFINERY RECEIPTS BY TRANSPORTATION METHOD (ANNUAL) (68)



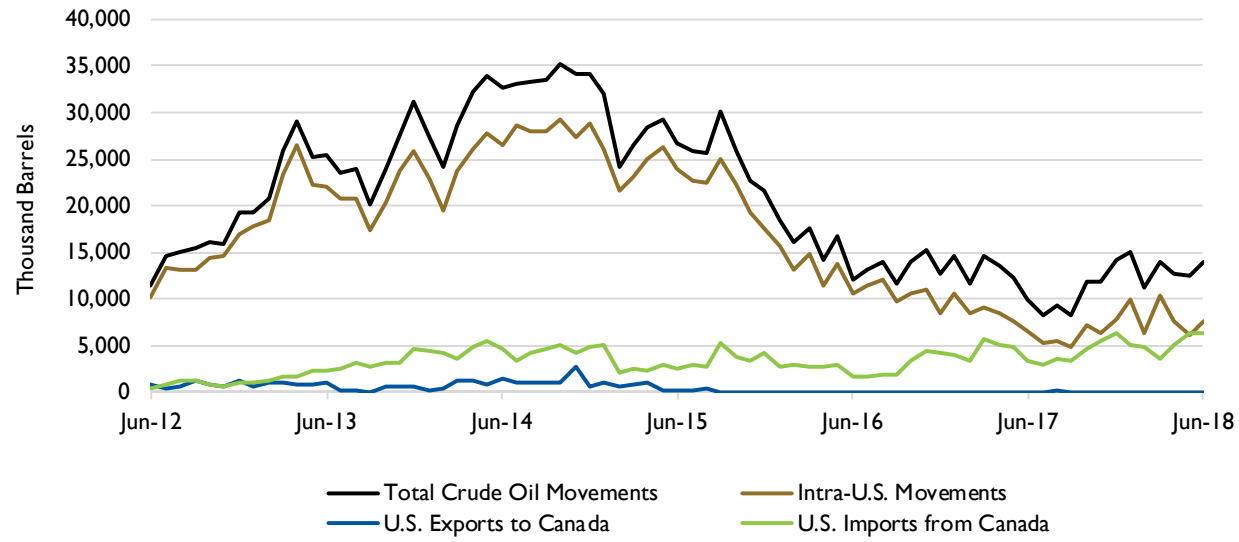
CRUDE OIL MOVEMENTS BY TANKER AND BARGE BETWEEN PETROLEUM ADMINISTRATION FOR DEFENSE DISTRICTS (PADDS) (MONTHLY) (69)



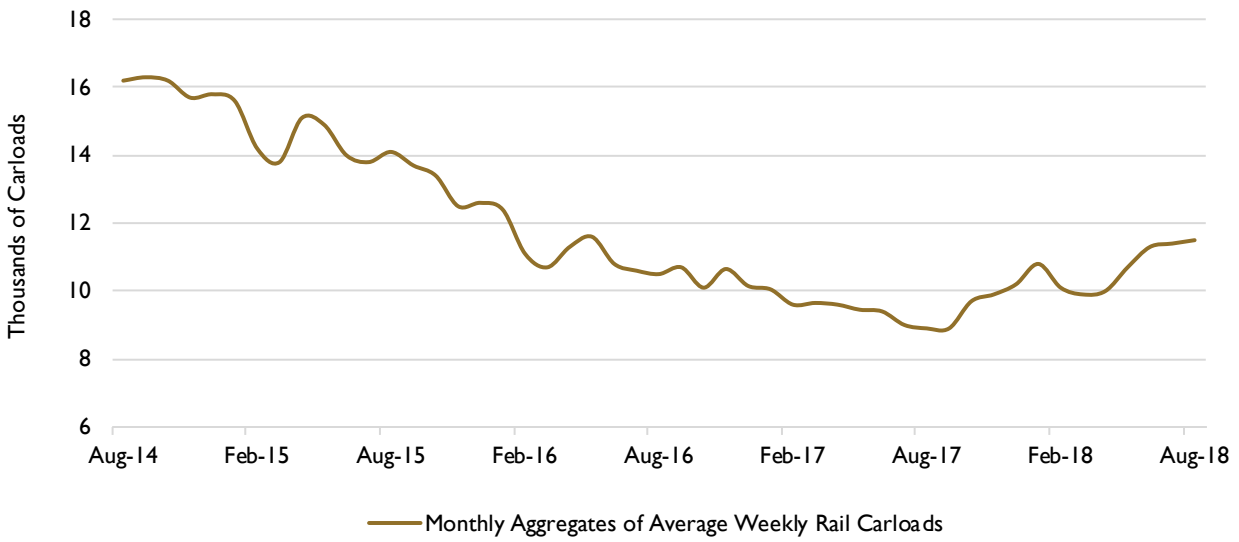
DATA CENTER

LOGISTICS - RAIL

MOVEMENTS OF CRUDE OIL BY RAIL (MONTHLY) (70)



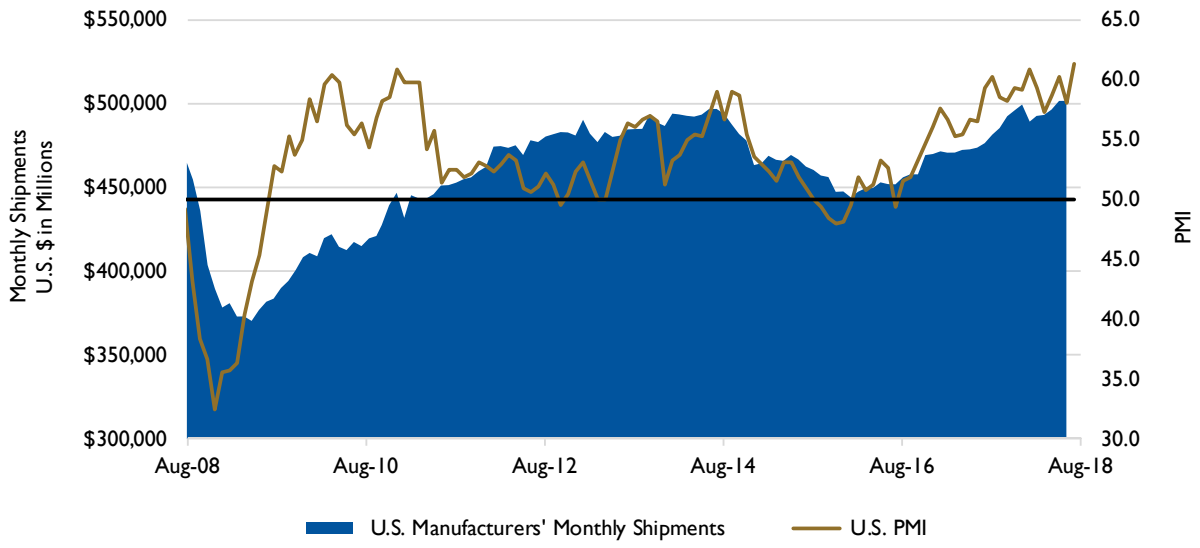
AVERAGE WEEKLY RAIL CARLOADS OF PETROLEUM AND PETROLEUM PRODUCTS (MONTHLY AGGREGATE) (71)



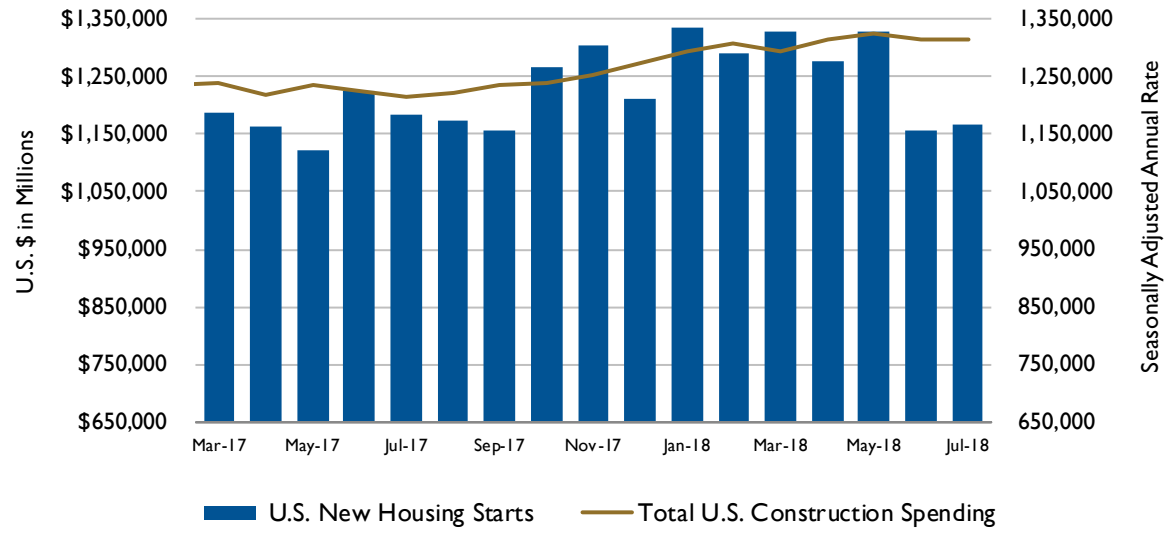
DATA CENTER

ECONOMIC / FINANCIAL

U.S. Manufacturers' Monthly Shipments and U.S. Purchasing Managers' Index (PMI) (Monthly) (72)



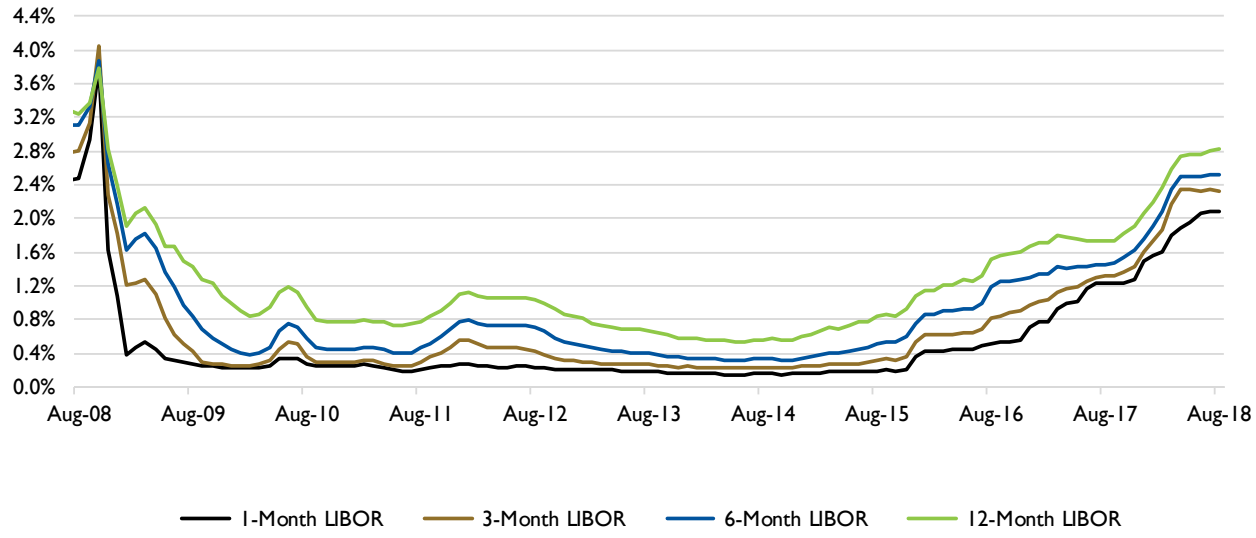
U.S. New Housing Starts and Total U.S. Construction Spending (Monthly) (73)



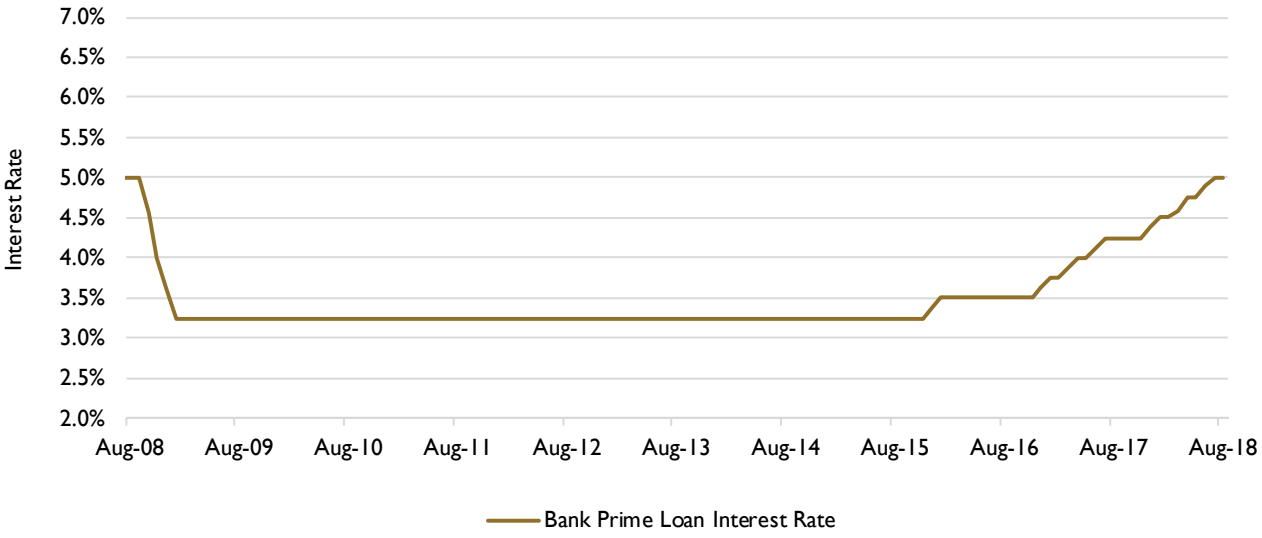
DATA CENTER

ECONOMIC / FINANCIAL

LONDON INTERBANK OFFERED RATE (LIBOR) (MONTHLY AVERAGE) BASED ON U.S. DOLLAR (74)



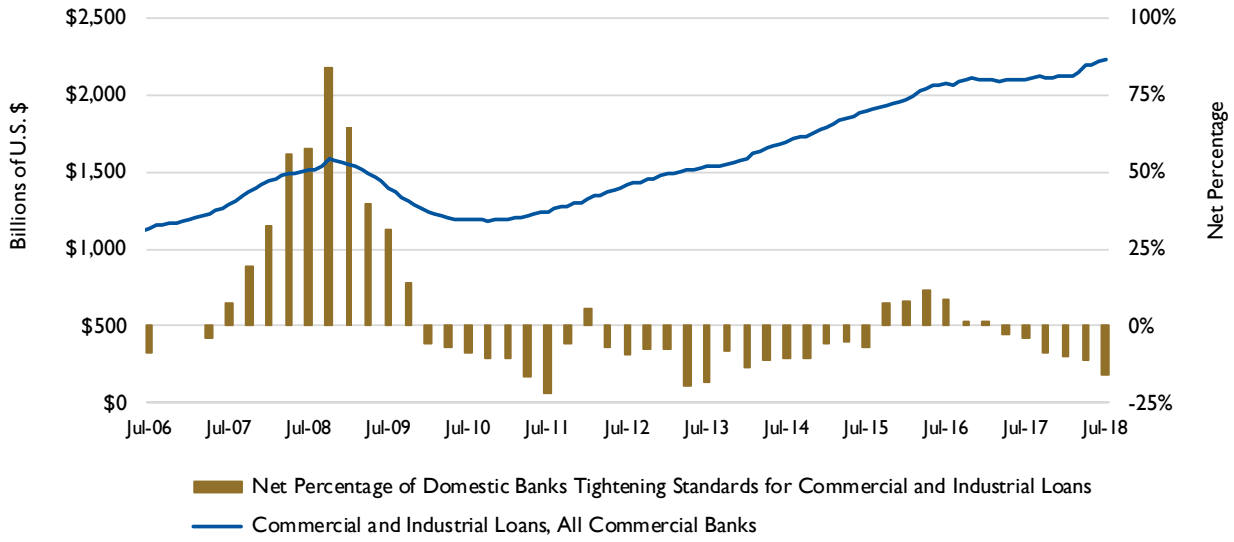
BANK PRIME LOAN INTEREST RATES (MONTHLY AVERAGE) (75)



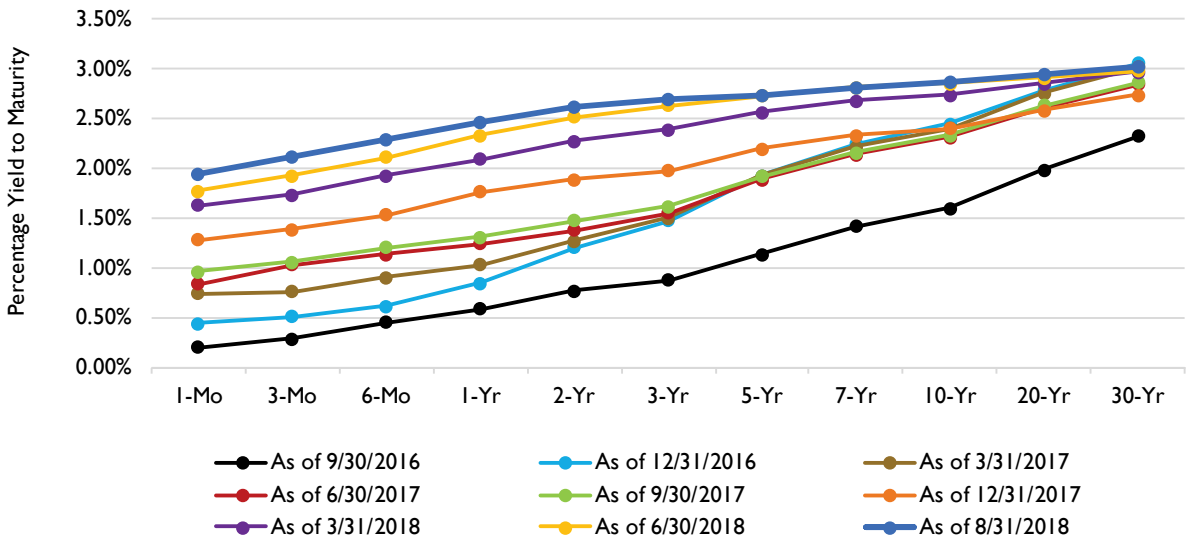
DATA CENTER

ECONOMIC / FINANCIAL

COMMERCIAL AND INDUSTRIAL LOANS VS. BANKING STANDARDS (QUARTERLY, MONTHLY) (76)



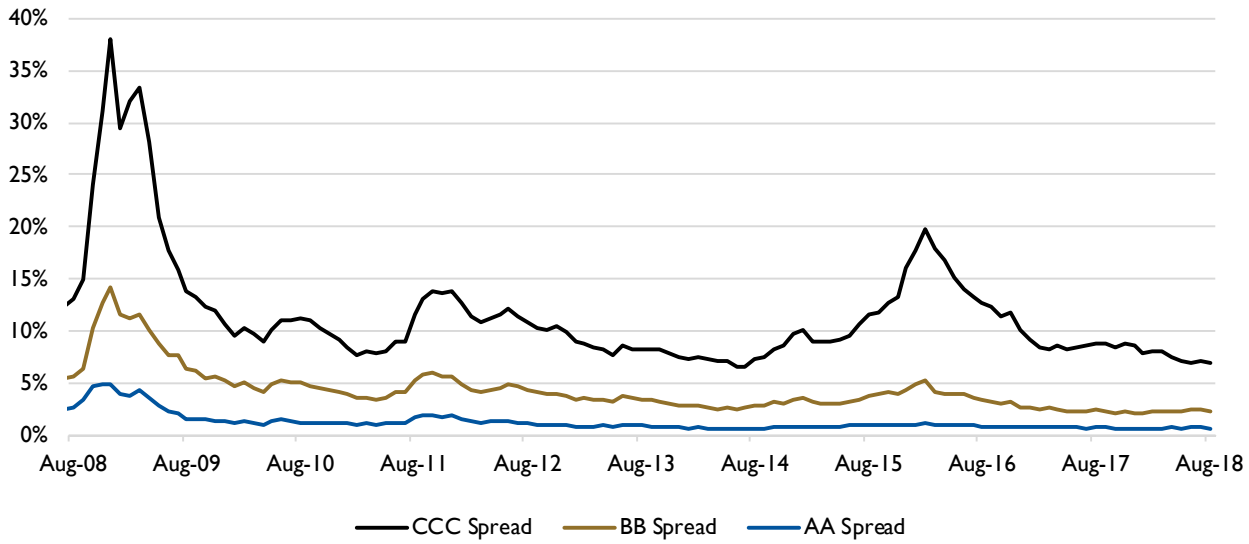
U.S. TREASURY YIELD CURVE (MONTHLY, ANNUAL) (77)



DATA CENTER

ECONOMIC / FINANCIAL

CORPORATE SPREADS TO TREASURIES BY QUALITY
(MONTHLY AVERAGE) (78)



DATA CENTER: ABBREVIATIONS & ACRONYMS, DEFINITIONS, DESCRIPTIONS AND CHART NOTES

ABBREVIATIONS & ACRONYMS

AECO – Alberta Energy Company
ARAMCO – Saudi Arabian Oil Company, formerly the Arabian-American Oil Company
BCF – Billion cubic feet
BTU – British thermal unit
CIF – Costs, insurance and freight
CMT – Constant maturity treasury
DUC – Drilled but uncompleted wells
EBITDA – Earnings before interest, taxes, depreciation and amortization
IFO – Intermediate fuel oil
ITC – Investment Tax Credit
LCOE – Levelized cost of energy
LIBOR – London Interbank Offered Rate
LNG – Liquefied natural gas
LPG – Liquefied petroleum gas
mmBTU – Millions of British Thermal Units
MTBE – Methyl tertiary butyl ether
MW – Megawatt
NBP – National Balancing Point
NGPL – Natural gas plant liquids
NYMEX – New York Mercantile Exchange
OAS – Option-adjusted spread
OPEC – The Organization of Petroleum Exporting Countries
PADD – Petroleum Administration for Defense District
PG&E – Pacific Gas & Electric
PMI – U.S. Purchasing Managers Index
PV – Photovoltaic
SoCal – Southern California
SPR – Strategic Petroleum Reserve
TETCO-M3 – Texas Eastern Transmission Corporation Pipeline Zone M3
TTF – Title Transfer Facility
UAE – United Arab Emirates
WTI – West Texas Intermediate crude oil

DATA CENTER: ABBREVIATIONS & ACRONYMS, DEFINITIONS, DESCRIPTIONS AND CHART NOTES

DEFINITIONS

Biofuels – liquid fuels and blending components produced from biomass feedstocks, used primarily for transportation.

British Thermal Unit (BTU) – A traditional unit of heat; it is defined as the amount of heat required to raise the temperature of one pound of water by one degree Fahrenheit.

Ending Stocks – A proxy for inventory, defined as the total volume of a given commodity held in storage (leases, refineries, processing plants, pipelines, terminals, tank farms) at the end of the last day of a given month.

Distillate Fuel Oil – A general classification for a variety of petroleum fractions produced in petroleum distillation operations. Included within this classification are No. 1, No. 2 and No. 4 diesel fuels (used in on-highway and off-highway diesel engines), as well as No. 1, No. 2 and No. 4 fuel oils (used primarily for space heating and electric power generation).

Distributed Solar Energy – Refers to solar energy generated by small-scale photovoltaic generation plants. Small-scale is defined as a plant with capacity below one megawatt.

Index – A figure in a system or scale representing the average value of specified prices, shares, or other items as compared with some reference figure.

Intermediate Fuel Oil – Also known as IFO and Bunker Fuel, fuel utilized by ships and barges to facilitate international exchange of various commodities across an array of industries.

Investment Tax Credit – A federal policy tax incentive that supports the deployment of solar energy in the United States.

LIBOR – The London Interbank Offered Rate is the average interest rate at which leading banks borrow funds of a sizeable amount from other banks in the London market.

Liquefied Natural Gas – Natural gas that has been cooled to a liquid state, at about -260°Fahrenheit, for shipping and storage.

Liquefied Petroleum Gas – A group of hydrocarbon gases, primarily propane, normal butane and isobutene, derived from crude oil refining or natural gas processing.

Natural Gas Liquids – A group of hydrocarbons including ethane, propane, normal butane, isobutene and natural gasoline. Generally include natural gas plant liquids and all liquefied refinery gases except olefins.

Natural Gas Plant Liquids – Ethane, propane, butane, isobutane, pentane and pentane plus.

Petroleum Administration for Defense District (PADD) – A geographic aggregation of the 50 States and the District of Columbia into five Districts. PADD 1 is the East Coast region, PADD 2 is the Midwest region, PADD 3 is the Gulf Coast region and PADD 5 is the West Coast region.

Petroleum Products – Obtained from the processing of crude oil (including lease condensate), natural gas and other hydrocarbon compounds. Petroleum products include unfinished oils, liquefied petroleum gases, pentanes plus, aviation gasoline, motor gasoline, naphtha-type jet fuel, kerosene-type jet fuel, kerosene, distillate fuel oil, residual fuel oil, petrochemical feedstocks, special naphthas, lubricants, waxes, petroleum coke, asphalt, road oil, still gas and miscellaneous products.

DATA CENTER: ABBREVIATIONS & ACRONYMS, DEFINITIONS, DESCRIPTIONS AND CHART NOTES

DEFINITIONS

Product Supplied – A widely utilized proxy for consumption of petroleum products, measuring the disappearance of said products from primary sources. Primary sources include, among others, refineries, processing plants, blending plants, pipelines and bulk terminals.

Propylene – Petrochemical feedstock that is recovered from refinery or petrochemical processes. It is an olefinic hydrocarbon that is gaseous at standard temperature and pressure.

Residual Fuel Oil – The general classification for heavy oils that remain after lighter oils are distilled away in the process of petroleum refining.

Spot vs. Wholesale Price – "Spot" prices are defined by the U.S. Energy Information Administration as, "the price for a one-time open market transaction for immediate delivery of a specific quantity of a product at a specific location where the commodity is purchased 'on the spot' at current market rates."

In this report, certain charts contain both "spot" and "wholesale" prices for given commodities alongside each other within the same chart. In these instances, the wholesale prices shown are, in fact, wholesale market "spot" prices. Thus, the terms are interchangeable in charts where both terms are present in describing respective price series.

Strategic Petroleum Reserve (SPR) – An emergency fuel storage of crude oil maintained by the United States Department of Energy for use during periods of major supply interruption.

Virtual Trading Point – Commodity trading center created to service a specific geographic region but does not have a physical location.

DATA CENTER: ABBREVIATIONS & ACRONYMS, DEFINITIONS, DESCRIPTIONS AND CHART NOTES

DESCRIPTIONS

General Conversion Information

- International pricing data for various commodities were converted by JKC from the units utilized by the original data source (in the form of currency value per unit of energy content or volume) to appropriate domestic units (in the form of U.S. dollars per common domestic unit of energy content or volume) in order to allow for convenient, informative comparison of international and domestic commodity price series through displaying them on a singular chart in consistent units. Appropriate domestic units for a given commodity are determined by whatever units are most commonly utilized in the United States to denote prices of that commodity, per the U.S. Energy Information Administration.
- International currency units were converted to U.S. dollars using historical exchange rates published by x-rates.com.
- Energy content and volume conversion factors differ by commodity. International energy content or volume units were converted using the various sources listed below:
  - Google.com In-Browser Unit Converter
    - Alberta Energy Co. Hub Natural Gas – gigajoules to mmBTU
    - Dutch TTF Hub Natural Gas – megawatt hours to mmBTU
    - Houston; Los Angeles; Rotterdam; Singapore; Port of Fujairah, UAE IFO 380, IFO 180 Bunker Fuel – liters/kilogram to gallons per metric ton
  - Iowa State University Liquid Fuel Measurements and Conversions
    - Netherlands Retail LPG – liters to metric tons, metric tons to barrels
    - Saudi ARAMCO Propane – metric tons to barrels
    - Japan Propane Imports – metric tons to barrels
    - Holland Retail Gasoline – liters to gallons
    - Singapore Retail Gasoline – liters to gallons
    - UAE Gasoline – liters to gallons
    - Edmonton Diesel Fuel – liters to gallons
    - Singapore Retail Diesel – liters to gallons
    - Holland Retail Diesel – liters to gallons
    - UAE Diesel – liters to gallons
  - Official Nebraska Government Website
    - Netherlands Retail LPG – barrels to gallons
    - Saudi ARAMCO Propane – barrels to gallons
    - Japan Propane Imports – barrels to gallons
  - Lanka IOC Oil Company
    - Houston; Los Angeles; Rotterdam; Singapore; Port of Fujairah, UAE IFO 380, IFO 180 Bunker Fuel – density, in liters per kilogram

DATA CENTER: ABBREVIATIONS & ACRONYMS, DEFINITIONS, DESCRIPTIONS AND CHART NOTES

CHART NOTES

All charts in this report are updated to the latest information available at the time of publication. Due to differing reporting dates for various data used throughout the report, all charts are not updated to the same ending period.

(1) Crude Oil Prices

- Sources: U.S. Energy Information Administration (Brent, West Texas Intermediate), IndexMundi via WorldBank (Dubai Fateh), Alberta.ca Economic Dashboard (Western Canadian Select), OPEC.org and Quandl.com (OPEC Reference Basket).
- The Organization of Petroleum Exporting Countries (OPEC) reference basket is a composite of the following blends of crude oil: Saharan Blend (Algeria), Girassol (Angola), Oriente (Ecuador), Zafiro (Equatorial Guinea), Rabi Light (Gabon), Iran Heavy (Islamic Republic of Iran), Basra Light (Iraq), Kuwait Export (Kuwait), Es Sider (Libya), Bonny Light (Nigeria), Qatar Marine (Qatar), Arab Light (Saudi Arabia), Murban (United Arab Emirates), Merey (Venezuela).
- All prices are spot or wholesale.

(2) Gasoline Prices

- Sources: U.S. Energy Information Administration (New York Harbor, U.S. Gulf Coast), Trading Economics (Singapore, Netherlands Retail), United Arab Emirates Ministry of Energy (UAE Retail).
- New York Harbor Spot, U.S. Gulf Coast Spot, Netherlands Retail and Singapore Retail all represent the price history of conventional gasoline in their respective locations. United Arab Emirates Retail represents an aggregate of unleaded 95, unleaded 98 and unleaded 91 prices in the United Arab Emirates.

(3) Diesel Prices

- Sources: U.S. Energy Information Administration (U.S. Gulf Coast, New York Harbor, Los Angeles, CA), Ec.euopa.eu European Commission (Netherlands Retail), Knoema.com (Singapore Retail), United Arab Emirates (UAE Retail).
- New York Harbor, U.S. Gulf Coast and Los Angeles, CA prices represent ultra-low sulfur No. 2 diesel.
- Edmonton, Canada price represents low-sulfur diesel.
- Singapore Retail, United Arab Emirates Retail and Netherlands Retail prices represent conventional gasoil found at the pump. Gasoil is an alternative term for diesel commonly used throughout Europe.
- Netherlands Retail prices exclude taxes, Singapore Retail prices include taxes.

(4) Jet Fuel Prices

- Source: U.S. Energy Information Administration.
- All prices are spot or wholesale prices.

(5) U.S. Crude Oil and Petroleum Products Supply, Inventory and Consumption

- Source: U.S. Energy Information Administration.
- Crude Oil and Petroleum Products consist of natural gas plant liquids (ethane, propane, butane, isobutane, pentane), other liquids (hydrogen, oxygenates and renewable fuels like fuel ethanol, motor and aviation gasoline blending components, unfinished oils) and finished petroleum products (motor gasoline, aviation gasoline, kerosene-type jet fuel, kerosene, distillate fuel oil, residual fuel oil, petrochemical feedstocks, napthas, lubricants, waxes, petroleum cokes, asphalt and road oil, still gas, miscellaneous products).
- Supply is comprised of field production, renewable fuels and oxygenate plant net production, refinery and blender net production, imports and net Petroleum Administration for Defense District (PADD) receipts. Net PADD receipts represent the net volume of product movement into and out of each PADD by tanker, barge and pipeline.
- Ending Stocks is a proxy for inventory and is defined as primary stocks held in storage as of midnight on the last day of the month. Primary stocks include products held in storage at, or in, leases, refineries, natural gas processing plants, pipelines, tank farms and bulk terminals with the capacity to store at least 50,000 barrels or that can receive product by tanker, barge or pipeline. Ending Stocks include volumes in the Strategic Petroleum Reserve (SPR) maintained by the Federal Government for use during periods of major supply interruption.
- Product Supplied is a proxy for consumption as it measures the disappearance of said product from primary sources, including refineries, processing plants, blending plants, pipelines and bulk terminals.

DATA CENTER: ABBREVIATIONS & ACRONYMS, DEFINITIONS, DESCRIPTIONS AND CHART NOTES

(6) U.S. Refinery Volumes and Wholesale Prices of Petroleum Products

- Source: U.S. Energy Information Administration Petroleum Marketing Monthly.

(7) U.S. Crude Oil Refinery Input, Distillation Capacity and Refinery Utilization

- Source: U.S. Energy Information Administration Petroleum Supply Weekly.
- Net Input is defined as gross inputs less gross production. Crude Oil Refinery Net Input values are monthly aggregates of weekly net input averages, measured in thousands of barrels per day. The resulting values are represented as monthly average refinery inputs, measured in thousands of barrels per day.
- Refinery Capacity refers to the maximum amount of crude oil designed to flow into the distillation (or crude) unit of the refinery. Operable Capacity is equal to the sum of operating and idle capacity. Idle Capacity is capacity that is not in operation, not under active repair, and can be placed in operation within 30 days.

(8) U.S. Crude Oil and Petroleum Products Imports and Exports

- Source: U.S. Energy Information Administration Petroleum Supply Monthly.
- U.S. Net Imports of Petroleum Products data fall below zero at which point the U.S. becomes a net exporter.

(9) Domestic Natural Gas Citygate Prices per Region

- Source: U.S. Energy Information Administration.
- The prices shown are "Citygate" prices. A Citygate is defined as "a point or measuring station at which a distributing gas utility receives gas from a natural gas pipeline company or transmission system." The Citygate price represents the benchmark price for a given region, accounting for all costs of acquisition, storage, and transportation of gas as well as other charges associated with local distribution companies obtaining the gas for sale to end-users.
- The Western market contains Oregon, Washington, California, Nevada, Arizona, New Mexico, Utah, Wyoming, Colorado, Montana, and Idaho.
- The Midwestern market contains North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Minnesota, Iowa, Missouri, Arkansas, Wisconsin, Michigan, Illinois, and Indiana.
- The Gulf market contains Texas and Louisiana; the Southeastern market contains Florida, Mississippi, Alabama, Georgia, Tennessee, North Carolina, and South Carolina.
- The Northeastern market contains Kentucky, Virginia, West Virginia, Ohio, Pennsylvania, New York, Vermont, New Hampshire, Maine, Massachusetts, Rhode Island, Connecticut, Delaware, New Jersey, and Maryland.

(10) International Natural Gas Prices

- Sources: U.S. Energy Information Administration (Henry Hub), NGX Clearinghouse (AECO Hub), BP Statistical Review of World Energy 2017 (United Kingdom NBP), World Bank via Index Mundi (Russian NG European Import Price), Knoema via World Bank (Japan LNG Import), my.Elexys.be Market Information (Dutch TTF).
- Henry Hub serves as the primary global pricing benchmark.
- Alberta Energy Company (AECO) Hub serves North America.
- United Kingdom National Balancing Point (NBP) serves the British Isles.
- Dutch Title Transfer Facility (TTF) serves continental Europe.
- Virtual Trading Point (Virtual) does not have a physical location and was created to serve a specific region.
- Japan LNG Import Price represents aggregate import prices of liquefied natural gas in Japan and is a price benchmark serving the Asia-Pacific region. The price includes costs, insurance and freight (CIF).
- All price benchmarks above represent gaseous state natural gas transported by pipeline, with the exception of Japan LNG Import Price, which represents liquid state natural gas transported by ship.
- All prices are spot or wholesale.

(11), (12), (13) and (14) Liquefied Natural Gas Prices

- Sources: Federal Energy Regulatory Commission (U.S., Mexico, Belgium, India), World Bank via Bluegold Research (Brazil/Argentina, Japan/Korea, China, United Kingdom).
- All prices are "landed" prices. Landed price is the price received at the regasification terminal and is based on a netback calculation that removes the costs of pipeline transportation, regasification, waterborne shipping and liquefaction, so as to best represent the effective price to the producer or seller at a specific location or defined point.

DATA CENTER: ABBREVIATIONS & ACRONYMS, DEFINITIONS, DESCRIPTIONS AND CHART NOTES

(15) U.S. Import / Export Liquefied Natural Gas Prices
- Source: U.S. Energy Information Administration.
- All prices are spot or wholesale.

(16) Natural Gas Plant Liquids Prices
- Source: U.S. Energy Information Administration.
- Natural gas liquids spot prices at Mont Belvieu, TX.
- Natural Gas Plant Liquids (NGPL) Composite price includes ethane, propane, butane, isobutane and natural gasoline. Daily closing spot prices for each component are averaged into a monthly series, then weighted according to the portion of a representative natural gas plant liquids barrel that they occupy. The NGPL Composite price excludes natural gas liquids produced at crude oil refineries.

(17) U.S. Natural Gas Production and Consumption
- Source: U.S. Energy Information Administration.
- Marketed Production is equal to gross withdrawals of natural gas from production reservoirs, less gas used for reservoir re-pressuring, nonhydrocarbon gases removed in treating and processing operations, and quantities vented and flared (gas that is disposed of by release into the atmosphere).

(18) U.S. Natural Gas Supply and Inventory
- Source: U.S. Energy Information Administration.
- Working Gas is defined as the total amount of natural gas in storage less the amount of base gas. Base gas is the amount of gas intended as permanent inventory.

(19) U.S. Natural Gas Consumption by End Use
- Source: U.S. Energy Information Administration.

(20) U.S. Natural Gas Plant Liquids Production
- Source: U.S. Energy Information Administration.
- Natural Gas Plant Liquids Production refers to the sum of all production of ethane, propane, butane, isobutane, pentane and pentane plus.

(21) U.S. Liquefied Natural Gas Import and Export Volumes
- Source: U.S. Energy Information Administration.

(22), (23) and (24) North American LNG Import / Export Terminals – Proposed, Approved and Existing
- Source: Federal Energy Regulatory Commission.

(25) Heating Oil Prices
- Source: U.S. Energy Information Administration.
- Spot prices of No 2. heating oil at New York Harbor, alongside the spot prices of West Texas Intermediate crude oil for comparison purposes.

(26) Intermediate Fuel Oil aka "Bunker Fuel" Prices
- Source: Ship & Bunker.
- Intermediate Fuel Oil, also known as IFO and Bunker Fuel, is fuel utilized by ships and barges to facilitate international exchange of various commodities across an array of industries, including energy. It is classified in the maritime field by its viscosity, measured in centistokes. IFO 380 has a maximum viscosity of 380 centistokes, while IFO 180 has a maximum viscosity of 180 centistokes. IFO 380 is comprised of 98% residual fuel oil and 2% distillate fuel oil. IFO 180 is comprised of 88% residual fuel oil and 12% distillate fuel oil.

DATA CENTER: ABBREVIATIONS & ACRONYMS, DEFINITIONS, DESCRIPTIONS AND CHART NOTES

(27) Propane Prices

- Sources: U.S. Energy Information Administration (Conway, KS and Mont Belvieu, TX spot prices), Government of Canada National Energy Board (Edmonton, Canada trading hub prices), Ec.euopa.eu European Commission (Netherlands Retail prices), LPG Australia and news articles (Saudi ARAMCO contract prices), Knoema.com and Petroleum Association of Japan (Japan Imports prices).
- Conway, KS and Mont Belvieu, TX retail prices are propane prices, while Saudi ARAMCO Contracts and Japan Imports are liquefied petroleum gas (LPG) prices. Netherlands Retail and Edmonton, Canada retail prices are auto propane and exclude taxes.
- Propane and LPG prices are represented on the same chart due to the fact that propane is dealt in international marketplaces as LPG, and is referred to as LPG in many European and Asian countries. LPG is comprised of a mixture of propane and butane.
- Conway, KS wholesale prices are typically available only for the winter months (October through March), during which propane demand is driven by cold weather, therefore, the data series displayed is intermittent.

(28) No. 1 Distillate Fuel Oil, Residual Fuel Oil Wholesale, Retail Sales Volume by Refiners

- Source: U.S. Energy Information Administration.
- No. 1 Distillate Fuel Oil consists of No. 1 diesel fuel and No. 1 fuel oil. The former is used in high-speed diesel engines, including those used by metropolitan buses and smaller automobiles. No. 1 fuel oil is utilized primarily as fuel for portable outdoor stoves and heaters.
- Residual Fuel Oil is the general classification for heavy oils that remain after lighter oils are distilled away in the process of petroleum refining. Residual Fuel Oil includes No. 5 and No. 6 fuel oils. The former is used in steam-powered vessels, and the latter is used for electric power generation, space heating, vessel bunkering and industrial processes.
- All wholesale and retail sales volumes refer to those sold by refiners only.

(29) No. 2 Distillate Fuel Oil Wholesale, Retail Sales Volume by Refiners

- Source: U.S. Energy Information Administration.
- No. 2 Distillate Fuel Oil consists of No. 2 diesel fuel and No. 2 fuel oil (heating oil). No. 2 diesel fuel is utilized in on-and-off highway diesel engines, including those used by railroad locomotives, trucks, automobiles and agricultural machinery. No. 2 fuel oil (heating oil) is used for space heating and moderate capacity industrial/commercial burner units.
- All wholesale and retail sales volumes refer to those sold by refiners only.

(30) Propane & Propylene and Distillate Fuel Oil Production and Consumption

- Source: U.S. Energy Information Administration.
- Distillate Fuel Oil is a general classification for a variety of petroleum fractions produced in petroleum distillation operations. Included within this classification are No. 1, No. 2 and No. 4 diesel fuels (used in on-highway and off-highway diesel engines), as well as No. 1, No. 2 and No. 4 fuel oils (used primarily for space heating and electric power generation).
- Propylene is an important petrochemical feedstock that is recovered from refinery or petrochemical processes. It is an olefinic hydrocarbon that is gaseous at standard temperature and pressure.
- Product Supplied is a proxy for consumption as it measures the disappearance of said product from primary sources, including refineries, processing plants, blending plants, pipelines and bulk terminals.

(31) U.S. Ending Stocks of Propane & Propylene and Distillate Fuel Oil

- Source: U.S. Energy Information Administration.
- Distillate Fuel Oil is a general classification for a variety of petroleum fractions produced in petroleum distillation operations. Included within this classification are No. 1, No. 2 and No. 4 diesel fuels (used in on-highway and off-highway diesel engines), as well as No. 1, No. 2 and No. 4 fuel oils (used primarily for space heating and electric power generation).
- Propylene is an important petrochemical feedstock that is recovered from refinery or petrochemical processes. It is an olefinic hydrocarbon that is gaseous at standard temperature and pressure.
- Ending Stocks are defined as the total volume of a propane and propylene/distillate fuel oil held in storage as of the last day of the period. Ending Stocks are monthly averages of Ending Stocks reported at the end of each week during that month, not the amount of Ending Stocks reported at the end of the month. The resulting values are represented as monthly average inventory levels.

DATA CENTER: ABBREVIATIONS & ACRONYMS, DEFINITIONS, DESCRIPTIONS AND CHART NOTES

(32) U.S. Land Well Count, Rig Count and Wells per Rig

- Source: Platts S&P Global Quarterly Well Count Report.
- Well and rig count data include only those on United States land. Thus, no offshore data is included.
- Platts RigData U.S. Land Rig Count methodology states that a rig is added to the count every time a new oil platform, or rig, is set up on a given site, or every time an existing rig moves to a new location and drills on that site.
- Platts RigData derives U.S. Land Well Count data through tracking new drilling permits and drilling activity only. Thus, the wells comprising the U.S. Land Well Count do not necessarily have to be completed or produce oil or gas in order to be included. For this reason, the well count represented overstates the amount of completed and producing wells that exist on U.S. land.

(33) U.S. Drilling Permits

- Source: Platts RigData.
- Total number of drilling permits issued per month on U.S. Land, U.S. Inland Waters and U.S. Offshore, respectively.

(34) U.S. Drilling Permits, Top 5 States

- Source: Platts RigData.
- The five states that issued the highest number of drilling permits each year.

(35) Drilled but Uncompleted Wells vs. Crude Oil Price

- Source: U.S. Energy Information Administration Drilling Productivity Report.
- Drilled but Uncompleted (DUC) Wells are oil and gas wells that have been drilled but haven't gone through the process of completion (the process of installing well casing, tubing and other equipment that prepares a well for production). The number of DUC wells has significant implications on the domestic supply response to crude oil price changes. If crude oil prices decrease, it is theoretically likely that the amount of DUC wells will increase, and vice versa in an increasing crude oil price scenario. Therefore, the West Texas Intermediate Crude price is tracked for comparative purposes.

(36) Hydraulic Fracturing Sand Consumption and Producer Price Index

- Sources: IHS Markit (consumption), U.S. Bureau of Labor Statistics (producer price index).
- Hydraulic Fracturing Sand is sand utilized as a proppant in the process of hydraulic fracturing to help facilitate the extraction of oil and gas from subsurface rock formations.
- Total 2017 Hydraulic Fracturing Sand Consumption contains actual data for January through April 2017, while May through December 2017 consumption data is projected based on IHS Markit's ProppantIQ research.
- The Producer Price Index for Hydraulic Fracturing Sand measures the weighted average period-to-period change in the selling prices received by domestic producers of hydraulic fracturing sand.
- 2017 Producer Price Index shows annual average as of 9/29/2017.
- Hydraulic Fracturing Sand Producer Price Index Base = 100 at December 2012.

(37) and (38) Crude Oil and Natural Gas Production, Rig Count and Production per Rig

- Sources: U.S. Energy Information Administration Drilling Productivity Report (new-well crude oil and natural gas production per rig), Baker Hughes Inc. (rig count).
- New-Well Crude Oil or Natural Gas Production per Rig in each quarter represents the average of each month's value. New-well production per rig is estimated by dividing several trailing months of data on total production from new wells in each region by that region's monthly rig count, lagged by two months. New-well production per rig is intended to indicate an average rig's contribution to total crude oil production from new wells.
- The determination between a crude oil rig and a natural gas rig is made by the operating company at the time of issuance of the rig permit by the relevant state's permitting authority. The classification of a given rig as an oil or gas rig is based solely upon the operator's judgment after drilling an appraisal well and determining its specific hydrocarbon content. For example, if a well's production comes 50% from gas, 20% from Natural Gas Liquids and 30% from oil, it could either be listed as a gas rig, because gas comprises the largest share of hydrocarbons, or an oil rig because oil drives the well's economics. This determination is at the judgment of the operator.

DATA CENTER: ABBREVIATIONS & ACRONYMS, DEFINITIONS, DESCRIPTIONS AND CHART NOTES

(39) U.S. Drilling Rigs by Type

- Source: Baker Hughes North America Rotary Rig Count.
- A vertical well is a well that penetrates the earth vertically below the surface-mounted drilling platform, or the surface location of the well.
- A directional well is classified as one in which the surface location of the well is not vertically above the target reservoir. Thus, the well deviates horizontally from its surface location in order to reach the target reservoir, at a specific azimuth and incline. Azimuth measures the cardinal direction of the well's path relative to the surface location, and incline measures degrees of deviation from vertical.
- Per Baker Hughes methodology, a horizontal well is a type of directional well that deviates from vertical by greater than 80 degrees, or one in which the lower part of the wellbore is parallel to the "pay zone." The pay zone is the section of a reservoir that contains hydrocarbons that can be produced economically.

(40) Wind and Solar Prices

- Source: Lazard's Levelized Cost of Energy Analysis 2012-2016.
- The Levelized Cost of Energy (LCOE) is the net present value of the per-megawatt hour cost of building and operating a generating plant over an assumed financial life and duty cycle. It is utilized as a means of comparing the cost-competitiveness of various energy-generating technologies of unequal life spans, project sizes, capital profiles and capacities.
- The respective levelized costs of each generation technology for each year are a simple average of the high and low values of the cost range associated with that generating technology during that year.
- Solar PV refers to solar photovoltaic.
- Solar PV – Community refers to a solar power plant whose electricity is shared by more than one household.
- Solar PV – Rooftop Residential refers to a Solar PV system that has its solar panels mounted on the rooftop of a residential structure.
- Solar PV – Crystalline Rooftop refers to crystalline solar panels mounted on rooftops. Crystalline panels are a type of solar panel that achieves the photoelectric effect, the chemical process that converts solar (light) energy to electricity, through use of crystalline silicone solar cells.
- Solar PV – Crystalline Utility-Scale refers to a solar power plant that uses crystalline panels to generate power that is fed into the grid, supplying a utility with energy.
- Solar PV – Thin Film Utility-Scale refers to a solar power plant that uses thin-film solar panels to generate power that is fed into the grid, supplying a utility with energy. Thin-film panels differ from crystalline panels in that the photoemissive materials, those which produce an electric current when contacted by sufficient solar energy, are not cut from crystals.
- Solar Thermal refers to solar technology that generates thermal energy to heat water or other fluids, rather than generating electricity.

(41) U.S. Total Renewable Energy Consumption

- Source: U.S. Energy Information Administration Monthly Energy Review.
- Total Renewable Energy Consumption is comprised of hydroelectric, geothermal, solar, wind, wood, waste and biofuels.
- Waste refers to biomass waste and is organic non-fossil material of biological origin that is a byproduct or a discarded product. Biomass waste includes municipal solid waste from biogenic sources, landfill gas, sludge waste, agricultural crop byproducts, straw and other biomass solids, liquids and gases.
- Biofuels are liquid fuels and blending components produced from biomass feedstocks, used primarily for transportation. Biomass is organic, non-fossil material comprised of decayed biological matter.

(42) U.S. Solar, Wind and Hydroelectric Energy Consumption

- Source: U.S. Energy Information Administration Monthly Energy Review.

(43) U.S. Wood, Waste, Biofuels and Geothermal Energy Consumption

- Source: U.S. Energy Information Administration Monthly Energy Review.
- Biofuels are liquid fuels and blending components produced from biomass feedstocks, used primarily for transportation. Biomass is organic, non-fossil material comprised of decayed biological matter.

(44) Corn and Ethanol Prices and Corn Cost per Gallon of Ethanol

- Source: U.S. Department of Agriculture Economic Research Service (corn and ethanol price).

DATA CENTER: ABBREVIATIONS & ACRONYMS, DEFINITIONS, DESCRIPTIONS AND CHART NOTES

(45) U.S. Solar Energy Consumption

- Source: U.S. Energy Information Administration Monthly Energy Review.
- Utility-scale solar energy refers to solar energy generated by plants with a capacity of at least one megawatt that is transmitted via the transmission grid to a high volume of consumers. Thus, Utility-Scale Solar Energy Consumption represents consumption of solar energy generated at plants with capacity of at least one megawatt.
- Distributed solar energy refers to solar energy generated by small-scale generating plants with capacity below one megawatt that is distributed over a specific locality with a small volume of consumers relative to utility-scale energy consumers. Thus, Distributed Solar Energy Consumption represents consumption of solar energy generated at small-scale generating plants.

(46) U.S. Solar Energy Net Generation

- Source: U.S. Energy Information Administration Monthly Energy Review.
- Distributed Solar Photovoltaic Generation refers to energy generated by small-scale photovoltaic generation plants. Small-scale is defined as a plant with capacity below one megawatt. Photovoltaic generation refers to solar energy generated by photovoltaic solar panels.
- Utility-Scale Solar Electricity Net Generation refers to generation of solar energy by plants with capacity equal to or above one megawatt. Net generation is defined as the amount of gross generation less electrical energy consumed by the generating plant for service or auxiliaries.

(47) Distributed Solar Photovoltaic Generation by Sector

- Source: U.S. Energy Information Administration Monthly Energy Review.
- Distributed Solar Photovoltaic Generation refers to energy generated by small-scale photovoltaic generation plants. Small-scale is defined as a plant with capacity below one megawatt. Photovoltaic generation refers to solar energy generated by photovoltaic solar panels.

(48) Utility-Scale Solar Electricity Net Generation by Sector

- Source: U.S. Energy Information Administration Monthly Energy Review.
- Utility-Scale Solar Electricity Net Generation refers to generation of solar energy by plants with capacity equal to or above one megawatt. Net generation is defined as the amount of gross generation less electrical energy consumed by the generating plant for service or auxiliaries.
- Gaps in the data represent periods for which there was no data reported, or the data value was trivially small and thus deemed unnecessary to report.

(49) U.S. Solar Capacity Installations

- Source: Solar Energy Industries Association Q1 2017 Solar Market Insight Report.
- The Investment Tax Credit (ITC) is a federal policy tax incentive that supports the deployment of solar energy in the United States. The ITC allows those who install a solar system to claim up to 30% of the price paid to install the system as a tax credit when filing Federal taxes, thereby significantly discounting the cost associated with transitioning to solar energy.

(50) U.S. Wind Power Capacity Installations

- Source: American Wind Energy Association U.S. Wind Energy Quarterly Market Report.
- Wind Power Generation Capacity Installations refers to non-utility-scale wind power capacity additions. Utility-scale is defined as installations of wind turbines larger than 100 kilowatts.

(51) Utility-Scale Wind Power Capacity Installations

- Source: American Wind Energy Association U.S. Wind Energy Quarterly Market Report.
- Utility-Scale Wind Capacity includes installations of wind turbines larger than 100 kilowatts. Capacity installations may not always equate to an equal increase in cumulative wind power capacity due to decommissioned, uprated and repowered wind turbines.

DATA CENTER: ABBREVIATIONS & ACRONYMS, DEFINITIONS, DESCRIPTIONS AND CHART NOTES

(52) Wind Power Under Construction or in Advanced Development

- Source: American Wind Energy Association (AWEA) U.S. Wind Energy Quarterly Market Report.
- AWEA defines projects as being "in advanced development" if it has not yet begun construction, but has either signed a power purchase agreement, announced a firm turbine order, or been announced to proceed under utility ownership.

(53) U.S. Aggregated Energy Consumption by Sector

- Source: U.S. Energy Information Administration.
- Energy consumed by the electric power sector is primary energy only. Primary energy is energy in its original form, before any transformation to secondary or tertiary forms of energy. For example, coal can be converted to synthetic gas and then to electricity. Under these circumstances, coal is primary energy, synthetic gas is secondary energy and electricity is tertiary energy.

(54) U.S. Aggregated Energy Consumption by Source

- Source: U.S. Energy Information Administration.
- Total consumption of each category of energy is as accurate as possible. However, some data is unavailable or unreported and, thus, some total consumption values may be understated.
- Fossil Fuels includes coal, petroleum-based products, natural gas and natural gas-based products.
- Renewable Energy includes conventional hydroelectric, solar, biomass, nuclear, geothermal and wind.
- Biomass is a renewable energy source derived from organic matter such as wood, crop waste, or garbage, with wood being the largest contributor.
- Fossil Fuels and Renewable Energy consumption represent consumption of primary energy, which is energy in its original form, before transformation to secondary or tertiary forms of energy. Thus, to arrive at total energy consumption, Electricity Retail Sales (representing consumption of secondary and tertiary forms of energy) is added alongside consumption of Fossil Fuels and Renewable Energy.
- Electrical System Energy Losses are a deduction from total energy consumption, and are incorrectly represented as positively contributing to total energy consumption. Thus, total energy consumption figures in each year are overstated by the amount of electrical system energy losses.

(55) Electricity Prices by Sector

- Source: U.S. Energy Information Administration.

(56) Commercial Crude Oil Inventory

- Source: U.S. Energy Information Administration.
- U.S. Ending Stocks of Commercial Crude Oil represents stocks (inventory) of crude oil held in storage for commercial use. This figure excludes both lease stock and volumes in the Strategic Petroleum Reserve (SPR). Lease stock is crude oil stored in tanks at sites where producers are drilling on leased land. They're excluded from total commercial crude oil inventory because they aren't yet available for commercial use. The SPR is petroleum maintained by the Federal Government for use during periods of major supply interruption.
- Ending stocks (inventory) are primary stocks of crude oil held in storage as of midnight on the last day of the month. Primary stocks include crude oil held in storage at, or in, leases, refineries, natural gas processing plants, pipelines, tank farms and bulk terminals with the capacity to store a minimum of 50,000 barrels of petroleum products or that can receive petroleum products by tanker, barge or pipeline.

(57) Petroleum and Other Liquids Commercial Inventory

- Source: U.S. Energy Information Administration.
- Hydrocarbon Gas Liquids (HGLs) are molecules of carbon and hydrogen in various combinations. HGLs include alkanes, or paraffins (ethane, propane, butane, isobutene, natural gasoline) and alkenes, or olefins (ethylene, propylene, butylene, isobutylene).
- Unfinished Oils are all oils that require further processing and are produced by partial refining of crude oil. Unfinished Oils include napthas and lighter oils, kerosene and light gas oils, heavy gas oils and residuum.
- Other Hydrocarbons/Oxygenates are substances that increase the amount of oxygen in various gasoline blends when added to them. This category includes fuel ethanol, methanol and methyl tertiary butyl ether (MTBE).
- Total Motor Gasoline includes finished motor gasoline and motor gasoline blending components.

DATA CENTER: ABBREVIATIONS & ACRONYMS, DEFINITIONS, DESCRIPTIONS AND CHART NOTES

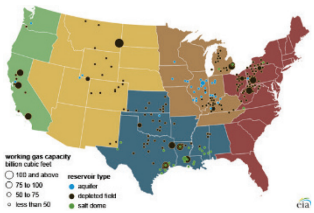
(57) Petroleum and Other Liquids Commercial Inventory (continued)

- Distillate Fuel Oil is a general classification for a variety of petroleum fractions produced in petroleum distillation operations. Included within this classification are No. 1, No. 2 and No. 4 diesel fuels (used in on-highway and off-highway diesel engines), as well as No. 1, No. 2 and No. 4 fuel oils (used primarily for space heating and electric power generation).
- Residual Fuel Oil is the general classification for heavy oils that remain after lighter oils are distilled away in the process of petroleum refining. Residual Fuel Oil includes No. 5 and No. 6 fuel oils. The former is used in steam-powered vessels, and the latter is used for electric power generation, space heating, vessel bunkering and industrial processes.
- Other Oils include aviation gasoline blending components, finished aviation gasoline, kerosene, petrochemical feedstocks, special napthas, lubricants, waxes, petroleum coke, asphalt and road oil, still gas and miscellaneous products.

(58) Natural Gas Underground Storage Capacity

- Source: U.S. Energy Information Administration.
- Underground Storage Capacity refers to total natural gas storage capacity in underground storage facilities called "salt domes," which are caverns hollowed out in subsurface salt formations. Salt domes are the primary means of natural gas storage in the United States.

U.S. Underground Natural Gas Storage Facilities by Type (July 2015)



(59) Commercial Crude Oil Refinery, Tank and Underground Storage Capacity and Utilization

- Source: U.S. Energy Information Administration.
- Commercial Crude Oil Storage Capacity refers to working storage capacity. Working capacity is the volume difference between a crude oil storage tank's maximum safe fill capacity and the volume below which pump suction is ineffective, called tank bottoms.
- Crude Oil Shell Storage Capacity is the design capacity of a petroleum storage tank. It includes tank bottoms, working storage capacity and contingency space. Contingency space is defined as available storage space above the defined maximum operating inventory level that remains empty during normal operations. Shell Storage Capacity is always greater than or equal to working storage capacity.
- Crude Oil Storage Capacity data is released only twice per year for the months of March and September. Thus, the data series excludes inventory levels for all months other than March and September of each year.

(60) Crude Oil and Natural Gas Pipeline Mileage

- Source: Pipeline and Hazardous Materials Safety Administration.
- The chart includes information from only Federal Energy Regulatory Commission-regulated pipeline companies.
- Crude Oil Pipeline Mileage represents total mileage of pipelines dedicated to the transport of crude oil and those dedicated to the transport of petroleum products. Pipeline Mileage for crude oil includes trunk lines only.
- Pipeline Mileage for natural gas includes both trunk and gathering lines.
- Trunk lines are synonymous with transmission lines, which are large, cross-country pipelines that move oil or gas from producing areas to refineries. Gathering lines are pipelines that transport oil or gas from the area in which it was produced to a storage facility which acts as an intermediate stop before transportation by truck, railcar, or trunk line.

(61) Crude Oil and Petroleum Products Pipeline Movements Between Petroleum Administration for Defense Districts (PADDs)

- Source: Federal Reserve Bank of St. Louis, with data provided by the U.S. Energy Information Administration.
- Crude Oil and Petroleum Products Pipeline Movements Between PADDs represents the total volume of crude oil and petroleum products transported between each PADD. The data does not include movements within each PADD.

DATA CENTER: ABBREVIATIONS & ACRONYMS, DEFINITIONS, DESCRIPTIONS AND CHART NOTES

(62) Natural Gas Cumulative Interstate Pipeline Systems Capacity

- Source: U.S. Energy Information Administration.
- Cumulative Interstate Capacity refers to capacity of natural gas pipelines crossing between states. Thus, capacity of intrastate pipelines is not included and the data should not be interpreted as representing total capacity of natural gas pipelines.

(63) Crude Oil and Petroleum Products Exports to Mexico

- Source: U.S. Energy Information Administration.
- Petroleum Products include pentanes plus, liquefied petroleum gases, unfinished oils, finished motor gasoline, motor gasoline blending components, oxygenates, fuel ethanol, distillate fuel oil, kerosene, kerosene-type jet fuel, special napthas, residual fuel oil, waxes, petroleum coke, asphalt and road oil, lubricants and miscellaneous products.

(64) Truck Tonnage Index

- Source: U.S. Department of Transportation, Bureau of Transportation Statistics.
- The Truck Tonnage Index measures the gross tonnage of freight that is transported by motor carriers for a given month. The Index serves as an indicator of shipping activity in the United States.
- Created by the U.S. Department of Transportation, Bureau of Transportation Statistics via information published in the American Trucking Association (ATA) Monthly Truck Tonnage Report.
- In January 2018, ATA revised the seasonally adjusted index back five years as part of its annual revision. In addition, ATA re-indexed the seasonally adjusted and not seasonally adjusted tonnage indexes to 2015 = 100 back to 1973.

(65) Heavy Truck Sales

- Source: Federal Reserve Bank of St. Louis.
- Heavy Trucks are trucks with more than 14,000 pounds gross vehicle weight.

(66) Trucking Conditions Index

- Source: FTR Transportation Intelligence.
- The Trucking Conditions Index summarizes the status of the trucking industry through tracking changes in six major conditions including freight volumes, freight rates, fleet capacity, fleet bankruptcies, fuel price and financing.
- An index value greater than zero represents a positive environment in the truck market, and an index value below zero represents a negative environment. An index value above 10 is a sign that volumes, prices and margin are in a solidly favorable range.

(67) Freight Transportation Services Index

- Source: Federal Reserve Bank of St. Louis.
- The Freight Transportation Services Index measures the output of the for-hire freight transportation industry and consists of data from for-hire trucking, rail, inland waterways, pipelines and air freight.

(68) Crude Oil Refinery Receipts by Transportation Method

- Source: U.S. Energy Information Administration.
- Refinery Receipts by Pipeline, Tanker, Barge, Truck and Rail refer to total volumes of crude oil of domestic and international origin that are in transit to, or received by, domestic refineries. Volumes of crude oil in transit via pipeline are excluded from receipts. Foreign crude oil is included in receipts only after entry through customs.
- Refinery inputs track volumes of crude oil that are entered into refining processes (e.g., distillation units, cokers, etc.).
- The volume difference between refinery receipts and refinery inputs is that which is in transit but not yet received by refineries plus that which has been received and is held in bonded storage, awaiting entry into refining processes.

(69) Crude Oil Movements by Tanker and Barge Movements Between Petroleum Administration for Defense Districts (PADDs)

- Source: U.S. Energy Information Administration.
- The data series shown on the chart is an aggregate of all crude oil movements between Petroleum Administration for Defense Districts (PADDs). This includes crude oil movement from PADD 1 to PADD 2 and PADD 3; PADD 2 to PADD 1 and PADD 3; and PADD 3 to PADD 1, PADD 2 and PADD 5.
- PADD 1 is the East Coast region, PADD 2 is the Midwest region, PADD 3 is the Gulf Coast region and PADD 5 is the West Coast region.

DATA CENTER: ABBREVIATIONS & ACRONYMS, DEFINITIONS, DESCRIPTIONS AND CHART NOTES

(70) Movements of Crude Oil by Rail
- Source: U.S. Energy Information Administration.

(71) Average Weekly Rail Carloads of Petroleum and Petroleum Products
- Source: Association of American Railroads.
- Monthly aggregates of the average weekly number of rail carloads transporting petroleum and petroleum products in the United States.
- Excludes the U.S. operations of Canadian railroads.

(72) U.S. Manufacturers' Monthly Shipments and U.S. Purchasing Managers' Index (PMI)
- Sources: For Manufacturers' Monthly Shipments - U.S. Census Bureau Manufacturers' Shipments, Inventories and Orders Survey; and for U.S. Purchasing Managers' Index (PMI) – Institute for Supply Management Manufacturing Report on Business®.
- A PMI above 50 represents expansion within the manufacturing sector compared with the prior month.

(73) U.S. New Housing Starts and Total U.S. Construction Spending
- Source: U.S. Census Bureau.

(74) London Interbank Offered Rate (LIBOR), Based on U.S. Dollar
- Source: ICE Benchmark Administration Limited via the Federal Reserve Bank of St. Louis.
- The London Interbank Offered Rate is the average interest rate at which leading banks borrow funds of a sizeable amount from other banks in the London market. LIBOR is the most widely used benchmark or reference rate for short term interest rates. The chart values are monthly percent averages of daily figures and are not seasonally adjusted.

(75) Bank Prime Loan Interest Rates
- Source: Federal Reserve Bank of St. Louis.
- The Bank Prime Loan Interest Rate is that posted by a majority of top 25 (by assets in domestic offices) insured, U.S.-chartered commercial banks. Prime is one of several base rates used by banks to price short-term business loans.
- The chart values are monthly percent averages of daily figures and are not seasonally adjusted.

(76) Commercial and Industrial Loans vs. Banking Standards
- Source: Federal Reserve Bank of St. Louis.
- Net Percentage of Domestic Banks Tightening Standards for Commercial and Industrial Loans to large and middle-market firms. Quarterly, not seasonally adjusted.
- Commercial and Industrial Loans, All Commercial Banks. Monthly, seasonally adjusted.

(77) U.S. Treasury Yield Curve
- Source: U.S. Treasury.
- U.S. Treasury Yield Curve rates are commonly referred to as Constant Maturity Treasury (CMT) rates. Yields are interpolated by the U.S. Treasury from the daily yield curve.
- The curve, which relates the yield on a security to its time to maturity, is based on the closing market bid yields on actively traded U.S. Treasury securities in the over-the-counter market.

(78) Corporate Spreads to Treasuries by Quality
- Source: Federal Reserve Bank of St. Louis.
- Corporate Spreads to Treasuries represent the spread, or difference, between the yield curve of an index of corporate bonds of a given rating category and the spot rate U.S. Treasury curve. The spot rate U.S. Treasury curve is a yield curve that uses U.S. Treasury spot rates rather than yields, and represents the rate for a zero-coupon U.S. Treasury bond.
- The corporate bond yield indexes are Bank of America Merrill Lynch Option-Adjusted Spread (OAS) Indexes for all bonds with a given investment rating of AA, BB or CCC or below that are publically issued in the U.S. domestic market. Each respective OAS index is calculated using each constituent bond's OAS, weighted by market capitalization. A bond's OAS is the bond's yield spread relative to the risk-free rate of return, typically the U.S. Treasury securities yield, adjusted to account for an embedded option.

HOT TOPICS

ALL EYES ON FERC TO GREENLIGHT NATURAL GAS EXPORTS

The Federal Energy Regulatory Commission (FERC) recently announced accelerated schedules for final permitting decisions on 12 pending liquefied natural gas export projects. All are now slated for Commission certificate decisions during 2019 and early 2020.

We pay close attention to this for two reasons: (1) LNG exports will drive major increases in U.S. natural gas production, delivering big opportunities to the upstream supply chain; and (2) each LNG project requires substantial investment in added pipeline capacity needed to feed the new LNG trains.

Announcing a decision timetable does not mean FERC will approve the project. Approval requires a favorable vote by a majority of FERC Commissioners – nominally a roster of five. Three are appointed by the political party in power at the White House, and two by the minority party. Recently, one of the Republican-appointed Commissioners resigned, leaving the Commission spilt 2-2. Given the polarization of natural gas politics, it's not inconceivable that any given project approval might fail on a 2-2 tie. A new FERC Commissioner candidate, once submitted by the White House, must be confirmed by 60 votes in the Senate – in today's political environment a heavy lift.

That's one of the principal sources of uncertainty in the numbers that follow. The other is whether U.S. producers can lock up enough of growing global demand to absorb the new capacity. Part of that answer lies in whether U.S. projects can be completed before those planned by foreign competitors.

Here are the metrics. If all 12 projects are approved, built and operated at capacity, by the late 2020s they would add another 22 billion cubic feet per day (bcf/d) to global LNG supply. That's on top of 5 U.S. projects now under construction with 8 bcf/d slated for service between 2019 and 2022, and 4 more already permitted but not yet under construction with another 7 bcf/d of capacity.

That's 37 bcf/d of new capacity. Bloomberg predicts a capacity utilization rate in the 85% range, which would bring growth of U.S. natural gas input and LNG output to about 30 bcf/d. For perspective, that's more than the current natural gas output from the Marcellus and Utica shales combined. If that much new gas can be produced and can find global customers, U.S. natural gas production from shale, now at 56 bcf/d, would increase more than 50% by 2030, even before adding in growing pipeline exports to Mexico and increased U.S. consumption.

On the demand side, the new capacity would be chasing a global LNG market that will grow from 42 bcf/d today to 52 bcf/d in 2023[1] to 65 bcf/d in 2030, of which 39 bcf/d is now uncontracted[2]. Bloomberg also estimates that project developers will need to reach final investment decisions (FID) by 2020 to be able to sign supply contracts and have projects built and operating in time to fill post-2025 demand. With a FERC permit necessary for FID, the 2019/2020 approvals would come in the nick of time. Meanwhile other LNG producers outside the U.S., especially in Australia and Qatar, are also trying to ramp up to compete for the same uncontracted demand.

(1) S&P Global Platts.
(2) Bloomberg.

HOT TOPICS

ALL EYES ON FERC TO GREENLIGHT NATURAL GAS EXPORTS (CONTINUED)

On the pipeline side, seven major pipeline projects are integral to their related LNG projects and therefore are also dependent on the FERC permits. They add up to 678 miles of large-diameter pipe, all in Texas and Louisiana except for the Pacific Connector in Oregon feeding the Jordan Cove project.

From this one can see the enormous importance of the coming battle for confirmation of the President's FERC Commissioner nominee to natural gas production, supply chain businesses, export infrastructure and pipeline construction.

THE WORLD'S LARGEST OIL AND GAS PRODUCER IS NOW ... THE UNITED STATES

The United States has surpassed Russia and Saudi Arabia to become the world's largest producer of crude oil for the first time since 1973 according to preliminary estimates from the Energy Information Administration (EIA).

The United States energy industry's achievement is owed largely to the U.S. shale boom. Shale is a fine-grained sedimentary rock, classified as a "mudstone," that can contain immense quantities of hydrocarbons trapped within the pore spaces littered throughout its body. Prevailing drilling technology pre-boom rendered the extraction of shale-based hydrocarbons economically unfeasible until around 2008, when two technologies coalesced to catalyze the boom that has propelled the United States back atop the global crude oil production landscape. These processes are horizontal drilling and hydraulic fracturing, or "fracking." In short, horizontal drilling allows a wellbore to access a much larger fraction of a given hydrocarbon deposit, and hydraulic fracturing allows for the hydrocarbons in these deposits, usually shale formations, to travel from pore spaces in which they were previously trapped into the wellbore.

HOT TOPICS

THE WORLD'S LARGEST OIL AND GAS PRODUCER IS NOW ... THE UNITED STATES (CONTINUED)

These advancements in drilling technology changed the game through allowing economical extraction of shale-based hydrocarbons, even in low oil price environments. Therefore, these technologies unlocked America's shale resources, the largest in the world, which could contain up to 3.7 trillion total barrels of oil and natural gas, as estimated by the World Energy Council's 2010 Survey of Energy Resources.

United States crude oil and natural gas production surged after 2008, with the period between 2008 and 2015 marking the largest oil production increase in U.S. history. During the period, production increased by approximately six million barrels per day, and the U.S. became the world's largest natural gas producer. This increased level of production prompted the Organization of Petroleum Exporting Countries, or "OPEC," to engage in an oil price war in 2014 to regain lost market share, which saw prices and production wither. However, the resilience of American drillers and an early-2016 rebound in oil prices gave rise to another production spike which has withstood a turbulent geopolitical environment and empowered the United States' recent coup on the oil production throne.

In June and August of this year, domestic oil production reached 11 million barrels per day. EIA forecasts for 2019 suggest that the U.S. will export 11.5 million barrels per day throughout the year, which would continue to top expected output from Russia and Saudi Arabia. Much of current production growth is centered in the Permian basin of western Texas and eastern New Mexico, the Gulf of Mexico, and the Bakken region in North Dakota and Montana. Texas alone is forecasted to produce more oil than Iraq or Iran in 2019, which would make the territory the third-largest producer of crude oil in the world were it a country.

While the U.S. is still dependent on foreign oil and is thus exposed to geopolitical events' contributions to price volatility, U.S. production has grappled leverage away from other major players in the global market. For example, American producers' ability to weather OPEC's price war and continue to gain market share in a low-price environment prompted an unprecedented strategic shift on the part of OPEC when, in 2016, it united with Russia and agreed to collectively cut production to upwardly manipulate prices. This strategy was effective, and the fact that OPEC was moved to partner with Russia to exert desired market influence demonstrates the United States' newfound clout in the global oil landscape. Domestic production has also served to dampen security concerns through diminishing our reliance on foreign oil, again bolstering the degree of leverage held by Washington in the geopolitical arena. The U.S.'s newfound status as 'the world's most productive' provides Washington with an asset in the country's geopolitical agenda.

PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

PETROLEUM PRODUCTS

EQUITY COMPARABLES (1)

Petroleum Products (United States & Canada)

Company	LTM(2) Revenues	LTM(2) EBITDA	LTM(2) Margin	Stock Price 06/30/18	% of 52-Week High	Market Cap	Total Enterprise Value(3)	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt(4)/ EBITDA
Andeavor	42,776	3,433	8.0	131.18	86.4	19,818	31,639	0.7x	9.2x	2.4x
Calumet Specialty Products Partners, LP	3,606	204	5.7	7.45	74.9	574	2,540	0.7x	12.5x	8.2x
Chevron Corporation	142,991	26,283	18.4	126.43	94.4	241,602	276,053	1.9x	10.5x	1.2x
CVR Energy, Inc.	6,497	519	8.0	36.99	77.6	3,212	4,759	0.7x	9.2x	1.2x
EnLink Midstream Partners, LP	6,704	995	14.8	15.53	83.6	5,439	11,322	1.7x	11.4x	4.0x
Gibson Energy Inc.	5,152	211	4.1	13.33	90.5	1,917	2,895	0.6x	13.7x	4.5x
Exxon Mobil Corporation	263,395	36,849	14.0	82.73	92.6	350,265	393,473	1.5x	10.7x	1.0x
HollyFrontier Corporation	16,312	2,101	12.9	68.43	82.2	11,984	14,162	0.9x	6.7x	0.7x
Keyera Corp.	3,006	529	17.6	27.81	89.2	5,753	6,944	2.3x	13.1x	2.8x
Marathon Petroleum Corporation	73,957	6,580	8.9	70.16	84.2	32,405	49,885	0.7x	7.6x	1.9x
Parkland Fuel Corporation	9,956	506	5.1	24.56	97.6	3,238	4,763	0.5x	9.4x	3.0x
Phillips 66	101,231	4,166	4.1	112.31	91.8	52,318	65,474	0.6x	15.7x	2.3x
NuStar Energy LP	1,853	633	34.2	22.65	47.2	2,120	6,609	3.6x	10.4x	5.4x
Valero Energy Corporation	101,557	6,348	6.3	110.83	87.3	47,759	53,106	0.5x	8.4x	0.7x
Median			**8.5%**		**86.8%**			**0.7x**	**10.5x**	**2.4x**
Mean			**11.6%**		**84.2%**			**1.2x**	**10.6x**	**2.8x**

SELECTED TRANSACTIONS

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
8/1/2018	Energy Transfer Partners, LP (NYSE:ETP)	Energy Transfer Equity, LP (NYSE:ETE)	$69,412.3	2.1x	10.8x
4/30/2018	Andeavor (NYSE:ANDV)	Marathon Petroleum Corporation (NYSE:MPC)	$35,103.0	0.9x	12.7x
11/8/2017	Alon USA Partners, LP	Delek US Holdings, Inc. (NYSE:DK)	$1,050.4	0.5x	5.9x
2/2/2017	ONEOK Partners, LP	ONEOK, Inc. (NYSE:OKE)	$23,722.4	2.7x	12.9x
4/5/2017	Houghton International Inc.	Quaker Chemical Corporation (NYSE:KWR)	$1,415.4	-	11.8x
10/14/2016	Alon USA Energy, Inc.	Delek US Holdings, Inc. (NYSE:DK)	$1,488.1	0.3x	16.6x
9/25/2016	LANXESS Solutions US Inc.	LANXESS Deutschland GmbH	$2,450.7	-	8.2x

(1) Matching public companies to middle-market companies is an imperfect comparable analysis due to the variables of size, equipment, markets, etc. Nonetheless JKC's research has yielded this list as the closest available.
(2) LTM is defined as last twelve months.
(3) Total Enterprise Value is defined as market capitalization plus total debt less cash and cash equivalents.
(4) Net Debt is defined as total debt less cash and cash equivalents.

PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

NATURAL GAS

EQUITY COMPARABLES (1)

Natural Gas (United States & Canada)

Company	LTM[2] Revenues	LTM[2] EBITDA	LTM[2] Margin	Stock Price 06/30/18	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Alliant Energy Corporation	$3,495	$1,178	33.7%	$42.32	92.9%	$9,796	$15,321	4.4x	13.0x	4.7x
AltaGas Ltd.	2,126	552	25.9	20.64	90.3	3,711	7,472	3.5x	13.5x	3.7x
Atmos Energy Corporation	3,136	1,078	34.4	90.14	96.3	10,011	13,224	4.2x	12.3x	3.1x
Avista Corporation	1,424	453	31.8	52.66	99.6	3,458	5,323	3.7x	11.7x	4.2x
Baytex Energy Corp.	700	266	38.1	3.32	70.1	786	2,096	3.0x	7.9x	5.0x
Calumet Specialty Products Partners, LP	3,606	204	5.7	7.45	74.9	574	2,540	0.7x	12.5x	8.2x
Cenovus Energy Inc.	15,135	1,546	10.2	10.38	93.2	12,751	19,880	1.3x	12.9x	4.7x
Chesapeake Utilities Corporation	683	137	20.1	79.95	92.6	1,308	1,763	2.6x	12.9x	3.5x
Corning Natural Gas Holding Corporation	34	9	26.1	17.40	81.9	52	105	3.1x	12.0x	5.5x
Crestwood Equity Partners LP	4,158	276	6.6	31.75	89.1	2,262	4,514	1.1x	16.4x	5.6x
Dominion Energy Midstream Partners, LP	592	349	58.9	13.60	39.0	1,287	6,912	11.7x	19.8x	2.1x
EnLink Midstream Partners, LP	6,704	995	14.8	15.53	83.6	5,439	11,322	1.7x	11.4x	4.0x
Enbridge Energy Partners, LP	2,356	1,486	63.1	10.93	65.7	4,661	17,300	7.3x	11.6x	5.0x
Enterprise Products Partners LP	33,080	5,369	16.2	27.67	93.3	60,117	85,612	2.6x	15.9x	4.8x
Epsilon Energy Ltd.	24	13	55.3	2.13	83.3	117	108	4.5x	8.1x	(0.8)x
Eversource Energy	8,026	2,619	32.6	58.61	88.6	18,573	32,587	4.1x	12.4x	5.4x
Genesis Energy, LP	2,684	521	19.4	21.91	67.2	2,686	7,158	2.7x	13.7x	7.2x
National Fuel Gas Company	1,590	727	45.7	52.96	88.4	4,551	6,408	4.0x	8.8x	2.4x
New Jersey Resources Corporation	2,804	287	10.2	44.75	98.5	3,926	5,236	1.9x	18.2x	4.6x
Northwest Natural Gas Company	720	236	32.7	63.80	91.8	1,836	2,633	3.7x	11.2x	3.4x
MDU Resources Group, Inc.	4,479	638	14.3	28.68	98.0	5,601	7,322	1.6x	11.5x	2.8x
OGE Energy Corp.	2,278	821	36.0	35.21	94.3	7,033	10,224	4.5x	12.4x	3.9x
ONE Gas, Inc.	1,641	449	27.3	74.74	94.0	3,922	5,353	3.3x	11.9x	3.0x
ONEOK, Inc.	12,761	2,044	16.0	69.83	98.4	28,705	36,832	2.9x	18.0x	4.0x
RGC Resources, Inc.	66	18	27.9	29.18	92.4	233	283	4.3x	15.4x	3.0x
South Jersey Industries, Inc.	1,322	366	27.7	33.47	91.9	2,800	4,288	3.2x	11.7x	8.4x
Southwest Gas Holdings, Inc.	2,759	581	21.1	76.27	87.8	3,688	5,665	2.1x	9.8x	3.5x
Summit Midstream Partners, LP	496	262	52.7	15.40	62.2	1,130	2,557	5.2x	9.8x	4.4x
Targa Resources Corp.	9,735	1,182	12.1	49.49	95.0	10,862	17,108	1.8x	14.5x	4.5x
TransCanada Corporation	10,211	5,395	52.8	43.24	87.3	39,077	76,948	7.5x	14.3x	6.4x
Valener Inc	50	0	0.0	15.37	86.9	601	749	14.9x	NM	NM
Median			**27.3%**		**90.3%**			**3.3x**	**12.4x**	**4.3x**
Mean			**28.1%**		**86.1%**			**4.0x**	**12.8x**	**4.3x**

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PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

NATURAL GAS

SELECTED TRANSACTIONS (1)

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
5/17/2018	Williams Partners LP (NYSE:WPZ)	The Williams Companies, Inc. (NYSE:WMB)	$57,052.1	7.0x	14.1x
4/25/2018	Rice Midstream Partners LP (NYSE:RMP)	EQT Midstream Partners, LP (NYSE:EQM)	$2,443.1	7.7x	9.9x
11/1/2017	Southcross Energy Partners, LP (NYSE:SXE)	American Midstream Partners, LP (NYSE:AMID)	$624.1	1.0x	14.8x
7/19/2017	Avista Corporation (NYSE:AVA)	Hydro One Limited (TSX:H)	$5,332.4	3.7x	11.3x
5/15/2017	Ceiba Energy Services Inc. (TSXV:CEB)	Secure Energy Services Inc. (TSX:SES)	$28.2	4.3x	30.3x
4/3/2017	Rockies Express Pipeline LLC	Tallgrass Energy Partners, LP (NYSE:TEP)	$4,043.9	-	7.3x
2/21/2017	Delta Natural Gas Company, Inc. (NasdaqGS:DGAS)	PNG Companies LLC	$260.2	3.7x	13.7x
2/1/2017	ONEOK Partners, LP	ONEOK, Inc. (NYSE:OKE)	$23,721.4	2.3x	12.9x
1/25/2017	WGL Holdings, Inc. (NYSE:WGL)	AltaGas Ltd. (TSX:ALA)	$6,634.5	2.7x	15.3x

(1) Total Enterprise Value is defined as market capitalization plus total debt less cash and cash equivalents.

PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

PROPANE AND HEATING/FUEL OIL

EQUITY COMPARABLES (1)

Propane and Heating/Fuel Oil (United States & Canada)

Company	LTM[2] Revenues	LTM[2] EBITDA	LTM[2] Margin	Stock Price 06/30/18	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
AmeriGas Partners, LP	$2,801	$635	22.7%	$42.22	87.3%	$3,925	$6,700	2.4x	10.6x	4.3x
Ferrellgas Partners, LP	2,159	231	10.7	3.36	58.4	326	2,348	1.1x	10.2x	9.1x
NGL Energy Partners LP	19,396	351	1.8	12.50	70.8	1,520	4,507	0.2x	12.9x	8.6x
Spire Inc.	1,985	464	23.4	70.65	85.3	3,558	6,117	3.1x	13.2x	5.1x
Star Group, LP	1,630	107	6.5	9.80	86.3	529	679	0.4x	6.4x	0.9x
Suburban Propane Partners, LP	1,349	287	21.3	23.49	86.8	1,442	2,721	2.0x	9.5x	4.4x
UGI Corporation	7,492	1,619	21.6	52.07	99.2	9,014	13,768	1.8x	8.5x	2.4x
Median			**21.3%**		**86.3%**			**1.8x**	**10.2x**	**4.4x**
Mean			**15.4%**		**82.0%**			**1.6x**	**10.2x**	**5.0x**

SELECTED TRANSACTIONS

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
5/30/2018	NGL Propane, LLC	Superior Plus Energy Services, Inc.	$900.0	-	10.6x
5/11/2018	Home Service Oil Co Inc.		-	-	-
2/14/2018	Propane Distribution Assets and the Fuels and Lubricants Business of Hi-Grade Oil Co.	Superior Plus Energy Services, Inc.	-	-	-
8/8/2017	Dixie Fuel Company, Inc.	Revere Gas Inc.	-	-	-
5/11/2017	Bell-Gaz Itée	Groupe Filgo-Sonic	-	-	-
3/15/2017	Valley Center Propane, LLC	Ferrellgas Partners, LP (NYSE:FGP)	-	-	-
12/2/2016	DOC Retail, Inc.	Holston Gases, Inc.	-	-	-
11/22/2016	Zephyr Solutions, Inc.	Aterian Investment Partners, LLC	-	-	-
10/11/2016	33 MMcf/d Gas-Processing Facility with Pipelines and Retail Propane Business	Noble Energy Partners	-	-	-
6/17/2016	Caledon Propane Inc.	Superior Plus Corp. (TSX:SPB)	-	-	-
6/15/2016	Selph's Propane, Inc.	Ferrellgas Partners, LP (NYSE:FGP)	-	-	-
1/15/2016	Hopatcong Gas Services Inc.	Combined Energy Services, Inc.	-	-	-

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PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

DRILLING

EQUITY COMPARABLES (1)

Drilling (United States & Canada)

Company	LTM[2] Revenues	LTM[2] EBITDA	Margin	Stock Price 06/30/18	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
AKITA Drilling Ltd.	$60	($9)	(15.3)%	$4.21	66.1%	$77	$79	1.3x	NM	NM
Baker Hughes, a GE company	22,127	2,420	10.9	33.03	57.2	13,754	39,438	1.8x	16.3x	1.0x
CES Energy Solutions Corp.	855	102	12.0	3.41	61.2	917	1,245	1.5x	12.1x	3.0x
Diamond Offshore Drilling, Inc.	1,249	398	31.9	20.86	95.2	2,867	4,410	3.5x	11.1x	3.9x
Ensco plc	1,790	348	19.4	7.26	95.5	3,174	7,294	4.1x	21.0x	12.2x
Ensign Energy Services Inc.	790	159	20.1	4.46	75.0	701	1,253	1.6x	7.9x	3.6x
Halliburton Company	23,271	4,377	18.8	45.06	77.9	39,471	48,059	2.1x	11.0x	1.9x
Helmerich & Payne, Inc.	2,323	548	23.6	63.76	85.0	6,942	7,056	3.0x	12.9x	0.3x
Independence Contract Drilling, Inc.	100	12	12.5	4.12	75.2	158	209	2.1x	16.8x	4.6x
National Oilwell Varco, Inc.	7,705	629	8.2	43.40	96.3	16,580	18,126	2.4x	28.8x	2.5x
Precision Drilling Corporation	1,059	244	23.1	3.31	81.6	970	2,258	2.1x	9.2x	5.1x
Rowan Companies plc	1,041	253	24.3	16.22	93.6	2,058	3,355	3.2x	13.3x	5.4x
Secure Energy Services Inc.	2,067	116	5.6	5.52	73.9	908	1,175	0.6x	10.2x	2.3x
Trinidad Drilling Ltd.	419	92	22.1	1.42	88.6	389	807	1.9x	8.7x	3.8x
Unit Corporation	802	305	38.0	25.56	95.3	1,381	2,185	2.7x	7.2x	1.8x
Xtreme Drilling Corp.	60	4	6.1	1.62	88.7	121	129	2.1x	34.8x	3.3x
Median			**19.1%**		**83.3%**			**2.1x**	**12.1x**	**3.3x**
Mean			**16.3%**		**81.6%**			**2.3x**	**14.8x**	**3.7x**

SELECTED TRANSACTIONS

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
8/13/2018	Trinidad Drilling Ltd. (TSX:TDG)	Ensign Energy Services Inc. (TSX:ESI)	$714.0	1.7x	8.5x
2/15/2018	Layne Christensen Company (NasdaqGS:LAYN)	Granite Construction Incorporated (NYSE:GVA)	$491.9	1.0x	16.5x
5/31/2017	Atwood Oceanics, Inc. (NYSE:ATW)	Ensco plc (NYSE:ESV)	$1,760.6	2.2x	4.7x
5/19/2017	Savanna Energy Services Corp.	Total Energy Services Inc. (TSX:TOT)	$458.2	1.4x	16.6x
12/12/2016	Seventy Seven Energy Inc.	Patterson-UTI Energy, Inc. (NasdaqGS:PTEN)	$1,878.9	-	18.8x
11/23/2016	Savanna Energy Services Corp.	Total Energy Services Inc. (TSX:TOT)	$362.5	1.4x	13.3x
5/19/2016	FMC Technologies, Inc.	TechnipFMC plc (NYSE:FTI)	$6,803.9	-	8.4x

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PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

LUBRICANTS AND GREASES

EQUITY COMPARABLES (1)

Lubricants and Greases (United States & Canada)

Company	LTM[2] Revenues	LTM[2] EBITDA	LTM[2] Margin	Stock Price 06/30/18	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Albemarle Corporation	$3,288	$938	28.5%	$94.33	65.1%	$10,448	$11,375	3.5x	12.1x	0.8x
Ashland Global Holdings Inc.	3,667	615	16.8	78.18	96.7	4,879	7,292	2.0x	11.9x	3.8x
Clean Harbors, Inc.	3,102	449	14.5	55.55	95.3	3,121	4,526	1.5x	10.1x	3.1x
CSW Industrials, Inc.	327	68	20.8	52.85	94.0	837	850	2.6x	12.5x	0.1x
FMC Corporation	4,099	1,143	27.9	89.21	90.4	12,000	14,991	3.7x	13.1x	2.4x
Ingevity Corporation	1,037	281	27.1	80.86	95.3	3,403	4,109	4.0x	14.6x	2.4x
KMG Chemicals, Inc.	439	111	25.2	73.78	93.0	1,144	1,446	3.3x	13.1x	2.7x
Kraton Corporation	2,018	370	18.3	46.14	85.5	1,472	3,056	1.5x	8.3x	4.3x
NewMarket Corporation	2,297	374	16.3	404.50	86.0	4,768	5,320	2.3x	14.2x	1.7x
Ocean Bio-Chem, Inc.	41	5	11.4	3.59	62.9	33	35	0.9x	7.5x	0.9x
Quaker Chemical Corporation	858	118	13.7	154.87	93.3	2,063	2,047	2.4x	17.4x	(0.2)x
Stepan Company	1,981	229	11.6	78.01	83.9	1,766	1,814	0.9x	7.9x	0.1x
Synalloy Corporation	238	21	8.8	19.95	93.4	175	208	0.9x	9.9x	2.5x
Trecora Resources	267	27	10.3	14.85	98.3	361	466	1.7x	17.0x	3.7x
Valvoline Inc.	2,238	563	25.2	21.57	84.2	4,221	5,300	2.4x	9.4x	2.0x
Median			**16.8%**		**93.0%**			**2.3x**	**12.1x**	**2.4x**
Mean			**18.4%**		**87.8%**			**2.2x**	**11.9x**	**2.0x**

SELECTED TRANSACTIONS

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
5/22/2017	Huntsman Corporation (NYSE:HUN)	Clariant AG (SWX:CLN)	$10,790.9	1.1x	9.6x
4/5/2017	Houghton International Inc.	Quaker Chemical Corporation (NYSE:KWR)	$1,415.4	1.8x	11.8x
1/31/2017	Sealweld Corporation	KMG Electronic Chemicals Luxembourg Holdings Sarl; KMG Industrial Lubricants	$17.3	1.4x	6.6x
9/25/2016	LANXESS Solutions US Inc.	LANXESS Deutschland GmbH	$2,450.7	1.4x	8.2x
4/1/2015	Valves Inc. of Texas	KMG Chemicals, Inc. (NYSE:KMG)	$38.9	3.2x	11.4x

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PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

SOLAR

EQUITY COMPARABLES (1)

Solar (United States & Canada)

Company	LTM[2] Revenues	LTM[2] EBITDA	LTM[2] Margin	Stock Price 06/30/18	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Boralex Inc.	$347	$217	62.5%	$16.01	84.1%	$1,222	$3,364	9.7x	15.5x	11.0x
Capital Power Corporation	850	496	58.4	19.18	95.2	1,975	3,571	4.2x	7.2x	3.1x
NextEra Energy Partners, LP	827	547	66.1	46.67	95.7	2,535	7,806	9.4x	14.3x	5.5x
NRG Energy, Inc.	10,889	2,738	25.1	30.70	87.3	9,667	27,752	2.5x	10.1x	5.4x
TerraForm Power, Inc.	596	366	61.4	11.70	82.4	2,446	6,639	11.1x	18.1x	15.6x
Vivint Solar, Inc.	291	(18)	(6.2)	4.95	81.2	571	1,658	5.7x	NM	NM
Median			**59.9%**		**85.7%**			**7.6x**	**14.3x**	**5.5x**
Mean			**44.6%**		**87.7%**			**7.1x**	**13.0x**	**8.1x**

SELECTED TRANSACTIONS

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
2/5/2018	8point3 Energy Partners LP (NasdaqGS:CAFD)	Capital Dynamics, Inc.	$1,671.3	23.8x	17.0x
12/11/2017	Canadian Solar Inc. (NasdaqGS:CSIQ)	Shawn (Xiaohua) Qu and Hanbing Zhang	$3,109.4	1.1x	15.4x
5/4/2017	Up To 20 Megawatts Of Solar Energy Power Generation Assets	Kontrol Energy Corp. (CNSX:KNR)	$22.6	-	4.1x
3/7/2017	TerraForm Global, Inc. (NasdaqGS:GLBL)	Orion US Holdings 1 LP	$1,651.8	6.6x	17.2x
1/20/2016	Capstone Infrastructure Corp.	Irving Infrastructure Corp.	$1,435.1	-	12.7x

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PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

WIND

EQUITY COMPARABLES (1)

Wind (United States & Canada)

Company	LTM[2] Revenues	LTM[2] EBITDA	LTM[2] Margin	Stock Price 06/30/18	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Algonquin Power & Utilities Corp.	$1,606	$637	39.6%	$9.66	88.2%	$4,559	$9,063	5.6x	14.2x	5.5x
Avangrid, Inc.	6,141	1,870	30.5	52.93	97.0	16,356	22,535	3.7x	12.0x	3.1x
Boralex Inc.	347	217	62.5	16.01	84.1	1,222	3,364	9.7x	15.5x	11.0x
Brookfield Renewable Partners LP	2,793	1,708	61.2	30.00	86.8	9,383	27,728	9.9x	16.2x	6.2x
Innergex Renewable Energy Inc.	368	258	70.1	10.50	87.8	1,392	4,509	12.3x	17.5x	10.6x
NextEra Energy Partners, LP	827	547	66.1	46.67	95.7	2,535	7,806	9.4x	14.3x	5.5x
Northland Power Inc.	1,151	843	73.2	18.65	98.7	3,291	9,739	8.5x	11.6x	6.7x
Pattern Energy Group Inc.	444	234	52.8	18.75	70.6	1,840	5,250	11.8x	22.4x	8.9x
TerraForm Power, Inc.	596	366	61.4	11.70	82.4	2,446	6,639	11.1x	18.1x	15.6x
TransAlta Renewables Inc.	333	205	61.6	9.46	79.0	2,481	3,239	9.7x	15.8x	3.7x
Median			**61.5%**		**87.3%**			**9.7x**	**15.7x**	**6.5x**
Mean			**57.9%**		**87.0%**			**9.2x**	**15.8x**	**7.7x**

SELECTED TRANSACTIONS

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
10/30/2017	Alterra Power Corp. (TSX:AXY)	Innergex Renewable Energy Inc. (TSX:INE)	$745.0	10.6x	31.0x
7/28/2017	Boralex Inc. (TSX:BLX)	Caisse de dépôt et placement du Québec	$3,437.5	12.5x	20.3x
6/19/2017	Pattern Energy Group Inc. (NasdaqGS:PEGI)	Public Sector Pension Investment Board	$4,313.7	12.2x	18.6x
3/7/2017	TerraForm Global, Inc. (NasdaqGS:GLBL)	Orion US Holdings 1 LP	$1,651.8	6.6x	17.2x
1/20/2016	Capstone Infrastructure Corp.	Irving Infrastructure Corp.	$1,435.1	-	12.7x

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PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

OIL AND GAS FIELD SERVICES

EQUITY COMPARABLES (1)

Oil and Gas Field Services (United States & Canada)

Company	LTM[2] Revenues	LTM[2] EBITDA	LTM[2] Margin	Stock Price 06/30/18	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Archrock, Inc.	$846	$289	34.2%	$12.00	92.3%	$1,554	$2,932	3.5x	10.1x	5.0x
Baker Hughes, a GE company	22,127	2,420	10.9	33.03	57.2	13,754	39,438	1.8x	16.3x	1.0x
Blueknight Energy Partners, LP	220	63	28.5	3.40	52.7	137	20	0.1x	0.3x	5.6x
CARBO Ceramics Inc.	218	(34)	(15.8)	9.17	72.3	251	279	1.3x	NM	NM
Cathedral Energy Services Ltd.	114	1	1.2	0.88	57.4	44	43	0.4x	30.2x	1.3x
CES Energy Solutions Corp.	855	102	12.0	3.41	61.2	917	1,245	1.5x	12.1x	3.0x
Cypress Energy Partners, LP	288	17	5.9	7.25	85.3	87	171	0.6x	10.1x	3.9x
Dawson Geophysical Company	169	18	10.4	7.90	94.0	181	153	0.9x	8.7x	(2.1)x
Eco-Stim Energy Solutions, Inc.	69	(22)	(32.2)	0.65	37.4	49	55	0.8x	NM	NM
ENGlobal Corporation	54	(5)	(8.8)	1.29	87.8	35	29	0.5x	NM	NM
Enservco Corporation	50	5	10.1	1.16	77.3	60	87	1.7x	17.1x	4.7x
Ensign Energy Services Inc.	790	159	20.1	4.46	75.0	701	1,253	1.6x	7.9x	3.6x
Enterprise Group, Inc.	28	3	12.3	0.36	76.2	20	24	0.9x	7.1x	1.3x
Essential Energy Services Ltd.	145	14	9.6	0.43	69.5	61	86	0.6x	6.2x	1.0x
High Arctic Energy Services Inc.	148	37	25.2	2.90	82.0	152	136	0.9x	3.7x	(0.6)x
Hyduke Energy Services Inc.	32	(7)	(20.7)	0.09	31.5	6	12	0.4x	NM	NM
Innospec Inc.	1,405	176	12.6	76.55	94.4	1,868	2,009	1.4x	11.4x	0.9x
Keane Group, Inc.	2,070	353	17.0	13.67	68.9	1,534	1,721	0.8x	4.9x	0.7x
Matrix Service Company	1,090	33	3.0	18.35	90.6	492	455	0.4x	14.0x	(1.2)x
McDermott International, Inc.	4,020	553	13.8	19.65	72.2	3,533	3,685	0.9x	6.7x	4.8x
Mullen Group Ltd.	888	125	14.1	11.78	87.9	1,221	1,543	1.7x	12.3x	2.7x
Newpark Resources, Inc.	870	90	10.4	10.85	93.1	969	1,096	1.3x	12.1x	1.4x
North American Construction Group Ltd.	263	58	21.9	5.95	84.8	147	245	0.9x	4.2x	1.7x
Parkland Fuel Corporation	9,956	506	5.1	24.56	97.6	3,238	4,763	0.5x	9.4x	3.0x
Pioneer Energy Services Corp.	543	67	12.3	5.85	92.1	453	847	1.6x	12.7x	6.0x
Precision Drilling Corporation	1,059	244	23.1	3.31	81.6	970	2,258	2.1x	9.2x	5.1x
Profire Energy, Inc.	45	9	20.6	3.38	63.8	162	145	3.3x	15.9x	(1.5)x
ProPetro Holding Corp.	1,442	264	18.3	15.68	68.5	1,308	1,379	1.0x	5.2x	0.3x
Secure Energy Services Inc.	2,067	116	5.6	5.52	73.9	908	1,175	0.6x	10.2x	2.3x
Select Energy Services, Inc.	1,228	185	15.1	14.53	66.2	963	1,446	1.2x	7.8x	0.4x
Shawcor Ltd.	1,164	148	12.7	19.40	84.8	1,359	1,377	1.2x	9.3x	0.1x
Smart Sand, Inc.	179	41	22.7	5.31	48.0	220	234	1.3x	5.8x	1.1x
STEP Energy Services Ltd.	534	108	20.1	8.35	68.9	555	535	1.0x	5.0x	2.0x
USA Compression Partners, LP	392	142	36.2	17.05	88.2	1,604	2,394	6.1x	16.9x	5.8x
Xtreme Drilling Corp.	60	4	6.1	1.62	88.7	121	129	2.1x	34.8x	3.3x
Median			**12.3%**		**76.2%**			**1.0x**	**9.4x**	**1.7x**
Mean			**11.2%**		**75.0%**			**1.3x**	**10.9x**	**2.1x**

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PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

EQUIPMENT AND PHYSICAL TECHNOLOGY

EQUITY COMPARABLES (1)

Equipment and Physical Technology (United States & Canada)

Company	LTM[2] Revenues	LTM[2] EBITDA	LTM[2] Margin	Stock Price 06/30/18	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
AKITA Drilling Ltd.	$60	($9)	(15.3)%	$4.21	66.1%	$77	$79	1.3x	NM	NM
Aveda Transportation and Energy Services Inc.	170	13	7.8	0.79	98.1	46	103	0.6x	7.8x	4.4x
CSI Compressco LP	340	78	23.0	5.58	69.3	230	835	2.5x	10.7x	8.1x
Enerflex Ltd.	1,183	145	12.3	10.75	74.0	953	1,132	1.0x	7.8x	0.9x
Exterran Corporation	1,346	196	14.6	25.04	74.3	905	1,274	0.9x	6.5x	2.0x
Gardner Denver Holdings, Inc.	2,602	545	21.0	29.39	77.3	5,822	7,547	2.9x	13.8x	2.9x
Geospace Technologies Corporation	79	(18)	(23.1)	14.06	75.1	191	150	1.9x	NM	NM
Gulf Island Fabrication, Inc.	198	(35)	(17.5)	9.00	64.5	135	139	0.7x	NM	NM
Halliburton Company	23,271	4,377	18.8	45.06	77.9	39,471	48,059	2.1x	11.0x	1.9x
Hanwei Energy Services Corp.	7	(1)	(9.4)	0.02	54.5	4	8	1.2x	NM	NM
Helix Energy Solutions Group, Inc.	695	136	19.6	8.33	93.9	1,234	1,426	2.1x	10.5x	1.2x
ION Geophysical Corporation	177	34	19.4	24.30	74.9	338	406	2.3x	11.8x	2.1x
McCoy Global Inc.	32	(6)	(19.8)	1.04	62.8	29	20	0.6x	NM	NM
Mitcham Industries, Inc.	35	(18)	(52.0)	4.02	88.0	49	55	1.6x	NM	NM
Nabors Industries Ltd.	2,866	664	23.2	6.41	72.3	2,293	6,389	2.2x	9.6x	4.8x
National Oilwell Varco, Inc.	7,705	629	8.2	43.40	96.3	16,580	18,126	2.4x	28.8x	2.5x
Natural Gas Services Group, Inc.	65	23	34.8	23.60	79.9	309	244	3.7x	10.7x	(2.7)x
Parker Drilling Company	463	73	15.8	5.70	26.4	53	514	1.1x	7.0x	6.4x
PHX Energy Services Corp.	202	16	8.0	1.62	81.3	94	107	0.5x	6.6x	0.3x
RigNet, Inc.	221	20	9.1	10.30	52.8	199	235	1.1x	11.7x	2.0x
RPC, Inc.	1,803	446	24.8	14.57	53.8	3,139	3,038	1.7x	6.8x	(0.2)x
Schlumberger Limited	32,215	6,916	21.5	67.03	83.4	92,845	107,194	3.3x	15.5x	2.1x
SEACOR Holdings Inc.	715	131	18.3	57.27	97.1	1,041	1,437	2.0x	11.0x	1.4x
Solaris Oilfield Infrastructure, Inc.	127	72	57.0	14.29	59.6	359	441	3.5x	6.1x	(0.1)x
Strad Energy Services Ltd.	90	18	20.4	1.18	88.6	68	74	0.8x	4.0x	0.3x
Superior Drilling Products, Inc.	18	5	27.6	1.94	83.3	48	58	3.2x	11.5x	1.7x
TechnipFMC plc	13,910	1,817	13.1	31.74	90.7	14,560	12,119	0.9x	6.7x	(1.0)x
TerraVest Industries Inc.	185	24	12.9	7.66	96.8	133	198	1.1x	8.3x	3.0x
TETRA Technologies, Inc.	940	129	13.7	4.45	91.8	559	1,472	1.6x	11.5x	6.1x
Weatherford International plc	5,821	(177)	(3.0)	3.29	69.7	3,279	10,656	1.8x	NM	NM
ZCL Composites Inc.	138	20	14.4	6.58	62.7	203	190	1.4x	9.6x	0.0x
Median			**14.4%**		**75.1%**			**1.6x**	**10.0x**	**1.9x**
Mean			**10.3%**		**75.4%**			**1.7x**	**10.2x**	**2.1x**

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PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

OIL AND GAS FIELD SERVICES AND EQUIPMENT AND PHYSICAL TECHNOLOGY

SELECTED TRANSACTIONS (1)

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
5/1/2018	KLX Inc. (NasdaqGS:KLXI)	Aviall Inc.	$4,482.9	-	15.7x
4/16/2018	Aveda Transportation and Energy Services Inc. (TSXV:AVE)	Daseke Companies, Inc.	$2,139.8	0.7x	4.8x
1/16/2018	USA Compression Partners, LP (NYSE:USAC)	Energy Transfer Partners, LP (NYSE:ETP); Energy Transfer Equity, LP (NYSE:ETE)	$2,033.4	7.3x	14.3x
5/19/2017	Savanna Energy Services Corp.	Total Energy Services Inc. (TSX:TOT)	$458.2	1.8x	16.6x
5/15/2017	Ceiba Energy Services Inc.	Secure Energy Services Inc. (TSX:SES)	$27.2	4.5x	29.2x
4/24/2017	Flowchem Ltd.	KMG Chemicals, Inc. (NYSE:KMG)	$495.0	N/A	11.5x
3/13/2017	Amec Foster Wheeler plc (LSE:AMFW)	John Wood Group plc (LSE:WG)	$4,032.4	0.6x	10.6x

(1) Total Enterprise Value is defined as market capitalization plus total debt less cash and cash equivalents.

PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

STORAGE AND TERMINALS

EQUITY COMPARABLES (1)

Storage and Terminals (United States & Canada)

Company	LTM[2] Revenues	LTM[2] EBITDA	LTM[2] Margin	Stock Price 06/30/18	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Alliant Energy Corporation	$3,495	$1,178	33.7%	$42.32	92.9%	$9,796	$15,321	4.4x	13.0x	4.7x
AltaGas Ltd.	2,126	552	25.9	20.64	90.3	3,711	7,472	3.5x	13.5x	3.7x
Blueknight Energy Partners, LP	220	63	28.5	3.40	52.7	137	20	0.1x	0.3x	5.6x
Buckeye Partners, LP	3,993	925	23.2	35.15	53.3	5,383	10,313	2.6x	11.1x	5.4x
Chart Industries, Inc.	1,146	139	12.1	61.68	83.0	1,910	2,283	2.0x	16.5x	2.6x
EnLink Midstream, LLC	6,704	993	14.8	16.45	82.3	2,978	10,466	1.6x	10.5x	4.1x
EQT Midstream Partners, LP	994	822	82.7	51.59	65.5	4,462	5,763	5.8x	7.0x	3.4x
Gibson Energy Inc.	5,152	211	4.1	13.33	90.5	1,917	2,895	0.6x	13.7x	4.5x
Green Plains Partners LP	106	69	65.0	17.15	81.7	546	681	6.4x	9.8x	2.0x
Magellan Midstream Partners, LP	2,569	1,113	43.3	69.08	91.1	15,764	20,195	7.9x	18.1x	4.2x
MPLX LP	4,880	2,324	47.6	34.14	86.7	27,106	40,111	8.2x	17.3x	5.1x
NuStar Energy LP	1,853	633	34.2	22.65	47.2	2,120	6,609	3.6x	10.4x	5.4x
Spectra Energy Partners, LP	2,060	1,063	51.6	35.42	76.2	17,175	26,071	12.7x	24.5x	7.6x
Median			**33.7%**		**82.3%**			**3.6x**	**13.0x**	**4.5x**
Mean			**35.9%**		**76.4%**			**4.6x**	**12.8x**	**4.5x**

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PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

STORAGE AND TERMINALS

SELECTED TRANSACTIONS (1)

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
8/1/2018	Energy Transfer Partners, LP (NYSE:ETP)	Energy Transfer Equity, LP (NYSE:ETE)	$69,412.3	2.1x	10.8x
7/30/2018	Four Corners Area Assets	Harvest Midstream Company	$1,125.0	-	13.2x
7/10/2018	Transmontaigne Partners LP (NYSE:TLP)	TLP Acquisition Holdings LLC	$1,254.3	6.1x	11.5x
6/29/2018	Boardwalk Pipeline Partners, LP	Boardwalk GP LP	$6,792.1	5.3x	8.3x
5/29/2018	Dorian LPG Ltd. (NYSE:LPG)	BW LPG Limited (OB:BWLPG)	$1,164.3	8.0x	20.9x
5/17/2018	Enbridge Energy Partners, LP (NYSE:EEP)	Enbridge (U.S.) Inc.	$15,925.8	6.6x	10.1x
4/30/2018	Andeavor (NYSE:ANDV)	Marathon Petroleum Corporation (NYSE:MPC)	$35,101.9	0.9x	12.7x
4/26/2018	Rice Midstream Partners LP (NYSE:RMP)	EQT Midstream Partners, LP (NYSE:EQM)	$2,443.1	7.7x	9.9x
3/26/2018	Tallgrass Energy Partners, LP (NYSE:TEP)	Tallgrass Equity, LLC	$4,176.5	6.4x	6.9x
11/1/2017	Southcross Energy Partners, LP (NYSE:SXE)	American Midstream Partners, LP	$624.1	1.0x	14.8x
8/29/2017	Arc Logistics Partners LP (NYSE:ARCX)	Zenith Energy U.S. Logistics Holdings, LLC	$658.0	6.2x	10.4x
8/14/2017	Western Refining Logistics, LP (NYSE:WNRL)	Andeavor Logistics LP (NYSE:ANDX)	$1,842.8	0.8x	14.4x
6/19/2017	Rice Energy Inc. (NYSE:RICE)	EQT Corporation (NYSE:EQT)	$10,239.2	9.9x	34.1x
6/2/2017	AMTROL Inc.	Worthington Steel Of Michigan, Inc.	$283.0	1.1x	7.4x
5/18/2017	PennTex Midstream Partners, LP	Energy Transfer Partners, LP (NYSE:ETP)	$562.6	7.3x	18.9x
5/15/2017	Ceiba Energy Services Inc. (TSXV:CEB)	Secure Energy Services Inc. (TSX:SES)	$28.2	4.3x	30.3x
4/4/2017	World Point Terminals, LP (NYSE:WPT)	World Point Terminals Inc.	$611.3	5.9x	10.0x
2/1/2017	ONEOK Partners, LP	ONEOK, Inc. (NYSE:OKE)	$23,721.4	2.7x	12.9x

(1) Total Enterprise Value is defined as market capitalization plus total debt less cash and cash equivalents.

PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

PIPELINES

EQUITY COMPARABLES (1)

Oil and Gas Pipelines (United States & Canada)

Company	LTM[2] Revenues	LTM[2] EBITDA	LTM[2] Margin	Stock Price 06/30/18	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Antero Midstream Partners LP	$884	$549	62.1%	$29.52	84.1%	$5,521	$6,842	7.7x	12.5x	2.5x
ATCO Ltd.	3,765	1,266	33.6	30.85	79.9	3,530	13,585	3.6x	10.7x	5.9x
Blueknight Energy Partners, LP	220	63	28.5	3.40	52.7	137	20	0.1x	0.3x	5.6x
Buckeye Partners, LP	3,993	925	23.2	35.15	53.3	5,383	10,313	2.6x	11.1x	5.4x
Crestwood Equity Partners LP	4,158	276	6.6	31.75	89.1	2,262	4,514	1.1x	16.4x	5.6x
Enable Midstream Partners, LP	3,064	914	29.8	17.11	94.4	7,410	11,392	3.7x	12.5x	4.0x
Enbridge Energy Partners, LP	2,356	1,486	63.1	10.93	65.7	4,661	17,300	7.3x	11.6x	5.0x
Enbridge Inc.	34,659	7,657	22.1	35.73	88.7	60,916	124,538	3.6x	16.3x	6.5x
Energy Transfer Equity, LP	47,435	7,067	14.9	17.25	89.2	19,910	92,749	2.0x	13.1x	6.2x
Energy Transfer Partners, LP	33,273	6,220	18.7	19.04	87.8	22,184	63,212	1.9x	10.2x	5.4x
Enterprise Products Partners LP	33,080	5,369	16.2	27.67	93.3	60,117	85,612	2.6x	15.9x	4.8x
EQT GP Holdings, LP	994	814	81.9	23.51	76.5	7,111	11,604	11.7x	14.3x	3.4x
EQT Midstream Partners, LP	994	822	82.7	51.59	65.5	4,462	5,763	5.8x	7.0x	3.4x
Genesis Energy, LP	2,684	521	19.4	21.91	67.2	2,686	7,158	2.7x	13.7x	7.2x
Gibson Energy Inc.	5,152	211	4.1	13.33	90.5	1,917	2,895	0.6x	13.7x	4.5x
Inter Pipeline Ltd.	1,857	921	49.6	18.73	88.3	7,222	11,291	6.1x	12.3x	4.4x
Kinder Morgan Canada Ltd.	527	283	53.8	12.09	79.5	1,257	3,231	6.1x	11.4x	0.1x
Kinder Morgan, Inc.	13,759	5,807	42.2	17.67	83.2	38,981	78,879	5.7x	13.6x	6.4x
ONEOK, Inc.	12,761	2,044	16.0	69.83	98.4	28,705	36,832	2.9x	18.0x	4.0x
Plains All American Pipeline, LP	29,956	1,449	4.8	23.64	87.6	17,153	29,277	1.0x	20.2x	6.8x
Sanchez Midstream Partners LP	72	25	34.5	11.80	89.1	180	706	9.9x	28.6x	7.3x
SemGroup Corporation	2,410	298	12.3	25.40	82.1	2,007	4,804	2.0x	16.1x	8.4x
Southcross Energy Partners, LP	637	54	8.4	1.55	48.6	124	653	1.0x	12.2x	9.7x
Summit Midstream Partners, LP	496	262	52.7	15.40	62.2	1,130	2,557	5.2x	9.8x	4.4x
Targa Resources Corp.	9,735	1,182	12.1	49.49	95.0	10,862	17,108	1.8x	14.5x	4.5x
TC PipeLines, LP	594	491	82.7	25.95	43.8	1,850	4,290	7.2x	8.7x	4.6x
The Williams Companies, Inc.	8,298	3,563	42.9	27.11	80.5	22,439	49,457	6.0x	13.9x	5.9x
TransCanada Corporation	10,211	5,395	52.8	43.24	87.3	39,077	76,948	7.5x	14.3x	6.4x
Western Gas Equity Partners, LP	2,080	949	45.6	35.75	81.8	7,827	14,316	6.9x	15.1x	4.4x
Western Gas Partners, LP	2,080	963	46.3	48.39	84.7	7,384	11,287	5.4x	11.7x	4.3x
Median			**31.7%**		**83.6%**			**3.7x**	**13.4x**	**5.2x**
Mean			**35.5%**		**79.0%**			**4.4x**	**13.3x**	**5.2x**

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PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

PIPELINES

SELECTED TRANSACTIONS (1)

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
7/10/2018	Transmontaigne Partners LP (NYSE:TLP)	TLP Acquisition Holdings LLC	$1,254.3	6.1x	11.5x
5/17/2018	Williams Partners LP	The Williams Companies, Inc. (NYSE:WMB)	$57,090.5	7.0x	14.1x
3/26/2018	Tallgrass Energy Partners, LP (NYSE:TEP)	Tallgrass Equity, LLC	$4,176.5	6.4x	6.9x
8/15/2017	Western Refining Logistics, LP (NYSE:WNRL)	Andeavor Logistics LP (NYSE:ANDX)	$1,843.8	0.8x	14.4x
12/20/2016	Howard Midstream Partners, LP	Alberta Investment Management Corporation	$1,394.7	4.3x	14.4x
11/21/2016	Sunoco Logistics Partners LP	Energy Transfer Partners, LP (NYSE:ETP)	$15,527.3	1.5x	13.7x
10/24/2016	JP Energy Partners LP	American Midstream Partners, LP (NYSE:AMID)	$465.0	-	11.3x
5/31/2016	Rose Rock Midstream, LP	SemGroup Corporation (NYSE:SEMG)	$1,649.9	-	10.4x

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PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

TRUCKERS

EQUITY COMPARABLES (1)

Truckers (United States & Canada)

Company	LTM[2] Revenues	LTM[2] EBITDA	LTM[2] Margin	Stock Price 06/30/18	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Adams Resources & Energy, Inc.	$1,543	$20	1.3%	$43.00	85.0%	$181	$71	0.0x	3.6x	(6.4)x
ArcBest Corporation	2,948	200	6.8	45.70	90.6	1,172	1,245	0.4x	6.2x	0.1x
Covenant Transportation Group, Inc.	752	116	15.5	31.50	89.5	577	753	1.0x	6.5x	1.3x
Daseke, Inc.	1,193	125	10.5	9.93	68.4	584	1,080	0.9x	8.6x	4.3x
Heartland Express, Inc.	660	144	21.9	18.55	73.6	1,527	1,422	2.2x	9.8x	(0.7)x
Hess Corporation	5,752	2,206	38.4	66.89	97.8	20,074	24,253	4.2x	11.0x	1.6x
J.B. Hunt Transport Services, Inc.	7,921	1,109	14.0	121.55	92.3	13,341	14,334	1.8x	12.9x	0.9x
Knight-Swift Transportation Holdings Inc.	4,484	739	16.5	38.21	73.6	6,813	7,603	1.7x	10.3x	1.0x
Landstar System, Inc.	4,229	331	7.8	109.20	92.1	4,594	4,487	1.1x	13.6x	(0.1)x
Marten Transport, Ltd.	737	140	18.9	23.45	79.2	1,280	1,270	1.7x	9.1x	(0.2)x
Old Dominion Freight Line, Inc.	3,723	892	24.0	148.96	90.8	12,244	12,129	3.3x	13.6x	(0.1)x
P.A.M. Transportation Services, Inc.	475	66	13.8	46.97	95.9	292	441	0.9x	6.7x	2.7x
Patriot Transportation Holding, Inc.	113	11	9.7	21.01	88.3	70	56	0.5x	5.1x	(1.6)x
Parkland Fuel Corporation	9,956	506	5.1	24.56	97.6	3,238	4,763	0.5x	9.4x	3.0x
Roadrunner Transportation Systems, Inc.	2,210	(30)	(1.4)	2.09	21.4	80	541	0.2x	NM	NM
Ryder System, Inc.	7,797	1,822	23.4	71.86	79.6	3,815	9,419	1.2x	5.2x	3.2x
Saia, Inc.	1,513	210	13.9	80.85	92.9	2,057	2,199	1.5x	10.5x	0.7x
Schneider National, Inc.	4,677	610	13.0	27.51	90.1	4,869	4,961	1.1x	8.1x	0.1x
TFI International Inc.	3,640	438	12.0	30.83	96.7	2,703	3,856	1.1x	8.8x	2.7x
Titanium Transportation Group Inc.	125	14	11.0	1.09	99.3	40	91	0.7x	6.6x	3.5x
Universal Logistics Holdings, Inc.	1,328	106	7.9	26.25	93.3	745	1,002	0.8x	9.5x	2.4x
USA Truck, Inc.	498	42	8.4	23.47	80.5	190	281	0.6x	6.7x	2.2x
Werner Enterprises, Inc.	2,278	384	16.9	37.55	85.4	2,715	2,751	1.2x	7.2x	0.2x
YRC Worldwide Inc.	5,001	251	5.0	10.05	57.1	341	1,137	0.2x	4.5x	2.9x
Median			**12.5%**		**89.8%**			**1.0x**	**8.6x**	**1.0x**
Mean			**13.1%**		**83.8%**			**1.2x**	**8.4x**	**1.0x**

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(3) Total Enterprise Value is defined as market capitalization plus total debt less cash and cash equivalents.
(4) Net Debt is defined as total debt less cash and cash equivalents.

PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

TRUCKERS

SELECTED TRANSACTIONS (1)

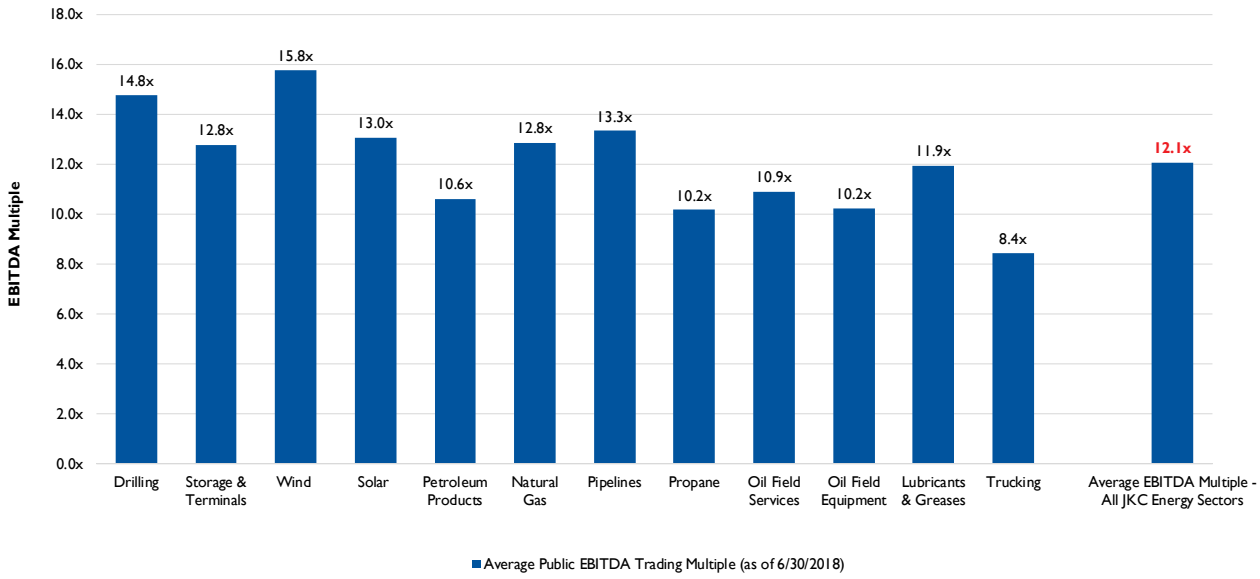
Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
8/31/2018	Mode Transportation, LLC	York Capital Management	$238.5	-	10.0x
12/7/2017	Keen Transport, Inc.	Wallenius Wilhelmsen Logistics ASA (OB:WWL)	$64.0	0.8x	6.4x
7/19/2016	Span-Alaska Transportation, Inc.	Matson Logistics, Inc.	$198.6	-	10.4x
5/2/2016	Trimac Transportation Ltd.	Trimac Corporation	$215.9	-	5.9x
9/9/2015	Con-way Inc.	XPO Logistics, Inc. (NYSE:XPO)	$3,057.0	-	6.2x
8/17/2015	Liberty International Inc.	Janel Corporation (OTCPK:JANL)	$2.3	-	26.6x
7/28/2015	Stagecoach Cartage and Distribution, LLC	Roadrunner Transportation Systems, Inc. (NYSE:RRTS)	$40.0	-	5.7x
5/25/2015	Hodges Trucking Company, LLC	Rodan Transport (U.S.A.) Ltd.	$42.0	-	3.0x
5/6/2015	Quality Distribution Inc.	Apax Partners LLP	$823.3	-	12.0x
5/4/2015	Bridge Terminal Transport Inc.	XPO Logistics, Inc. (NYSE:XPO)	$100.0	-	8.1x

(1) Total Enterprise Value is defined as market capitalization plus total debt less cash and cash equivalents.

PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

AVERAGE PUBLIC EBITDA TRADING MULTIPLES

ALL JKC ENERGY SECTORS (AS OF 6/30/2018)



FACTOIDS: LITTLE-KNOWN FACTS AND STATS

Petroleum Products (1)

- On average, U.S. refineries produce about 20 to 19 gallons of motor gasoline, 12 gallons of distillate fuel distillate fuel (most of which is sold as diesel fuel) and 4 gallons of jet fuel from a 42-gallon barrel of crude oil.
- Crude oil is produced in 32 U.S. states and in U.S. coastal waters. In 2017, about 65% of total U.S. crude oil production came from five states: Texas (38%), North Dakota (11%), Alaska (5%), California (5%) and New Mexico (5%).

Natural Gas

- Natural gas is used throughout the United States, but five states accounted for about 39% of total U.S. natural gas consumption in 2016: Texas (14.7%), California (7.9%), Louisiana (5.7%), New York (5.0%) and Florida (4.8%).(1)
- Natural gas is delivered to U.S. customers through a 2.5 million-mile underground pipeline system.(2)

Propane and Heating/Fuel Oil

- As of 2016, there are nearly 200,000 propane powered vehicles being used in U.S. private and public fleets. (3)
- About 5.7 million households in the U.S. use heating oil as their main space heating fuel.(1)
- About 20% of households in the U.S. Northeast use heating oil as their main space heating fuel, representing about 80% of the U.S. households that use heating oil for space heating.(1)

(1) U.S. Energy Information Administration.
(2) American Gas Association.
(3) Propane Education & Research Council.

FACTOIDS: LITTLE-KNOWN FACTS AND STATS

Lubricants and Greases

- Tribology is the study and application of the principles of friction, lubrication and wear. This science works to reduce energy use, lower the cost of maintenance and replacement, develop new technology and solve resource problems. Proper tribological procedures save an estimated 1.3% to 1.6% of a nation's gross domestic product.(1)
- Specialized greases have been designed to perform under the challenging conditions of wind turbines, which include low speeds, high loads, both high and low temperatures, and oscillating conditions. These greases are used in both on-shore and off-shore wind turbines in a wide variety of weather conditions.(2)

Solar (3)

- There are more than 1.7 million solar installations in the U.S. After reaching 1 million in 2016, 2 million installations are expected by late 2018 and 4 million installations by 2023.
- Nearly 56 gigawatts of total solar capacity is installed in the U.S., generating enough electricity to power 10.7 million homes.

Wind (4)

- Typically standing at least 260 feet tall, a typical modern wind turbine generates usable amounts of power over 90% of the time. A turbine starts to generate electricity when wind speeds reach 6 to 9 miles per hour and shuts down at about 45 miles an hour to prevent equipment damage.
- The U.S. wind industry grew by 9% in 2017, adding 7,017 megawatts of new wind capacity. In the first half of 2018, the industry added an additional 1,032 megawatts.

(1) Society of Tribologists and Lubricating Engineers.
(2) National Lubricating Grease Institute.
(3) Solar Energy Industries Association.
(4) American Wind Energy Association.

FACTOIDS: LITTLE-KNOWN FACTS AND STATS

Oil and Gas Field Services (1)

- Worldwide, the oil and gas well drilling and field services industry generates about $250 billion in revenue and is forecast to reach about $325 billion by 2022.
- The U.S. oil and gas field services industry includes about 11,000 establishments (single-location companies and units of multi-location companies) with combined annual revenue of about $70 billion.

Storage and Terminals (2)

- Analysts forecast the global oil and gas storage market to grow at a compound annual rate of 2.92% during the period 2017-2021.

Pipelines

- Transmission pipelines are protected by an electrical shield called cathodic protection. Cathodic protection is achieved by applying a current to the pipeline at a high enough current that the structure is at one potential. This supplements other coating protections to ensure corrosion protection.(3)
- Oil travels through a pipeline at a leisurely pace, typically, it moves about 3 to 6 miles per hour – roughly a person's average walking speed.(4)

Truckers

- The first tractor trailer was invented in 1914 by Charles Freuhauf, who built the truck in Detroit at a merchant's request to transport his boat. Freuhauf was then asked to build a similar tractor trailer to haul lumber, leading him to establish the Freuhauf Trailer Company in 1918.(5)
- On average, small business truckers drive more than 115,000 miles per year and more than 3 million miles in their lifetime.(6)

(1) Dun & Bradstreet, First Research.
(2) Research and Markets.
(3) Interstate Natural Gas Association of America.
(4) aboutpipelines.com.
(5) roadscholar.com.
(6) Owner-Operator Independent Drivers Association.

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ABOUT JORDAN KNAUFF & COMPANY

Jordan Knauff & Company was founded in 2001 to undertake a distinct mission: to assemble and maintain a staff of top-notch investment banking personnel and offer their knowledge and experience to provide the best available investment banking services to middle-market companies, the entrepreneurs who lead them and the financial entities that transact with them. On a combined basis, over the course of their careers our employees have completed over 200 transactions as investors, owners, operators, buyers, sellers and investment bankers of middle-market businesses across a variety of industries. The majority of our firm's broad transaction experience has been with private companies owned by one shareholder, a partnership, a family or private equity investors.

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ABOUT THE ENERGY EQUIPMENT & INFRASTRUCTURE ALLIANCE

EEIA is a Washington, D.C.-based trade association representing the North American natural gas and petroleum production, transportation and processing infrastructure supply chain. That supply chain is comprised of 60 industries that provide construction, equipment, materials, services and supplies to energy infrastructure and operations. EEIA advocates for sound legislative and regulatory policies at the federal and state levels. Our members include companies, trade associations and labor organizations operating in the energy sector. We advocate for our industries both directly with policymakers, and through mobilization of business leaders and workers to act and speak for the value and benefits of full and responsible development of our energy resources in their communities and with their political leaders.

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