ENERGY LOGISTICS & DISTRIBUTION

Industry In-Sight™

SPRING / SUMMER 2020




JORDAN KNAUFF & COMPANY

ENERGY EQUIPMENT & INFRASTRUCTURE ALLIANCE

The Voice of the Energy Supply Chain

ENERGYBUILDERS

IN THIS REPORT

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

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.

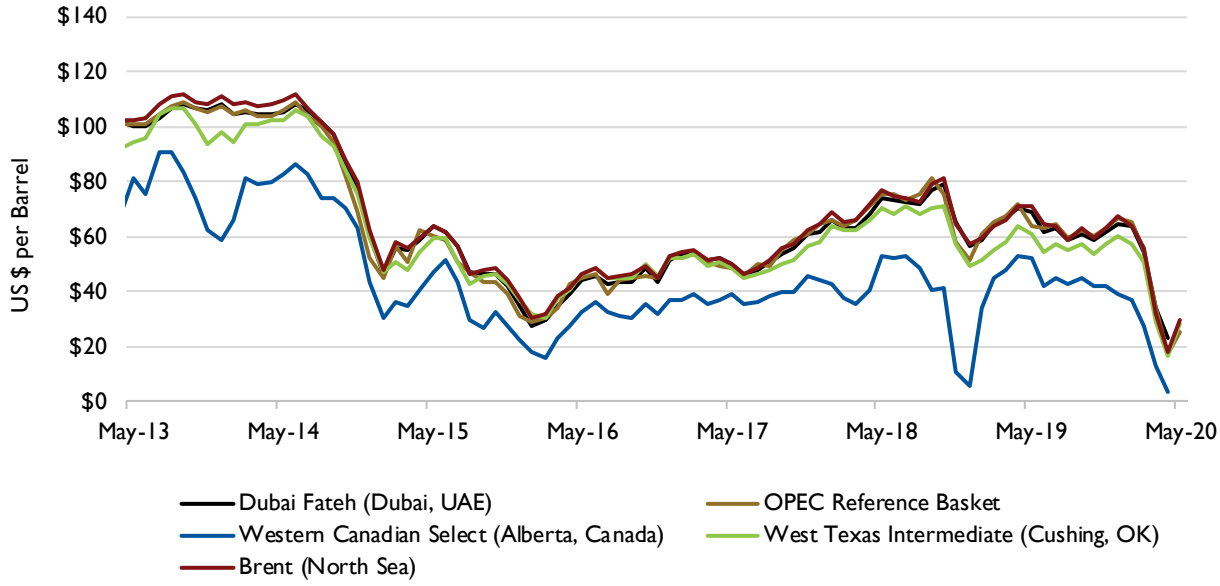
The Services We Provide

- 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.

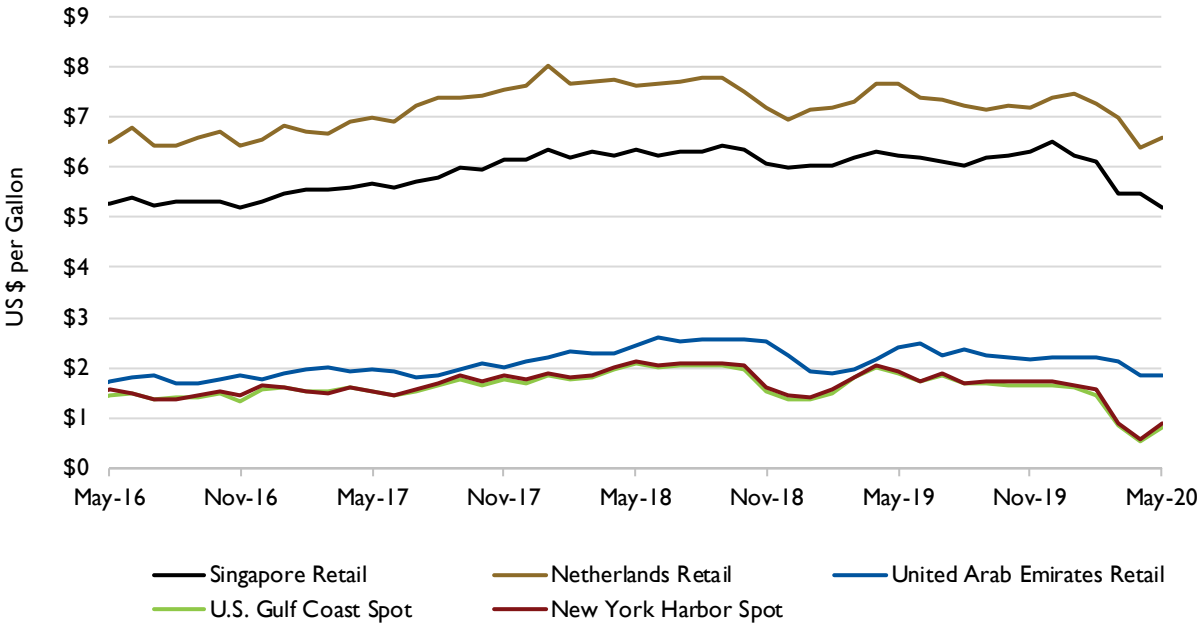
DATA CENTER

OIL

CRUDE OIL PRICES (MONTHLY AVERAGE) (1)



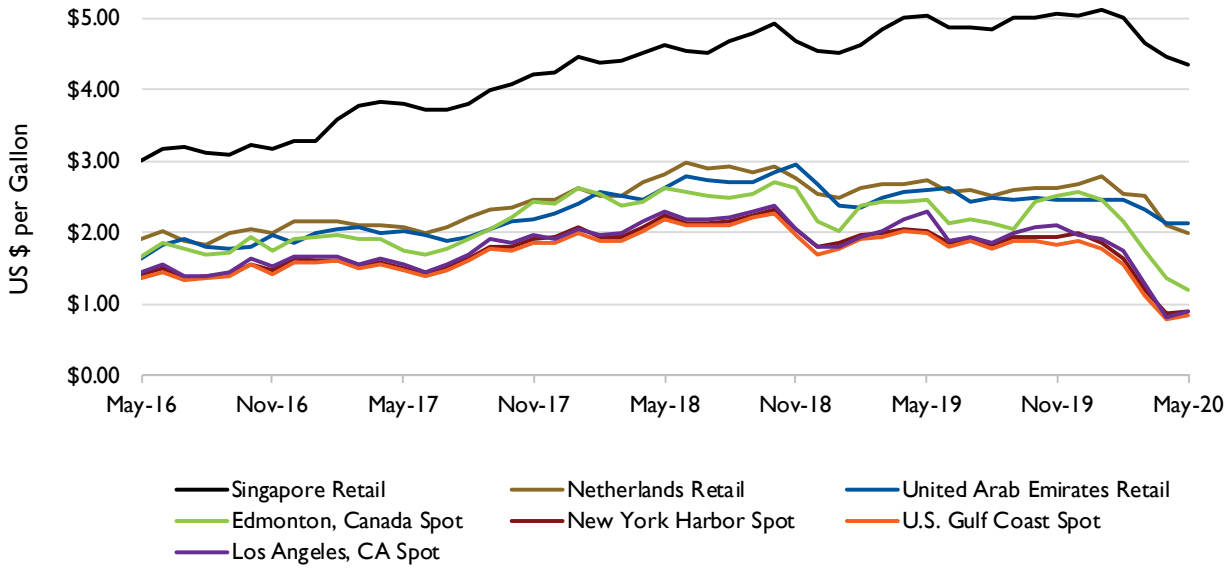
GASOLINE PRICES (MONTHLY AVERAGE) (2)



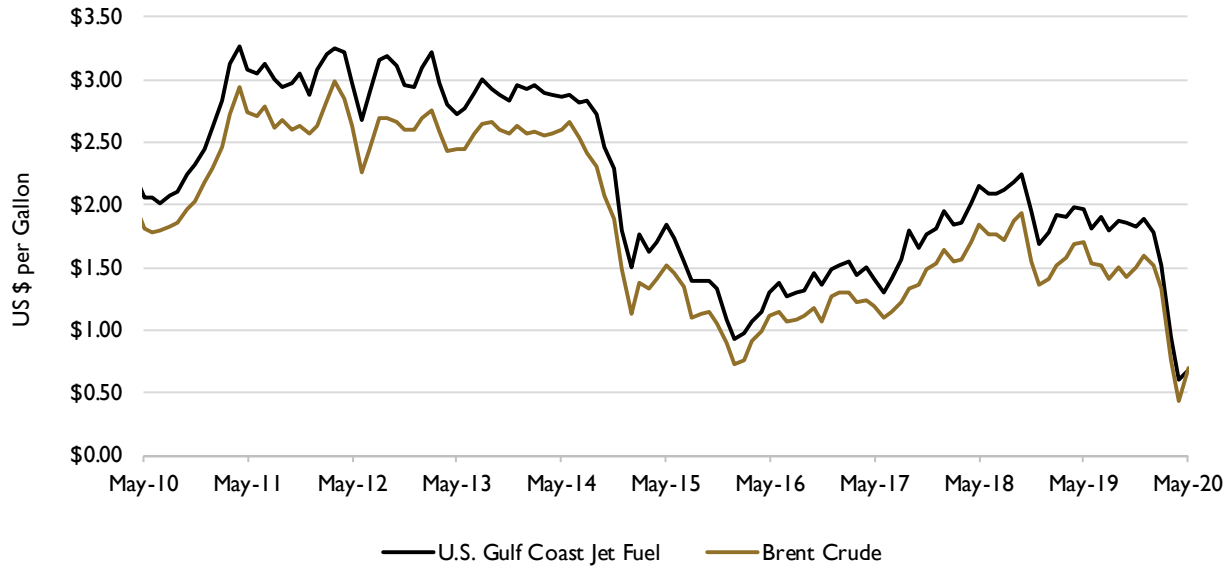
DATA CENTER

OIL

DIESEL PRICES (MONTHLY AVERAGE) (3)



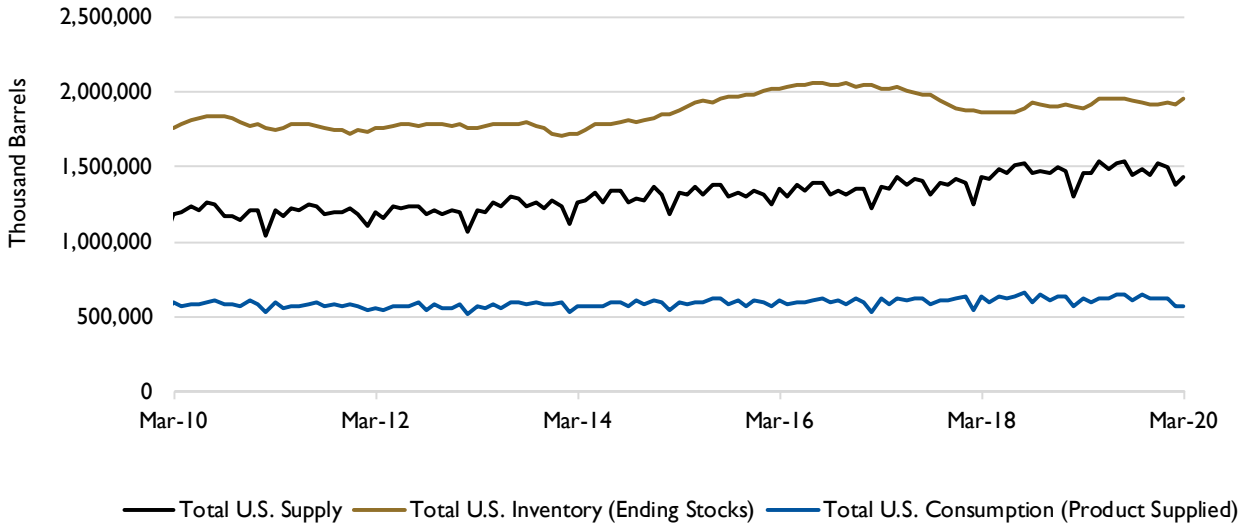
JET FUEL PRICES (MONTHLY AVERAGE) (4)



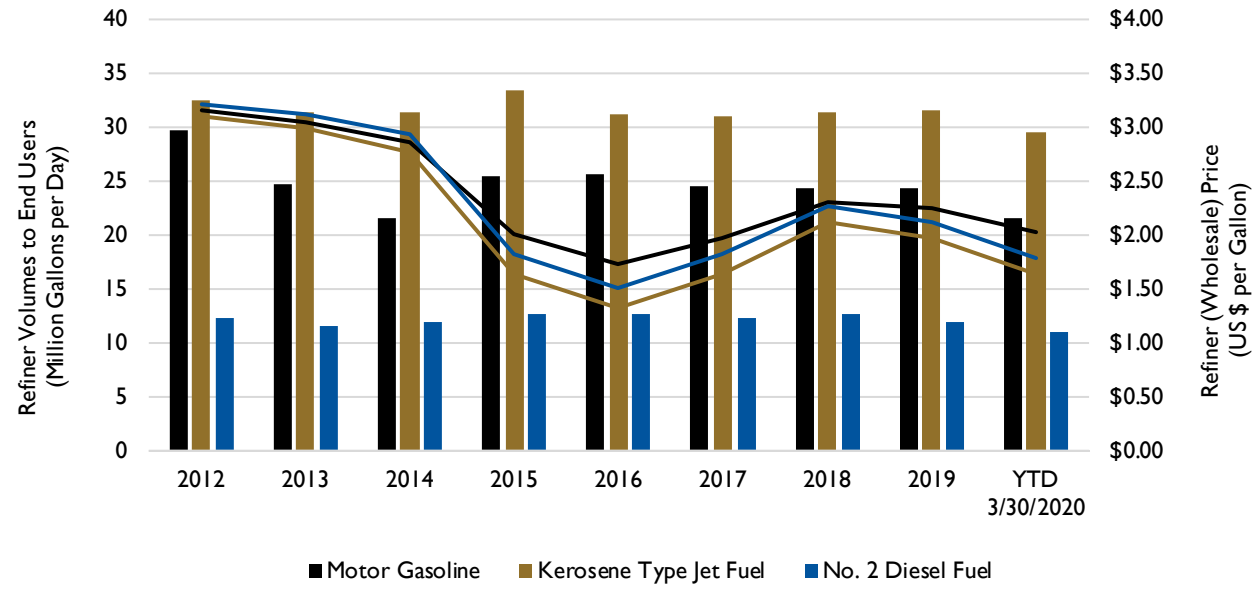
DATA CENTER

OIL

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



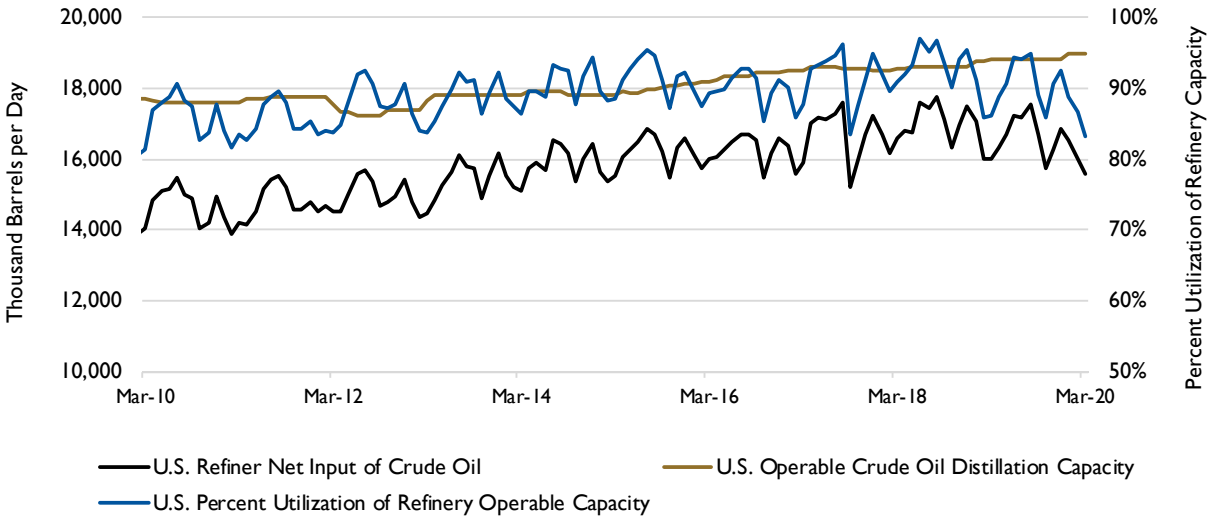
U.S. Refinery Volumes and Wholesale Prices of Petroleum Products (Annual Average) (6)



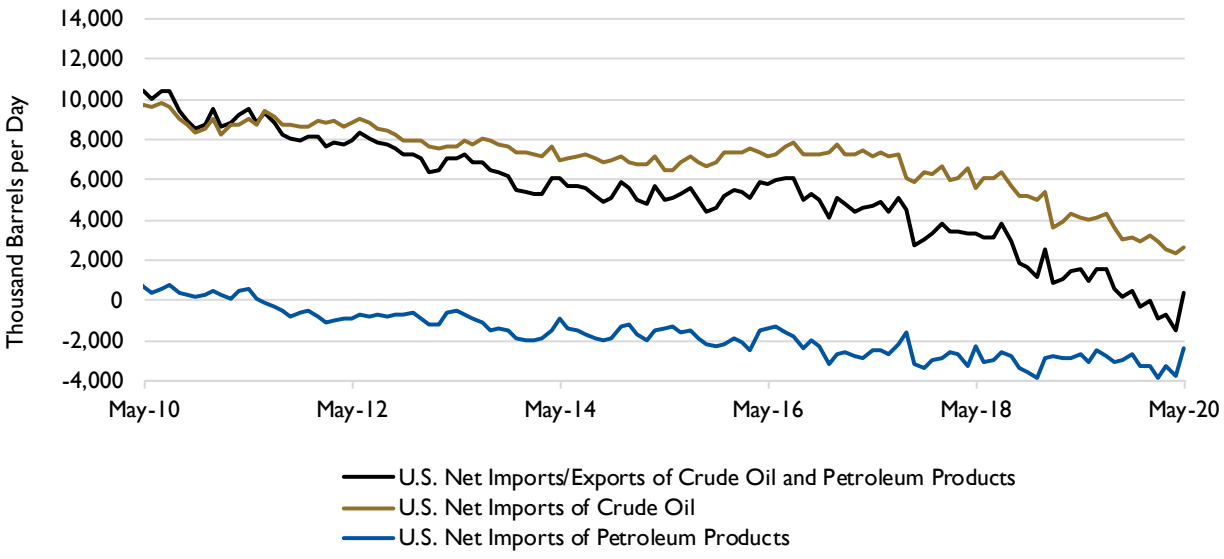
DATA CENTER

OIL

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



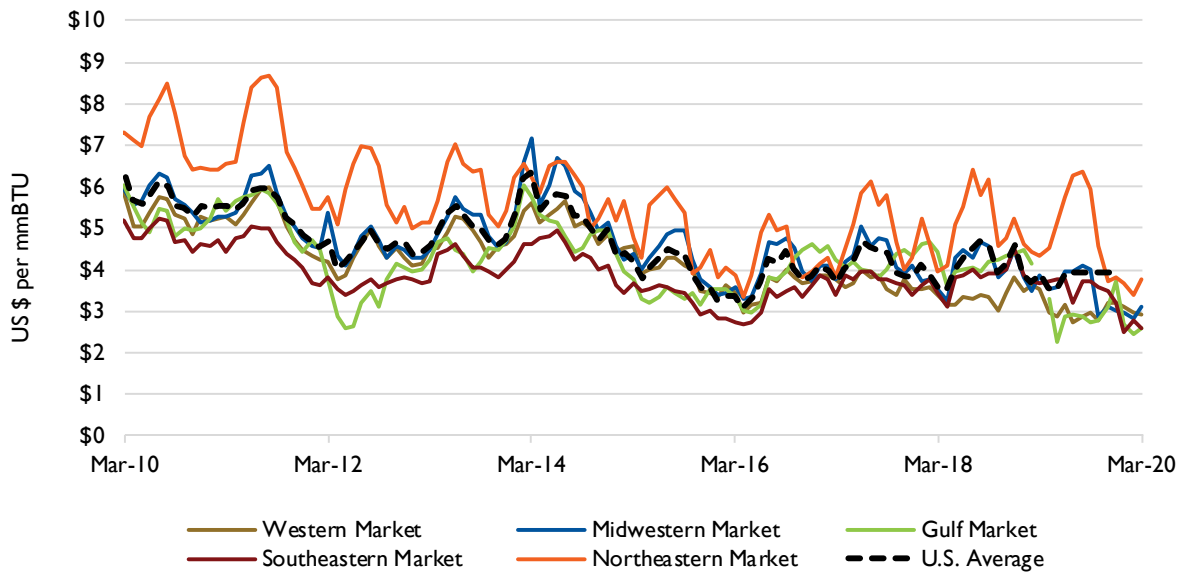
U.S. Crude Oil and Petroleum Products Imports and Exports (Monthly Average) (8)



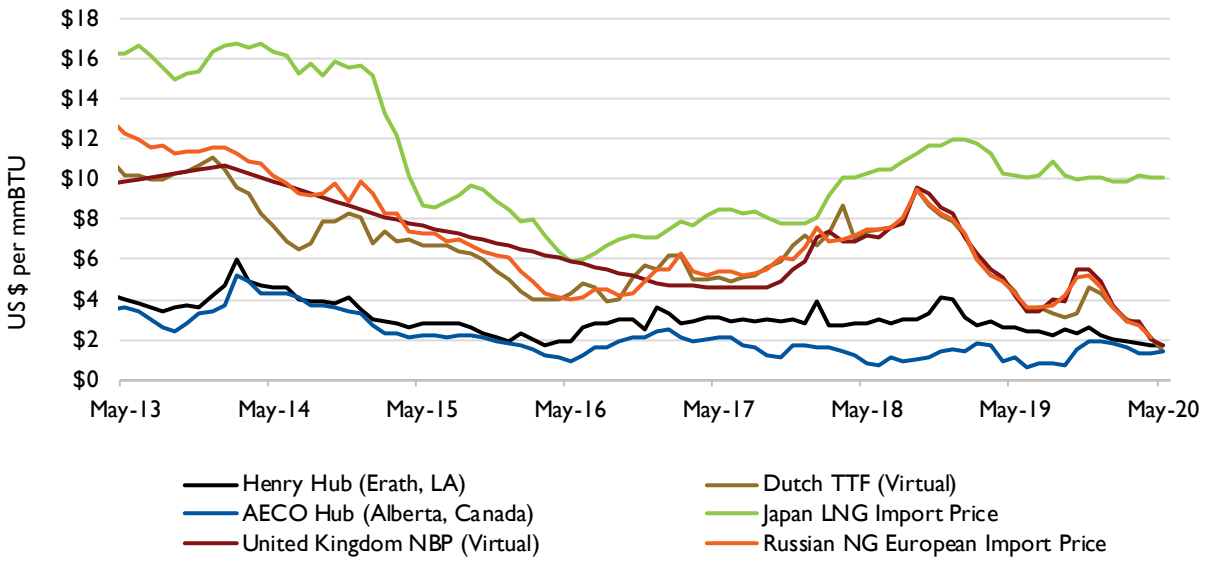
DATA CENTER

NATURAL GAS

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



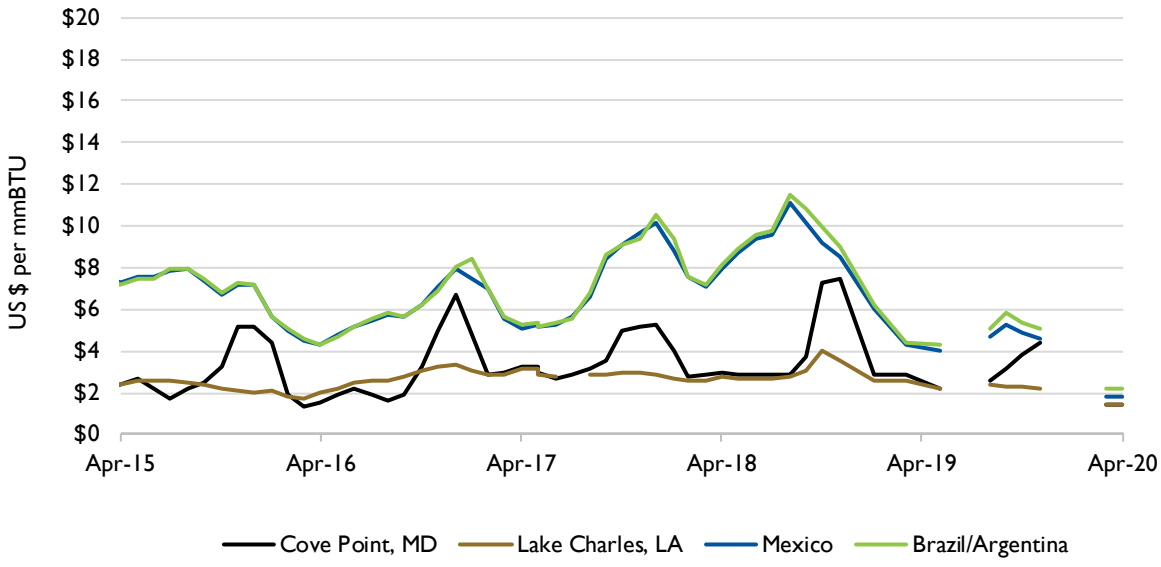
INTERNATIONAL NATURAL GAS PRICES (MONTHLY AVERAGE) (10)



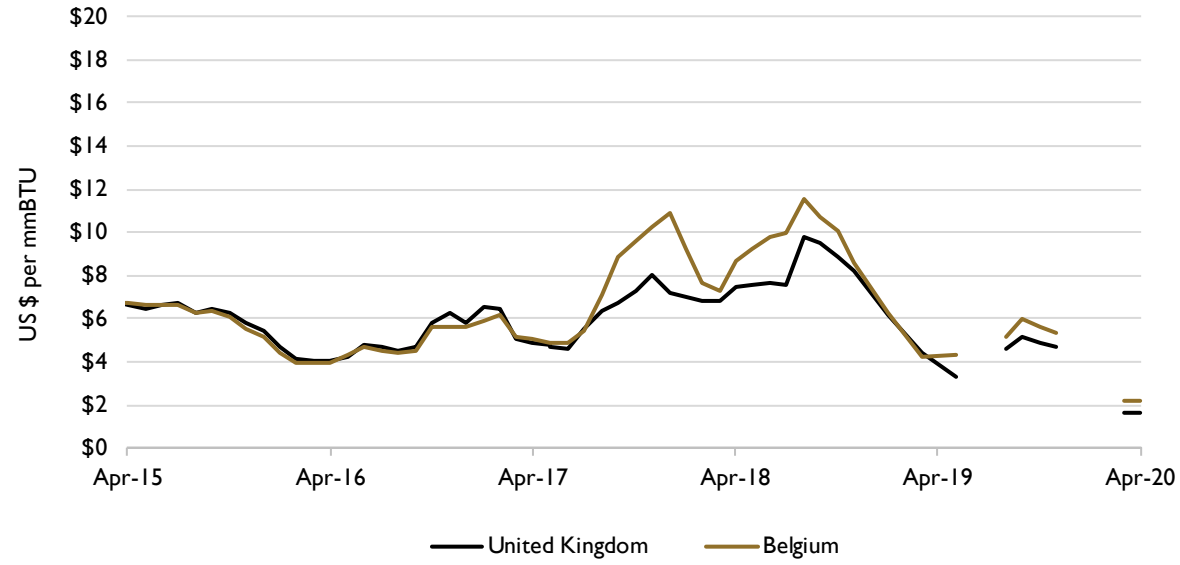
DATA CENTER

NATURAL GAS

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



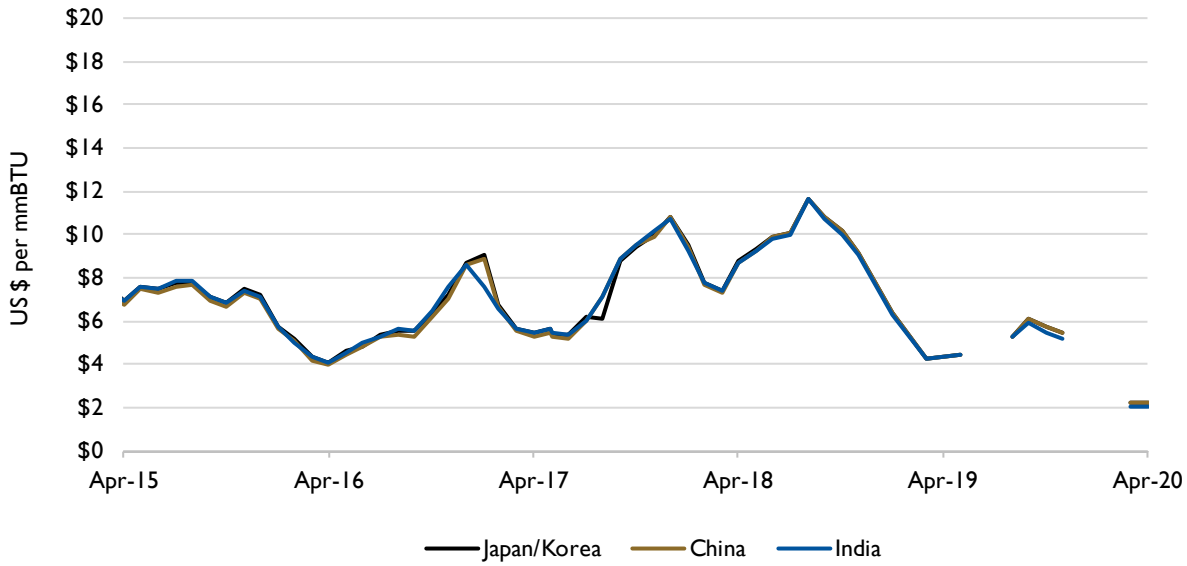
WESTERN EUROPE LIQUEFIED NATURAL GAS PRICES (MONTHLY AVERAGE) (12)



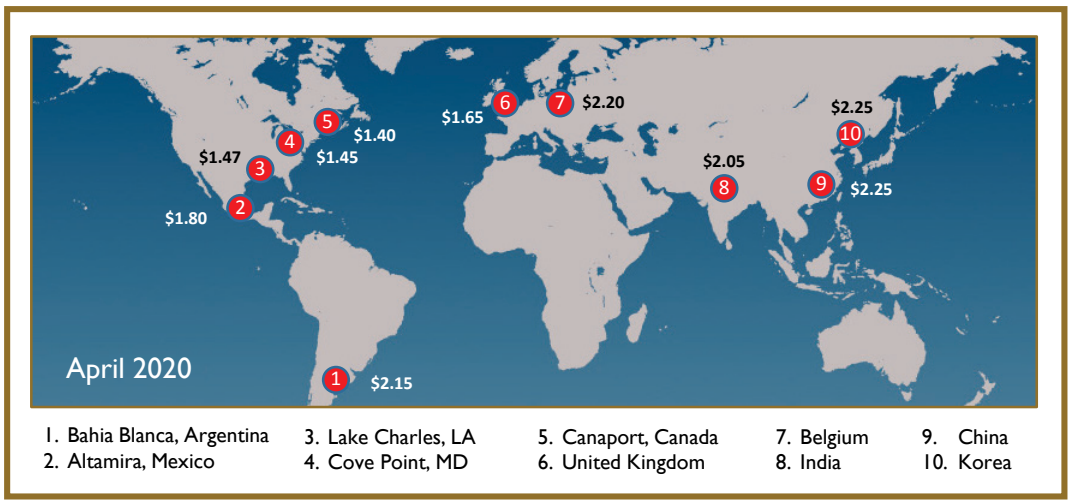
DATA CENTER

NATURAL GAS

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



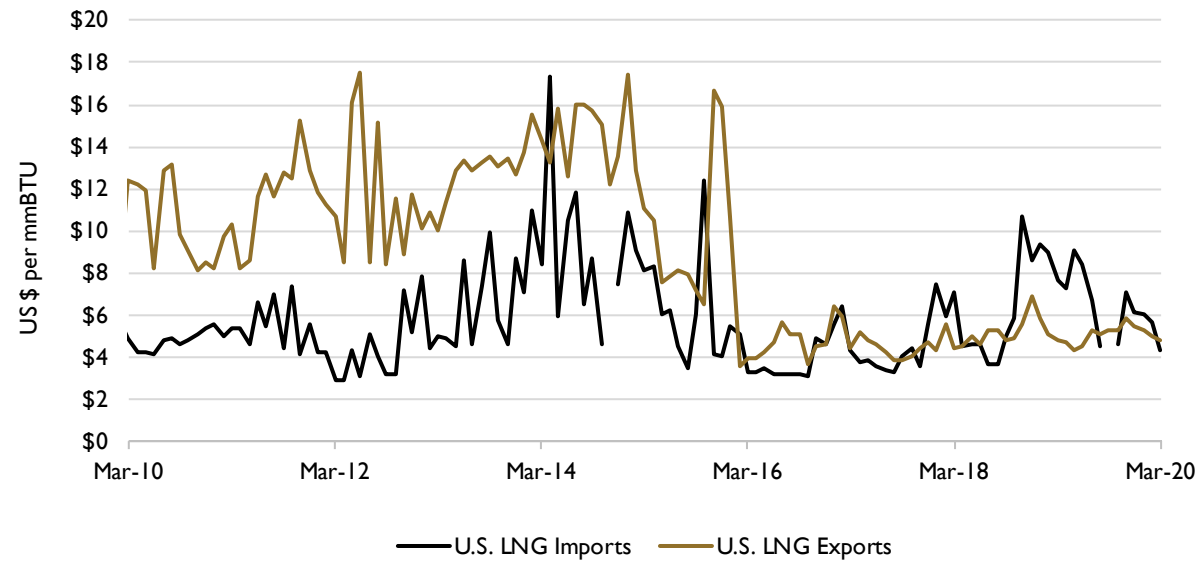
WORLD LIQUEFIED NATURAL GAS PRICES MAP (MONTHLY AVERAGE) (14)



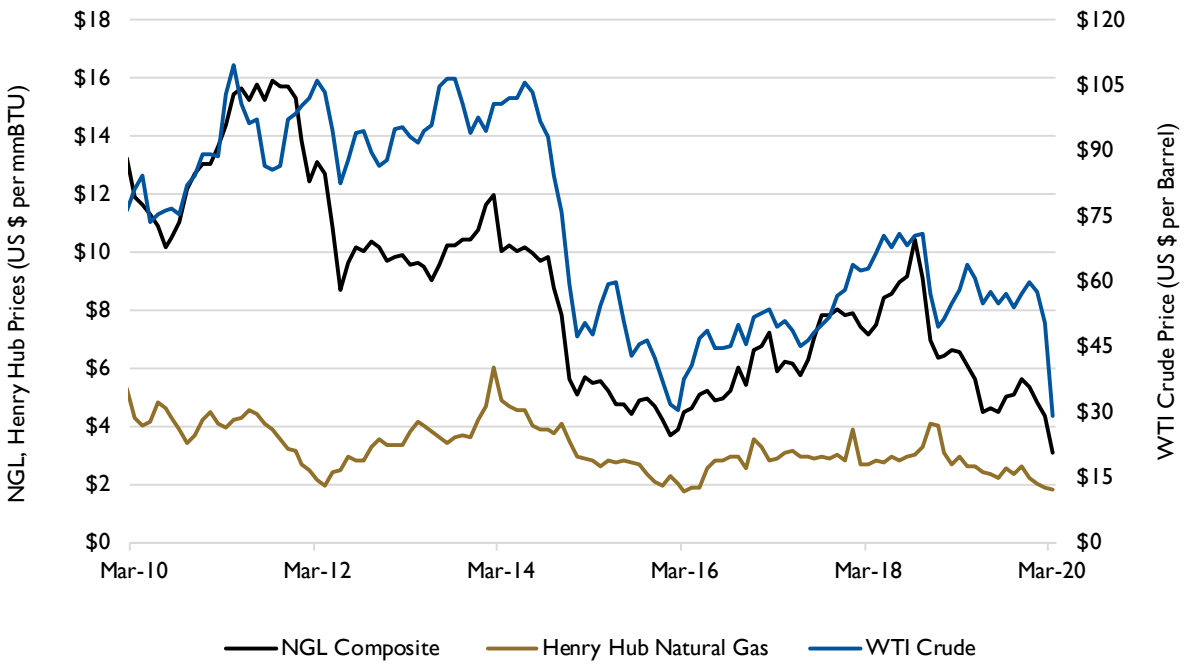
DATA CENTER

NATURAL GAS

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



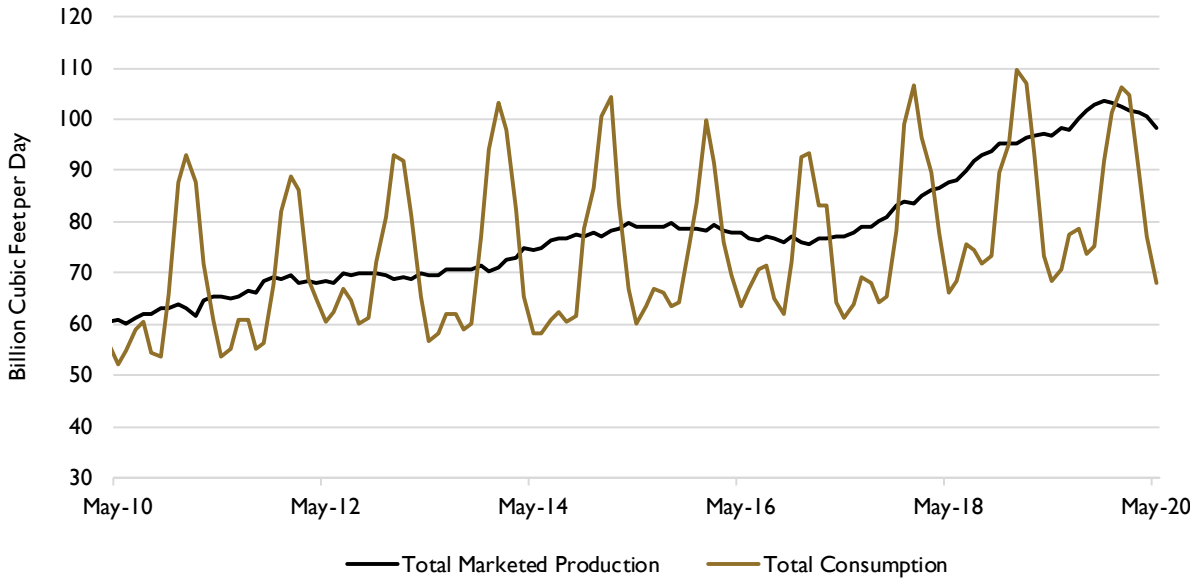
NATURAL GAS PLANT LIQUIDS PRICES (MONTHLY AVERAGE) (16)



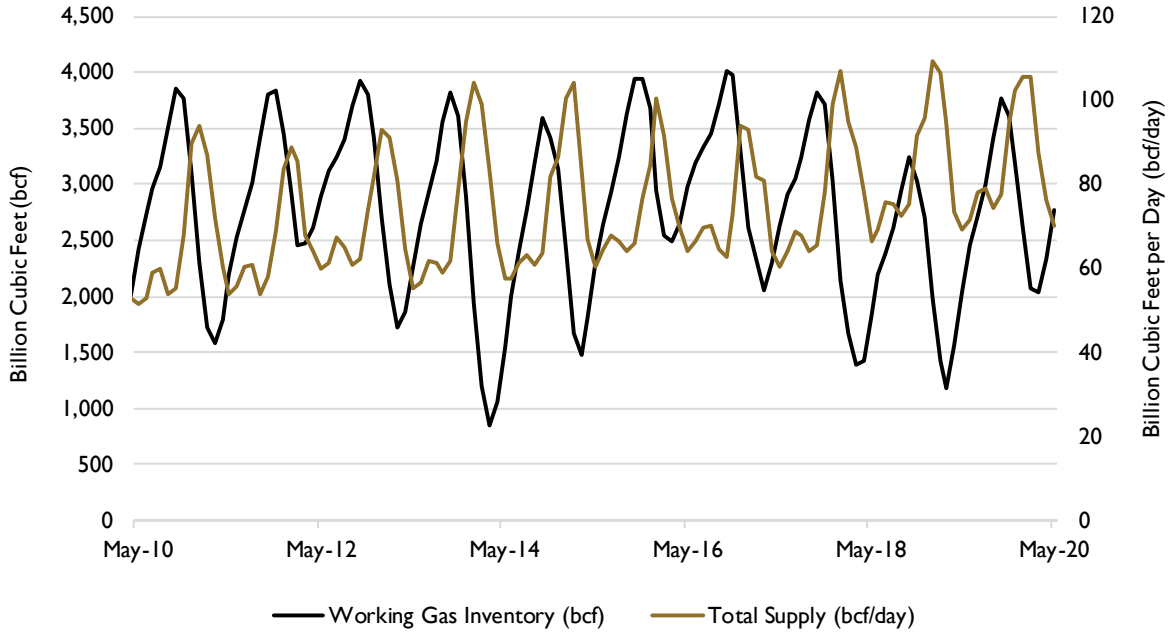
DATA CENTER

NATURAL GAS

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



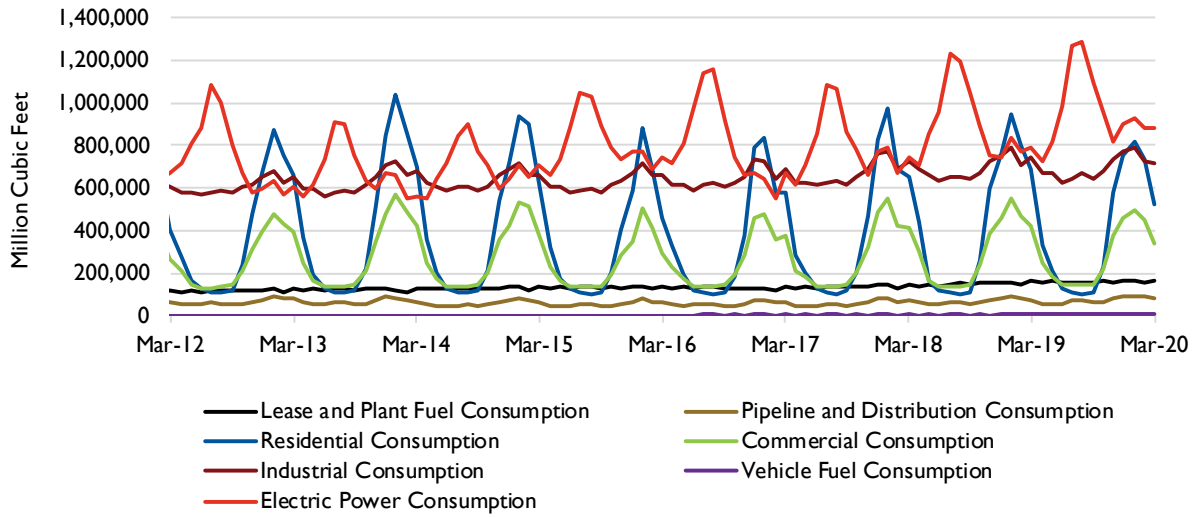
U.S. Natural Gas Supply and Inventory (Monthly) (18)



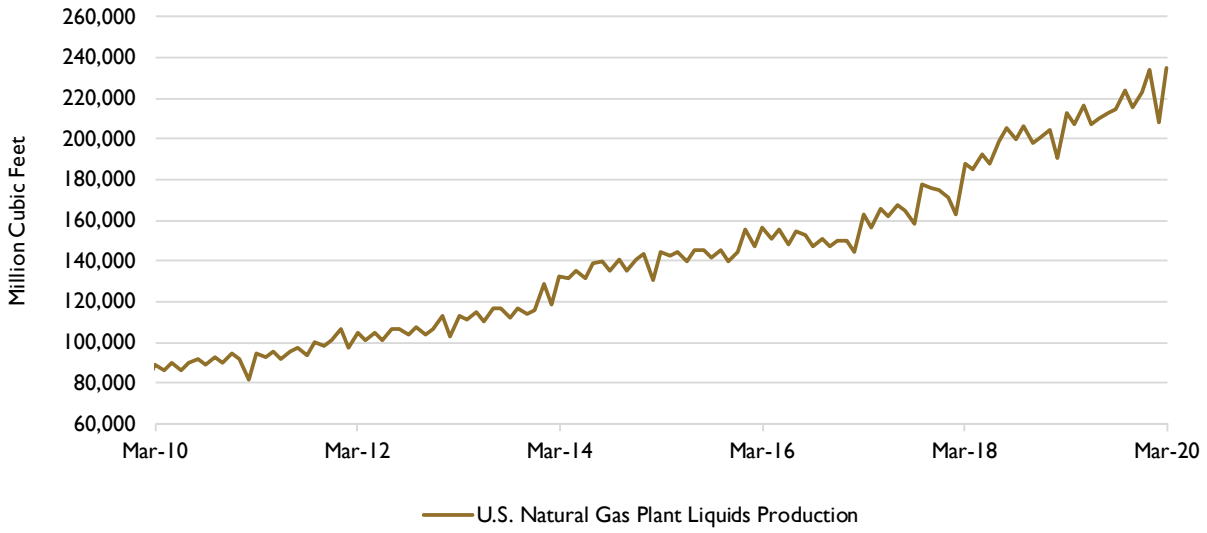
DATA CENTER

NATURAL GAS

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



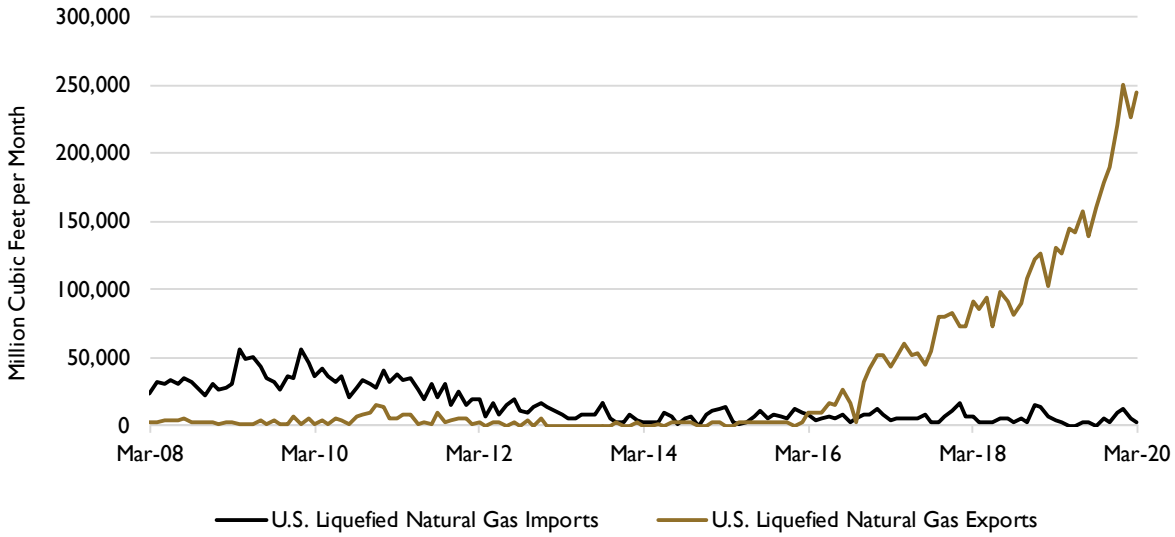
U.S. Natural Gas Plant Liquids Production (Monthly) (20)



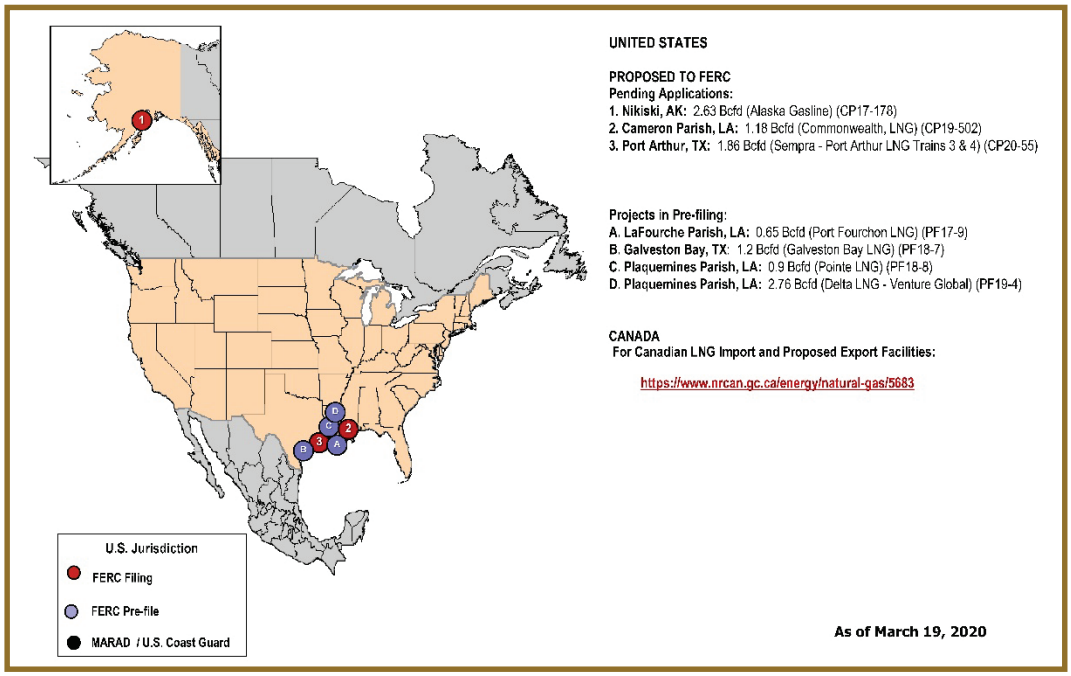
DATA CENTER

NATURAL GAS

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



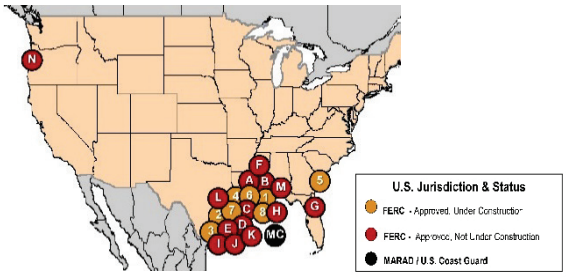
NORTH AMERICAN LNG EXPORT TERMINALS – *PROPOSED* (22)



DATA CENTER

NATURAL GAS

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



Import Terminals (Not Shown on Map)

UNITED STATES As of March 19, 2020

APPROVED - UNDER CONSTRUCTION - FERC
None

APPROVED – NOT UNDER CONSTRUCTION – FERC
1. **Corpus Christi, TX:** 0.4 Bcfd (Cheniere – Corpus Christi LNG) (CP12-507)

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

CANADA
For Canadian LNG Import and Proposed Export Facilities go to:

https://www.nrcan.gc.ca/energy/natural-gas/5683

★ Trains 2 & 3

Export Terminals (Shown on Map)

UNITED STATES As of March 19, 2020

APPROVED - UNDER CONSTRUCTION - FERC
1. **Hackberry, LA:** .71 Bcfd (Sempra–Cameron LNG Train 3) (CP13-25)
2. **Freeport, TX:** 0.713 Bcfd (Freeport LNG Dev/Freeport LNG Expansion/FLNG Liquefaction Train 3) (CP12-509) (CP15-518)
3. **Corpus Christi, TX:** 0.72 Bcfd (Cheniere–Corpus Christi LNG Train 2) (CP12-507)
4. **Sabine Pass, LA:** 0.7 Bcfd Train 6 (Sabine Pass Liquefaction) (CP13-552)
5. **Elba Island, GA:** 175 MMcfd (Southern LNG Company Units 6-10) (CP14-103)
6. **Cameron Parish, LA:** 1.41 Bcfd (Venture Global Calcasieu Pass) (CP15-550)
7. **Sabine Pass, TX:** 2.1 Bcfd (ExxonMobil – Golden Pass) (CP14-517)
8. **Calcasieu Parish, LA:** 4.0 Bcfd (Driftwood LNG) (CP17-117)

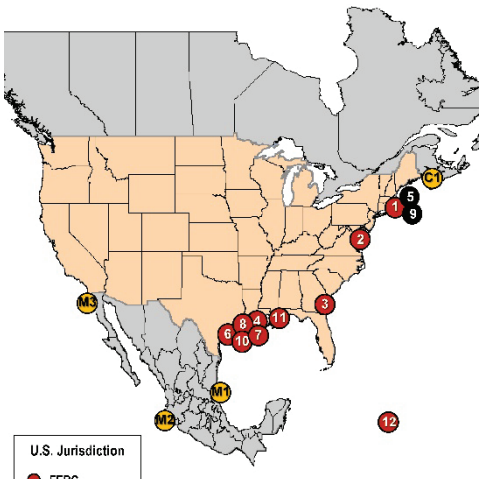
APPROVED – NOT UNDER CONSTRUCTION - FERC
A. **Lake Charles, LA:** 2.2 Bcfd (Southern Union – Lake Charles LNG) (CP14-120)
B. **Lake Charles, LA:** 1.08 Bcfd (Magnolia LNG) (CP14-347)
C. **Hackberry, LA:** 1.41 Bcfd (Sempra - Cameron LNG) (CP15-560)
D. **Port Arthur, TX:** 1.86 Bcfd (Port Arthur LNG Trains 1 & 2) (CP17-20)
E. **Freeport, TX:** 0.72 Bcfd (Freeport LNG Dev Train 4) (CP17-470)
F. **Pascagoula, MS:** 1.5 Bcfd (Gulf LNG Liquefaction) (CP15-521)
G. **Jacksonville, FL:** 0.132 Bcfd (Eagle LNG Partners) (CP17-41)
H. **Plaquemines Parish, LA:** 3.40 Bcfd (Venture Global LNG) (CP17-66)
I. **Brownsville, TX:** 0.55 Bcfd (Texas LNG Brownsville) (CP16-116)
J. **Brownsville, TX:** 3.6 Bcfd (Rio Grande LNG – NextDecade) (CP16-454)
K. **Brownsville, TX:** 0.9 Bcfd (Annova LNG Brownsville) (CP16-480)
L. **Corpus Christi, TX:** 1.86 Bcfd (Cheniere Corpus Christi LNG) (CP18-512)
M. **Sabine Pass, LA:** NA Bcfd (Sabine Pass Liquefaction) (CP19-11)
N. **Coos Bay, OR:** 1.08 Bcfd (Jordan Cove) (CP17-494)

APPROVED – NOT UNDER CONSTRUCTION – MARAD/Coast Guard
MC. **Gulf of Mexico:** 1.8 Bcfd (Delfin LNG)

CANADA
For Canadian LNG Import and Proposed Export Facilities:

https://www.nrcan.gc.ca/energy/natural-gas/5683

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



*Authorized to re-export delivered LNG

Import Terminals (Shown on Map)

UNITED STATES As of March 19, 2020
1. **Everett, MA:** 1.035 Bcfd (GDF SUEZ - DOMAC)
2. **Cove Point, MD:** 1.8 Bcfd (Dominion - Cove Point LNG)
3. **Elba Island, GA:** 1.6 Bcfd (El Paso - Southern LNG)
4. **Lake Charles, LA:** 2.1 Bcfd (Southern Union – Corpus Christi LNG) ★
5. **Offshore MA:** 0.8 Bcfd (Excelerate Energy – Northeast Gateway)
6. **Freeport, TX:** 1.5 Bcfd (Cheniere/Freeport LNG Dev.) ★
7. **Sabine, LA:** 4.0 Bcfd (Cheniere/Sabine Pass LNG) ★
8. **Hackberry, LA:** 1.8 Bcfd (Sempra - Cameron LNG)
9. **Offshore MA:** 0.4 Bcfd (GDF SUEZ – Neptune LNG)
10. **Sabine Pass, TX:** 2.0 Bcfd (ExxonMobil – Golden Pass) (Phase I & II)
11. **Pascagoula, MS:** 1.5 Bcfd (El Paso/Crest/Sonangol - Gulf LNG Energy)
12. **Peñuelas, PR:** 0.3 Bcfd (EcoElectrica)

CANADA
C1. **Saint John, NB:** 1.0 Bcfd (Repsol/Fort Reliance - Canaport LNG)

MEXICO
M1. **Altamira, Tamulipas:** 0.7 Bcfd (Shell/Total/Mitsui – Altamira LNG)
M2. **Baja California, MX:** 1.0 Bcfd (Sempra – Energia Costa Azul)
M3. **Manzanillo, MX:** 0.5 Bcfd (KMS GNL de Manzanillo)

Export Terminals (Not Shown on Map)

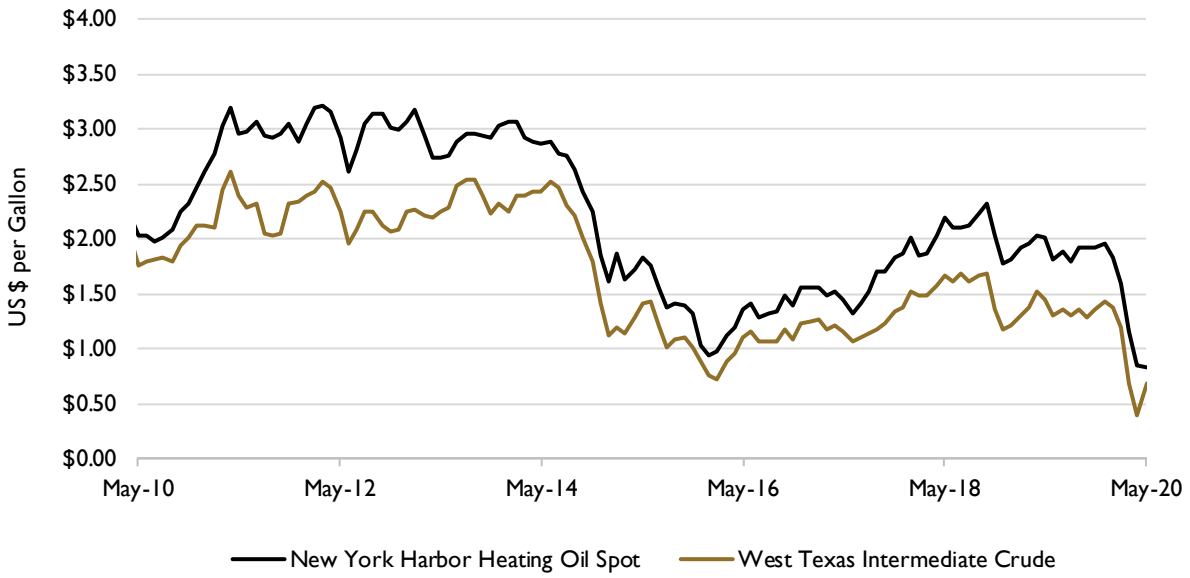
UNITED STATES As of March 19, 2020

1. **Kenai, AK:** 0.2 Bcfd (Trans-Foreland)
2. **Sabine, LA:** 3.5 Bcfd (Cheniere/Sabine Pass LNG – Trains 1-5)
3. **Cove Point, MD:** 0.82 Bcfd (Dominion–Cove Point LNG)
4. **Corpus Christi, TX:** 1.44 Bcfd (Cheniere – Corpus Christi LNG Trains 1, 2)
5. **Hackberry, LA:** 1.4 Bcfd (Sempra–Cameron LNG, Trains 1, 2)
6. **Elba Island, GA:** 175 MMcfd (Southern LNG Company Units 1-5)
7. **Freeport, TX:** 1.42 Bcfd (Freeport LNG Dev/Freeport LNG Expansion/FLNG Liquefaction Trains 1, 2)

DATA CENTER

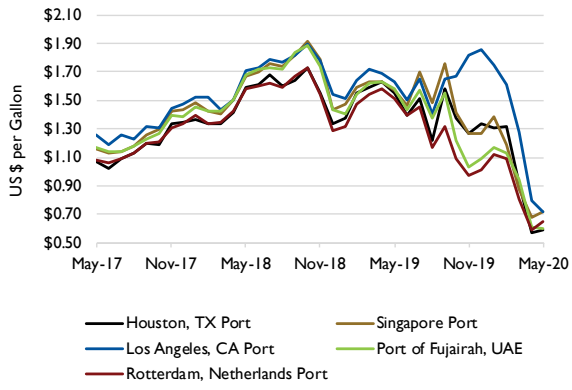
PROPANE AND HEATING/FUEL OIL

HEATING OIL PRICES (MONTHLY AVERAGE) (25)

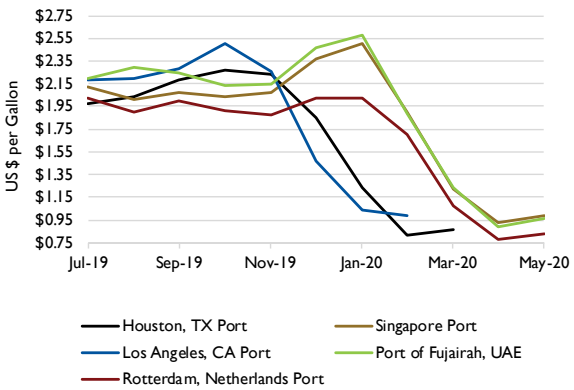


INTERMEDIATE FUEL OIL AKA "BUNKER FUEL" PRICES (MONTHLY AVERAGE) (26)

Intermediate Fuel Oil 380



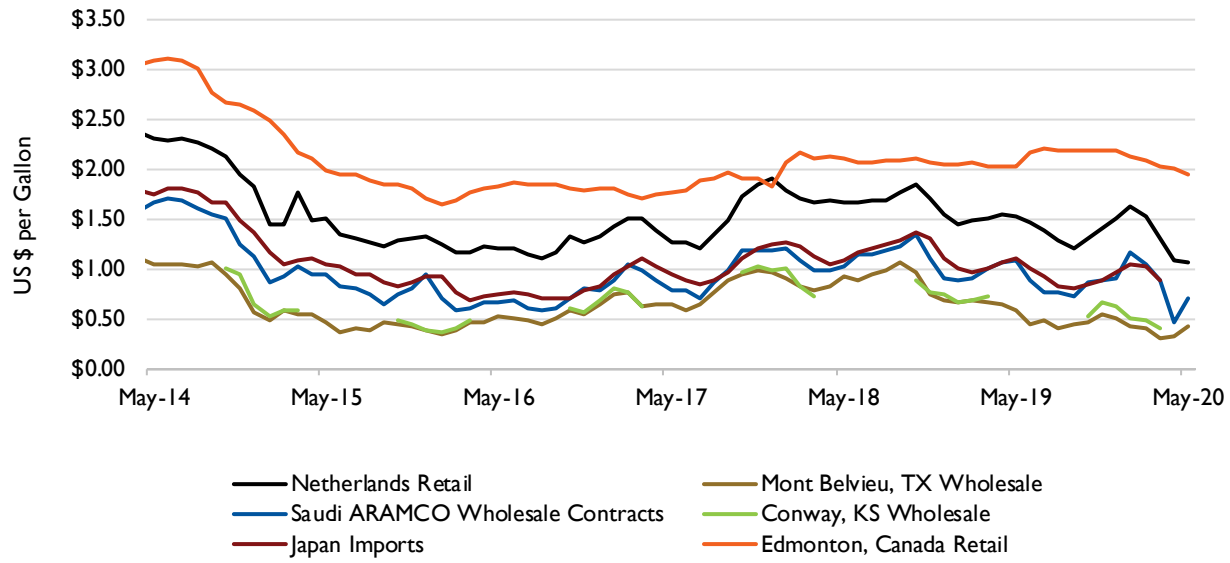
Very Low Sulfur Fuel Oil (VLSFO)



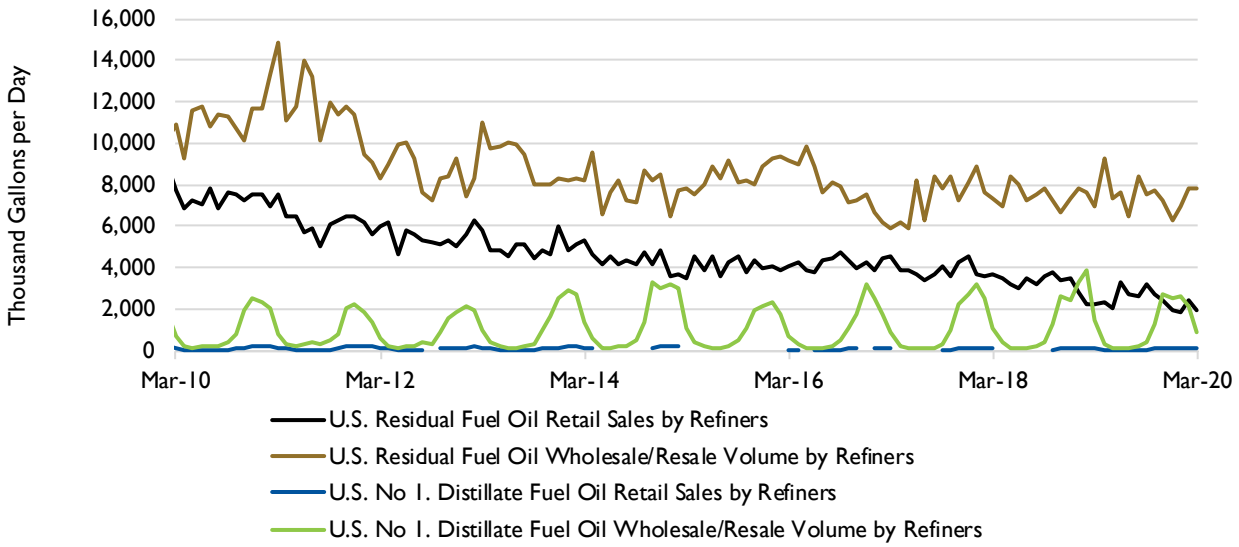
DATA CENTER

PROPANE AND HEATING/FUEL OIL

PROPANE PRICES (MONTHLY AVERAGE) (27)



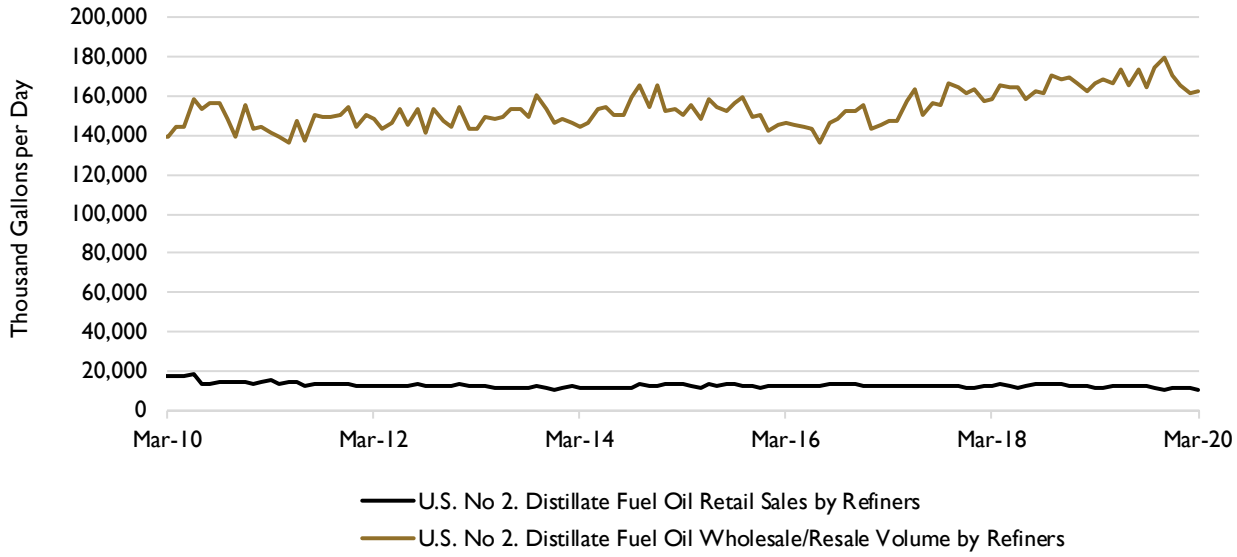
NO. 1 DISTILLATE FUEL OIL, RESIDUAL FUEL OIL WHOLESALE, RETAIL SALES VOLUME BY REFINERS (MONTHLY) (28)



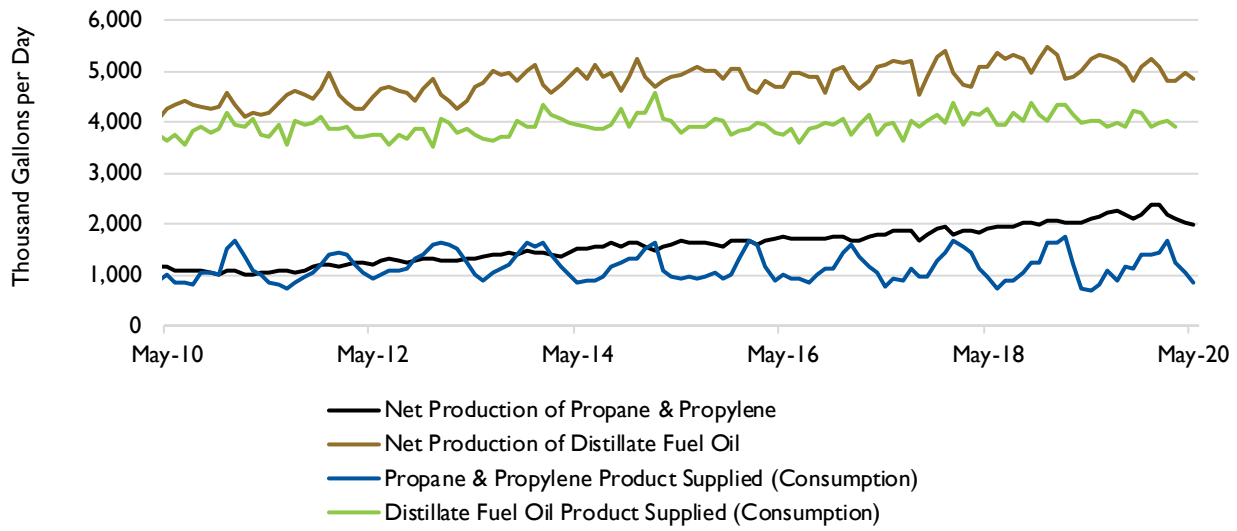
DATA CENTER

PROPANE AND HEATING/FUEL OIL

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



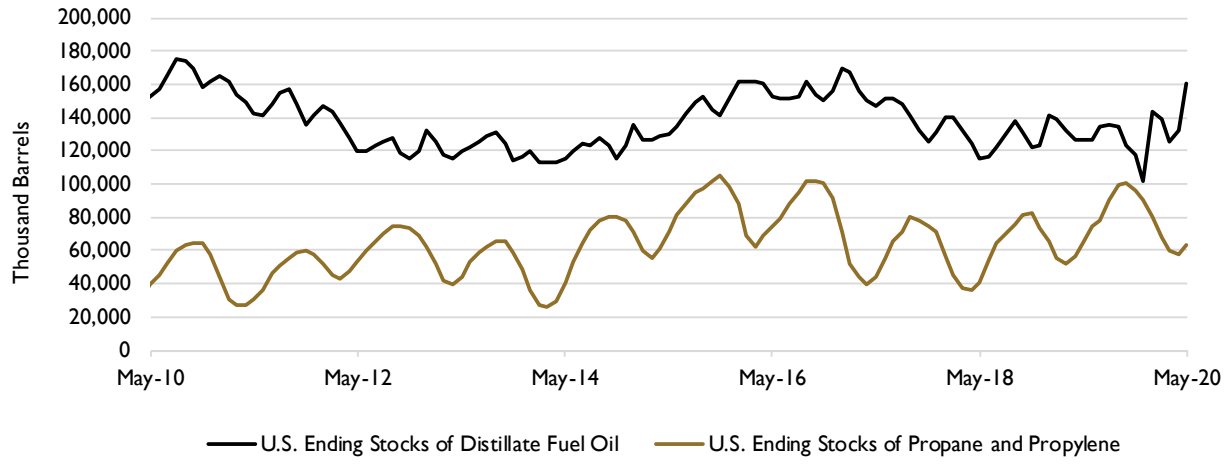
Propane & Propylene and Distillate Fuel Oil Production and Consumption (Monthly) (30)



DATA CENTER

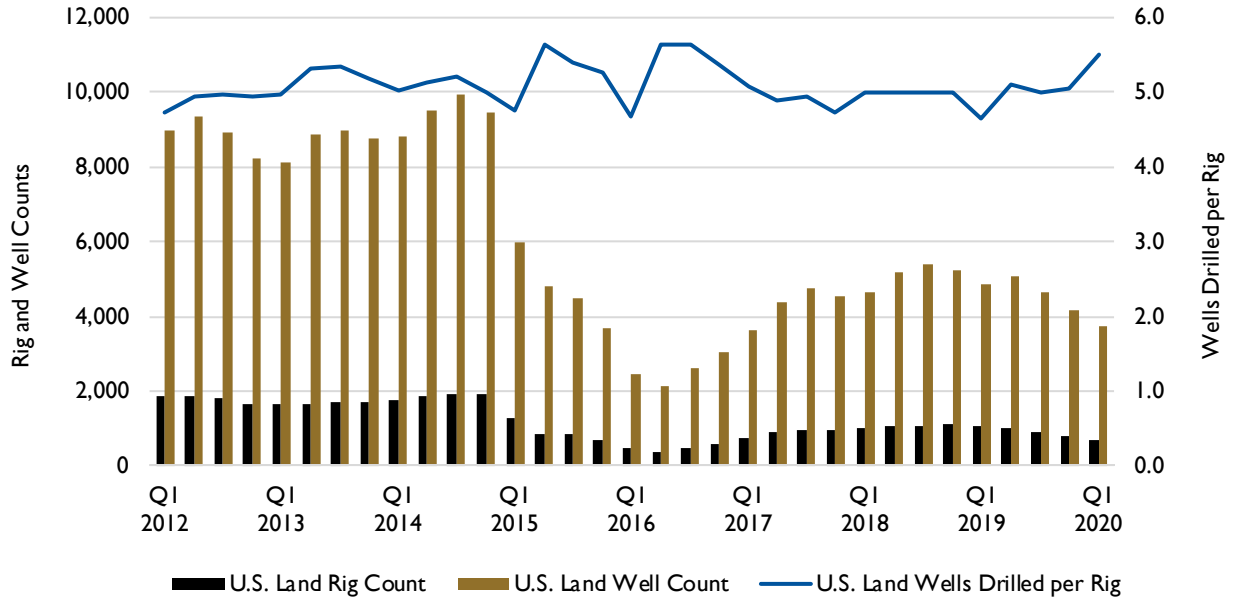
PROPANE AND HEATING/FUEL OIL

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



DRILLING ACTIVITY

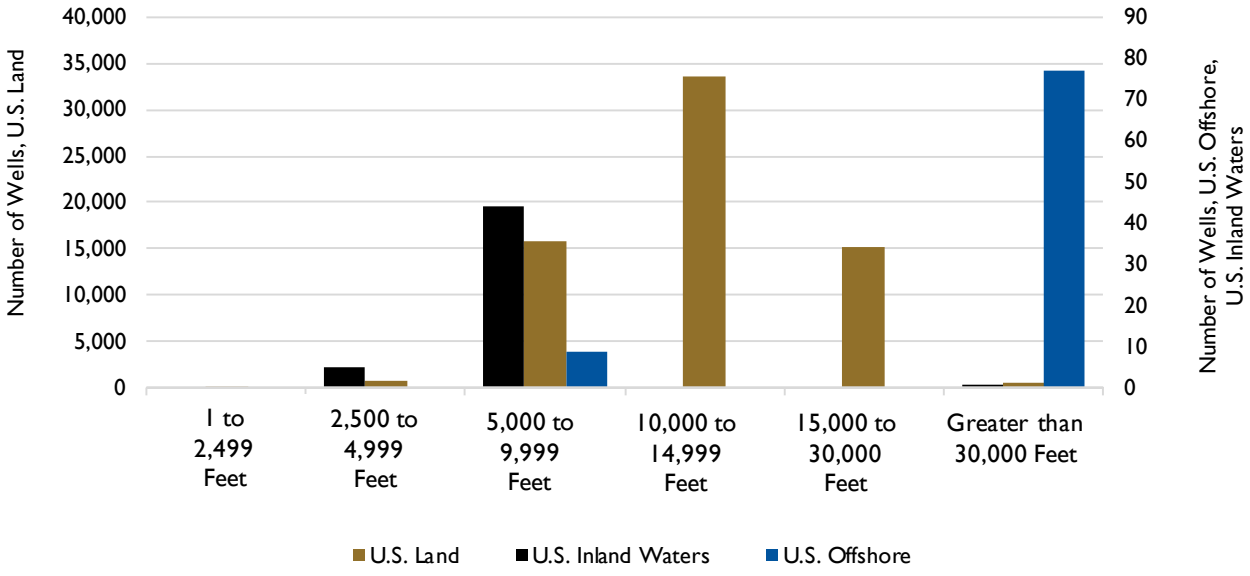
U.S. Land Well Count, Rig Count and Wells per Rig (Quarterly) (32)



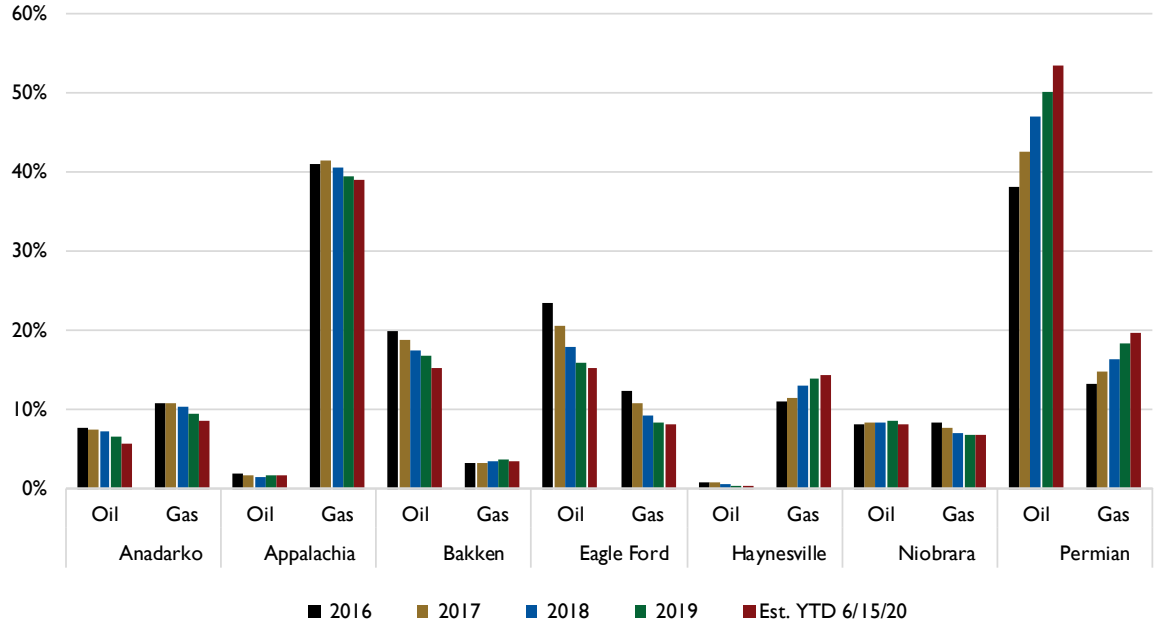
DATA CENTER

DRILLING ACTIVITY

U.S. WELL STARTS BY DEPTH (YEAR TO DATE MAY 31, 2020) (33)



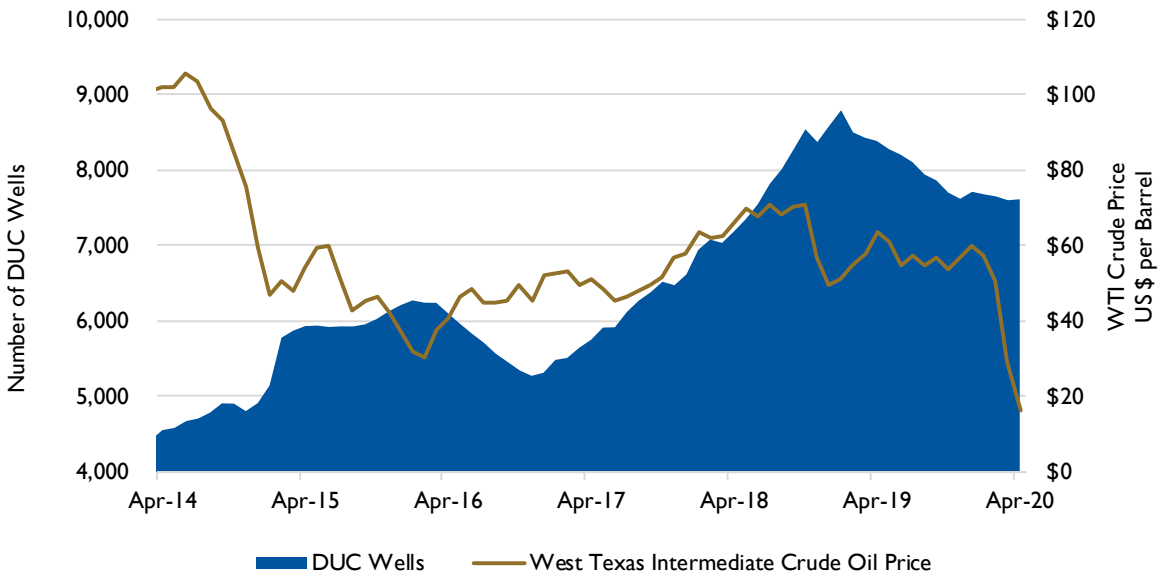
PERCENTAGE OF CRUDE OIL AND NATURAL GAS PRODUCTION PER SHALE REGION (ANNUAL) (34)



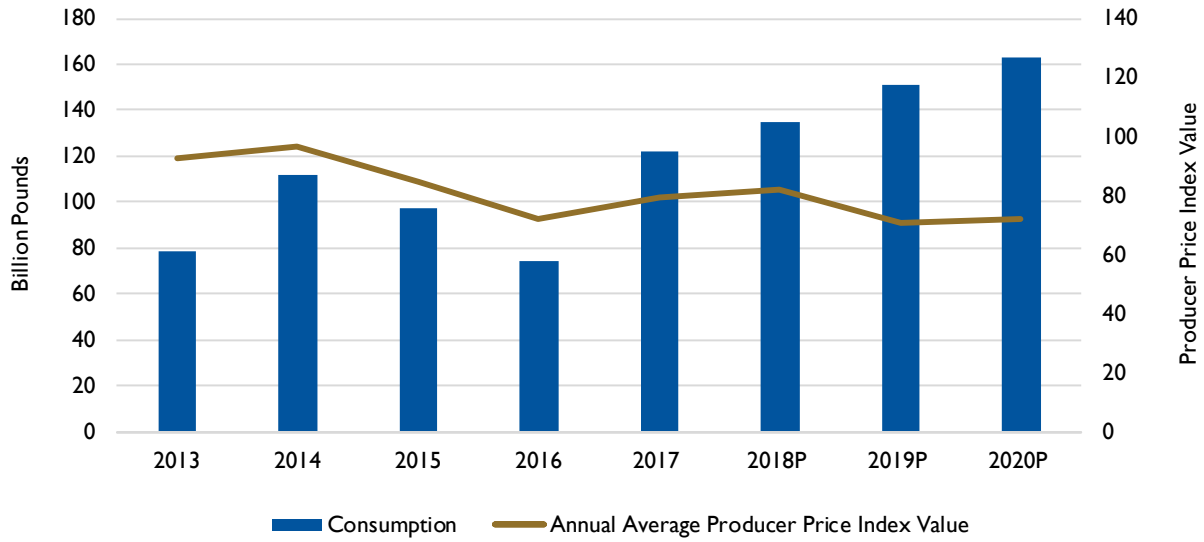
DATA CENTER

DRILLING ACTIVITY

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



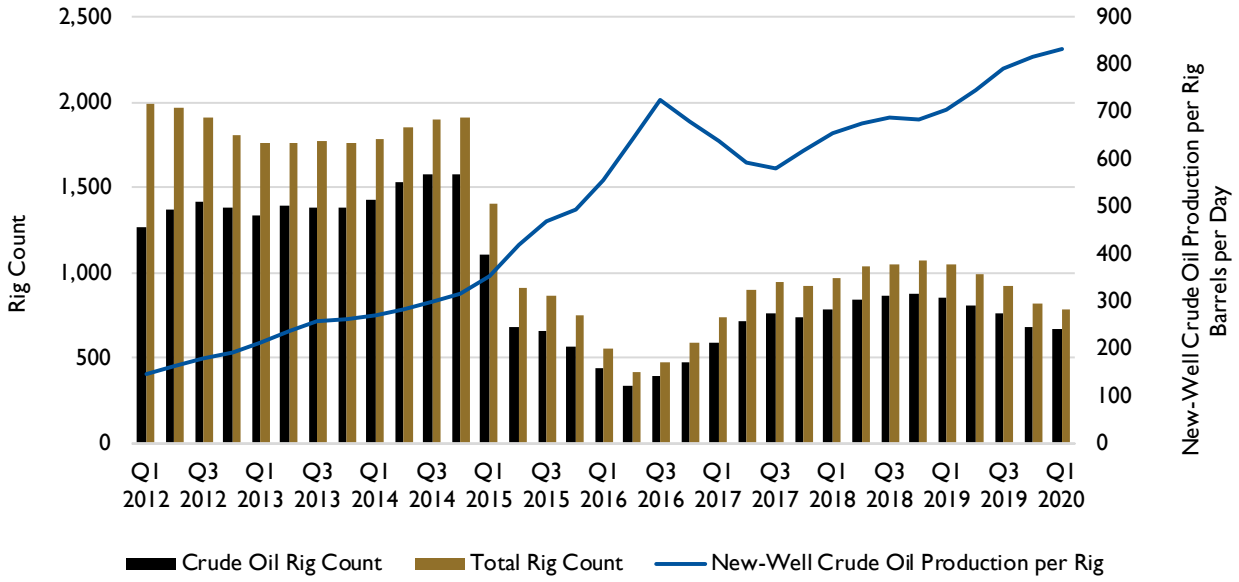
HYDRAULIC FRACTURING SAND CONSUMPTION AND PRODUCER PRICE INDEX (ANNUAL) (36)



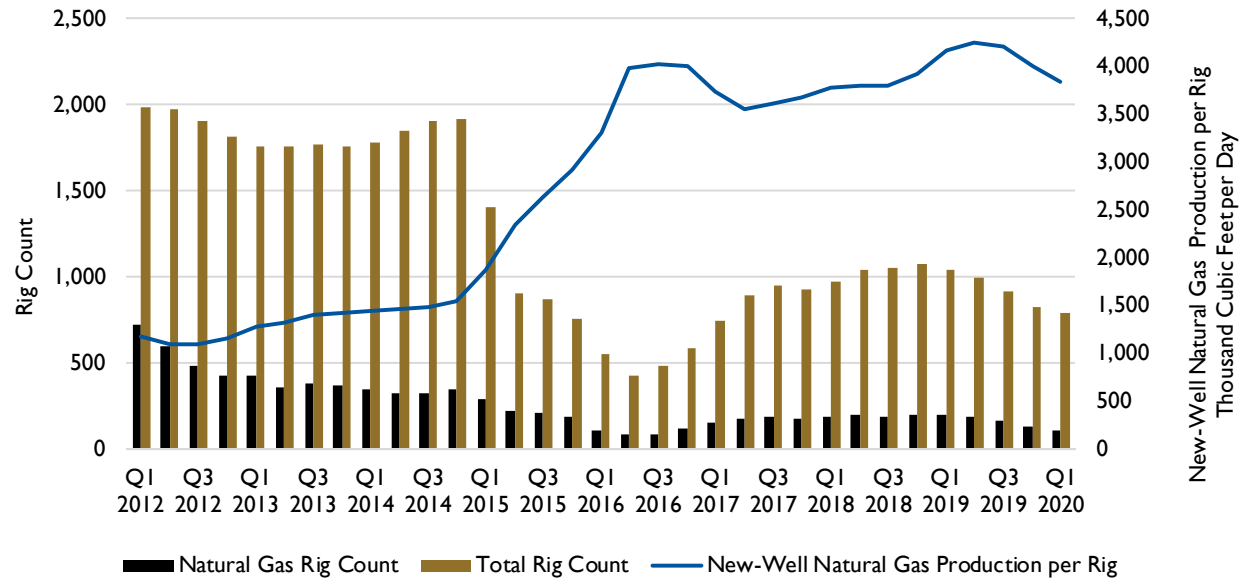
DATA CENTER

DRILLING ACTIVITY

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



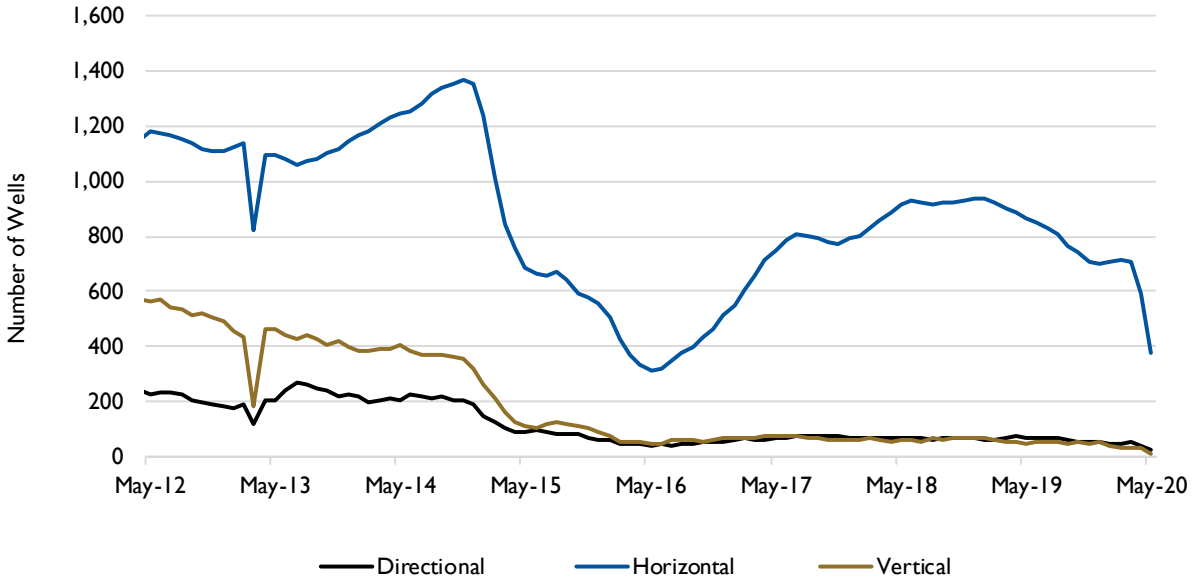
NATURAL GAS PRODUCTION, RIG COUNT AND PRODUCTION PER RIG (QUARTERLY) (38)



DATA CENTER

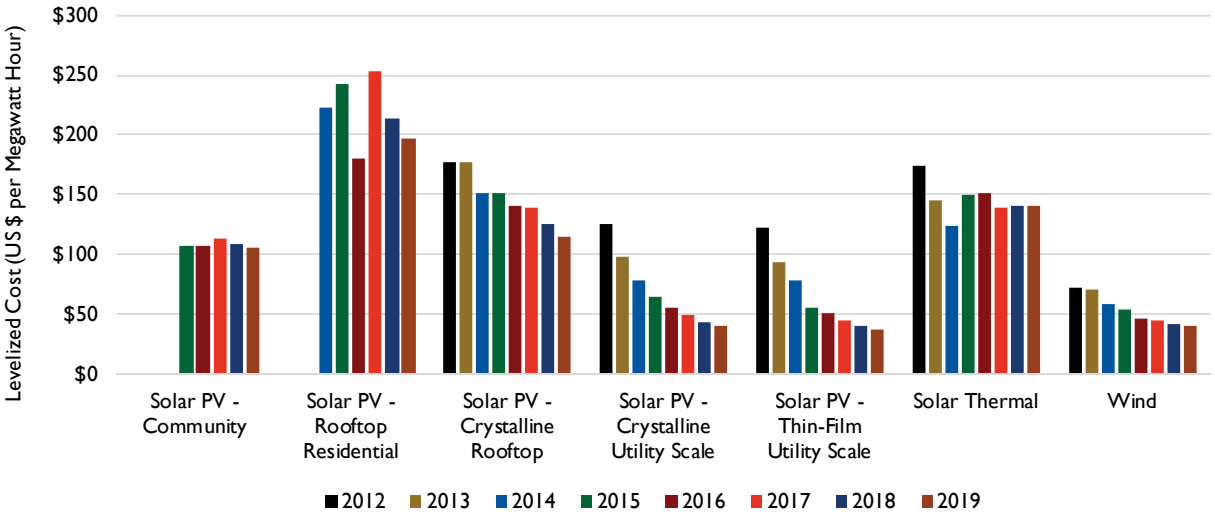
DRILLING ACTIVITY

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



RENEWABLES

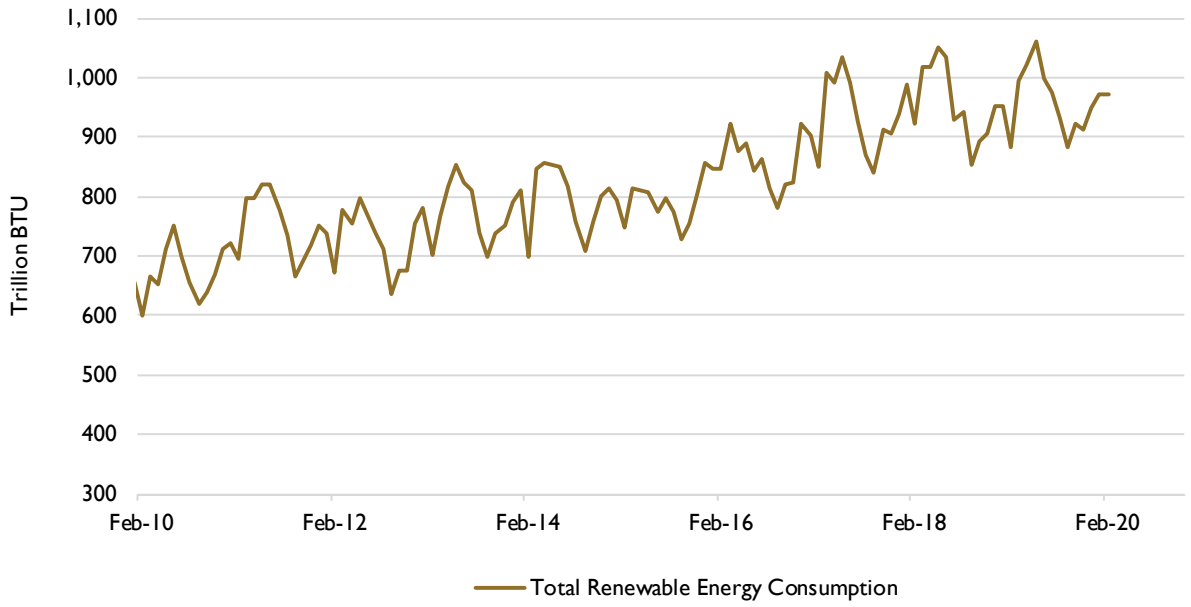
WIND AND SOLAR PRICES (ANNUAL AVERAGE) (40)



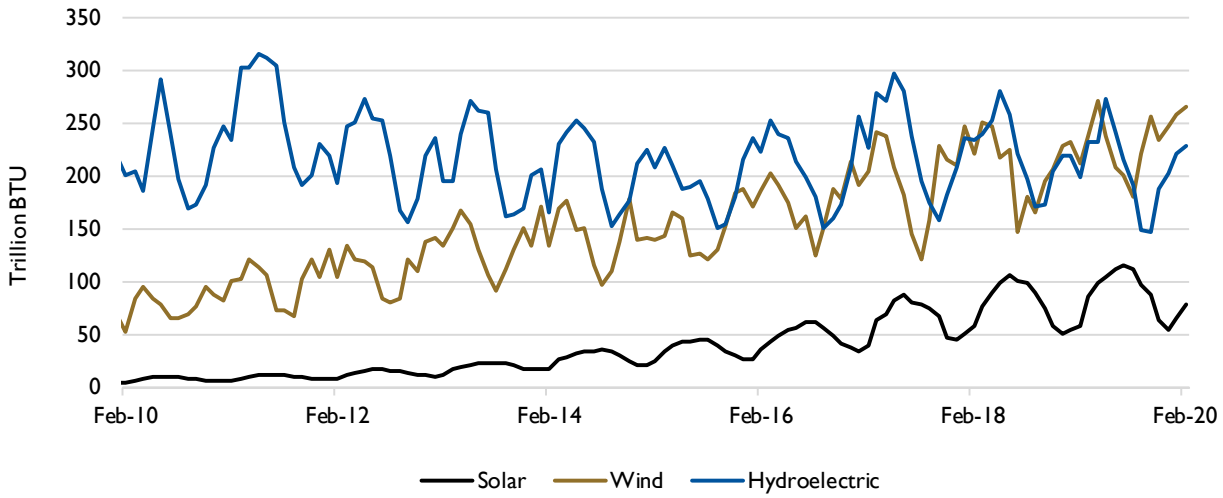
DATA CENTER

RENEWABLES

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



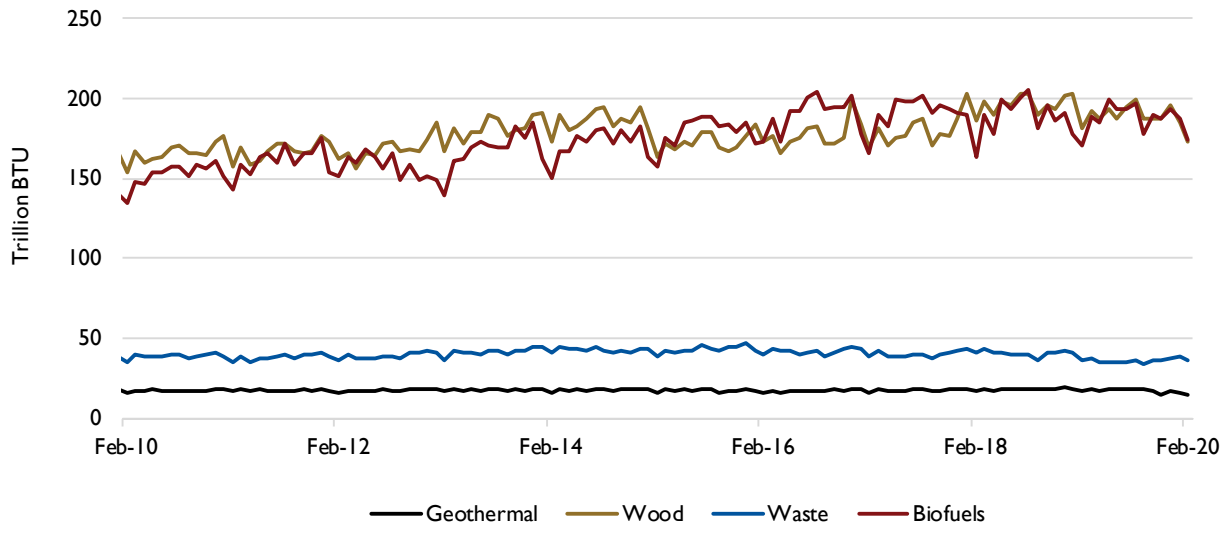
U.S. SOLAR, WIND AND HYRDOELECTRIC ENERGY CONSUMPTION (MONTHLY) (42)



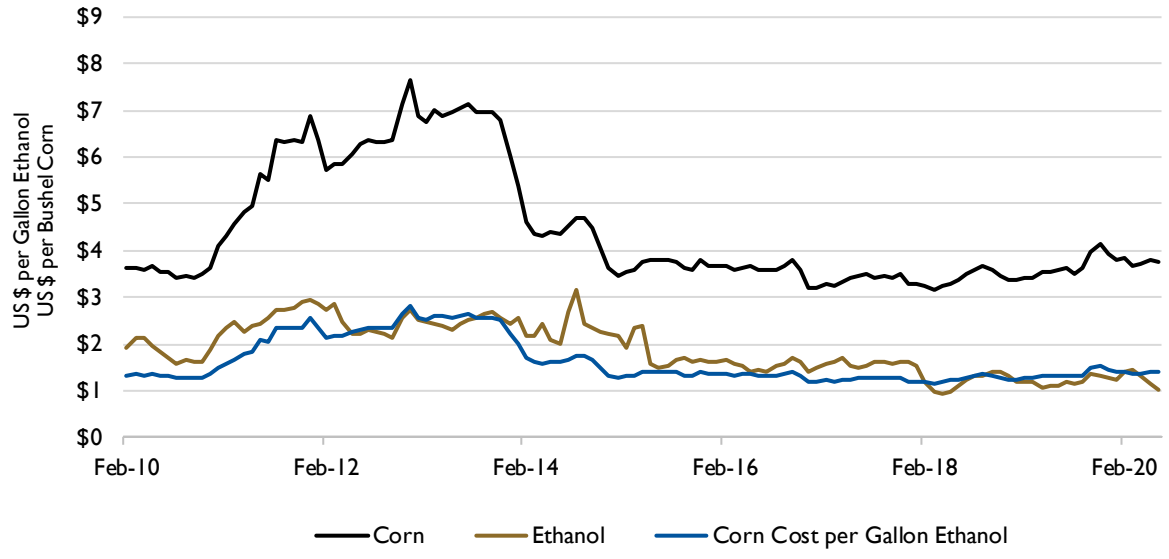
DATA CENTER

RENEWABLES

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



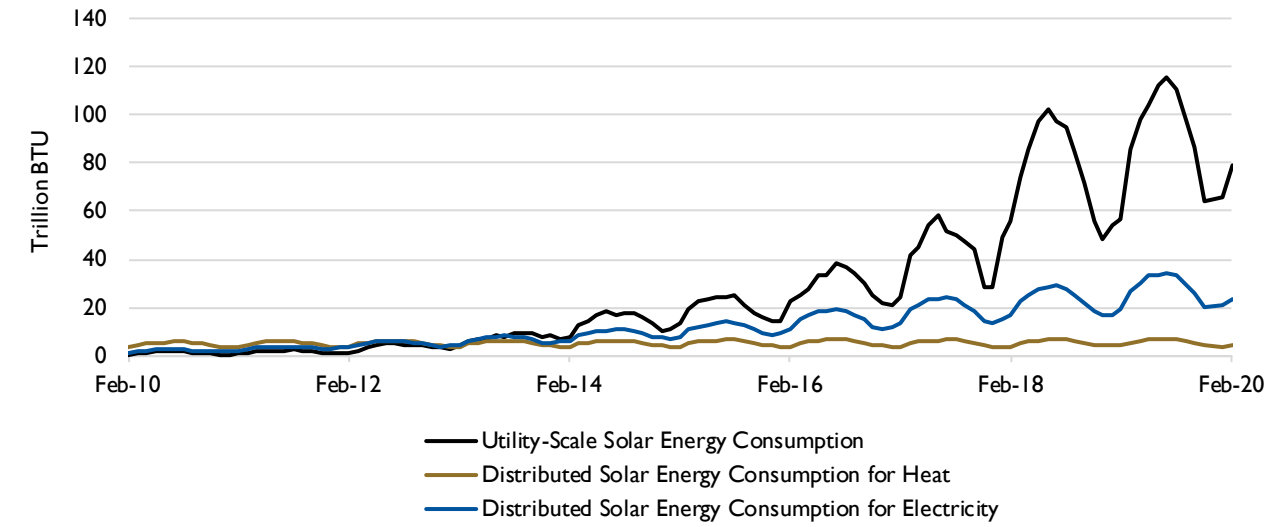
Corn and Ethanol Prices and Corn Cost per Gallon of Ethanol (Quarterly) (44)



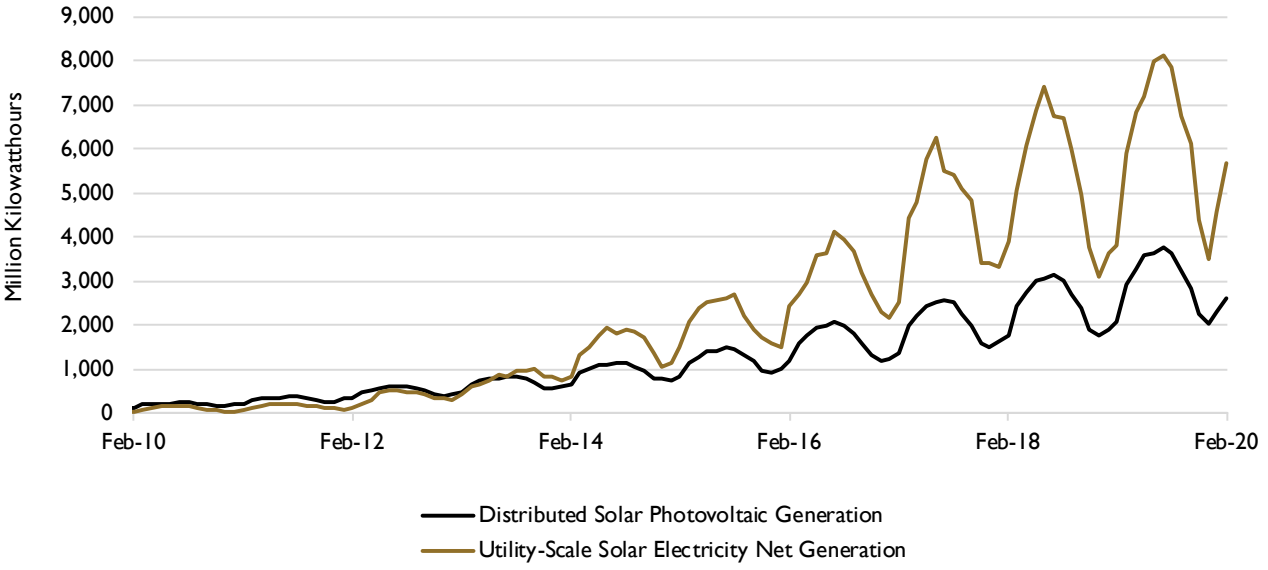
DATA CENTER

RENEWABLES

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



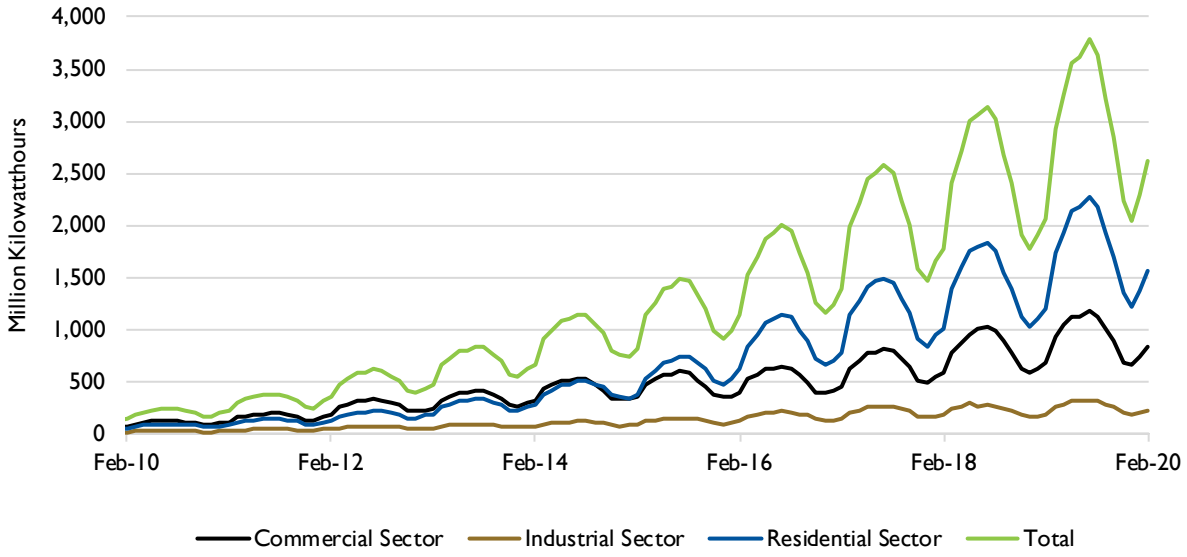
U.S. Solar Energy Net Generation (Monthly) (46)



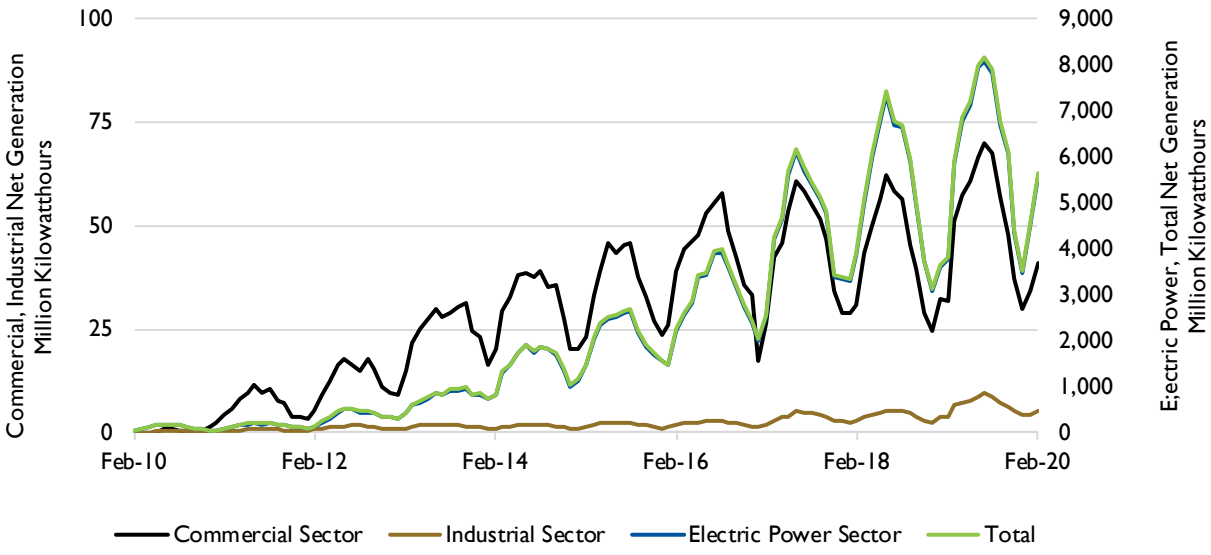
DATA CENTER

RENEWABLES

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



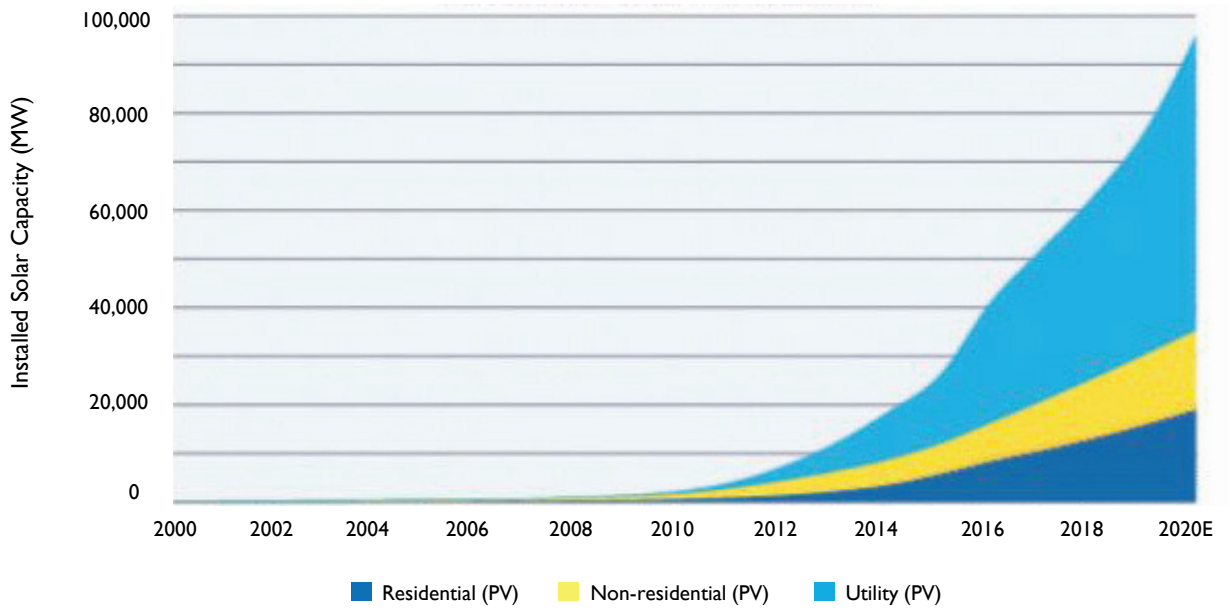
UTILITY-SCALE SOLAR ELECTRICITY NET GENERATION BY SECTOR (MONTHLY) (48)



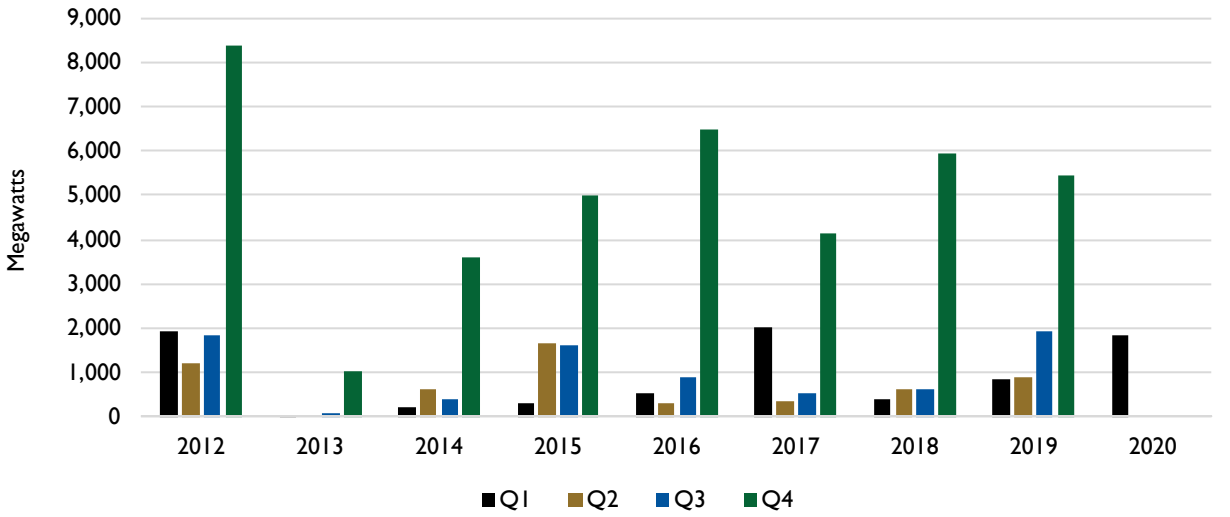
DATA CENTER

RENEWABLES

U.S. Cumulative Solar Installations (Annual) [49]



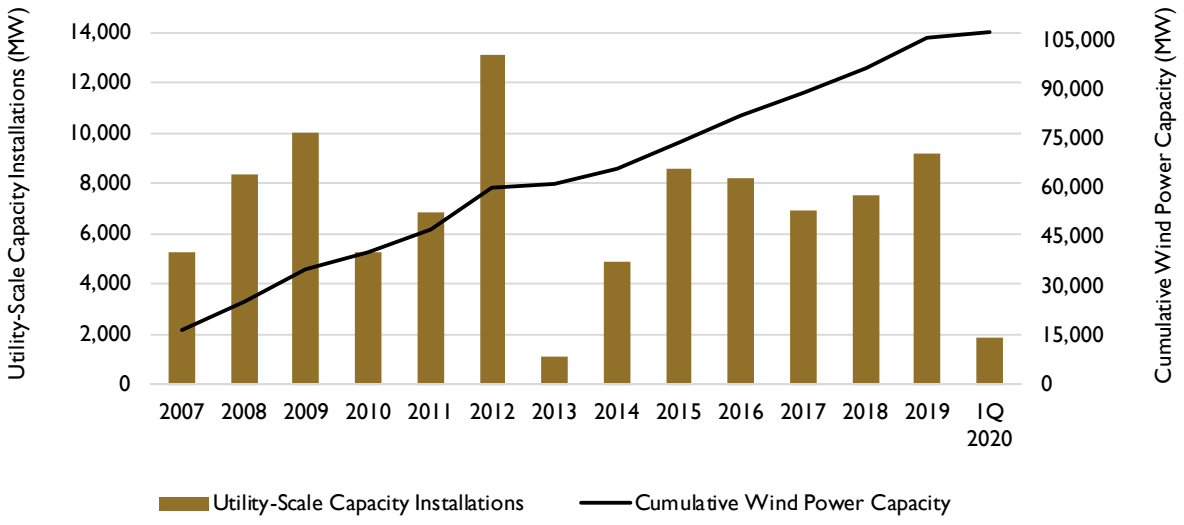
U.S. Wind Power Capacity Installations (Quarterly) [50]



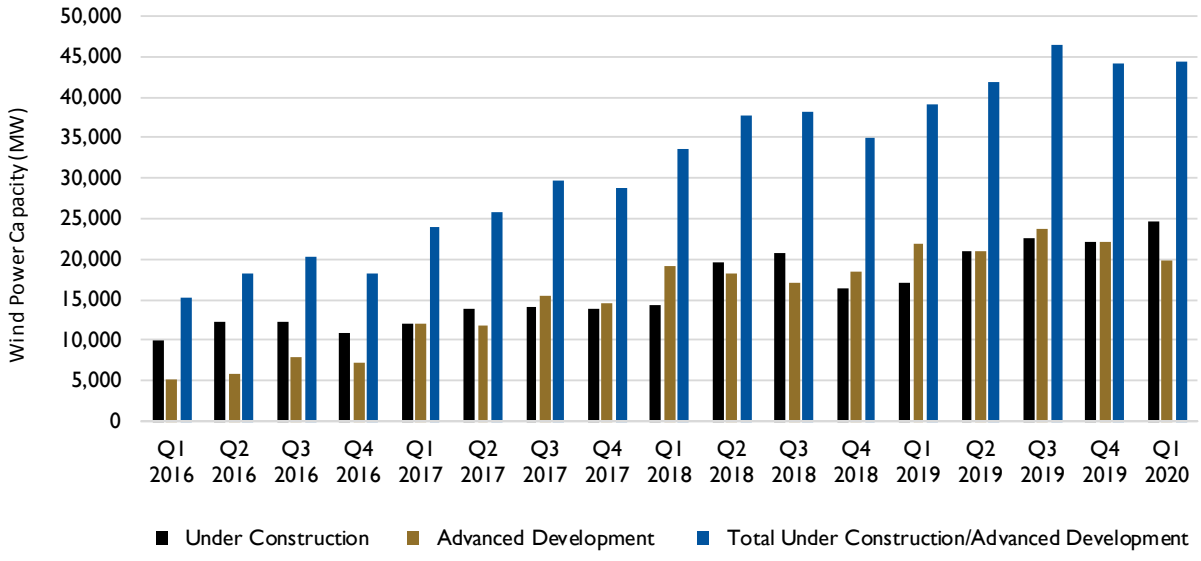
DATA CENTER

RENEWABLES

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



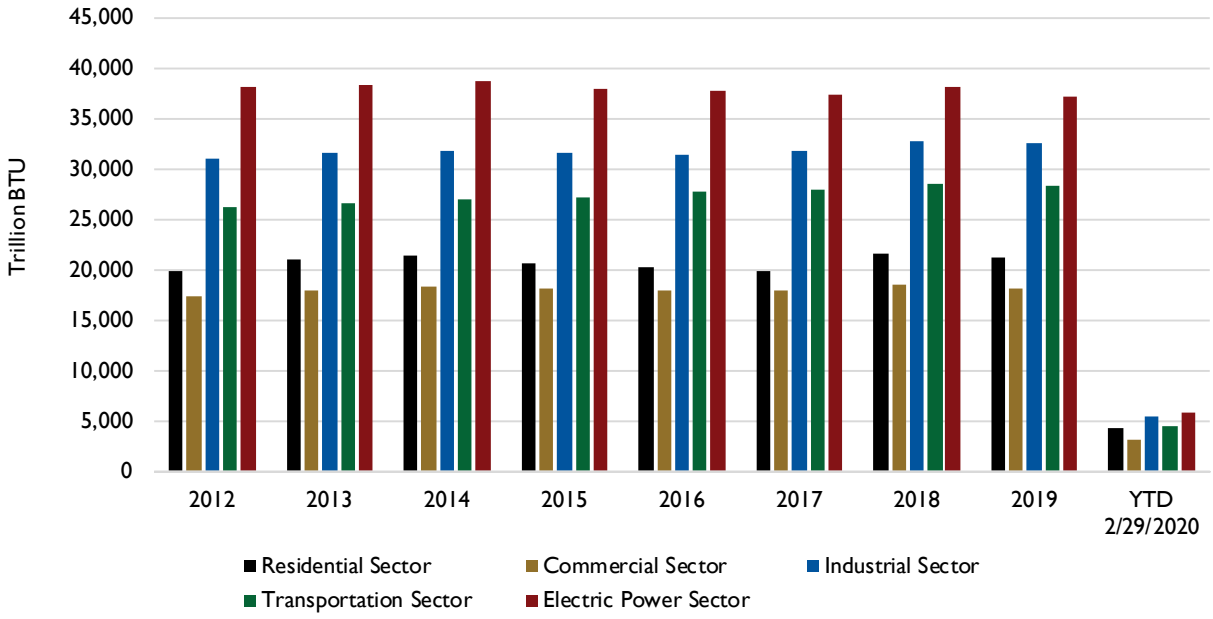
WIND POWER UNDER CONSTRUCTION OR IN ADVANCED DEVELOPMENT (QUARTERLY) (52)



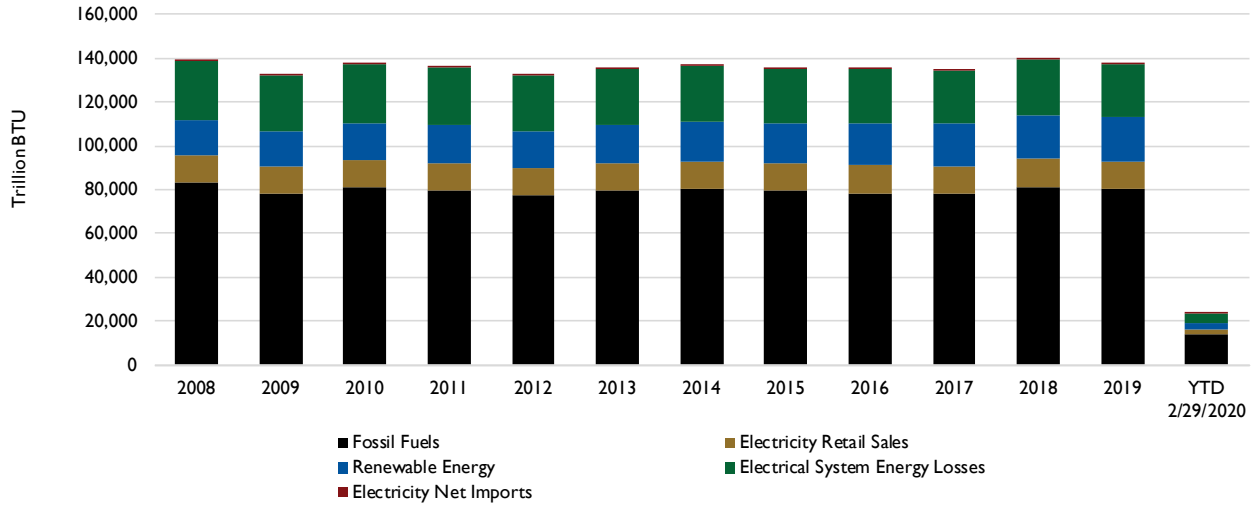
DATA CENTER

U.S. AGGREGATED ENERGY CONSUMPTION

ENERGY CONSUMPTION BY SECTOR (ANNUAL) (53)



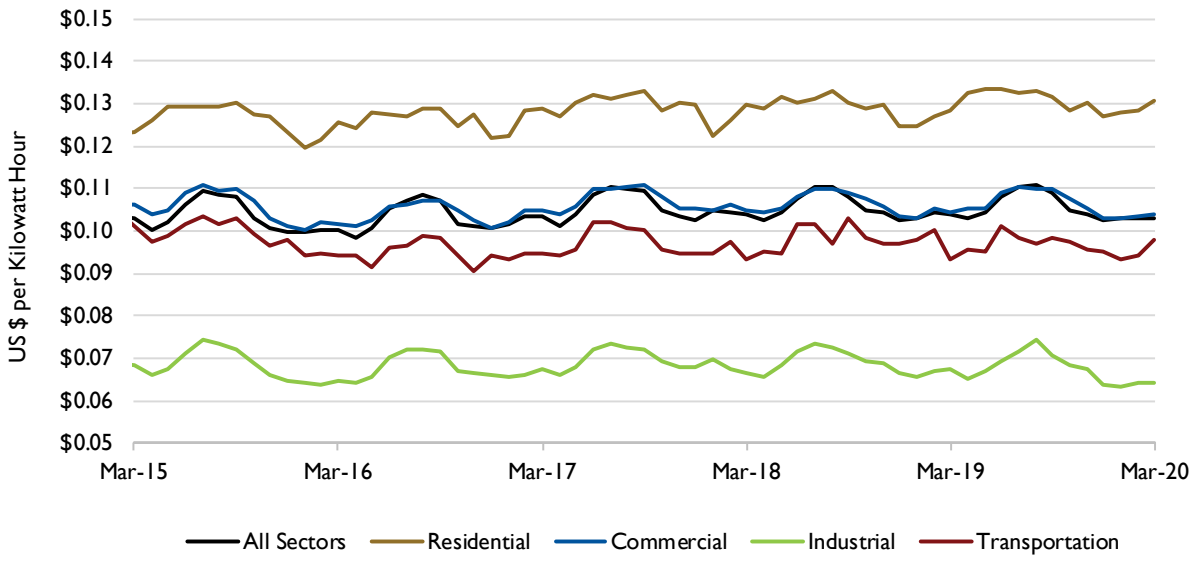
ENERGY CONSUMPTION BY SOURCE (ANNUAL) (54)



DATA CENTER

U.S. AGGREGATED ENERGY CONSUMPTION

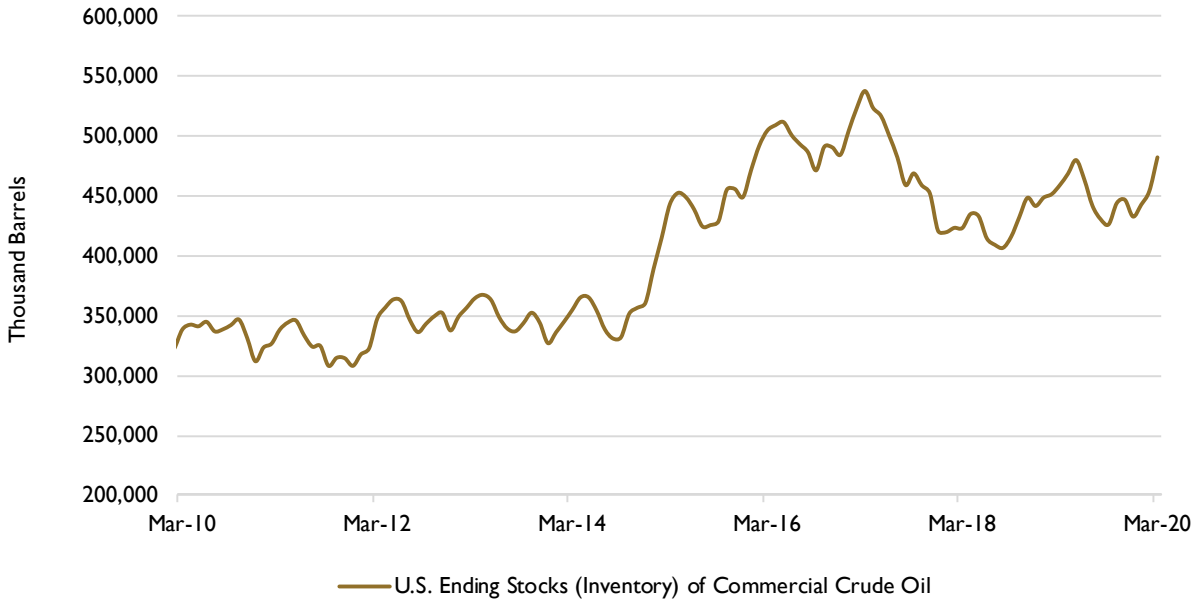
ELECTRICITY PRICES BY SECTOR (MONTHLY AVERAGE) (55)



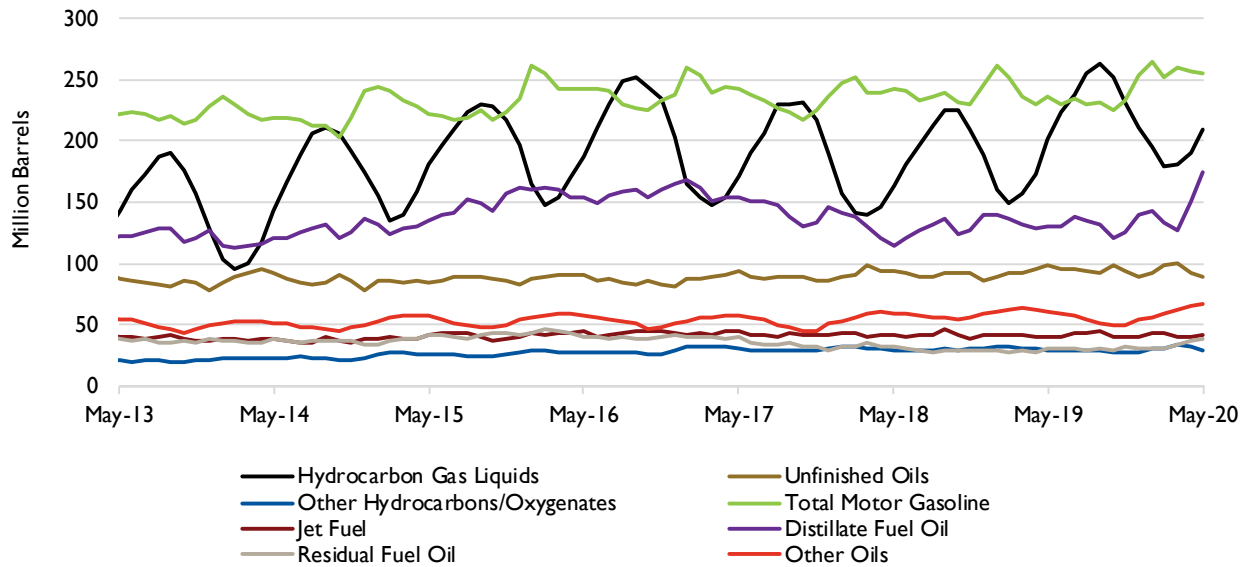
DATA CENTER

LOGISTICS - STORAGE AND TERMINALS

COMMERCIAL CRUDE OIL INVENTORY (MONTHLY) (56)



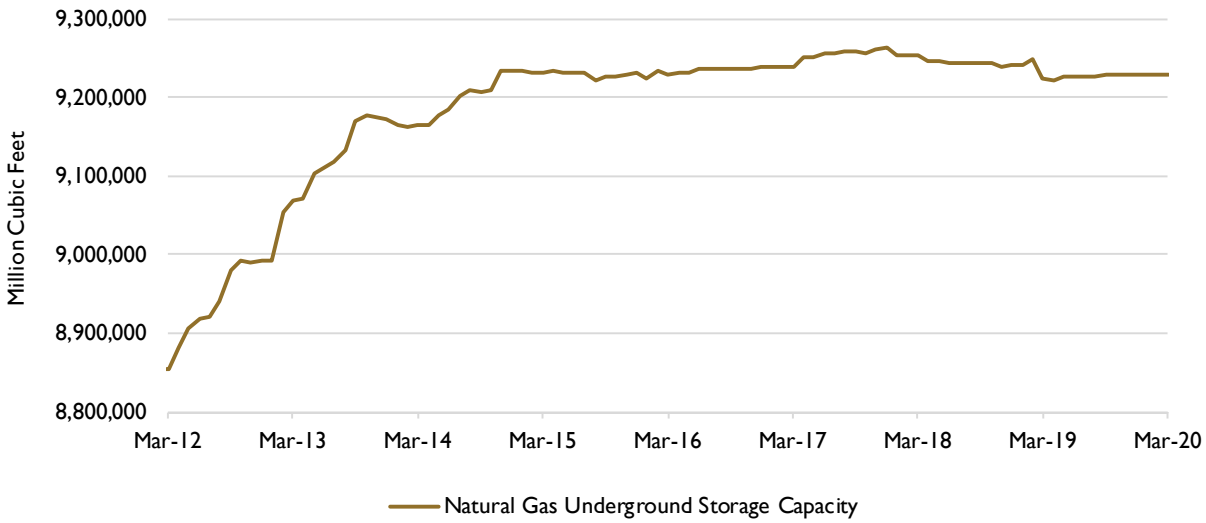
PETROLEUM AND OTHER LIQUIDS COMMERCIAL INVENTORY (MONTHLY) (57)



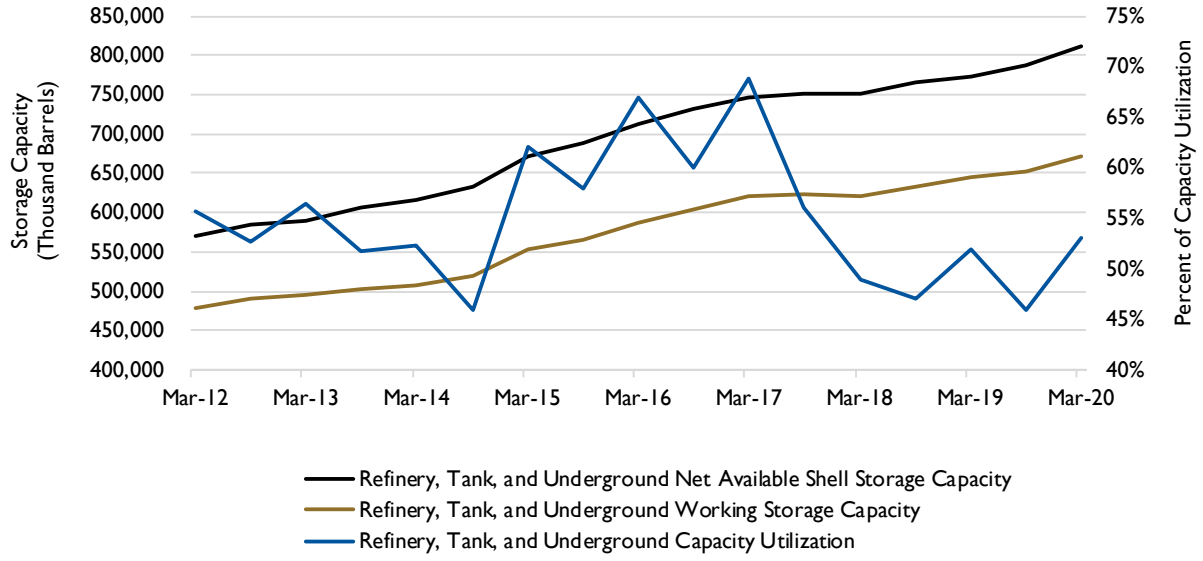
DATA CENTER

LOGISTICS - STORAGE AND TERMINALS

NATURAL GAS UNDERGROUND STORAGE CAPACITY (MONTHLY) (58)



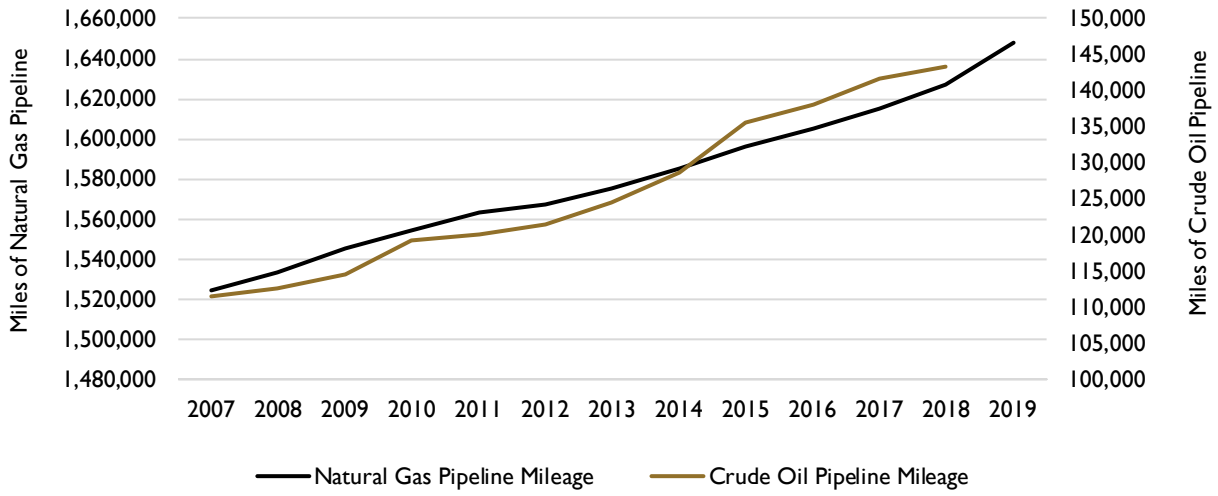
COMMERCIAL CRUDE OIL REFINERY, TANK AND UNDERGROUND STORAGE CAPACITY AND UTILIZATION (MONTHLY) (59)



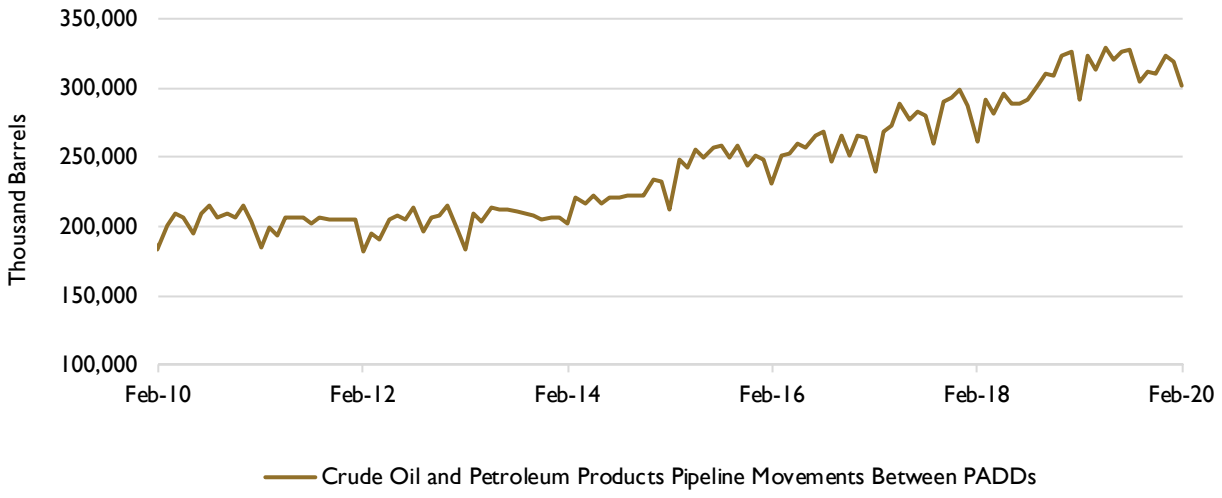
DATA CENTER

LOGISTICS - PIPELINES

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



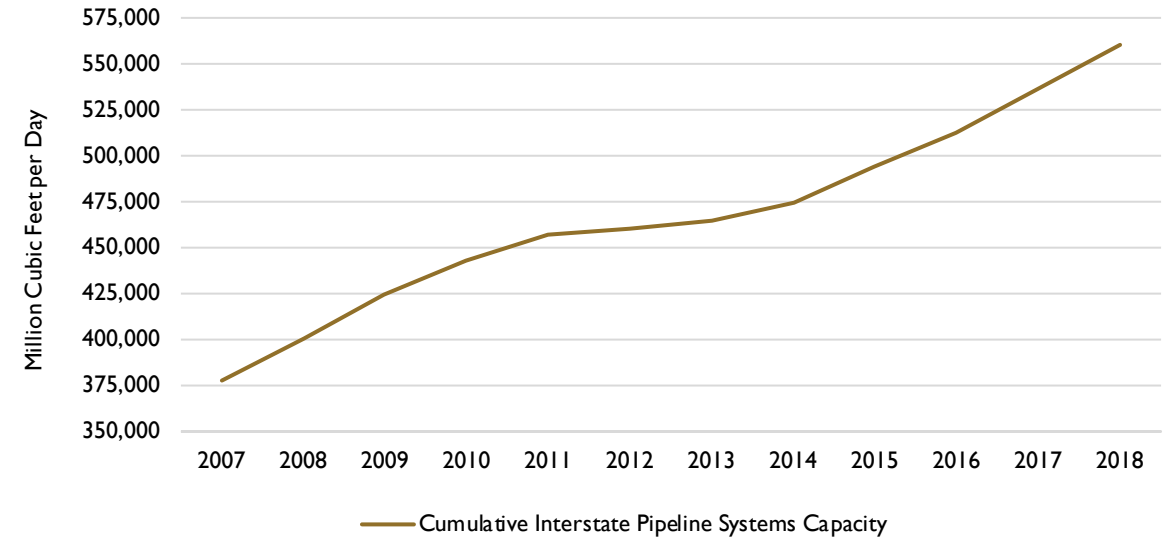
CRUDE OIL AND PETROLEUM PRODUCTS PIPELINE MOVEMENTS BETWEEN PETROLEUM ADMINISTRATION FOR DEFENSE DISTRICTS (PADDS) (MONTHLY) (61)



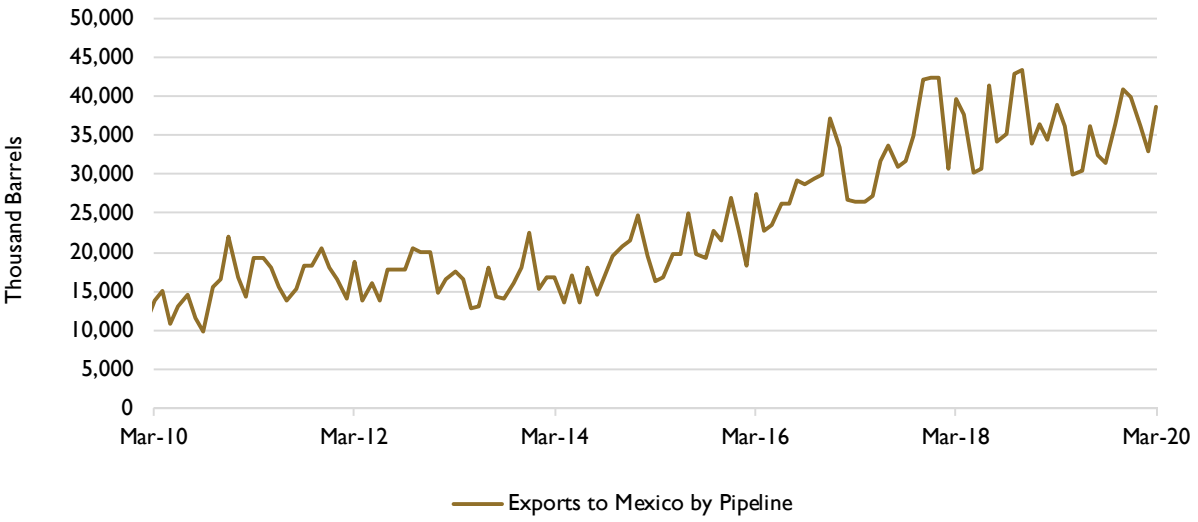
DATA CENTER

LOGISTICS - PIPELINES

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



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

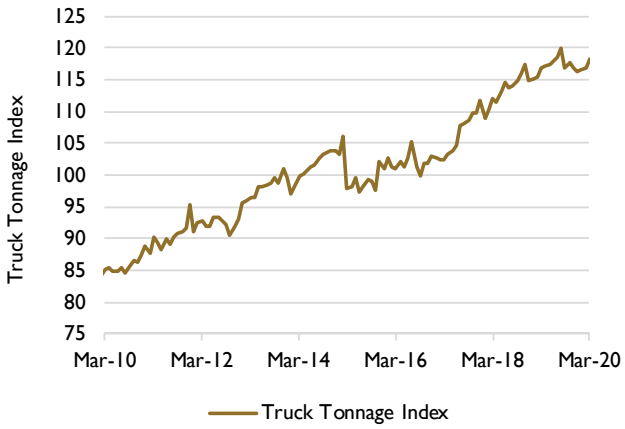


DATA CENTER

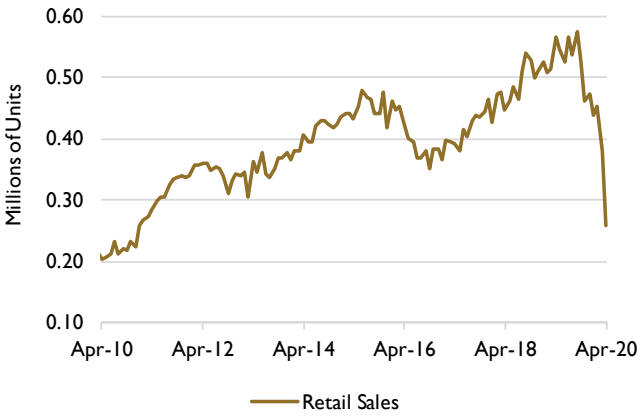
LOGISTICS - TRUCKERS

TRUCK TONNAGE INDEX (MONTHLY) (64)

MEASURES GROSS TONNAGE OF FREIGHT

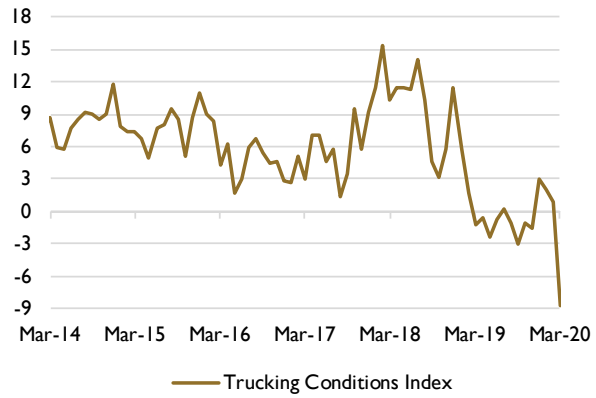


HEAVY TRUCK SALES (MONTHLY) (65)



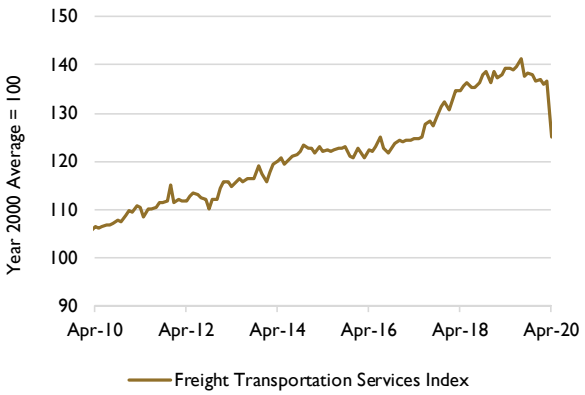
TRUCKING CONDITIONS INDEX (MONTHLY) (66)

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



FREIGHT TRANSPORTATION SERVICES INDEX (MONTHLY) (67)

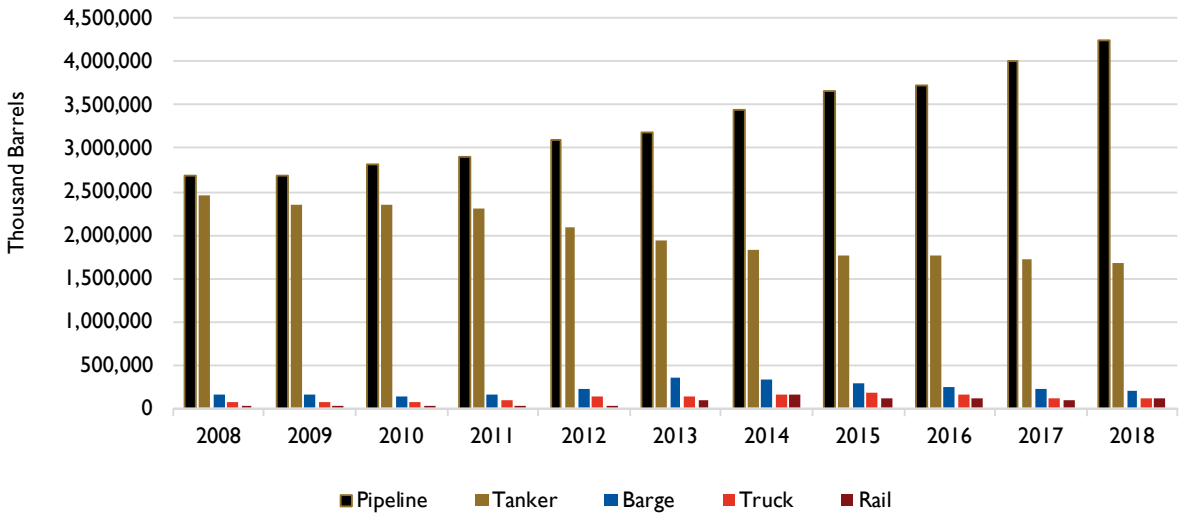
INCLUDES TRUCKING, RAIL, WATERWAYS, PIPELINES AND AIR FRIGHT



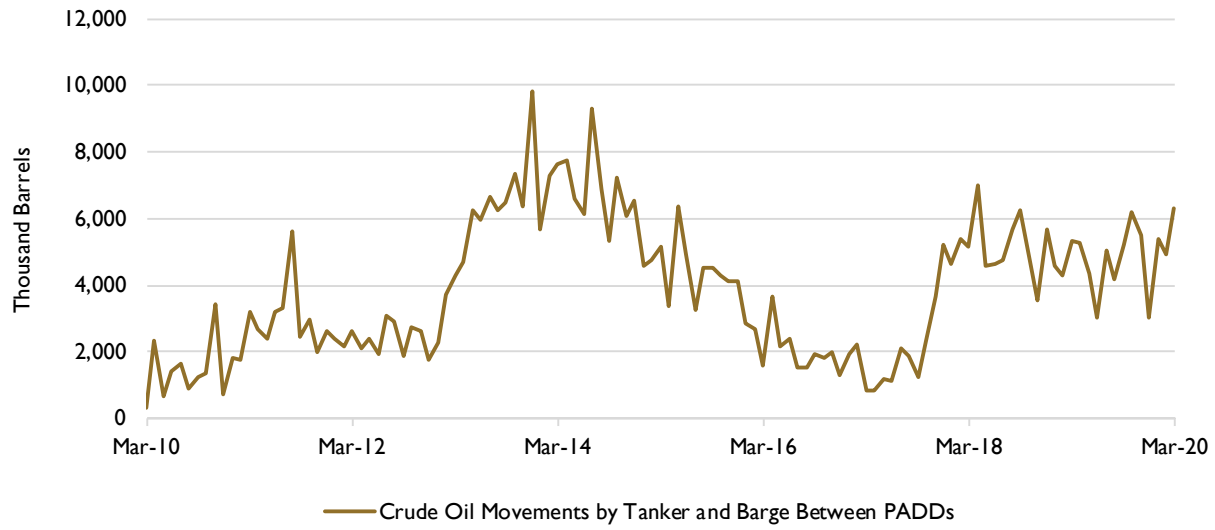
DATA CENTER

LOGISTICS - SHIPPING

Crude Oil Refinery Receipts by Transportation Method (Annual) (68)



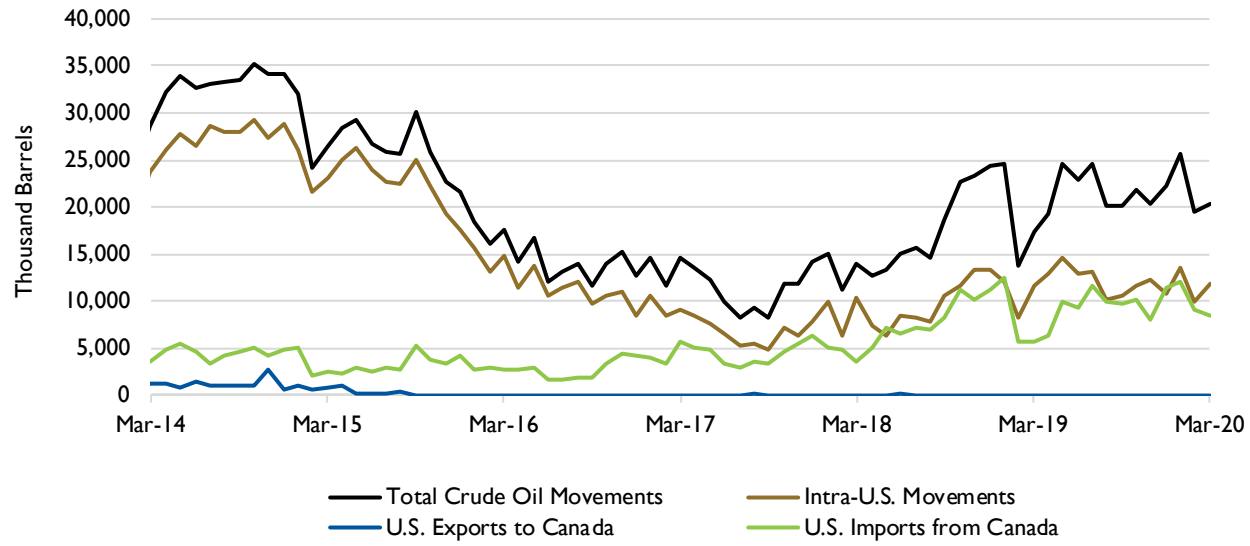
Crude Oil Movements by Tanker and Barge Between Petroleum Administration for Defense Districts (PADDs) (Monthly) (69)



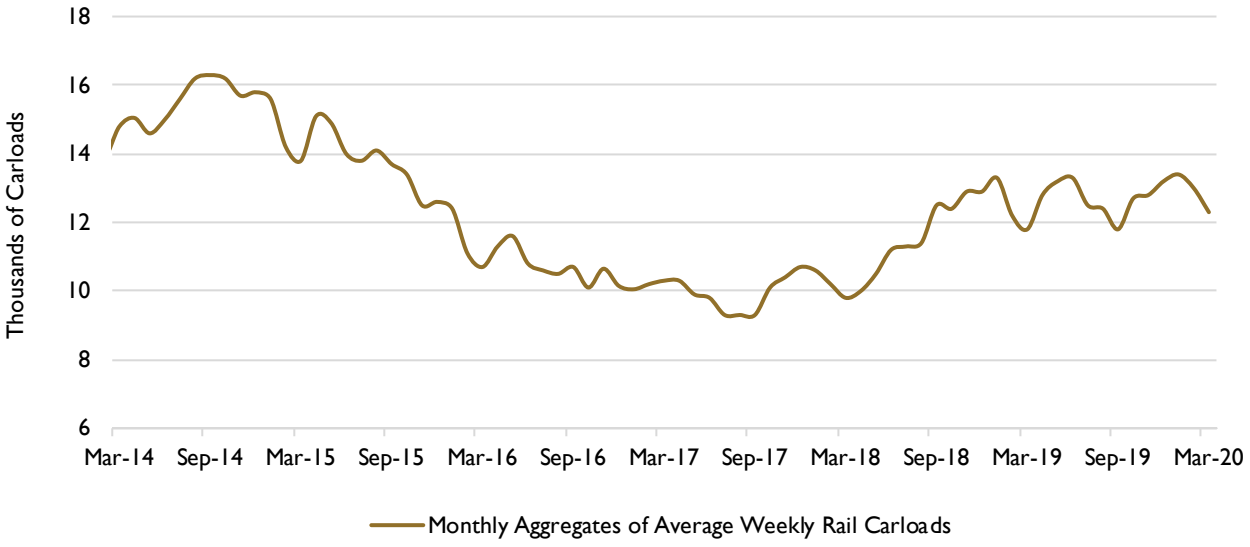
DATA CENTER

LOGISTICS - RAIL

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



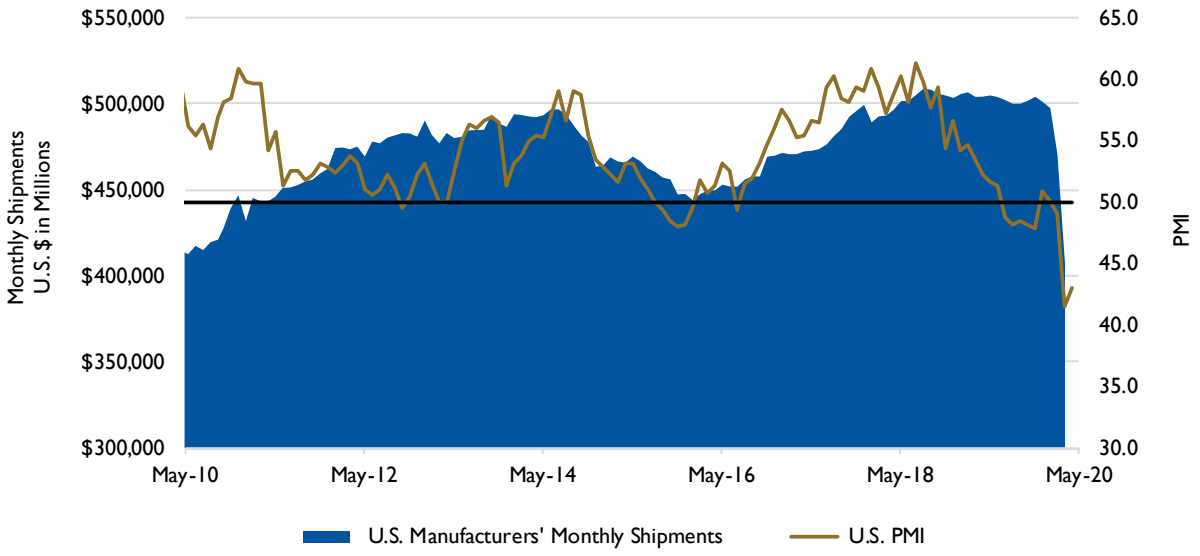
AVERAGE WEEKLY RAIL CARLOADS OF PETROLEUM AND PETROLEUM PRODUCTS (MONTHLY AGGREGATE) (71)



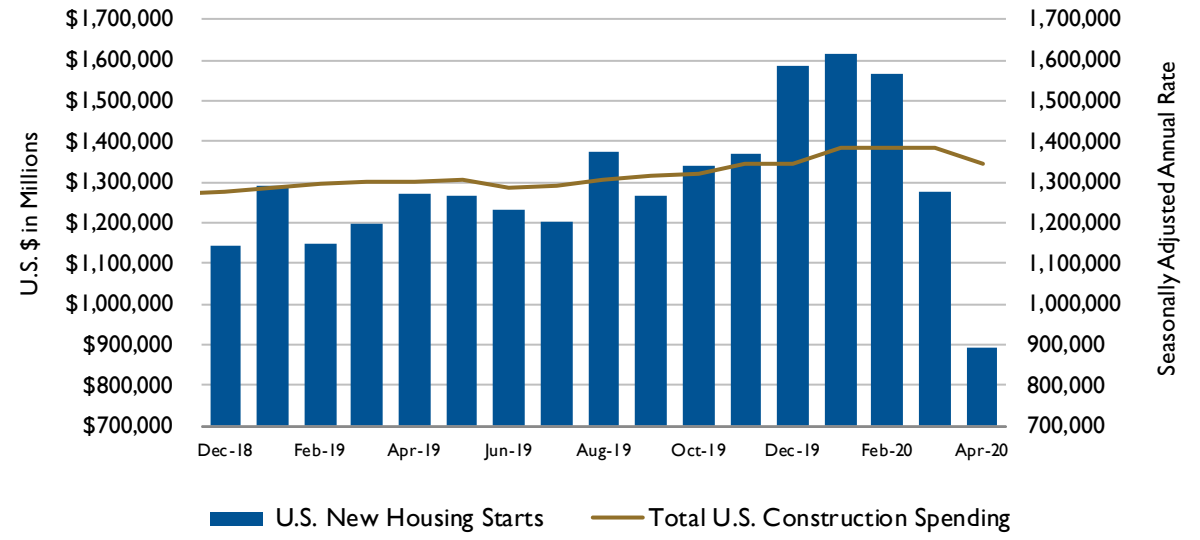
DATA CENTER

ECONOMIC / FINANCIAL

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



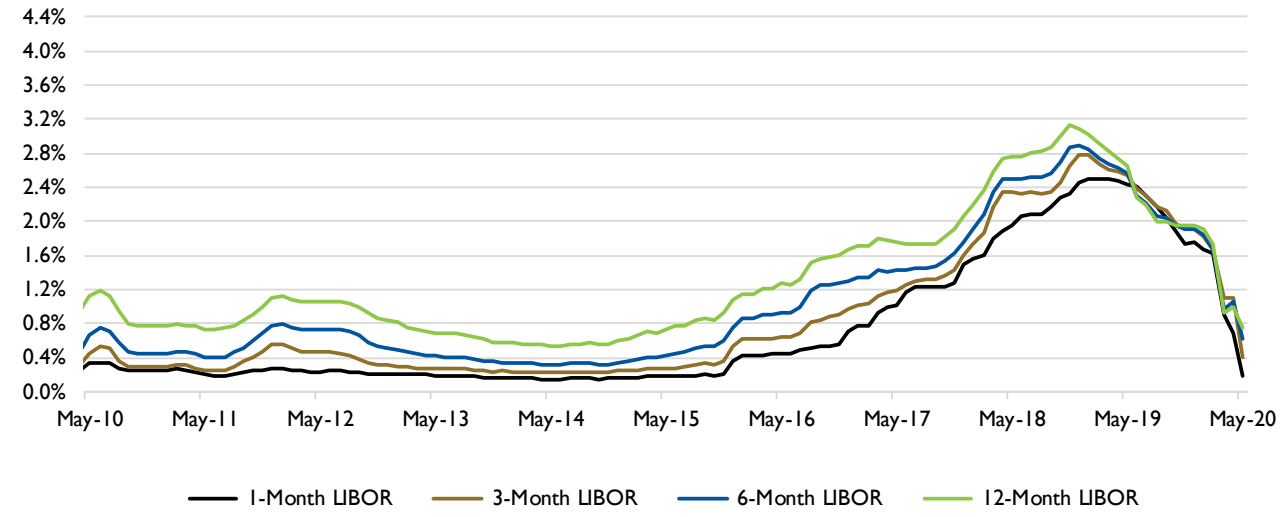
U.S. New Housing Starts and Total U.S. Construction Spending (Monthly) (73)



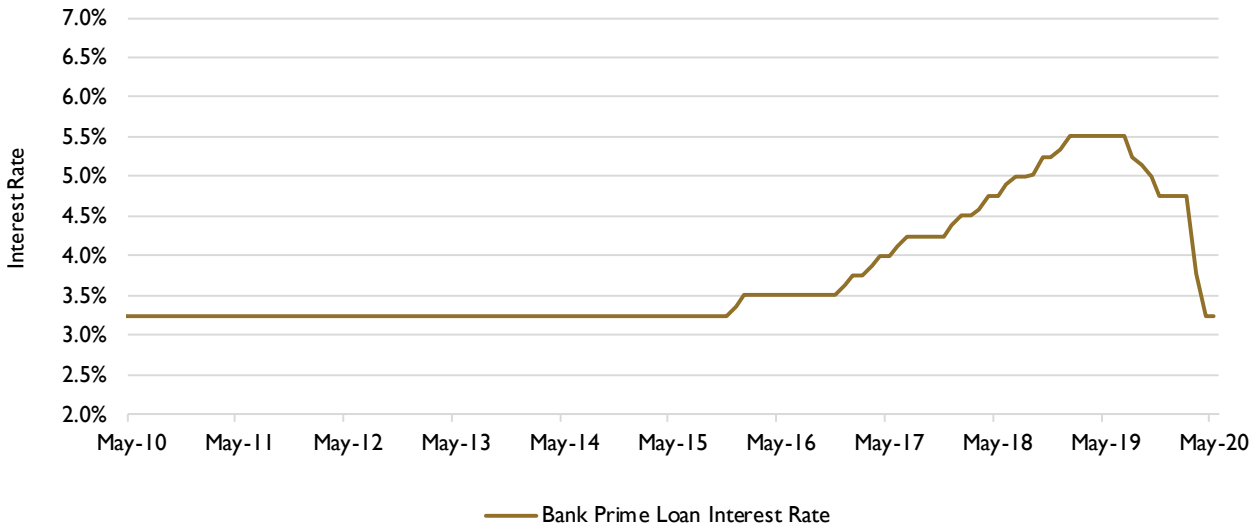
DATA CENTER

ECONOMIC / FINANCIAL

London Interbank Offered Rate (LIBOR) (Monthly Average) Based on U.S. Dollar (74)



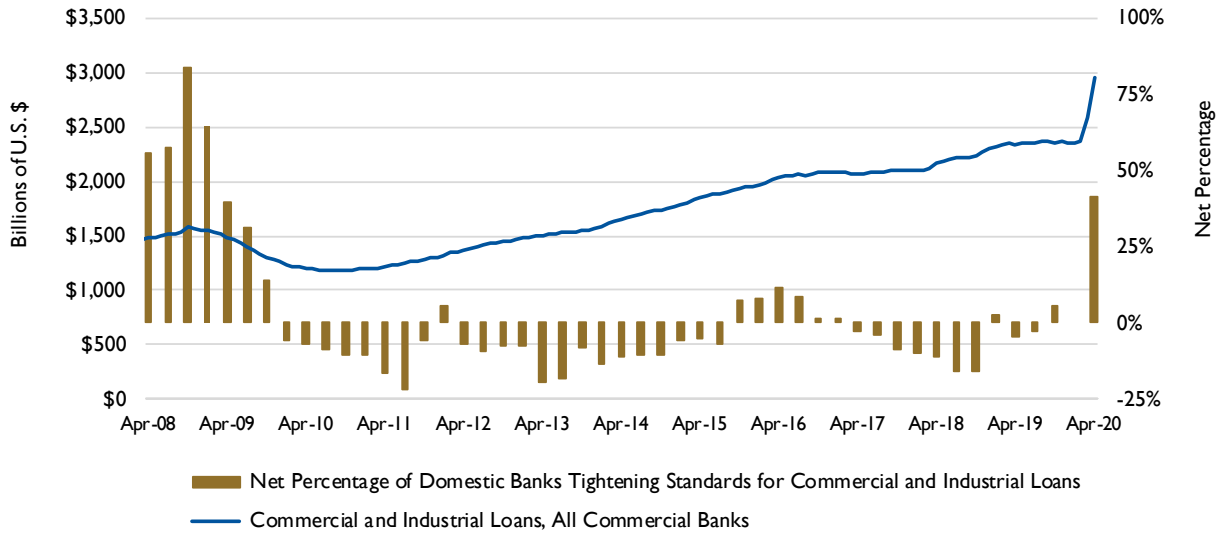
Bank Prime Loan Interest Rates (Monthly Average) (75)



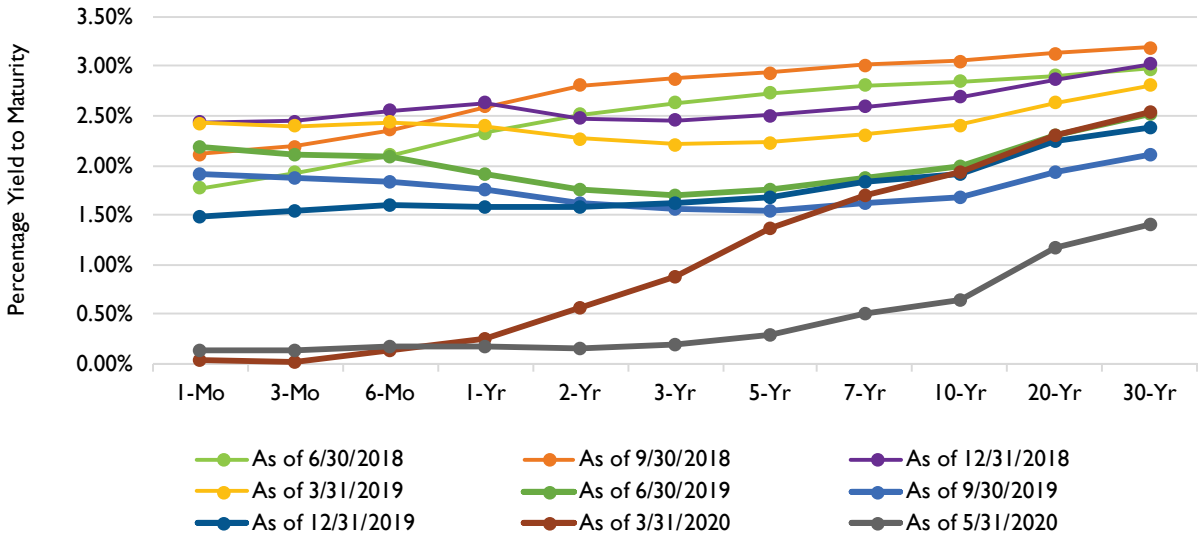
DATA CENTER

ECONOMIC / FINANCIAL

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



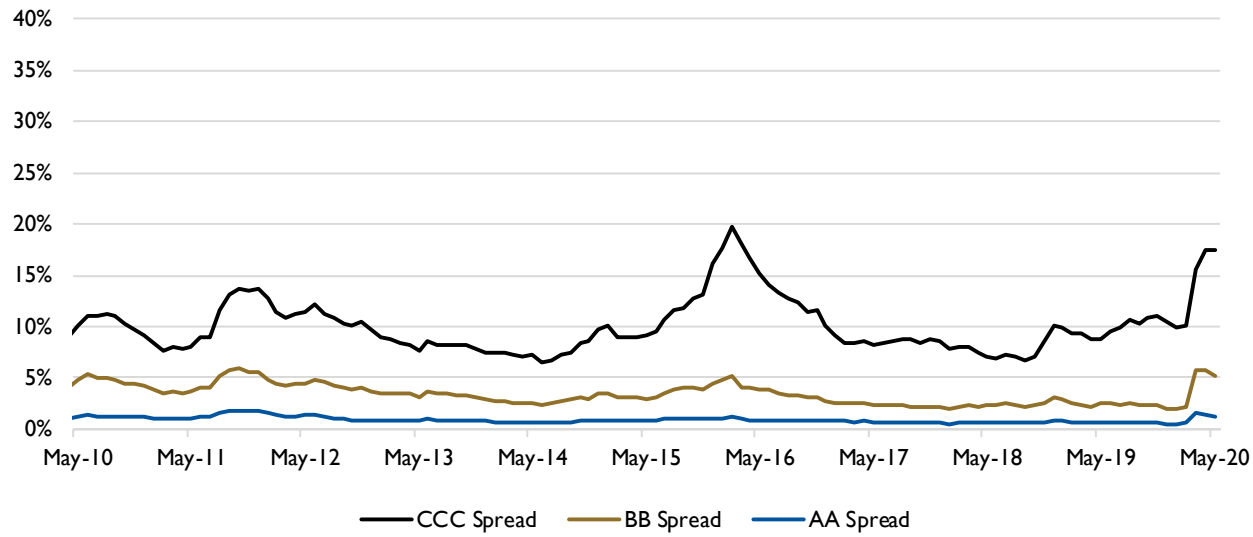
U.S. TREASURY YIELD CURVE (MONTHLY, ANNUAL) (77)



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 and is comprised of 98% residual fuel oil and 2% distillate fuel oil. Under new regulations from the International Maritime Organization, ships must burn fuel with a sulfur content of not more than 0.5 percent or install costly emissions-cleaning scrubbers. Very Low Sulfur Fuel Oil (VLSFO) contains a maximum sulfur content of 0.5 percent.

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. Well Starts by Depth

- Source: Platts RigData.
- Total number of well starts by depth on U.S. Land, U.S. Inland Waters and U.S. Offshore, respectively.

(34) Percentage of Crude Oil and Natural Gas Production per Shale Region

- Source: U.S. Energy Information Administration Drilling Productivity Report.
- Percentage of total U.S. crude oil and natural gas production from each of the shale regions.

(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

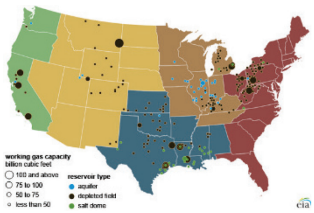
(57) Petroleum and Other Liquids Commercial Inventory (continued)

- 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

THE FIGHT FOR ENERGY INFRASTRUCTURE HAS MOVED TO THE COURTS

Federal courts and regulatory agencies are the main venues for ongoing battles over whether, when and where energy infrastructure projects – predominantly oil and natural gas pipelines – can be built. Groups opposed to fossil fuels have targeted stopping infrastructure as their primary strategy. As one observer recently put it succinctly, "The game for environment groups is fairly simple. Use every tool to drag the project into the courts, raise the cost as much as you can, hope for an economic downturn and hope the developer throws in the towel." Following is a synopsis of some of the most important current cases the Energy Equipment & Infrastructure Alliance (EEIA) is engaged with.

Army Corps Nationwide 12 Water Crossing Permits

In early May, Montana Federal Judge Brian Morris struck down the Army Corps-issued Nationwide 12 (NWP 12) water crossing permits for the Keystone XL project and for good measure extended his order to all projects nationwide using the NWP 12 permits. TC Energy, EEIA and other industry organizations petitioned the 9th Circuit Court of Appeals to stay Morris' order pending an appeal, citing extremely adverse impacts on jobs, the economy and energy security. The petition was denied on grounds that an appeal was unlikely to succeed, and that any economic harm was not "irreparable". The next chance is from the U.S. Supreme Court, when it rules on a petition for a stay pending appeal filed by the U.S. Department of Justice June 15. If the Supreme Court does not grant it, the fate of all NWP 12 permits rests with the 9th Circuit's review of the appeal. That Court has already expressed doubt that an appeal will succeed and skepticism that the harm is irreparable.

Another possible avenue of putting NWP 12 permits back on track is for the Army Corps to revise and renew the NWP 12 programmatically with a cure for the Montana court-claimed defect - essentially incorporating a more robust Endangered Species Act consultation with Fish & Wildlife Service. As the gears of justice and the regulatory process both grind slowly, none of this can happen quickly.

PennEast Pipeline Appeal Before Supreme Court - With Nationwide Implications

This Pennsylvania-New Jersey natural gas pipeline project's future is now before the U.S. Supreme Court. To perform right-of-way survey and engineering work, PennEast sought access to parcels of New Jersey state-owned land. New Jersey denied access, and PennEast initiated eminent domain proceedings. New Jersey sued, asserting that the U. S. Constitution's 11th Amendment "Sovereign Immunity" clause precluded a private developer from initiating court proceedings against a state. The case went to the U.S. Court of Appeals for the Third Circuit, which ruled in favor of New Jersey. PennEast then petitioned the U.S. Supreme Court to hear their challenge to the Third Circuit's ruling. This was supported by EEIA's "amicus curiae" brief urging the highest court to take the case. A decision is expected in late June. If the Court takes the case, arguments likely would be heard in the fall with a decision expected in the first half of 2021. This case has major implications nationwide, far beyond the PennEast project. If the 3rd Circuit's ruling stands, its precedent could empower any state to prevent developers from routing projects across state-owned or controlled property, including boundary rivers and property where landowners have granted recreational, agricultural or conservation easements to the state.

HOT TOPICS

THE FIGHT FOR ENERGY INFRASTRUCTURE HAS MOVED TO THE COURTS (CONTINUED)

Lawsuits Coming Against Trump Executive Order re Emergency Permitting

Opponents are planning legal action against President Donald Trump's effort to speed up federal permitting for pipelines and other infrastructure projects. The Center for Biological Diversity (CBD) has filed notice that it plans to sue over the June 4 executive order directing government officials to invoke emergency powers to bypass standard environmental review requirements in an effort to speed new jobs and economic recovery amid the coronavirus pandemic. The White House responded that the order balances economic recovery and environmental protection. "President Trump has used his lawful executive authority to expedite infrastructure projects and the economic recovery while protecting the environment, and the CBD is misreading the plain text of the order to push a radical, Green New Deal-like agenda," spokesman Judd Deere said in an email. Opponents are also expected to sue against any individual permits issued under the President's order.

New FERC Order Gives Landowners Better Leverage to Challenge Eminent Domain - and Slow Project Construction Starts

Unexpectedly, in mid-June the Federal Energy Regulatory Commission announced a new order - what it calls an "instant and final rule", giving landowners whose property is subject to eminent domain proceedings, the right to challenge FERC's "convenience and necessity" determination via a request for a rehearing of their determination. The order provides that FERC will withhold authorization to proceed with construction until it has acted on such requests. Previous to the order, FERC typically issued authorizations to proceed with construction, including on lands subject to eminent domain challenges, while the challenge was being considered. Under the new rule, challengers have 30 days to submit their appeals for a rehearing to FERC. The agency said it would "strive to act...within 30 days" on a given challenge. Needless to say, if a future FERC majority is comprised of pipeline opponents, eminent domain's availability will be sharply limited. Also, in the event FERC denies a petitioner's request, that case becomes eligible for an appeal by the landowner in Federal court

Time to Raise Our Game

With the playing field now increasingly the federal and state judiciary systems, industry organizations supporting energy infrastructure development must energetically engage in the processes of litigation in support of developers by intervening directly, submitting supporting briefs to courts, and rallying other business stakeholders to do likewise. The challenges aren't going away or getting easier, the stakes are growing and outcomes are uncertain. Advocates must raise their game or we'll see much-needed projects delayed indefinitely or terminated altogether when the costs of litigation and related delays make projects uneconomic.

HOT TOPICS

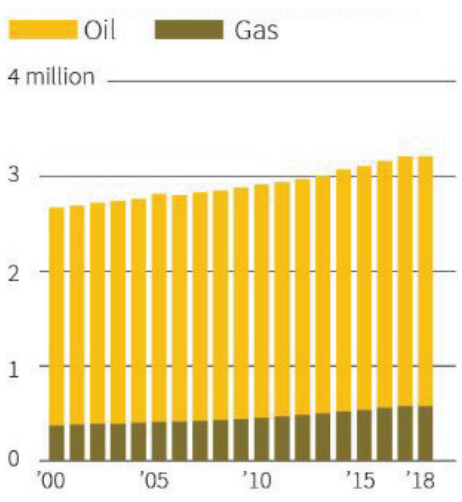
NEW DETECTION SYSTEMS FOR METHANE LEAKS

Invisible to the naked eye, methane leaks are a problem that oil and gas companies around the world are under pressure to address. Methane is a colorless, odorless and highly flammable gas and the main component in natural gas. It is a powerful greenhouse gas, dozens of times stronger than carbon dioxide as a heat-trapping gas, despite dissipating more quickly.(1) According to the Environmental Defense Fund, about a quarter of human-driven climate change is caused by methane.(2)

The oil and gas industry is a leading emitter of methane as the gas seeps out of multiple places during the production, processing and transport of oil and gas, such as wells, pipelines and storage facilities. Abandoned oil and gas wells also contribute to the problem. More than a century of oil and gas drilling has left behind millions of abandoned wells, many of which are leaching pollutants into the air and water. These wells go mostly unmonitored, and rarely, if ever, are checked for such leaks. Nationwide, the number of documented abandoned wells have jumped by more than 12% since 2008.(3) In 2018, more than 3.2 million abandoned oil and gas wells together emitted 281 kilotons of methane in the U.S.(3)

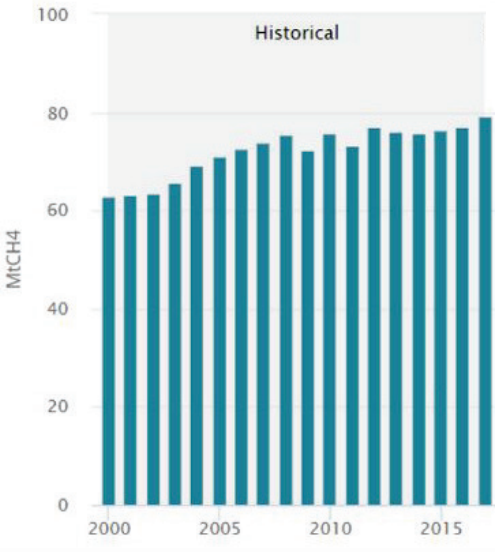
Last year, global atmospheric methane reached a 20-year high.(2) The International Energy Agency estimates total methane emissions from the oil and gas sector hit 80 megatons in 2017, or 6% of the energy sector's global greenhouse gas emissions. In the United States, unwanted emissions from the oil and gas industry amounted to $2 billion in lost revenue; globally, the value of leaking gas is $30 billion.(4)

Abandoned Wells in the United States



Source: Reuters and Environmental Protection Agency.

Global Methane Emissions from Oil and Gas Operations



Source: Forbes and International Energy Agency.

HOT TOPICS

NEW DETECTION SYSTEMS FOR METHANE LEAKS (CONTINUED)

The problem is so pervasive that in 2016, the U.S. Environmental Protection Agency (EPA) moved to reduce methane emissions across the natural gas industry. However, last fall the EPA moved to roll back these regulations. In addition, companies that are part of the Oil and Gas Climate Initiative, an industry organization whose members include Exxon Mobil Corp. and Chevron Corp., have pledged to collectively cut average methane emissions to less than 0.25% of gas sold by 2025.[5]

If the industry is sincere about stopping these leaks, experts say there is an urgent need to incorporate new methane monitoring technologies into their operations. As more companies monitor these emissions, it is spurring the formation of startups focused on leak detection and management. There is also a growing group of engineers and entrepreneurs working to develop and deploy novel technologies to address the issue.

As the problem will require more than one technology solution, a variety of new products and services are needed to cover the entire supply chain. For example, drones are better for identifying leaks along pipelines, whereas lasers are much better suited to monitoring a dense field of wells or a storage facility. The key to large-scale deployment is to match the strength of each technology, like speed, accuracy and cost, with the right leak detection application.

Some of the new technologies being developed include: aerial light detection and ranging sensors to pinpoint and measure leaks (Bridger Photonics); airplane sensors that are coupled with weather and atmospheric information to measure emissions (Scientific Aviation); airplane-mounted spectrometers with simultaneous optical imagery and geolocation (Kairos Aerospace); helicopter-mounted, gas-imaging surveys (Leak Surveys); drone-mounted gas sensors (SeekOps); the use of satellites to measures methane concentrations (GHGSat); truck-mounted autonomous sensors (mAIRsure); and stationary methane and wind sensors (Troposphere).

While scanning for emissions from a mud volcano in a Balkan province in western Turkmenistan in January, a satellite controlled by a Canadian company called GHGSat noticed a large methane plume coming from a nearby gas facility and pipeline. It was the first time that a methane leak has been detected and confirmed from space. GHGSat is among the first of what could be a fleet of such space-based emissions detectors. For example, the non-profit Environmental Defense Fund is developing a satellite called MethaneSAT, while others are in the works.

In April, ExxonMobil announced that it is conducting field trials of emerging methane leak detection technologies at nearly a thousand sites in Texas and New Mexico. In West Texas, BP has begun monthly flights over its wells by a drone equipped with methane detection equipment. The flights generate data on the location and size of leaks that BP uses to identify faulty equipment and direct repairs.

HOT TOPICS

NEW DETECTION SYSTEMS FOR METHANE LEAKS (CONTINUED)

This surge of invention presents a considerable opportunity to reduce emissions at a lower cost and at a much faster pace than what is currently available. If these technology investments are realized, the benefits could multiply beyond the removal of pollutants from the atmosphere. With close to a million active wells around the U.S. that would require ongoing monitoring, and 300,000 miles of interstate gas pipelines, along with thousands of compressor stations and over 100 liquefied natural gas facilities, methane detection using all these new tools could be a boost for the economy. It has the potential to create economic opportunity for contractors out in the field and a whole host of support services throughout the industry.

Sources:
(1) Forbes, *Detection Of Methane Leak From Space Could Herald A Revolution*, November 27, 2019.
(2) Environmental Health News, *Oil and Gas Methane Emissions in U.S. Are At Least 15% Higher Than We Thought*, April 23, 2020.
(3) Reuters, *Special Report: Millions of Abandoned Oil Wells Are Leaking Methane, a Climate Menace*, June 16, 2020.
(4) Yale School of Forestry & Environmental Studies, *Methane Detectives: Can a Wave of New Technology Slash Natural Gas Leaks?*, October 31, 2019.
(5) The Wall Street Journal, *The Leaks That Threaten the Clean Image of Natural Gas*, August 8, 2019.

Other
Journal of Petroleum Technology, *ExxonMobil Field Tests New Methane Leak Detection Systems*, April 14, 2020.
Science News, *Promising Mobile Technologies Find Methane Leaks Quickly*, September 10, 2019.

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 03/31/20	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Calumet Specialty Products Partners, L.P.	$3,294	$267	8.1%	$1.05	21.0%	$82	$1,514	0.5x	5.7x	5.4x
Chevron Corporation	135,381	28,558	21.1	72.46	56.9	136,176	162,280	1.2x	5.7x	0.8x
CVR Energy, Inc.	6,008	566	9.4	16.53	29.8	1,662	2,528	0.4x	4.5x	1.3x
EnLink Midstream, LLC	5,398	1,074	19.9	1.10	8.4	537	7,026	1.3x	6.5x	4.5x
Gibson Energy Inc.	4,971	286	5.8	11.46	57.3	1,676	2,613	0.5x	9.1x	3.2x
Exxon Mobil Corporation	249,071	28,253	11.3	37.97	45.5	160,696	217,662	0.9x	7.7x	1.7x
HollyFrontier Corporation	16,990	1,034	6.1	24.51	41.6	3,968	6,585	0.4x	6.4x	2.0x
Keyera Corp.	2,709	792	29.2	9.23	35.8	2,017	4,142	1.5x	5.2x	2.7x
Marathon Petroleum Corporation	121,110	6,605	5.5	23.62	33.9	15,353	54,556	0.5x	8.3x	4.9x
Parkland Corporation	13,120	731	5.6	17.50	50.4	2,596	5,450	0.4x	7.5x	3.9x
Phillips 66	105,068	4,984	4.7	53.65	44.7	23,490	37,159	0.4x	7.5x	2.4x
NuStar Energy L.P.	1,543	728	47.2	8.59	28.6	938	5,757	3.7x	7.9x	4.7x
Valero Energy Corporation	100,530	3,577	3.6	45.36	44.5	18,532	27,644	0.3x	7.7x	3.1x
Median			**8.1%**		**41.6%**			**0.5x**	**7.5x**	**3.1x**
Mean			**13.6%**		**38.3%**			**0.9x**	**6.9x**	**3.1x**

SELECTED TRANSACTIONS

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
3/27/2020	Sprague Resources LP (NYSE:SRLP)	Sprague Resources Holdings LLC	$1,139.4	0.3x	8.7x
4/24/2019	Anadarko Petroleum Corporation (NYSE:APC)	Occidental Petroleum Corporation (NYSE:OXY)	$57,809.2	4.4x	7.6x
10/22/2018	EnLink Midstream Partners, LP (NYSE:ENLK)	EnLink Midstream, LLC (NYSE:ENLC)	$12,923.5	1.7x	12.2x
8/27/2018	Blue Ridge Mountain Resources, Inc. (OTCPK:BRMR)	Eclipse Resources Corporation (NYSE:ECR)	$348.0	3.6x	12.8x
8/1/2018	Energy Transfer Operating, LP	Energy Transfer, LP (NYSE:ET)	$69,430.8	2.1x	10.9x
5/17/2018	Enbridge Energy Partners, LP (NYSE:EEP)	Enbridge Inc. (TSX:ENB)	$15,925.8	6.6x	10.1x
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
4/5/2017	Houghton International Inc.	Quaker Chemical Corporation (NYSE:KWR)	$1,415.4	-	11.8x

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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 03/31/20	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Alliant Energy Corporation	$3,576	$1,334	37.3%	$48.29	80.1%	$11,833	$18,560	5.2x	13.9x	4.8x
AltaGas Ltd.	3,856	812	21.0	9.00	56.1	2,514	8,768	2.3x	10.8x	6.3x
Atmos Energy Corporation	2,783	1,204	43.3	99.23	82.0	12,133	16,499	5.9x	13.7x	3.7x
Avista Corporation	1,339	425	31.7	42.49	80.2	2,856	5,146	3.8x	12.1x	5.5x
Baytex Energy Corp.	983	682	69.4	0.24	10.7	132	1,432	1.5x	2.1x	2.0x
Calumet Specialty Products Partners, L.P.	3,294	267	8.1	1.05	21.0	82	1,514	0.5x	5.7x	5.4x
Cenovus Energy Inc.	13,507	1,577	11.7	2.00	19.8	2,462	8,409	0.6x	5.3x	4.2x
Chesapeake Utilities Corporation	472	157	33.4	85.71	84.6	1,406	2,144	4.5x	13.6x	4.6x
Corning Natural Gas Holding Corporation	32	10	30.5	15.50	66.0	47	108	3.3x	11.0x	5.5x
Crestwood Equity Partners LP	3,075	465	15.1	4.23	10.6	309	3,718	1.2x	8.0x	5.2x
Dominion Energy, Inc.	17,210	8,108	47.1	72.19	79.4	60,515	103,778	6.0x	12.8x	4.9x
EnLink Midstream, LLC	5,398	1,074	19.9	1.10	8.4	537	7,026	1.3x	6.5x	4.5x
Enbridge Inc.	34,729	7,839	22.6	28.91	71.5	58,540	112,433	3.2x	14.3x	6.2x
Enterprise Products Partners L.P.	31,728	7,443	23.5	14.30	46.3	31,306	59,885	1.9x	8.0x	3.8x
Epsilon Energy Ltd.	25	19	76.8	2.67	56.3	72	57	2.3x	3.0x	(0.8)x
Eversource Energy	8,484	2,818	33.2	78.21	78.7	25,835	41,606	4.9x	14.8x	5.5x
Genesis Energy, L.P.	2,401	585	24.4	3.92	16.4	481	5,017	2.1x	8.6x	5.8x
National Fuel Gas Company	1,586	774	48.8	37.29	60.9	3,228	5,486	3.5x	7.1x	2.9x
New Jersey Resources Corporation	2,169	288	13.3	33.97	66.3	3,247	5,268	2.4x	18.3x	7.4x
Northwest Natural Holding Company	746	234	31.3	61.75	79.9	1,882	2,906	3.9x	12.4x	4.8x
MDU Resources Group, Inc.	5,443	738	13.6	21.50	66.7	4,311	6,603	1.2x	9.0x	3.3x
OGE Energy Corp.	2,173	875	40.3	30.73	66.2	6,151	9,504	4.4x	10.9x	3.9x
ONE Gas, Inc.	1,520	479	31.5	83.62	86.2	4,420	6,239	4.1x	13.0x	3.6x
ONEOK, Inc.	9,521	2,449	25.7	21.81	27.8	9,014	21,945	2.3x	9.0x	5.7x
RGC Resources, Inc.	64	22	34.6	28.93	90.5	235	348	5.5x	15.8x	5.0x
South Jersey Industries, Inc.	1,525	377	24.7	25.00	72.5	2,305	5,700	3.7x	15.1x	8.6x
Southwest Gas Holdings, Inc.	3,123	677	21.7	69.56	74.8	3,834	6,642	2.1x	9.8x	3.8x
Summit Midstream Partners, LP	418	238	56.8	0.61	6.1	57	1,849	4.4x	7.8x	6.0x
Targa Resources Corp.	8,421	1,789	21.2	6.91	15.9	1,611	12,958	1.5x	7.2x	4.2x
TC Energy Corporation	9,303	5,964	64.1	44.13	81.7	41,472	79,984	8.6x	13.4x	6.3x
Median			**30.9%**	**66.3%**				**3.3x**	**10.8x**	**4.9x**
Mean			**32.6%**	**55.5%**				**3.3x**	**10.4x**	**4.8x**

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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
3/27/2020	Sprague Resources LP (NYSE:SRLP)	Sprague Resources Holdings LLC	$1,139.4	0.3x	8.7x
10/21/2019	AltaGas Canada Inc. (TSX:ACI)	Alberta Teachers' Retirement Fund Board; Public Sector Pension Investment	$1,278.2	5.2x	15.2x
9/16/2019	SemGroup Corporation	Energy Transfer LP (NYSE:ET)	$5,007.4	1.9x	11.2x
8/27/2019	Tallgrass Energy, LP (NYSE:TGE)	The Blackstone Group Inc. (NYSE:BX)	$9,337.3	9.9x	9.9x
5/8/2019	Andeavor Logistics LP	MPLX LP (NYSE:MPLX)	$14,804.7	5.6x	10.6x
4/24/2019	Anadarko Petroleum Corporation (NYSE:APC)	Occidental Petroleum Corporation (NYSE:OXY)	$57,809.2	4.4x	7.6x
11/8/2018	Western Gas Partners, LP (NYSE:WES)	Western Gas Equity Partners, LP (NYSE:WGP)	$13,427.9	6.5x	12.0x
10/22/2018	EnLink Midstream Partners, LP (NYSE:ENLK)	EnLink Midstream, LLC (NYSE:ENLC)	$12,923.5	1.7x	12.2x
10/9/2018	Antero Midstream Partners LP (NYSE:AM)	Antero Midstream GP LP (NYSE:AMGP)	$7,359.7	7.7x	11.5x
9/28/2018	American Midstream Partners, LP (NYSE:AMID)	ArcLight Capital Partners, LLC	$1,595.1	2.0x	14.2x
8/27/2018	Blue Ridge Mountain Resources, Inc. (OTCPK:BRMR)	Eclipse Resources Corporation (NYSE:ECR)	$348.0	3.6x	12.8x
8/1/2018	Energy Transfer Operating, LP	Energy Transfer, LP (NYSE:ET)	$69,430.8	2.1x	10.9x
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)	EQM 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

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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 03/31/20	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Ferrellgas Partners, L.P.	$1,493	$223	15.0%	$0.20	14.1%	$19	$2,312	1.5x	10.4x	10.6x
NGL Energy Partners LP	7,584	549	7.2	2.60	16.5	334	4,478	0.6x	8.2x	6.0x
Spire Inc.	1,829	479	26.2	74.48	84.6	3,804	7,142	3.9x	14.9x	6.3x
Star Group, L.P.	1,571	87	5.5	7.70	75.1	356	690	0.4x	8.0x	2.9x
Suburban Propane Partners, L.P.	1,121	237	21.1	14.14	56.8	878	2,265	2.0x	9.6x	5.8x
UGI Corporation	6,750	1,193	17.7	26.67	48.3	5,562	12,392	1.8x	10.4x	5.6x
Median			**16.3%**		**52.6%**			**1.7x**	**10.0x**	**5.9x**
Mean			**15.4%**		**49.3%**			**1.7x**	**10.2x**	**6.2x**

SELECTED TRANSACTIONS

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
2/6/2020	All American Propane, Inc.	ThompsonGas LLC	-	-	-
1/9/2020	Evelyn Jeanne, Inc., d/b/a Western Propane Service	Superior Plus Corp. (TSX:SPB)	-	-	-
11/13/2019	Propane Distribution Assets in New Brunswick and Quebec	Superior Plus Corp. (TSX:SPB)	$3.7	-	-
11/13/2019	Propane Distribution Assets in North Carolina	Superior Plus Corp. (TSX:SPB)	$1.2	-	-
5/9/2019	Sheldon Gas Company/Sheldon Oil Company	Superior Plus Corp. (TSX:SPB)	$15.9	-	-
4/2/2019	AmeriGas Partners, LP (NYSE:APU)	UGI Corporation (NYSE:UGI)	$6,149.2	2.2x	10.5x
3/26/2019	Substantially all of the Propane Distribution Assets of Phelps Sungas, Inc. and BMK of Geneva, Inc.	Superior Plus Corp. (TSX:SPB)	$19.5	-	-
2/7/2019	Propane Assets and Operations of Propane Retailer in West Coast	Suburban Propane, LP	$12.0	-	-
1/30/2019	Wholesale Propane Business of Gas Supply Resources LLC	NGL Energy Partners LP (NYSE:NGL)	$90.0	-	-
10/18/2018	Propane Distribution Assets of Musco Fuel & Propane LLP	Superior Plus Corp. (TSX:SPB)	$14.5	-	-
10/11/2018	Salathe Gas Company, LLC/North Star Exchange, Inc.	Ferrellgas Partners, LP (NYSE:FGP)	-	-	-
9/18/2018	Propane Distribution and Other Assets of Porco Energy Corp	Superior Plus Corp. (TSX:SPB)	$15.5	-	-

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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	LTM[2] Margin	Stock Price 03/31/20	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
AKITA Drilling Ltd.	$125	$12	9.8%	$0.32	13.4%	$14	$76	0.6x	6.2x	4.9x
Baker Hughes Company	23,648	3,012	12.7	10.50	37.6	6,864	23,649	1.0x	7.9x	1.2x
CES Energy Solutions Corp.	913	110	12.1	0.57	26.5	150	437	0.5x	4.0x	2.7x
Diamond Offshore Drilling, Inc.	926	49	5.3	1.83	14.5	252	2,225	2.4x	45.0x	39.1x
Ensign Energy Services Inc.	1,080	263	24.4	0.37	8.1	60	1,173	1.1x	4.5x	4.3x
Halliburton Company	21,708	3,089	14.2	6.85	21.2	6,027	15,275	0.7x	4.9x	3.1x
Helmerich & Payne, Inc.	2,585	675	26.1	15.65	24.2	1,704	1,823	0.7x	2.7x	0.2x
Independence Contract Drilling, Inc.	182	31	16.9	1.40	2.2	5	140	0.8x	4.6x	4.6x
National Oilwell Varco, Inc.	8,422	(8)	(0.1)	9.83	33.5	3,794	5,468	0.6x	NM	NM
Precision Drilling Corporation	1,049	256	24.4	0.31	10.9	84	1,086	1.0x	4.2x	4.1x
Secure Energy Services Inc.	2,042	99	4.9	0.66	10.6	103	475	0.2x	4.8x	3.5x
Unit Corporation	675	258	38.3	0.26	1.6	14	1,000	1.5x	3.9x	3.0x
Valaris plc	2,104	(43)	(2.0)	0.45	2.6	89	6,112	2.9x	NM	NM
Median			**12.7%**		**13.4%**			**0.8x**	**4.6x**	**3.5x**
Mean			**14.4%**		**15.9%**			**1.1x**	**8.4x**	**6.4x**

SELECTED TRANSACTIONS

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
10/8/2018	Rowan Companies plc (NYSE:RDC)	Ensco plc (NYSE:ESV) / Valaris plc (NYSE:VAL)	$3,139.1	3.8x	43.9x
10/1/2018	Sidewinder Drilling LLC	Independence Contract Drilling Inc. (NYSE:ICD)	$291.8	2.6x	45.1x
8/27/2018	Blue Ridge Mountain Resources, Inc. (OTCPK:BRMR)	Eclipse Resources Corporation (NYSE:ECR)	$347.9	3.6x	12.8x
8/13/2018	Trinidad Drilling Ltd. (TSX:TDG)	Ensign Energy Services Inc. (TSX:ESI)	$714.0	1.5x	5.1x
6/5/2018	Xtreme Drilling Corp.	AKITA Drilling Ltd. (TSX:AKT.A)	$155.0	2.8x	162.4x
2/15/2018	Layne Christensen Company (NasdaqGS:LAYN)	Granite Construction Incorporated (NYSE:GVA)	$491.9	1.0x	16.5x
5/30/2017	Atwood Oceanics, Inc. (NYSE:ATW)	Ensco plc (NYSE:ESV)	$1,759.6	2.2x	4.7x
5/19/2017	Savanna Energy Services Corp.	Total Energy Services Inc. (TSX:TOT)	$458.2	1.4x	16.6x

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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 03/31/20	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Albemarle Corporation	$3,496	$950	27.2%	$56.37	56.7%	$5,993	$8,729	2.5x	9.2x	2.9x
Ashland Global Holdings Inc.	2,393	505	21.1	50.07	61.2	3,017	4,708	2.0x	9.3x	3.6x
Clean Harbors, Inc.	3,490	551	15.8	51.34	58.1	2,866	4,211	1.2x	7.6x	2.5x
CSW Industrials, Inc.	386	76	19.6	64.85	80.0	981	968	2.5x	12.8x	0.2x
FMC Corporation	4,668	1,234	26.4	81.69	75.1	10,574	13,717	2.9x	11.1x	2.9x
Ingevity Corporation	1,304	407	31.2	35.20	30.1	1,473	2,724	2.1x	6.7x	3.1x
Kraton Corporation	1,775	246	13.8	8.10	21.0	257	1,712	1.0x	7.0x	3.8x
NewMarket Corporation	2,213	475	21.4	382.87	75.8	4,284	4,858	2.2x	10.2x	1.3x
Ocean Bio-Chem, Inc.	41	6	13.7	4.85	61.0	46	45	1.1x	7.9x	(0.2)x
Quaker Chemical Corporation	1,301	166	12.8	126.28	56.3	2,239	3,081	2.4x	18.6x	5.1x
Stepan Company	1,820	209	11.5	88.46	83.6	1,994	1,939	1.1x	9.3x	0.0x
Synalloy Corporation	295	9	3.0	8.73	44.4	79	188	0.6x	21.5x	12.9x
Trecora Resources	256	26	10.3	5.95	56.5	147	238	0.9x	9.0x	2.9x
Valvoline Inc.	2,427	449	18.5	13.09	54.8	2,467	3,926	1.6x	8.7x	3.4x
Median			**17.1%**		**57.4%**			**1.8x**	**9.2x**	**2.9x**
Mean			**17.6%**		**58.2%**			**1.7x**	**10.6x**	**3.2x**

SELECTED TRANSACTIONS

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
7/12/2019	Milacron Holdings Corp. (NYSE:MCRN)	Hillenbrand, Inc. (NYSE:HI)	$2,051.1	1.7x	12.9x
4/23/2019	Synalloy Corporation (NasdaqGM:SYNL)	Privet Fund Management, LLC	$308.8	1.0x	10.9x
9/13/2018	MPM Holdings Inc. (OTCPK:MPMQ)	KCC Corporation (KOSE:A002380); SJL Partners; Wonik QnC Corporation (KOSDAQ:A074600)	$2,664.9	1.0x	7.4x
8/15/2018	KMG Chemicals, Inc.	Cabot Microelectronics Corporation (NasdaqGS:CCMP)	$1,606.5	3.5x	13.5x
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 Canada, Inc.	$17.3	1.4x	6.6x

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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 03/31/20	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Boralex Inc.	$425	$281	66.2%	$17.64	78.0%	$1,701	$3,936	9.3x	14.0x	8.0x
Capital Power Corporation	1,307	775	59.3	19.15	69.8	2,020	5,088	3.9x	6.6x	3.2x
NextEra Energy Partners, LP	890	601	67.5	43.00	69.5	2,818	12,359	13.9x	20.6x	8.8x
NRG Energy, Inc.	9,675	1,862	19.2	27.26	63.4	6,830	12,952	1.3x	7.0x	3.3x
TerraForm Power, Inc.	963	620	64.4	15.77	73.1	3,572	10,489	10.9x	16.9x	11.1x
Vivint Solar, Inc.	363	(119)	(32.9)	4.37	33.6	543	2,163	6.0x	NM	NM
Median			**61.8%**		**69.7%**			**7.6x**	**14.0x**	**8.0x**
Mean			**40.6%**		**64.6%**			**7.5x**	**13.0x**	**6.9x**

SELECTED TRANSACTIONS

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
1/13/2020	TerraForm Power, Inc. (NasdaqGS:TERP)	Brookfield Renewable Partners L.P. (TSX:BEP.UN)	$10,880.5	9.5x	13.0x
11/4/2019	Pattern Energy Group Inc. (NasdaqGS:PEGI)	Canada Pension Plan Investment Board	$6,293.7	11.5x	16.1x
2/5/2018	8point3 Energy Partners LP (NasdaqGS:CAFD)	Capital Dynamics, Inc.	$1,671.3	23.8x	17.0x
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 Corporation	Irving Infrastructure Corp.	$1,435.1	-	12.7x
12/3/2014	Hawaiian Electric Industries, Inc. (NYSE:HE)	NextEra Energy, Inc. (NYSE:NEE)	$4,398.8	1.3x	8.5x

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(2) LTM is defined as last twelve months.
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(4) Net Debt is defined as total debt less cash and cash equivalents.

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 03/31/20	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Algonquin Power & Utilities Corp.	$1,613	$641	39.8%	$13.37	84.6%	$7,027	$11,610	7.2x	18.1x	6.3x
Avangrid, Inc.	6,285	1,891	30.1	43.78	76.5	13,528	21,845	3.5x	11.6x	4.4x
Boralex Inc.	425	281	66.2	17.64	78.0	1,701	3,936	9.3x	14.0x	8.0x
Brookfield Renewable Partners L.P.	2,947	1,824	61.9	41.76	77.5	12,999	32,324	11.0x	17.7x	5.4x
Innergex Renewable Energy Inc.	397	372	93.6	13.51	86.0	2,352	5,736	14.4x	15.4x	7.6x
NextEra Energy Partners, LP	890	601	67.5	43.00	69.5	2,818	12,359	13.9x	20.6x	8.8x
Northland Power Inc.	1,290	970	75.2	19.82	84.7	3,840	9,643	7.5x	9.9x	5.9x
TerraForm Power, Inc.	963	620	64.4	15.77	73.1	3,572	10,489	10.9x	16.9x	11.1x
TransAlta Renewables Inc.	298	184	61.8	10.49	81.5	2,789	3,442	11.6x	18.7x	3.1x
Median			**64.4%**		**78.0%**			**10.9x**	**16.9x**	**6.3x**
Mean			**62.3%**		**79.0%**			**9.9x**	**15.9x**	**6.7x**

SELECTED TRANSACTIONS

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
1/13/2020	TerraForm Power, Inc. (NasdaqGS:TERP)	Brookfield Renewable Partners L.P. (TSX:BEP.UN)	$10,880.5	9.5x	13.0x
11/4/2019	Pattern Energy Group Inc. (NasdaqGS:PEGI)	Canada Pension Plan Investment Board	$6,293.7	11.5x	16.1x
10/21/2019	AltaGas Canada Inc. (TSX:ACI)	Alberta Teachers' Retirement Fund Board; Public Sector Pension Investment	$1,278.2	5.2x	15.2x
10/30/2017	Alterra Power Corp. (TSX:AXY)	Innergex Renewable Energy Inc. (TSX:INE)	$745.0	10.6x	31.0x
7/27/2017	Boralex Inc. (TSX:BLX)	Caisse de dépôt et placement du Québec	$3,436.5	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 Corporation	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 03/31/20	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Archrock, Inc.	$979	$408	41.7%	$3.76	32.9%	$575	$2,435	2.5x	6.0x	4.5x
Baker Hughes Company	23,648	3,012	12.7	10.50	37.6	6,864	23,649	1.0x	7.9x	1.2x
Blueknight Energy Partners, L.P.	356	62	17.3	0.88	57.2	36	(75)	(0.2)x	(1.2)x	4.6x
CARBO Ceramics Inc.	162	(43)	(26.3)	0.02	0.6	1	80	0.5x	NM	NM
Cathedral Energy Services Ltd.	93	(5)	(5.4)	0.06	11.7	3	17	0.2x	NM	NM
CES Energy Solutions Corp.	913	110	12.1	0.57	26.5	150	437	0.5x	4.0x	2.7x
Cypress Environmental Partners, L.P.	380	27	7.2	4.45	43.9	54	140	0.4x	5.1x	2.3x
Dawson Geophysical Company	134	6	4.6	0.97	30.4	23	5	0.0x	0.9x	(2.5)x
Eco-Stim Energy Solutions, Inc.	41	(23)	(55.3)	0.01	5.2	0	4	0.1x	NM	NM
ENGlobal Corporation	64	1	1.7	0.78	52.7	21	16	0.2x	14.2x	(3.4)x
Enservco Corporation	28	(6)	(23.3)	0.12	16.3	7	47	1.7x	NM	NM
Ensign Energy Services Inc.	1,080	263	24.4	0.37	8.1	60	1,173	1.1x	4.5x	4.3x
Enterprise Group, Inc.	14	1	6.5	0.08	57.1	4	13	0.9x	14.6x	9.9x
Essential Energy Services Ltd.	95	7	6.9	0.10	28.6	14	29	0.3x	4.4x	2.4x
High Arctic Energy Services Inc	126	11	8.6	0.39	13.7	19	20	0.2x	1.9x	(0.5)x
Hyduke Energy Services Inc.	6	(5)	(83.7)	0.01	40.0	0	0	0.0x	NM	NM
Innospec Inc.	1,497	213	14.2	69.49	64.4	1,725	1,742	1.2x	8.2x	0.1x
Matrix Service Company	1,304	53	4.0	9.47	38.9	253	190	0.1x	3.6x	(0.9)x
McDermott International, Inc.	8,274	(72)	(0.9)	0.06	0.5	11	5,057	0.6x	NM	NM
Mullen Group Ltd.	901	134	14.9	2.89	32.7	303	683	0.8x	5.1x	2.9x
Newpark Resources, Inc.	773	64	8.3	0.90	9.4	81	225	0.3x	3.5x	2.2x
North American Construction Group Ltd.	516	129	24.9	5.08	37.3	129	429	0.8x	3.3x	2.5x
Parkland Corporation	13,120	731	5.6	17.50	50.4	2,596	5,450	0.4x	7.5x	3.9x
Precision Drilling Corporation	1,049	256	24.4	0.31	10.9	84	1,086	1.0x	4.2x	4.1x
Profire Energy, Inc.	36	2	5.7	0.79	39.0	38	26	0.7x	13.1x	(5.6)x
ProPetro Holding Corp.	1,901	405	21.3	2.50	9.9	251	269	0.1x	0.7x	(0.1)x
Secure Energy Services Inc.	2,042	99	4.9	0.66	10.6	103	475	0.2x	4.8x	3.5x
Select Energy Services, Inc.	1,207	135	11.2	3.23	25.3	285	473	0.4x	3.5x	(0.2)x
Shawcor Ltd.	1,029	53	5.1	1.26	8.3	88	392	0.4x	7.4x	5.8x
Smart Sand, Inc.	229	77	33.5	1.04	22.7	45	105	0.5x	1.4x	0.7x
STEP Energy Services Ltd.	484	41	8.6	0.22	10.6	15	191	0.4x	4.6x	4.2x
USA Compression Partners, LP	707	418	59.1	5.66	29.8	547	2,899	4.1x	6.9x	4.6x
Median			**7.8%**		**27.5%**			**0.4x**	**4.5x**	**2.5x**
Mean			**6.1%**		**27.0%**			**0.7x**	**5.4x**	**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 03/31/20	% of 52-Week High	Market Cap	Total Enterprise Value(3)	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt(4)/ EBITDA
AKITA Drilling Ltd.	$125	$12	9.8%	$0.32	13.4%	$14	$76	0.6x	6.2x	4.9x
CSI Compressco LP	463	117	25.2	0.65	16.3	31	703	1.5x	6.0x	5.8x
Enerflex Ltd.	1,359	243	17.9	4.11	28.7	369	653	0.5x	2.7x	1.4x
Exterran Corporation	1,176	185	15.7	4.80	26.4	159	624	0.5x	3.4x	2.6x
Forum Energy Technologies, Inc.	867	24	2.8	0.18	2.7	20	424	0.5x	17.3x	15.7x
Geospace Technologies Corporation	103	9	9.1	6.40	36.2	87	77	0.7x	8.3x	(2.0)x
Gulf Island Fabrication, Inc.	314	(24)	(7.7)	3.00	32.8	46	(21)	(0.1)x	NM	NM
Halliburton Company	21,708	3,089	14.2	6.85	21.2	6,027	15,275	0.7x	4.9x	3.1x
Hanwei Energy Services Corp.	8	(0)	(5.6)	0.01	50.0	2	4	0.5x	NM	NM
Helix Energy Solutions Group, Inc.	766	157	20.5	1.64	16.4	246	652	0.9x	4.2x	2.7x
ION Geophysical Corporation	194	61	31.4	1.27	7.5	18	151	0.8x	2.5x	2.6x
Key Energy Services, Inc.	380	(11)	(2.9)	3.90	1.4	54	287	0.8x	NM	NM
McCoy Global Inc.	35	2	7.0	0.28	44.4	8	10	0.3x	4.0x	0.8x
Mitcham Industries, Inc.	40	(8)	(19.7)	1.25	28.3	15	34	0.8x	NM	NM
Nabors Industries Ltd.	2,962	796	26.9	19.51	9.6	143	3,563	1.2x	4.5x	3.7x
National Oilwell Varco, Inc.	8,422	(8)	(0.1)	9.83	33.5	3,794	5,468	0.6x	NM	NM
Natural Gas Services Group, Inc.	78	24	30.2	4.46	23.8	60	49	0.6x	2.1x	(0.5)x
Parker Drilling Company	630	129	20.4	8.48	35.2	128	229	0.4x	1.8x	0.8x
PHX Energy Services Corp.	263	33	12.6	0.48	19.4	26	66	0.3x	2.0x	1.2x
RigNet, Inc.	244	29	11.7	1.80	15.9	36	139	0.6x	4.9x	3.8x
RPC, Inc.	1,132	114	10.1	2.06	15.7	437	426	0.4x	3.7x	(0.4)x
Schlumberger Limited	32,493	6,336	19.5	13.49	27.6	18,726	33,680	1.0x	5.3x	2.1x
SEACOR Holdings Inc.	783	92	11.8	26.96	52.4	544	918	1.2x	9.9x	3.8x
Solaris Oilfield Infrastructure, Inc.	234	117	49.9	5.25	27.2	159	245	1.0x	2.1x	(0.3)x
Superior Drilling Products, Inc.	19	3	13.6	0.35	25.4	9	16	0.8x	5.9x	1.7x
TechnipFMC plc	13,626	1,541	11.3	6.74	23.6	3,022	3,242	0.2x	2.1x	0.1x
TerraVest Industries Inc.	230	35	15.1	9.59	78.8	180	280	1.2x	8.1x	2.6x
TETRA Technologies, Inc.	1,017	183	17.9	0.32	12.4	40	1,064	1.0x	5.8x	4.9x
Weatherford International plc	5,084	338	6.6	5.95	16.1	416	2,290	0.5x	6.8x	5.3x
Median			**12.6%**		**23.8%**			**0.6x**	**4.7x**	**2.6x**
Mean			**12.9%**		**25.6%**			**0.7x**	**5.2x**	**2.8x**

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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
5/3/2020	Quintana Energy Services Inc. (NYSE:QES)	KLX Energy Services Holdings, Inc. (NasdaqGS:KLXE)	$49.6	0.1x	2.1x
2/23/2020	Strad Inc. (TSX:SDY)	Management	$116.6	1.1x	3.5x
11/20/2019	W&W Energy Services, Inc.	Petrofac Limited (LSE:PFC)	$24.8	-	-
6/17/2019	C&J Energy Services, Inc. (NYSE:CJ)	Keane Group, Inc. (NYSE:FRAC)	$699.2	0.3x	2.9x
3/20/2019	Red Bone Services LLC/Tecton Energy Services Ltd.	KLX Energy Services Holdings, Inc. (NasdaqGS:KLXE)	$82.5	-	4.8x
1/20/2019	ZCL Composites Inc. (TSX:ZCL)	Shawcor Ltd. (TSX:SCL)	$233.7	1.7x	12.5x
10/29/2018	Adler Hot Oil Service, LLC.	Enservco Corporation (AMEX:ENSV)	$12.5	0.7x	4.3x
6/5/2018	Xtreme Drilling Corp.	AKITA Drilling Ltd. (TSX:AKT.A)	$155.0	2.8x	162.4x
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
1/2/2018	Archrock Partners, LP	Archrock, Inc. (NYSE:AROC)	$2,405.5	4.3x	10.5x
12/11/2017	Pure Technologies Ltd.	Xylem Inc. (NYSE:XYL)	$395.2	4.0x	26.5x
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
12/12/2016	Seventy Seven Energy Inc.	Patterson-UTI Energy, Inc. (NasdaqGS:PTEN)	$1,878.9	3.1x	18.8x
10/13/2016	Critical Flow Solutions Inc.	CIRCOR International, Inc. (NYSE:CIR)	$214.0	1.8x	8.6x

(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 03/31/20	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Alliant Energy Corporation	$3,576	$1,334	37.3%	$48.29	80.1%	$11,833	$18,560	5.2x	13.9x	4.8x
AltaGas Ltd.	3,856	812	21.0	9.00	56.1	2,514	8,768	2.3x	10.8x	6.3x
Blueknight Energy Partners, L.P.	356	62	17.3	0.88	57.2	36	(75)	(0.2)x	(1.2)x	4.6x
Chart Industries, Inc.	1,331	210	15.7	28.98	30.9	1,040	1,737	1.3x	8.3x	3.3x
EnLink Midstream, LLC	5,398	1,074	19.9	1.10	8.4	537	7,026	1.3x	6.5x	4.5x
EQM Midstream Partners, LP	1,694	1,412	83.4	11.80	24.8	2,365	9,800	5.8x	6.9x	4.7x
Gibson Energy Inc.	4,971	286	5.8	11.46	57.3	1,676	2,613	0.5x	9.1x	3.2x
Green Plains Partners LP	82	53	64.7	6.64	41.2	154	320	3.9x	6.1x	3.2x
Magellan Midstream Partners, L.P.	2,882	1,336	46.4	36.49	53.9	8,310	13,128	4.6x	9.8x	3.6x
MPLX LP	8,763	4,597	52.5	11.62	34.5	12,299	34,424	3.9x	7.5x	4.6x
NuStar Energy L.P.	1,543	728	47.2	8.59	28.6	938	5,757	3.7x	7.9x	4.7x
Median			**37.3%**		**41.2%**			**3.7x**	**7.9x**	**4.6x**
Mean			**37.4%**		**43.0%**			**2.9x**	**7.8x**	**4.3x**

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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
9/16/2019	SemGroup Corporation (NYSE:SEMG)	Energy Transfer LP (NYSE:ET)	$4,991.7	2.1x	13.5x
8/27/2019	Tallgrass Energy, LP (NYSE:TGE)	The Blackstone Group Inc. (NYSE:BX)	$9,337.3	8.9x	11.2x
8/21/2019	Kinder Morgan Canada Limited (TSX:KML)	Pembina Pipeline Corporation (TSX:PPL)	$2,294.7	4.4x	16.3x
5/10/2019	Buckeye Partners, LP (NYSE:BPL)	IFM Global Infrastructure Fund	$10,500.3	2.7x	18.6x
11/8/2018	Western Gas Partners, LP (NYSE:WES)	Western Gas Equity Partners, LP (NYSE:WGP)	$13,427.9	6.5x	12.0x
10/22/2018	EnLink Midstream Partners, LP (NYSE:ENLK)	EnLink Midstream, LLC (NYSE:ENLC)	$12,923.5	1.7x	12.2x
10/18/2018	Valero Energy Partners LP	Valero Energy Corporation (NYSE:VLO)	$4,069.8	7.6x	10.5x
9/19/2018	Dominion Energy Midstream Partners, LP (NYSE:DM)	Dominion Energy, Inc. (NYSE:D)	$10,405.4	13.6x	19.7x
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
5/17/2018	Enbridge Energy Partners, LP (NYSE:EEP)	Enbridge Inc. (TSX:ENB)	$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)	EQM 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
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

(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 03/31/20	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Antero Midstream Corporation	$1,055	$694	65.7%	$2.10	14.5%	$1,017	$3,908	3.7x	5.6x	4.5x
ATCO Ltd.	3,131	1,261	40.3	27.49	70.9	3,125	11,774	3.8x	9.3x	4.6x
Blueknight Energy Partners, L.P.	356	62	17.3	0.88	57.2	36	(75)	(0.2)x	(1.2)x	4.6x
Crestwood Equity Partners LP	3,075	465	15.1	4.23	10.6	309	3,718	1.2x	8.0x	5.2x
Enable Midstream Partners, LP	2,813	1,096	39.0	2.57	17.7	1,118	5,931	2.1x	5.4x	4.0x
Enbridge Inc.	34,729	7,839	22.6	28.91	71.5	58,540	112,433	3.2x	14.3x	6.2x
Energy Transfer LP	52,719	10,062	19.1	4.60	29.0	12,374	76,855	1.5x	7.6x	5.1x
Enterprise Products Partners L.P.	31,728	7,443	23.5	14.30	46.3	31,306	59,885	1.9x	8.0x	3.8x
Equitrans Midstream Corporation	1,694	1,407	83.1	5.03	22.6	1,408	12,320	7.3x	8.8x	4.6x
EQM Midstream Partners, LP	1,694	1,412	83.4	11.80	24.8	2,365	9,800	5.8x	6.9x	4.7x
Genesis Energy, L.P.	2,401	585	24.4	3.92	16.4	481	5,017	2.1x	8.6x	5.8x
Gibson Energy Inc.	4,971	286	5.8	11.46	57.3	1,676	2,613	0.5x	9.1x	3.2x
Inter Pipeline Ltd.	1,750	733	41.9	5.94	33.1	2,516	7,333	4.2x	10.0x	6.7x
Kinder Morgan Canada Limited	313	141	45.0	10.52	93.0	368	1,255	4.0x	8.9x	2.6x
Kinder Morgan, Inc.	12,886	6,235	48.4	13.92	61.6	31,530	66,244	5.1x	10.6x	5.5x
ONEOK, Inc.	9,521	2,449	25.7	21.81	27.8	9,014	21,945	2.3x	9.0x	5.7x
Plains All American Pipeline, L.P.	33,563	2,303	6.9	5.28	20.9	3,844	16,474	0.5x	7.2x	4.6x
Sanchez Midstream Partners LP	79	43	53.7	0.43	13.8	8	433	5.5x	10.2x	10.3x
Summit Midstream Partners, LP	418	238	56.8	0.61	6.1	57	1,849	4.4x	7.8x	6.0x
Targa Resources Corp.	8,421	1,789	21.2	6.91	15.9	1,611	12,958	1.5x	7.2x	4.2x
TC PipeLines, LP	552	449	81.3	27.48	61.5	1,959	3,998	7.2x	8.9x	4.2x
The Williams Companies, Inc.	8,060	4,198	52.1	14.15	47.9	17,166	42,410	5.3x	10.1x	5.3x
TC Energy Corporation	9,303	5,964	64.1	44.13	81.7	41,472	79,984	8.6x	13.4x	6.3x
Western Midstream Partners, LP	2,849	1,575	55.3	3.24	9.1	1,438	9,438	3.3x	6.0x	5.0x
Median			**41.1%**		**28.4%**			**3.5x**	**8.7x**	**4.8x**
Mean			**41.3%**		**38.0%**			**3.5x**	**8.3x**	**5.1x**

(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

PIPELINES

SELECTED TRANSACTIONS (1)

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
2/27/2020	EQM Midstream Partners, LP (NYSE:EQM)	Equitrans Midstream Corporation (NYSE:ETRN)	$12,076.0	7.3x	8.8x
9/16/2019	SemGroup Corporation (NYSE:SEMG)	Energy Transfer LP (NYSE:ET)	$4,991.7	2.1x	13.5x
8/27/2019	Tallgrass Energy, LP (NYSE:TGE)	The Blackstone Group Inc. (NYSE:BX)	$9,337.3	8.9x	11.2x
8/21/2019	Kinder Morgan Canada Limited (TSX:KML)	Pembina Pipeline Corporation (TSX:PPL)	$2,294.7	4.4x	16.3x
5/10/2019	Buckeye Partners, LP (NYSE:BPL)	IFM Global Infrastructure Fund	$10,500.3	2.7x	18.6x
11/8/2018	Western Gas Partners, LP (NYSE:WES)	Western Gas Equity Partners, LP (NYSE:WGP)	$13,427.9	6.5x	12.0x
10/18/2018	Valero Energy Partners LP	Valero Energy Corporation (NYSE:VLO)	$4,069.8	7.6x	10.5x
10/9/2018	Antero Midstream Partners LP (NYSE:AM)	Antero Midstream GP LP (NYSE:AMGP)	$7,359.7	7.7x	11.5x
9/28/2018	American Midstream Partners, LP (NYSE:AMID)	ArcLight Capital Partners, LLC	$1,595.1	2.0x	14.2x
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
5/17/2018	Enbridge Energy Partners, LP (NYSE:EEP)	Enbridge Inc. (TSX:ENB)	$15,925.8	6.6x	10.1x
5/10/2018	Amberjack Pipeline Company LLC	Shell Midstream Partners, LP (NYSE:SHLX)	$1,928.7	8.2x	9.4x
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
2/1/2016	Dominion Energy Questar Corporation	Dominion Energy, Inc. (NYSE:D)	$6,092.9	-	9.7x

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

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 03/31/20	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Adams Resources & Energy, Inc.	$1,720	$0	0.0%	$23.50	59.2%	$100	$3	0.0x	20.1x	(547.7)x
ArcBest Corporation	2,978	190	6.4	17.52	50.9	444	522	0.2x	2.7x	0.4x
Covenant Transportation Group, Inc.	889	90	10.1	8.67	41.3	161	465	0.5x	5.2x	3.7x
Daseke, Inc.	1,695	145	8.5	1.40	24.8	90	858	0.5x	5.9x	4.8x
Heartland Express, Inc.	624	169	27.1	18.57	81.8	1,524	1,447	2.3x	8.6x	(0.4)x
Hess Corporation	6,090	2,336	38.4	33.30	44.9	10,097	17,458	2.9x	7.5x	2.9x
J.B. Hunt Transport Services, Inc.	9,356	1,266	13.5	92.23	75.4	9,800	11,186	1.2x	8.8x	1.1x
Knight-Swift Transportation Holdings Inc.	4,764	902	18.9	32.80	81.1	5,569	6,506	1.4x	7.2x	1.1x
Landstar System, Inc.	3,984	316	7.9	95.86	79.7	3,785	3,602	0.9x	11.4x	(0.2)x
Marten Transport, Ltd.	863	166	19.3	20.52	87.7	1,125	1,095	1.3x	6.6x	(0.2)x
Old Dominion Freight Line, Inc.	4,106	1,079	26.3	131.26	86.7	15,692	15,400	3.8x	14.3x	(0.3)x
P.A.M. Transportation Services, Inc.	515	70	13.5	30.75	43.0	177	398	0.8x	5.7x	3.4x
Patriot Transportation Holding, Inc.	102	8	7.4	9.25	43.5	31	16	0.2x	2.1x	(1.0)x
Parkland Corporation	13,120	731	5.6	17.50	50.4	2,596	5,450	0.4x	7.5x	3.9x
Roadrunner Transportation Systems, Inc.	1,848	(68)	(3.7)	2.55	19.6	97	507	0.3x	NM	NM
Ryder System, Inc.	8,907	2,237	25.1	26.44	39.1	1,381	9,456	1.1x	4.2x	3.6x
Saia, Inc.	1,823	286	15.7	73.54	68.7	1,899	2,140	1.2x	7.5x	1.1x
Schneider National, Inc.	4,672	637	13.6	19.34	79.3	3,426	3,270	0.7x	5.1x	(0.5)x
TFI International Inc.	3,660	528	14.4	21.91	64.0	1,934	3,495	1.0x	6.6x	2.5x
Titanium Transportation Group Inc.	122	9	7.5	0.85	69.5	31	82	0.7x	9.1x	5.4x
Universal Logistics Holdings, Inc.	1,517	165	10.9	13.10	47.7	357	886	0.6x	5.4x	3.2x
USA Truck, Inc.	515	35	6.8	3.17	18.9	26	216	0.4x	6.2x	5.6x
Werner Enterprises, Inc.	2,460	448	18.2	36.26	90.6	2,515	2,800	1.1x	6.2x	0.4x
YRC Worldwide Inc.	4,839	168	3.5	1.68	19.4	61	1,184	0.2x	7.0x	6.4x
Median			**12.2%**		**55.0%**			**0.7x**	**6.6x**	**1.1x**
Mean			**13.1%**		**57.0%**			**1.0x**	**7.4x**	**(21.8)x**

(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.
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(4) Net Debt is defined as total debt less cash and cash equivalents.

PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

TRUCKERS

SELECTED TRANSACTIONS (1)

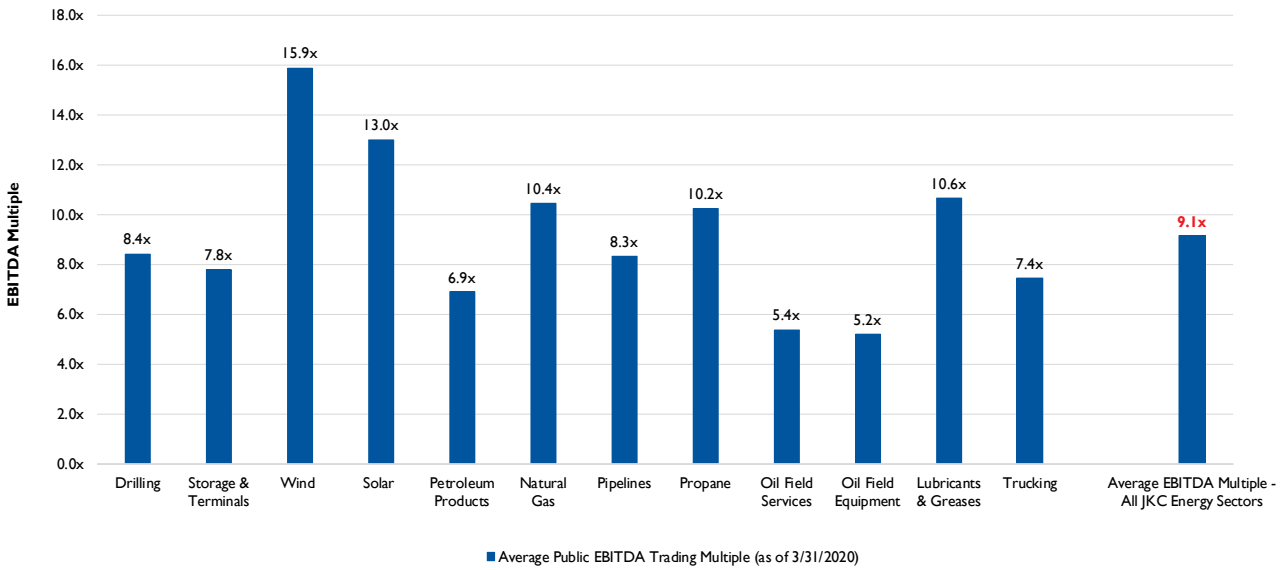
Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
2/19/2020	Performance Team LLC	A.P. Møller - Mærsk A/S (CPSE:MAERSK B)	$545.0	1.0x	6.1x
11/5/2018	CaseStack, Inc.	Hub Group, Inc. (NasdaqGS:HUBG)	$255.0	1.1x	11.6x
8/31/2018	Mode Transportation, LLC	York Capital Management	$238.5	-	10.0x
12/7/2017	Keen Transport, Inc.	Wallenius Wilhelmsen ASA (OB:WALWIL)	$64.0	0.8x	6.4x
7/19/2016	Span-Alaska Transportation, Inc.	Matson Logistics, Inc.	$197.6	-	9.4x
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
4/21/2015	Command Transportation, LLC	Echo Global Logistics, Inc. (NasdaqGS:ECHO)	$391.0	-	10.6x
1/20/2015	Wheels Group Inc.	Radiant Global Logistics Ltd.	$80.1	-	13.5x

(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 3/31/2020)



FACTOIDS: LITTLE-KNOWN FACTS AND STATS

PETROLEUM PRODUCTS (1)

- Energy exports from the United States reached an all-time high of 23.6 quadrillion British thermal units (quads) in 2019, marking the first time in 67 years that annual U.S. gross energy exports exceeded U.S. gross energy imports.
- Net U.S. energy imports have fallen from a peak of 30 quads in 2005, and they have decreased every year since 2016.

NATURAL GAS (2)

- Commercial buildings account for one-fifth of total U.S. energy use, of which natural gas accounts for 18%.
- Fertilizer used to grow crops is composed almost entirely of natural gas components.
- Crude oil markets respond quickly and often dramatically to world events, but natural gas markets tend to be driven by regional factors and have been less connected to the international market.

PROPANE AND HEATING/FUEL OIL (3)

- There is a lot of discussion regarding the use of propane in the rapidly growing cannabis industry. A lot of the facilities are built in places without access to natural gas, and many don't have adequate high voltage power lines to meet their demand in a cost-effective way.
- Propane produces 43% fewer greenhouse gas emissions than using an equivalent amount of electricity generated from the grid.

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

FACTOIDS: LITTLE-KNOWN FACTS AND STATS

Lubricants and Greases (1)

- Finished lubricant demand was 36.4 million metric tons in 2018, with 54% in Asia Pacific (and the rest of the world), 27% in the Americas and 19% in Europe. Lubes n grease mag
- The top five lubricant manufacturers by volume in 2018 were: Shell, ExxonMobil, BP-Castrol, Total and Chevron.

Solar (2)

- Modern solar cells used in homes can convert close to 20% of sunlight into electricity. Commercial systems can reach an efficiency of 40%.
- As of 2018, the United States has 242,343 solar workers.
- The manufacturing sector makes up 14% of the solar workforce (33,700 jobs).
- Concentrating solar power (CSP) concentrates the sun's energy like a sophisticated magnifying glass. The energy is so intense it becomes hot enough to heat a fluid, often molten salts, to somewhere in the neighborhood of 1,000 degrees Fahrenheit. This fluid can be stored, with energy inside it, until it's needed.

Wind (3)

- A wind turbine has as many as 8,000 different components.
- The largest turbines can harness energy to power 600 American homes. A small turbine in the back yard can easily power a small business or a home.

(1) Lubes N Grease Magazine.
(2) U.S. Energy Information Administration, Solar Energy Industries Association and How Stuff Works.
(3) Conserve Energy Future.

FACTOIDS: LITTLE-KNOWN FACTS AND STATS

Oil and Gas Field Services (1)

- In the wake of the pandemic, oil producers are shutting wells at a tremendous rate. Exxon Mobil Corp. said it will cut the number of its rigs in the Permian Basin by 75%, running just 15 by year's end. Chevron Corp. said it's now down to just five rigs there, a 71% drop.
- North Dakota has already seen roughly 6,200 wells shut. The total closed-off amounts to more than a third of the state's active wells.
- In this world of automated operations it can be simple and non-eventful to start and stop a shale well and can often be performed using an iPhone. Generally, non-automated wells can be shut easily as well, something that happens regularly for maintenance.

Equipment and Physical Technology (1,2)

- With the internet of things (IoT), smart sensors and blockchain technology, oil can be tracked from the ground to the gasoline pump, accounting for every single drop of crude in the process. Smart sensors can measure the volume, temperature and location of each barrel of oil, relaying that data through the IoT, and applying it to a blockchain, allowing traders, management and even individuals to monitor the journey to ensure the quality and environmental impact of the product.
- New wells in the shale patch use electric submersible pumps (ESPs) that act as surveillance systems to organize and store data in a centralized location for monitoring and control. They send data from deep within the well to a remote telemetry unit on the surface that transmits it online to production managers.

Storage and Terminals (3)

- Due to the glut of oil caused by the pandemic, Gravity Oilfield Services is offering its inventory of 5,000 storage tanks normally used as frac or mud tanks to operators in the Permian Basin, Eagle Ford and Haynesville areas for crude storage.
- Chevron, Exxon Mobil and Alon USA, along with six other companies, have agreed to rent space to store 23 million barrels of crude in the U.S. emergency oil reserve (SPR). Companies storing oil will be allowed to keep it in the SPR through March 2021 and will pay a small amount of oil to cover storage costs.

(1) Oilandgaspeople.com.
(2) Oilprice.com.
(3) Storage Terminals Magazine.

FACTOIDS: LITTLE-KNOWN FACTS AND STATS

PIPELINES

- TC Energy reported that construction has started on the long-stalled Keystone XL oil pipeline across the U.S.-Canada border. The 1,200-mile pipeline was proposed in 2008 and would carry up to 830,000 barrels per day of crude oil to refineries and export terminals on the Gulf of Mexico.(1)
- Energy Transfer asked the Texas Railroad Commission to allow it to idle two pipelines in Texas and turn them into storage for around two million barrels of oil as oil producers scramble to find storage for their barrels due to the coronavirus pandemic. Enterprise Products Partners applied to open the northbound capacity of its Seaway pipeline.(2)

TRUCKERS (3)

- Long-haul trips are down considerably as container imports at ports dried up as a result of the coronavirus pandemic. At the same time, local trips under 100 miles increased by more than 100%.
- States with most trucking bottlenecks include Texas with 11; California, Georgia and New York with 7; Pennsylvania, Tennessee and Washington with 6; and Minnesota with 5.

(1) Pipeline and Gas Journal.
(2) Oilprice.com.
(3) American Transportation Research Institute.

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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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