ENERGY LOGISTICS & DISTRIBUTION

Industry In-Sight™

WINTER/SPRING 2023




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 & 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. EEIA mobilizes and leads 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. It also works for widespread public support for energy development.

EEIA is active on all fronts: federal and state legislative, regulatory, judicial and public opinion. Its strength is based upon the supply chain's enormous fifty-state contributions to jobs, economic growth and community prosperity. EEIA conducts economic research that measures and reports the facts about the energy supply chain's tremendous contributions to the American economy.

EEIA is an organization of leading supply chain companies, trade associations and labor organizations. It is the voice 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.

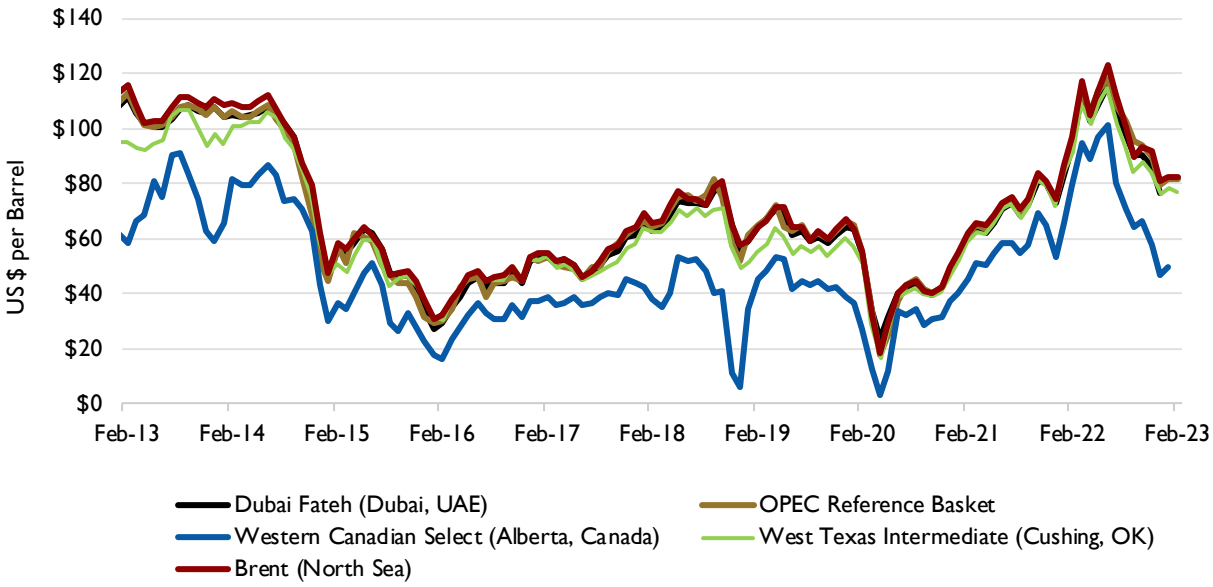
The Services We Provide

- 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.

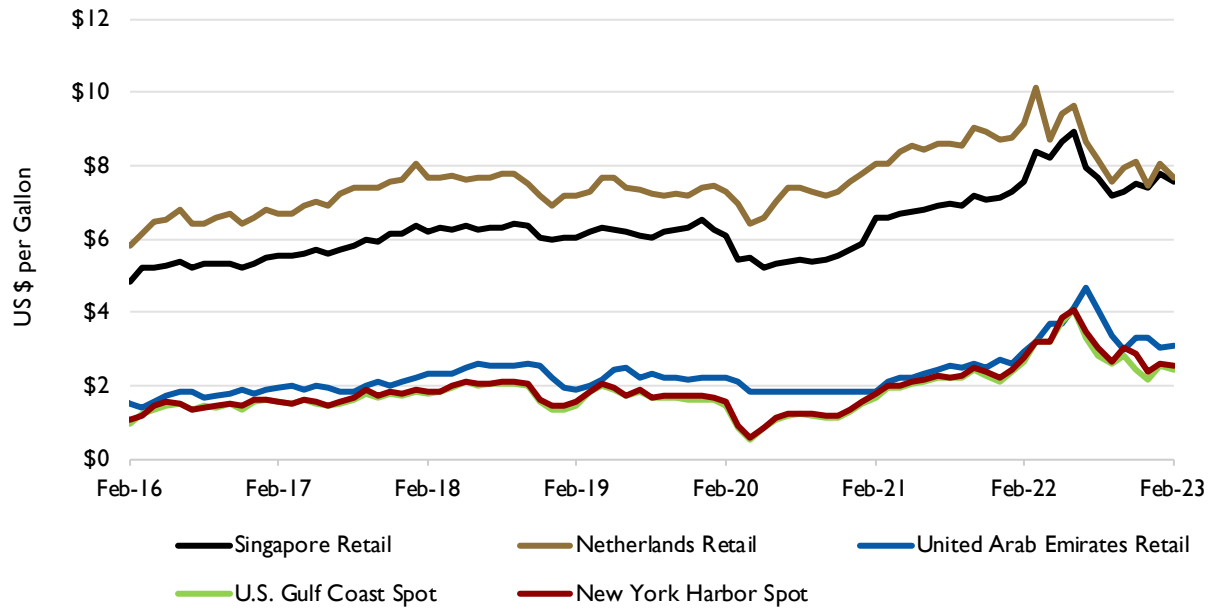
DATA CENTER

OIL

CRUDE OIL PRICES (MONTHLY AVERAGE) (1)



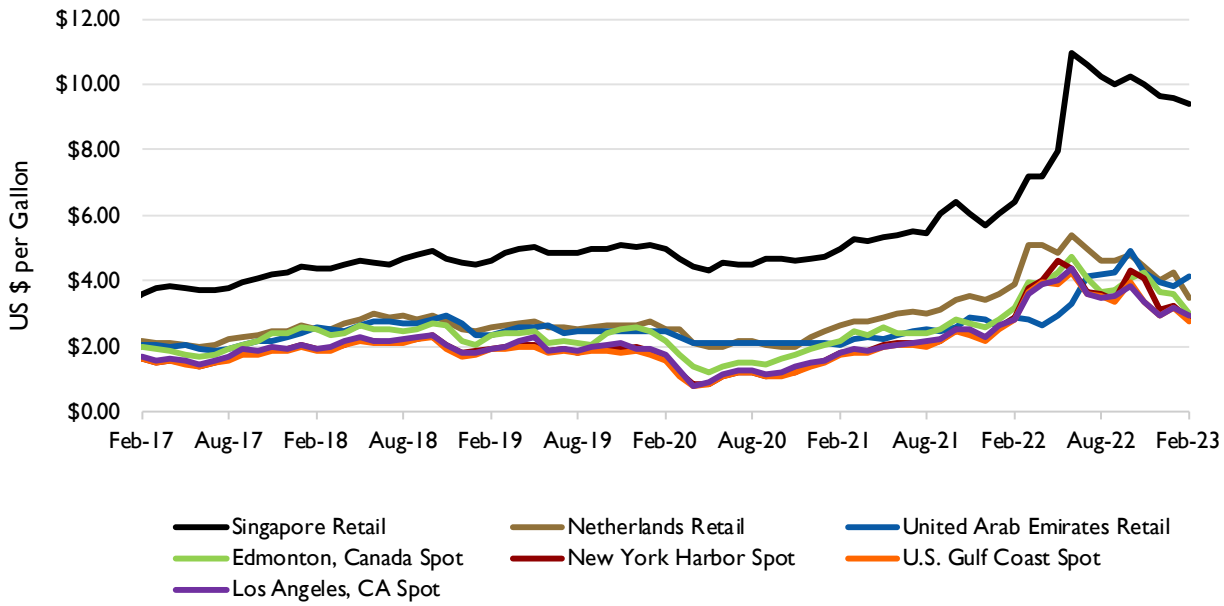
GASOLINE PRICES (MONTHLY AVERAGE) (2)



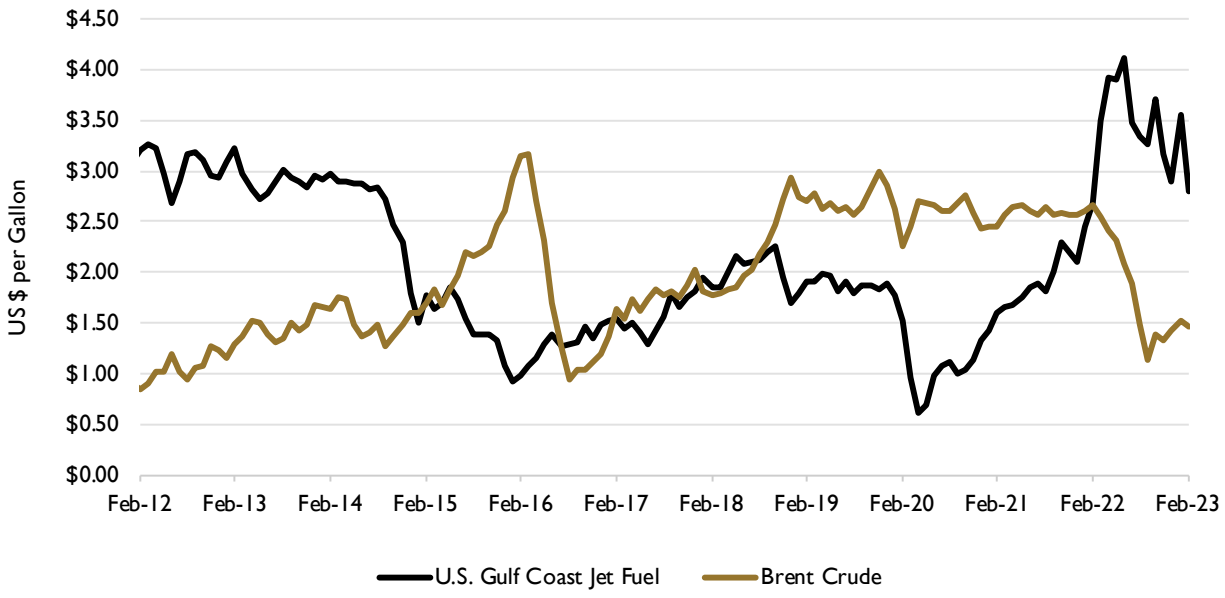
DATA CENTER

OIL

DIESEL PRICES (MONTHLY AVERAGE) (3)



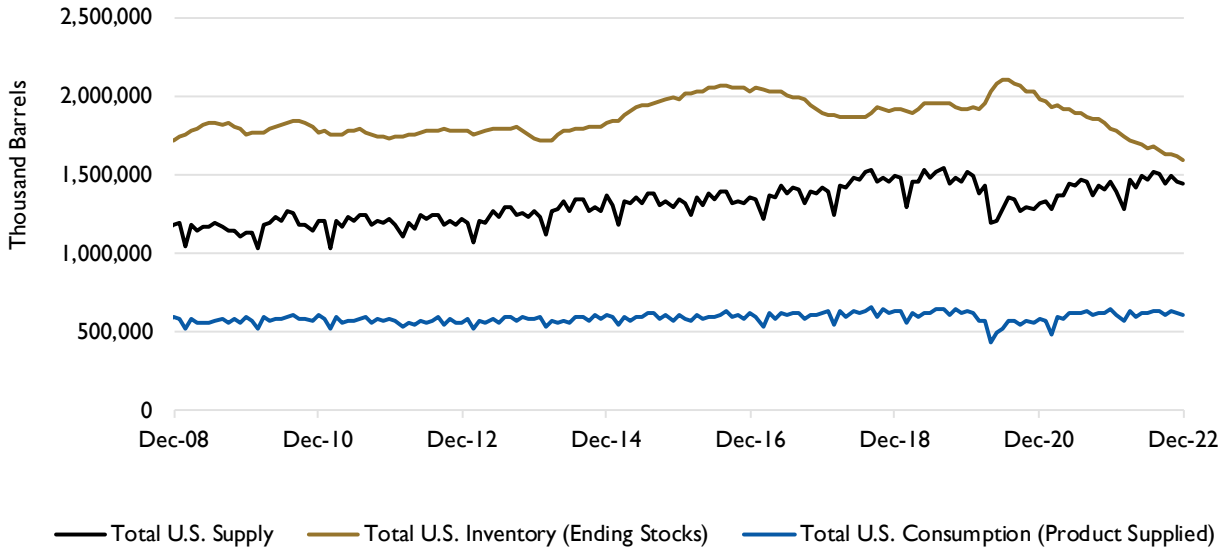
JET FUEL PRICES (MONTHLY AVERAGE) (4)



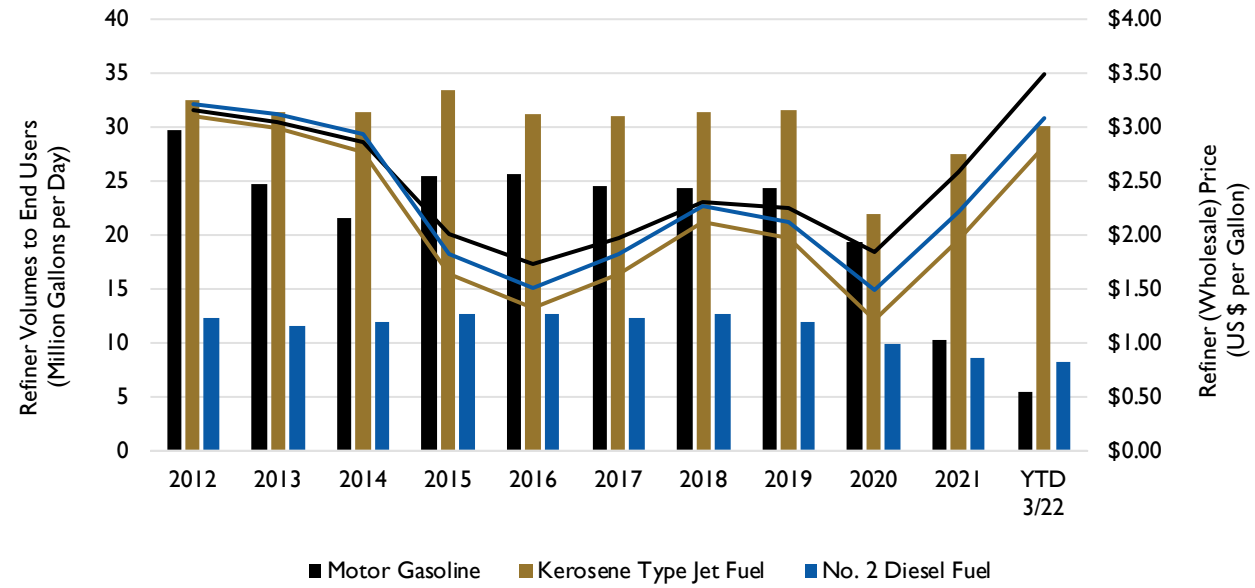
DATA CENTER

OIL

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



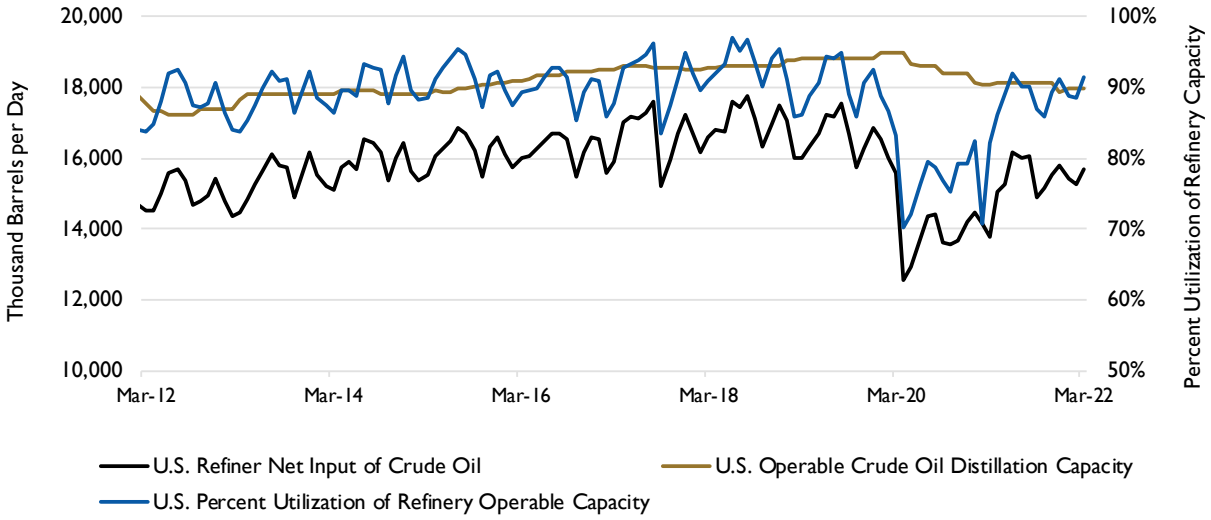
U.S. Refinery Volumes and Wholesale Prices of Petroleum Products (Annual Average) (6) (Latest Available Data)



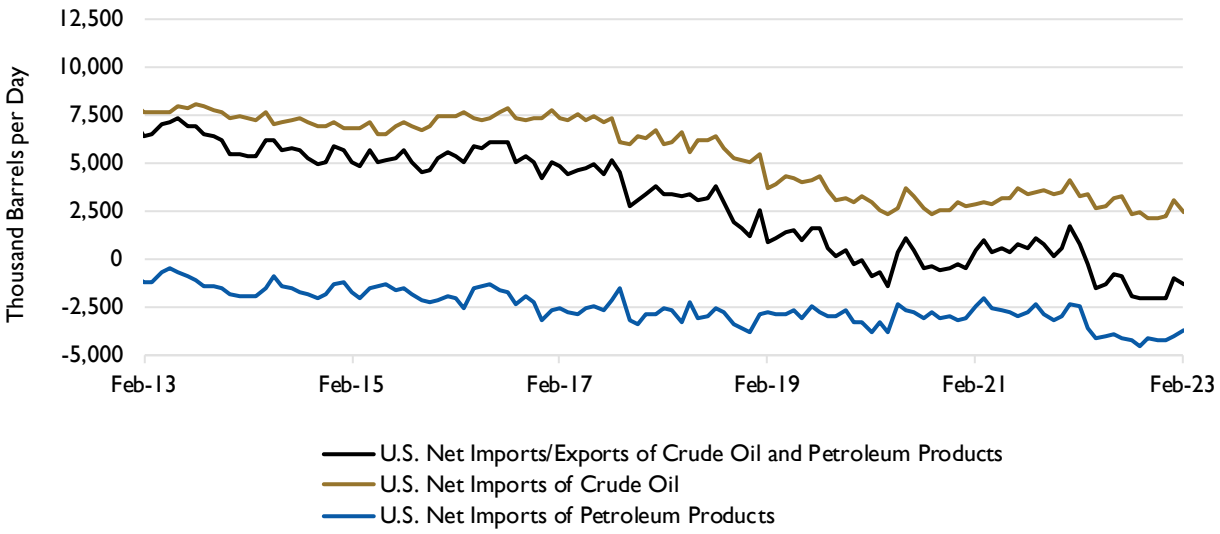
DATA CENTER

OIL

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



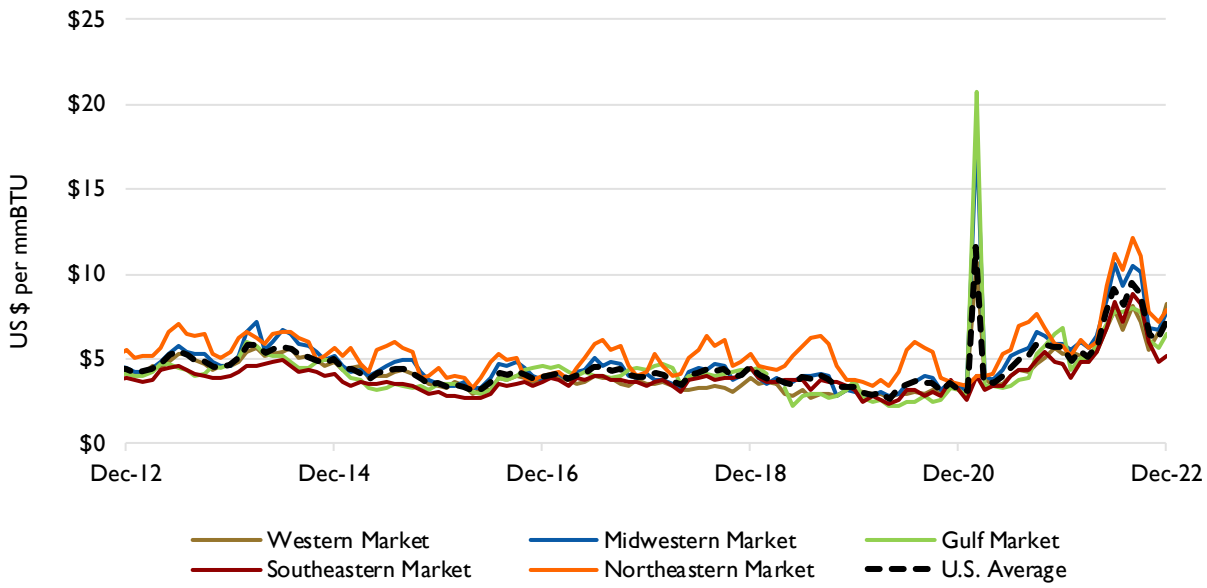
U.S. Crude Oil and Petroleum Products Imports and Exports (Monthly Average) (8)



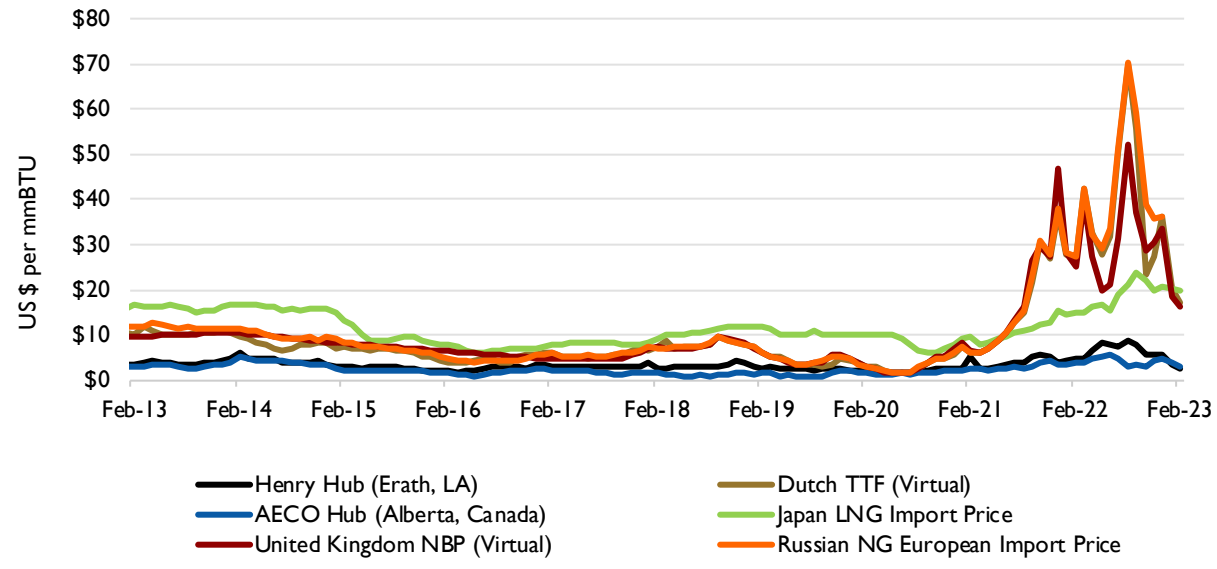
DATA CENTER

NATURAL GAS

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



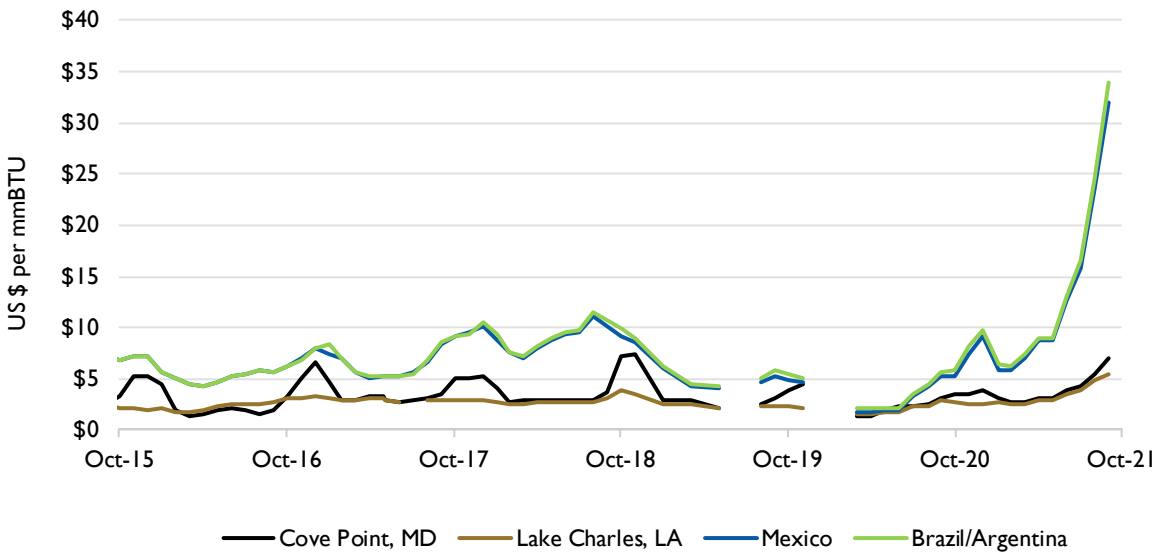
INTERNATIONAL NATURAL GAS PRICES (MONTHLY AVERAGE) (10)



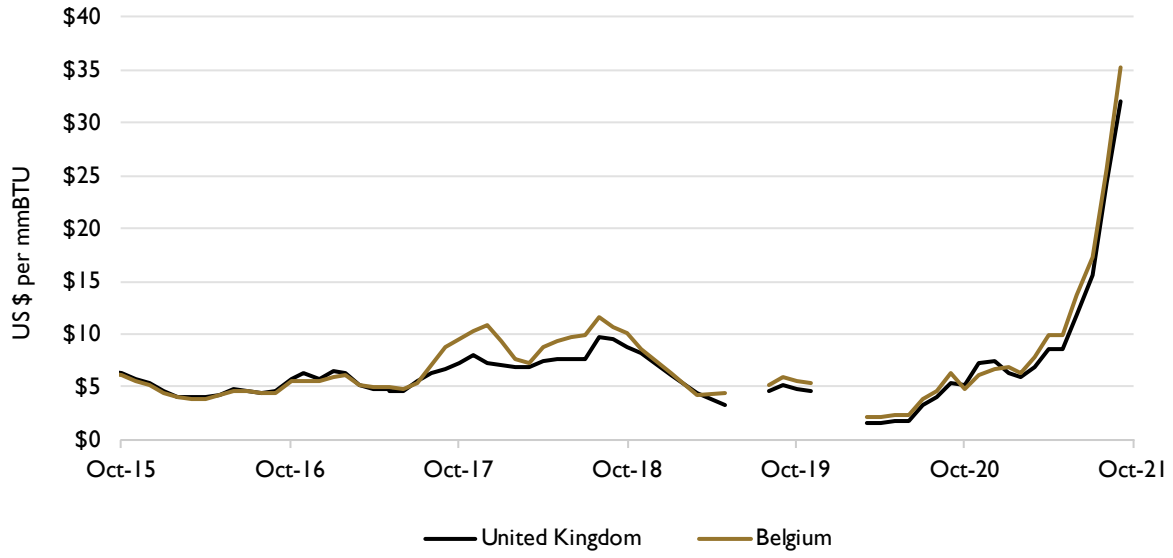
DATA CENTER

NATURAL GAS

AMERICAS LIQUEFIED NATURAL GAS PRICES (MONTHLY AVERAGE) (11) (LATEST AVAILABLE DATA)



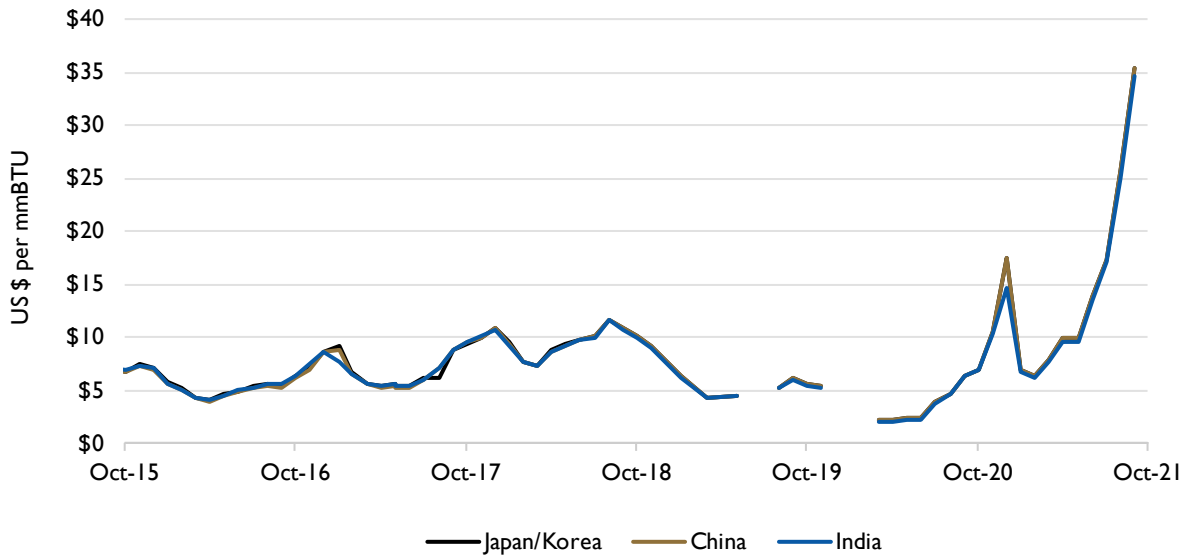
WESTERN EUROPE LIQUEFIED NATURAL GAS PRICES (MONTHLY AVERAGE) (12) (LATEST AVAILABLE DATA)



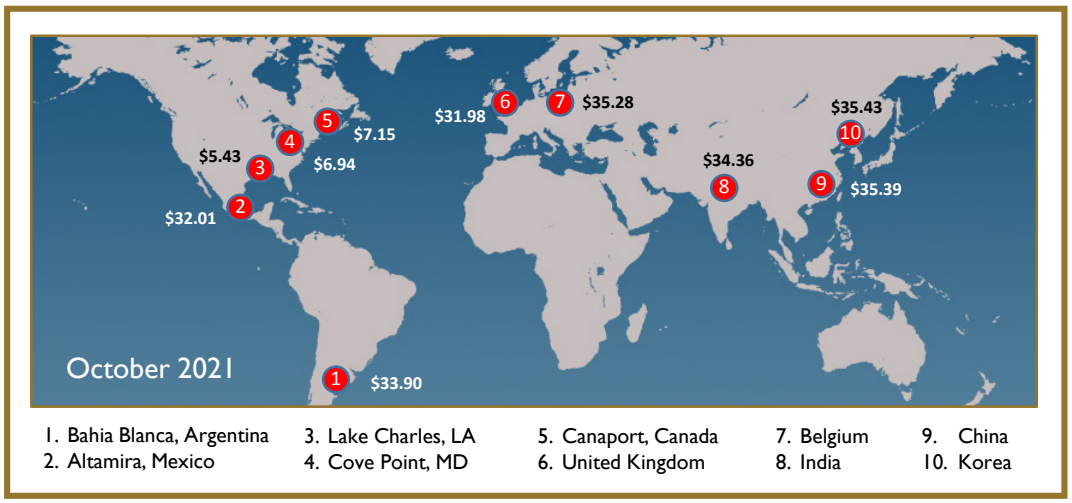
DATA CENTER

NATURAL GAS

ASIA LIQUEFIED NATURAL GAS PRICES (MONTHLY AVERAGE) (13) (LATEST AVAILABLE DATA)



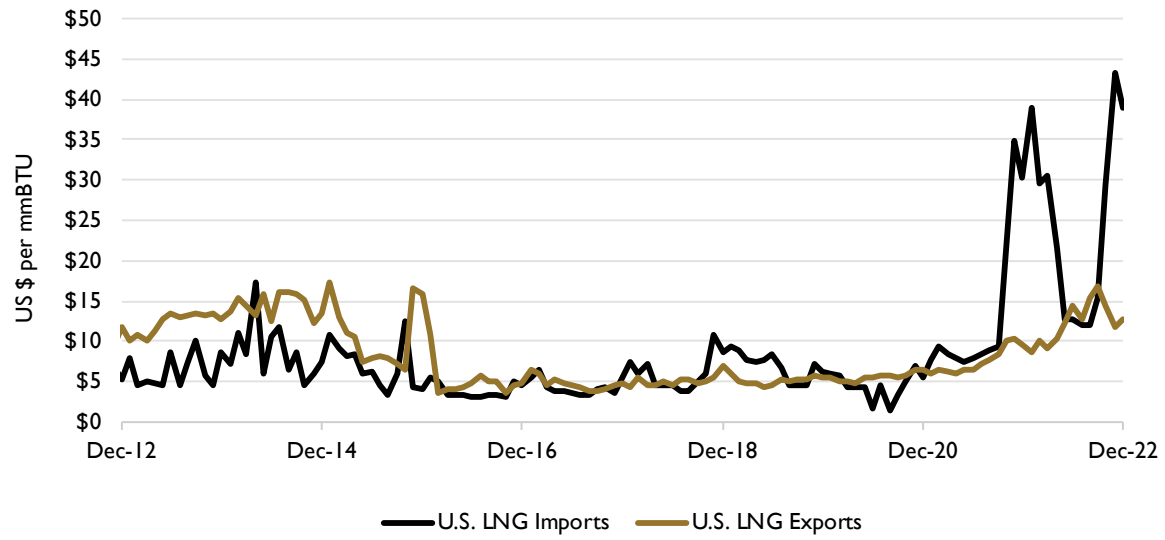
WORLD LIQUEFIED NATURAL GAS PRICES MAP (MONTHLY AVERAGE) (14) (LATEST AVAILABLE DATA)



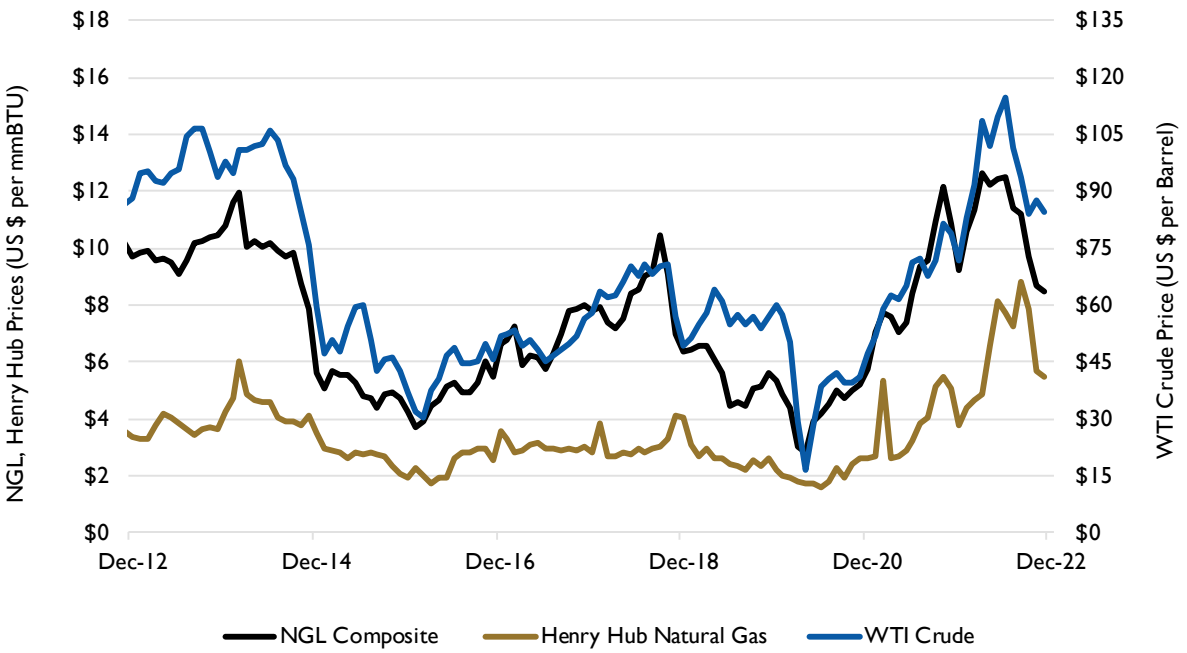
DATA CENTER

NATURAL GAS

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



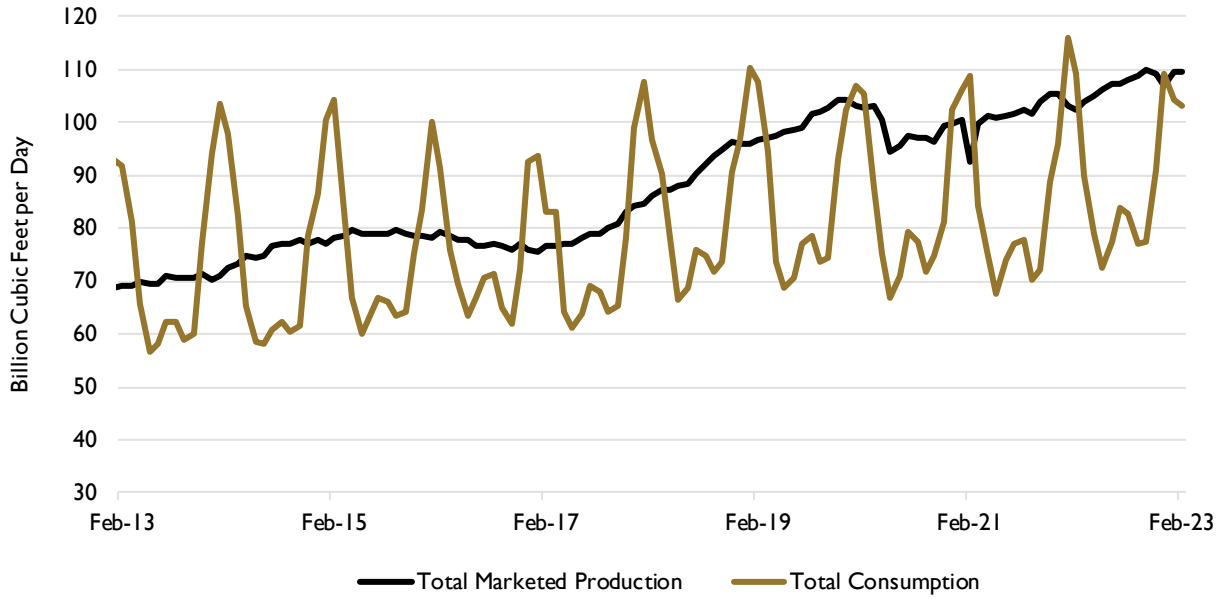
NATURAL GAS PLANT LIQUIDS PRICES (MONTHLY AVERAGE) (16)



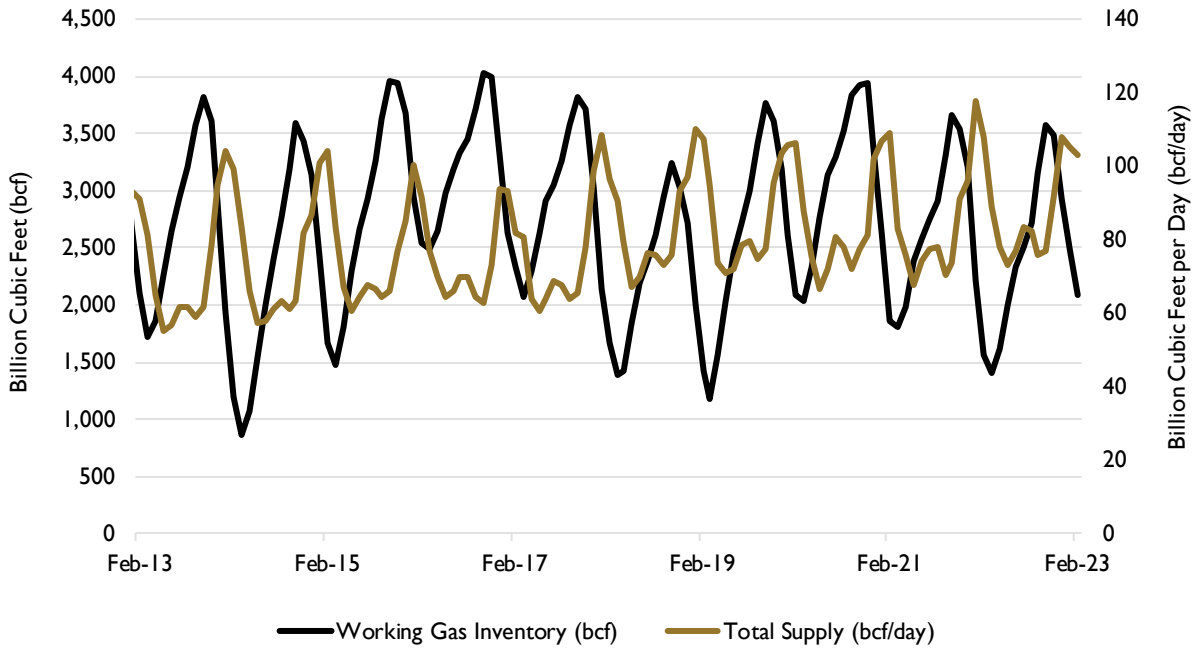
DATA CENTER

NATURAL GAS

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



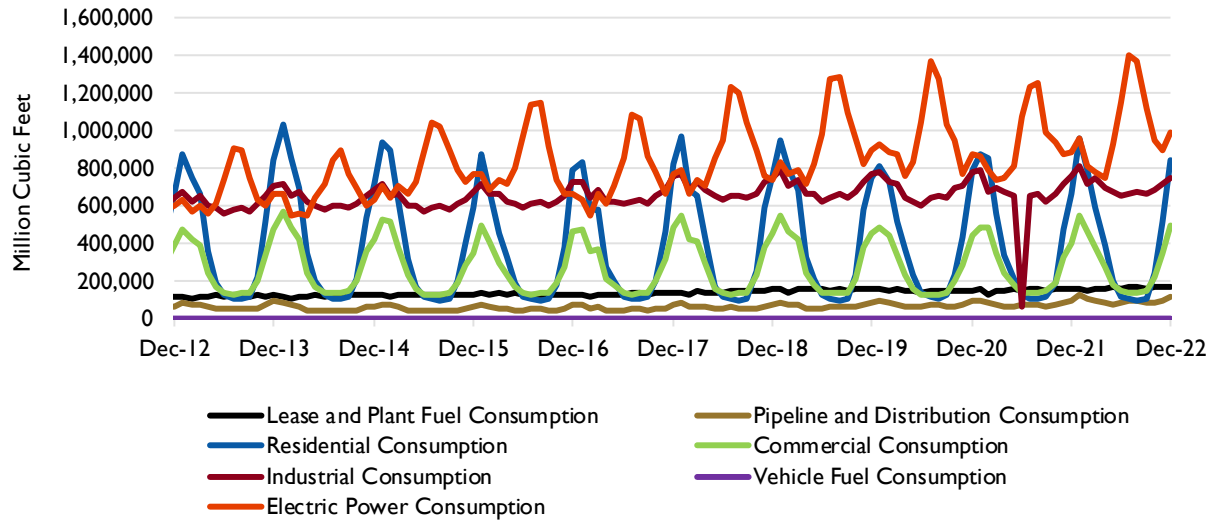
U.S. Natural Gas Supply and Inventory (Monthly) (18)



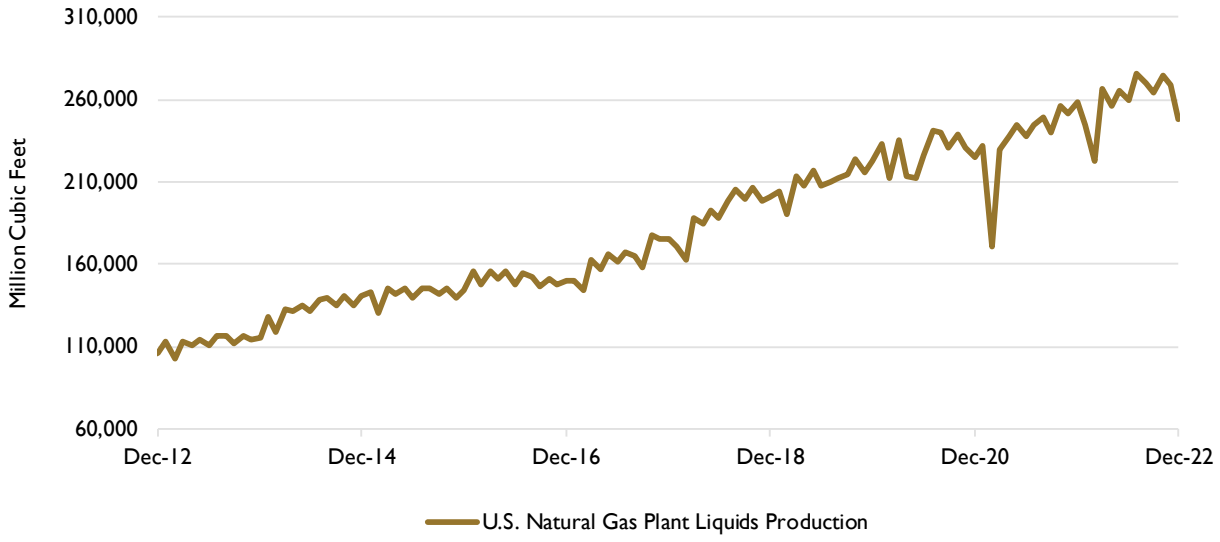
DATA CENTER

NATURAL GAS

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



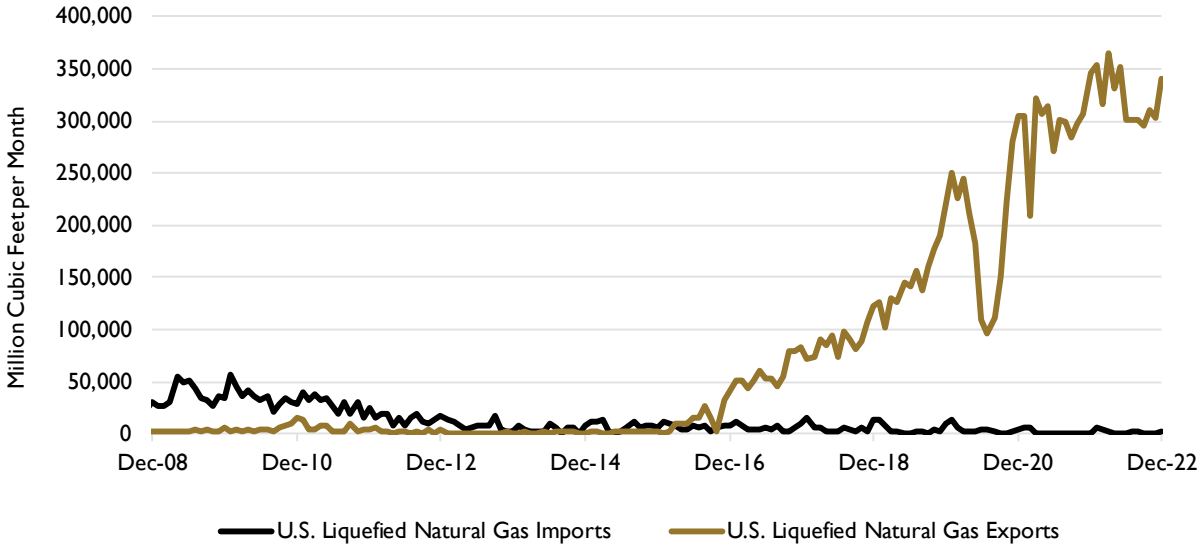
U.S. Natural Gas Plant Liquids Production (Monthly) (20)



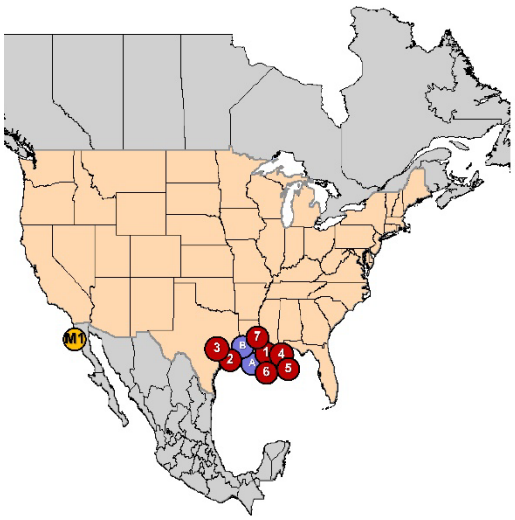
DATA CENTER

NATURAL GAS

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



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



UNITED STATES

PROPOSED TO FERC
Pending Applications:
1. **Cameron Parish, LA:** 1.18 Bcfd (Commonwealth, LNG) (CP19-502)
2. **Port Arthur, TX:** 1.86 Bcfd (Sempra - Port Arthur LNG Trains 3 & 4) (CP20-55)
3. **Freeport, TX:** 0.24 Bcfd (Freeport LNG uprate) (CP21-470
4. **Cameron Parish, LA:** 1.45 Bcfd (Venture Global CP2 Blocks 1-9) (CP22-21)
5. **Cameron Parish, LA:** .057 Bcfd (Venture Global Calcasieu Pass) (CP22-25)
6. **Hackberry, LA:** -0.45 Bcfd (Sempra - Cameron LNG Vacate T5 & modify T4) (CP22-41)
7. **Plaquemines Parish, LA:** 0.45 Bcfd (Venture Global Plaquemines) (CP22-92)

Projects in Pre-filing:
A. LaFourche Parish, LA: 0.65 Bcfd (Port Fourchon LNG) (PF17-9)
B. Plaquemines Parish, LA: 2.76 Bcfd (Delta LNG - Venture Global) (PF19-4)

CANADA
For Canadian LNG Import and Proposed Export Facilities:

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

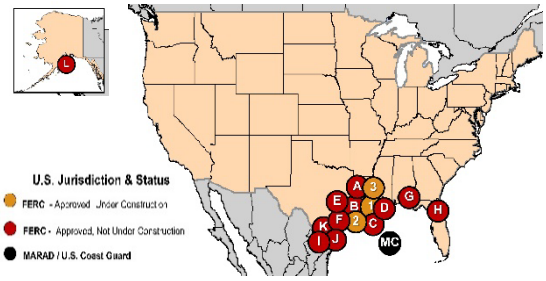
MEXICO (Projects in advanced planning/development stages)
M1. Baja California, MX: 0.4 Bcfd (Sempra – Energía Costa Azul Phase 1)

As of March 7, 2023

DATA CENTER

NATURAL GAS

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



Import Terminals (Not Shown on Map)

UNITED STATES As of March 7, 2023

APPROVED - UNDER CONSTRUCTION - FERC
None

APPROVED – NOT UNDER CONSTRUCTION – FERC
1. Kenai, AK: .007 Bcfd (Trans-Foreland – Kenai LNG) (CP15-521)

APPROVED - NOT UNDER CONSTRUCTION - MARAD/Coast Guard
A. Gulf of Mexico: 1.0 Bcfd (Main Pass Energy Hub)
B. 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

Export Terminals (Shown on Map)

UNITED STATES As of March 7, 2023

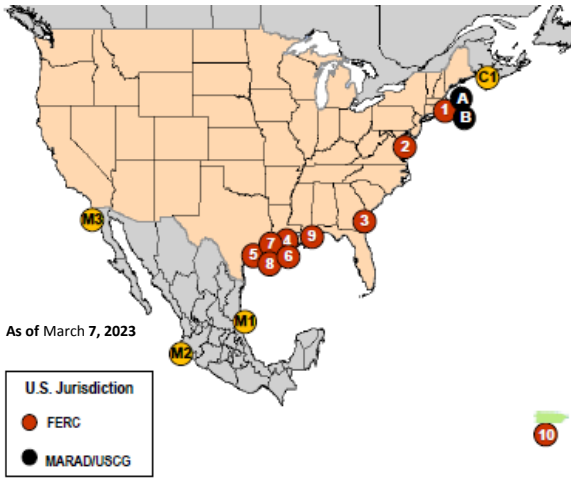
FERC – APPROVED, UNDER CONSTRUCTION
1. Cameron Parish, LA: 0.92 Bcfd (Venture Global Calcasieu Pass Units 5-9) (CP15-550)
2. Sabine Pass, TX: 2.26 Bcfd (ExxonMobil – Golden Pass) (CP14-517, CP20-459)
3. Plaquemines Parish, LA: 3.40 Bcfd (Venture Global Plaquemines) (CP17-66)

FERC – APPROVED, NOT UNDER CONSTRUCTION
A. Lake Charles, LA: 2.2 Bcfd (Lake Charles LNG) (CP14-120)
B. Lake Charles, LA: 1.186 Bcfd (Magnolia LNG) (CP14-347)
C. Hackberry, LA: 1.41 Bcfd (Sempra - Cameron LNG Trains 4 & 5) (CP15-560)
D. Calcasieu Parish, LA: 4.0 Bcfd (Driftwood LNG) (CP17-117)
E. Port Arthur, TX: 1.86 Bcfd (Sempra - Port Arthur LNG Trains 1 & 2) (CP17-20)
F. Freeport, TX: 0.72 Bcfd (Freeport LNG Dev Train 4) (CP17-470)
G. Pascagoula, MS: 1.5 Bcfd (Gulf LNG Liquefaction) (CP15-521)
H. Jacksonville, FL: 0.132 Bcf/d (Eagle LNG Partners) (CP17-41)
I. Brownsville, TX: 0.55 Bcfd (Texas LNG Brownsville) (CP16-116)
J. Brownsville, TX: 3.6 Bcfd (Rio Grande LNG – NextDecade) (CP16-454)
K. Corpus Christi, TX: 1.86 Bcfd (Cheniere Corpus Christi Stage III) (CP18-512)
L. Nikiski, AK: 2.63 Bcfd (Alaska Gasline) (CP17-178)

MARAD/USCG – APPROVED, NOT UNDER CONSTRUCTION
MC. Gulf of Mexico: 1.8 Bcfd (Delfin LNG)

CANADA - 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
★ Added liquefaction and export capabilities (also shown on the LNG Export Terminals Existing map)

Import Terminals (Shown on Map)

UNITED STATES
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. Freeport, TX: 1.5 Bcfd (Cheniere/Freeport LNG Dev.) ★★
6. Sabine, LA: 4.0 Bcfd (Cheniere/Sabine Pass LNG) ★★
7. Hackberry, LA: 1.8 Bcfd (Sempra - Cameron LNG) ★
8. Sabine Pass, TX: 2.0 Bcfd (ExxonMobil – Golden Pass) (Phase I & II)
9. Pascagoula, MS: 1.5 Bcfd (El Paso/Crest/Sonangol - Gulf LNG Energy)
10. Peñuelas, PR: 0.3 Bcfd (EcoElectrica)

MARAD/USCG
A. Offshore MA: 0.8 Bcfd (Excelerate Energy – Northeast Gateway)
B. Offshore MA: 0.4 Bcfd (GDF SUEZ – Neptune LNG)

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)

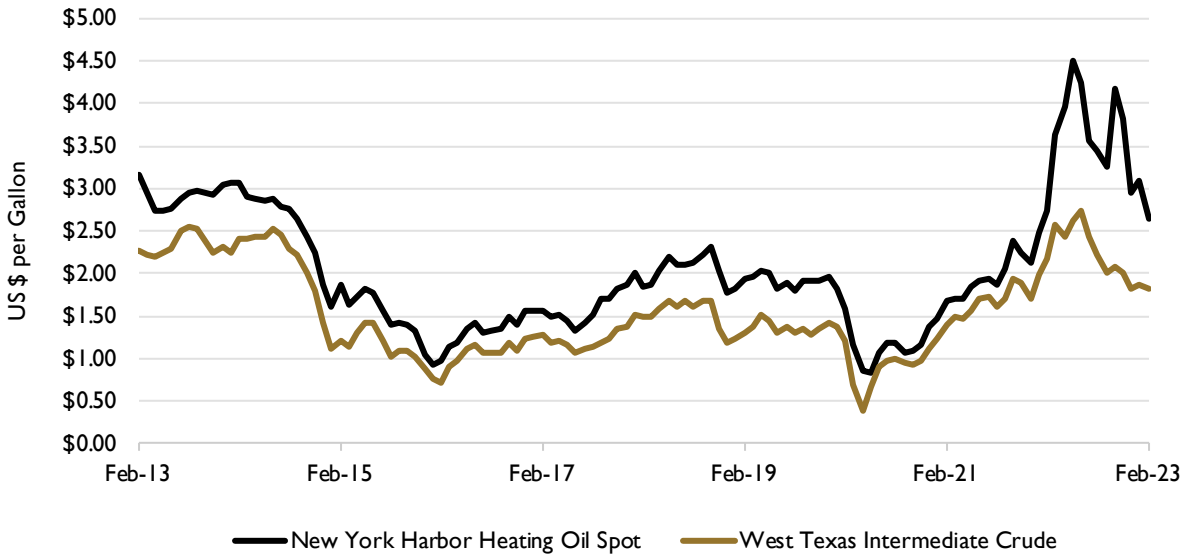
Export Terminals (Not Shown on Map)

1. Kenai, AK: 0.2 Bcfd (Trans-Foreland)
2. Sabine, LA: 4.55 Bcfd (Cheniere/Sabine Pass LNG – Trains 1-6)
3. Cove Point, MD: 0.82 Bcfd (Dominion–Cove Point LNG)
4. Corpus Christi, TX: 2.40 Bcfd (Cheniere – Corpus Christi LNG Trains 1-3)
5. Hackberry, LA: 2.15 Bcfd (Sempra–Cameron LNG, Trains 1-3)
6. Elba Island, GA: 0.35 Bcd (Southern LNG Company Units 1-10)
7. Freeport, TX: 2.14 Bcfd (Freeport LNG Dev/Freeport LNG Expansion/FLNG Liquefaction Trains 1-3)
8. Cameron Parish, LA: 0.74 Bcfd (Venture Global Calcasieu Pass Units 1-4)

DATA CENTER

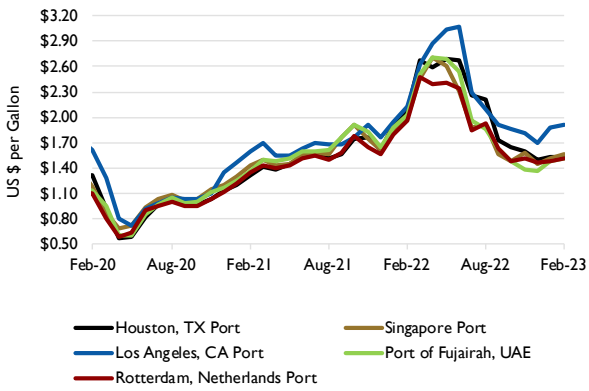
PROPANE AND HEATING/FUEL OIL

HEATING OIL PRICES (MONTHLY AVERAGE) (25)

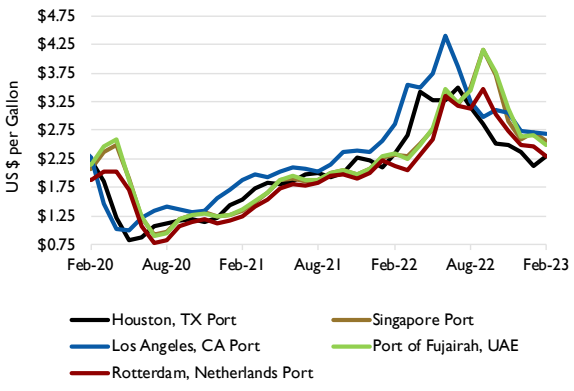


INTERMEDIATE FUEL OIL AKA "BUNKER FUEL" PRICES (MONTHLY AVERAGE) (26)

Intermediate Fuel Oil 380



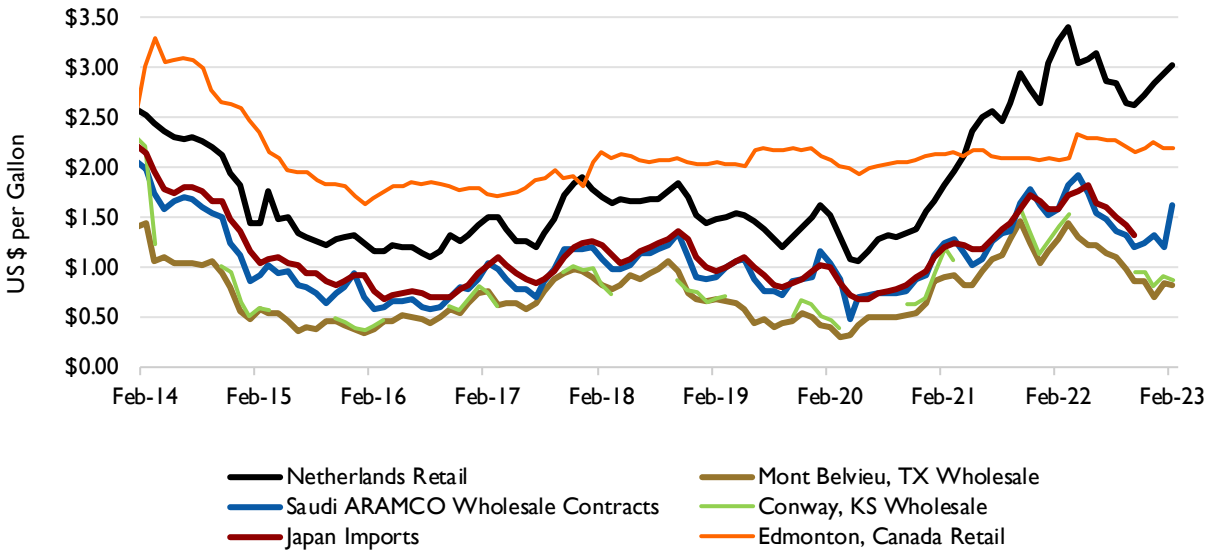
Very Low Sulfur Fuel Oil (VLSFO)



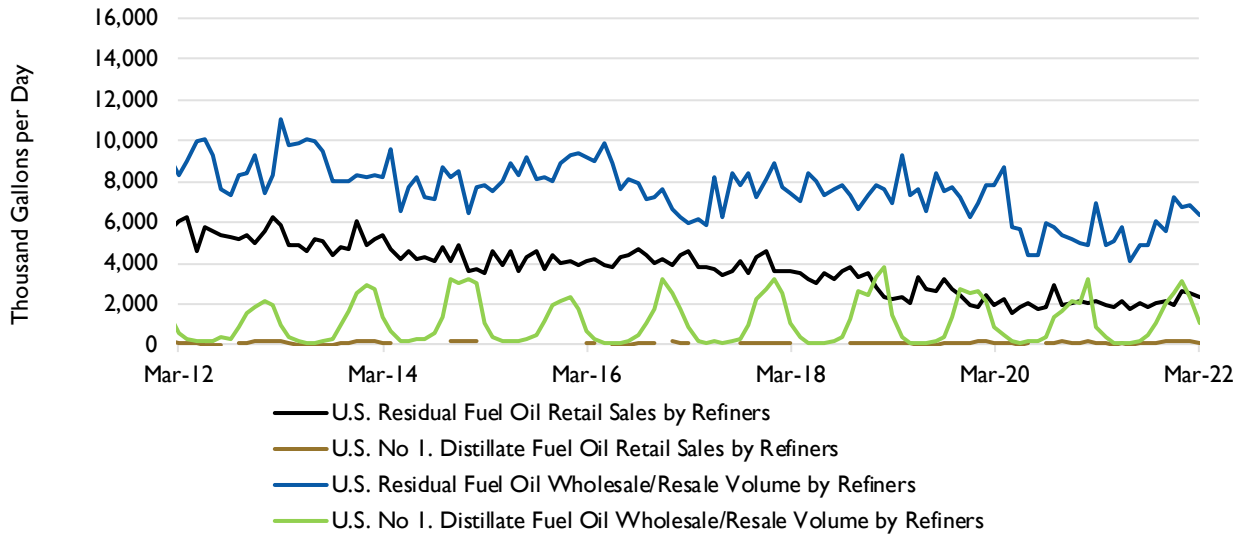
DATA CENTER

PROPANE AND HEATING/FUEL OIL

PROPANE PRICES (MONTHLY AVERAGE) (27)



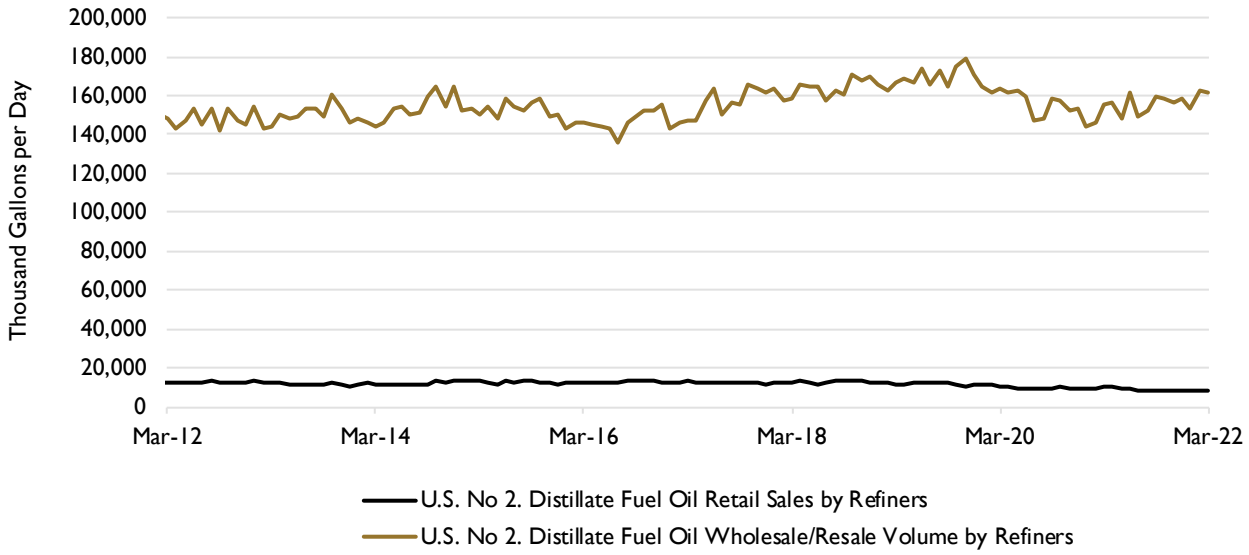
NO. 1 DISTILLATE FUEL OIL, RESIDUAL FUEL OIL WHOLESALE, RETAIL SALES VOLUME BY REFINERS (MONTHLY) (28)



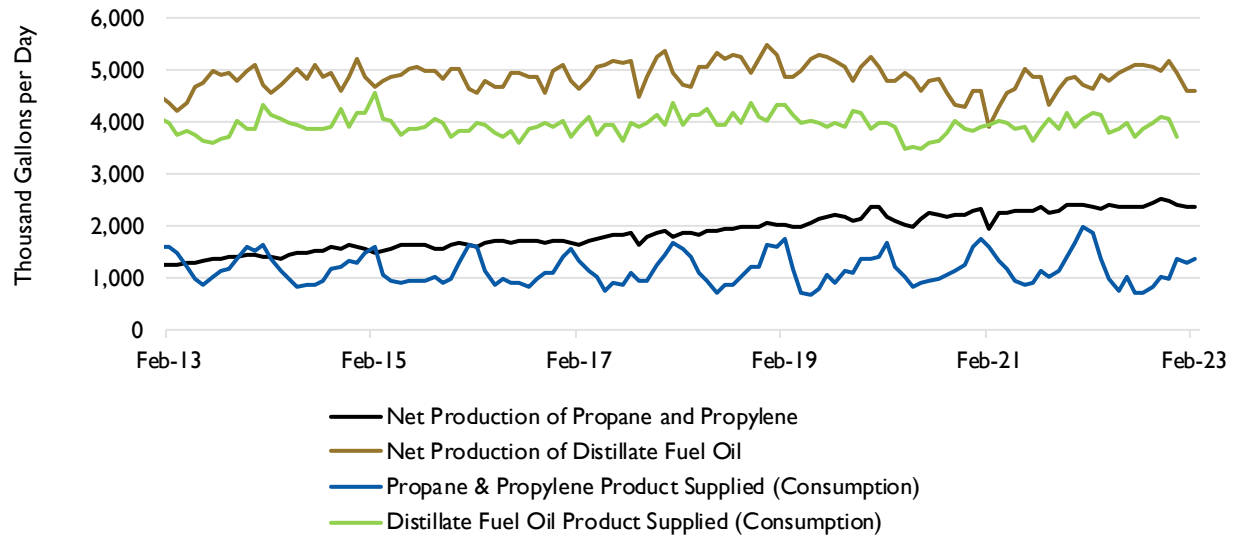
DATA CENTER

PROPANE AND HEATING/FUEL OIL

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



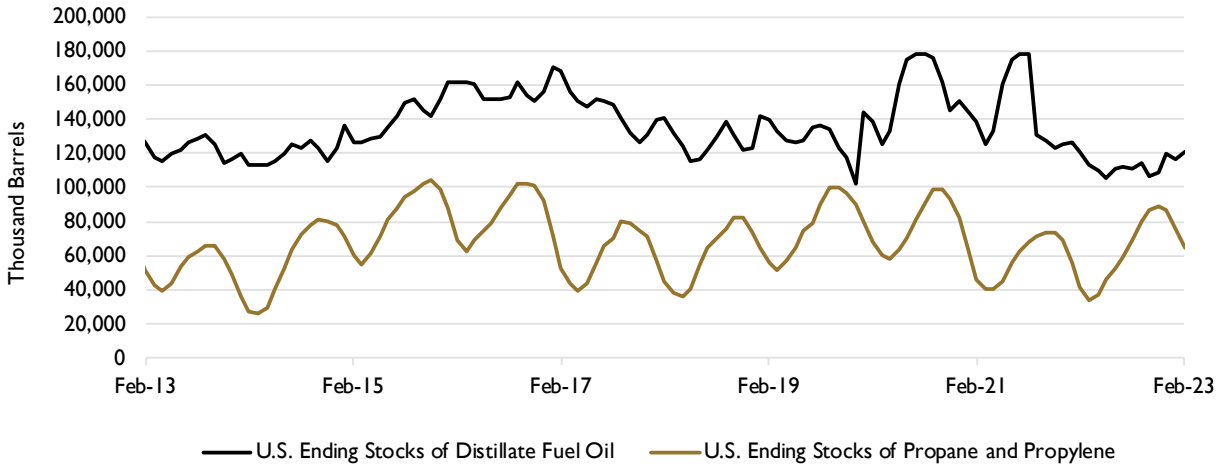
Propane & Propylene and Distillate Fuel Oil Production and Consumption (Monthly) (30)



DATA CENTER

PROPANE AND HEATING/FUEL OIL

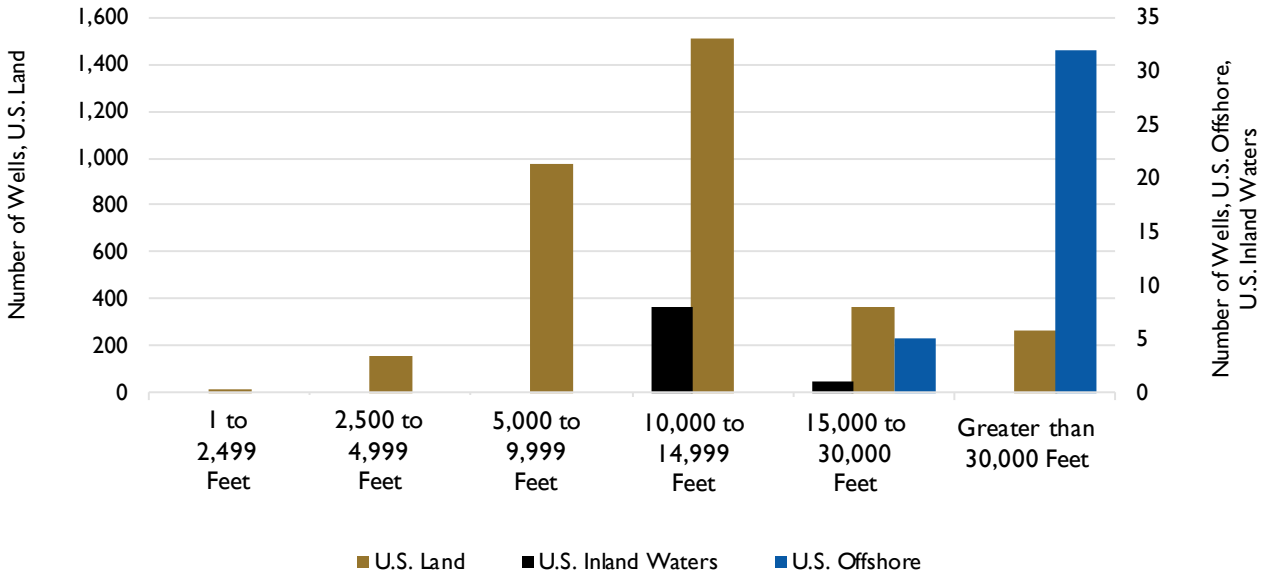
U.S. ENDING STOCKS OF PROPANE & PROPYLENE AND DISTILLATE FUEL OIL (MONTHLY AVERAGE) (31)



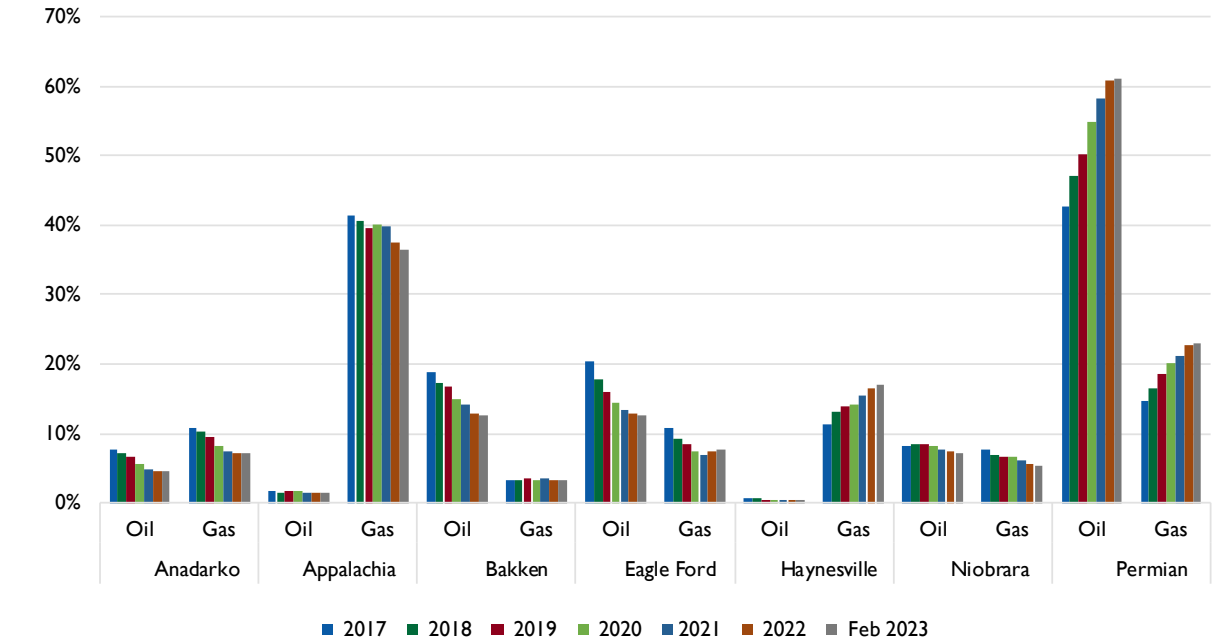
DATA CENTER

DRILLING ACTIVITY

U.S. WELL STARTS BY DEPTH (YEAR TO DATE FEBRUARY 28, 2023) (32)



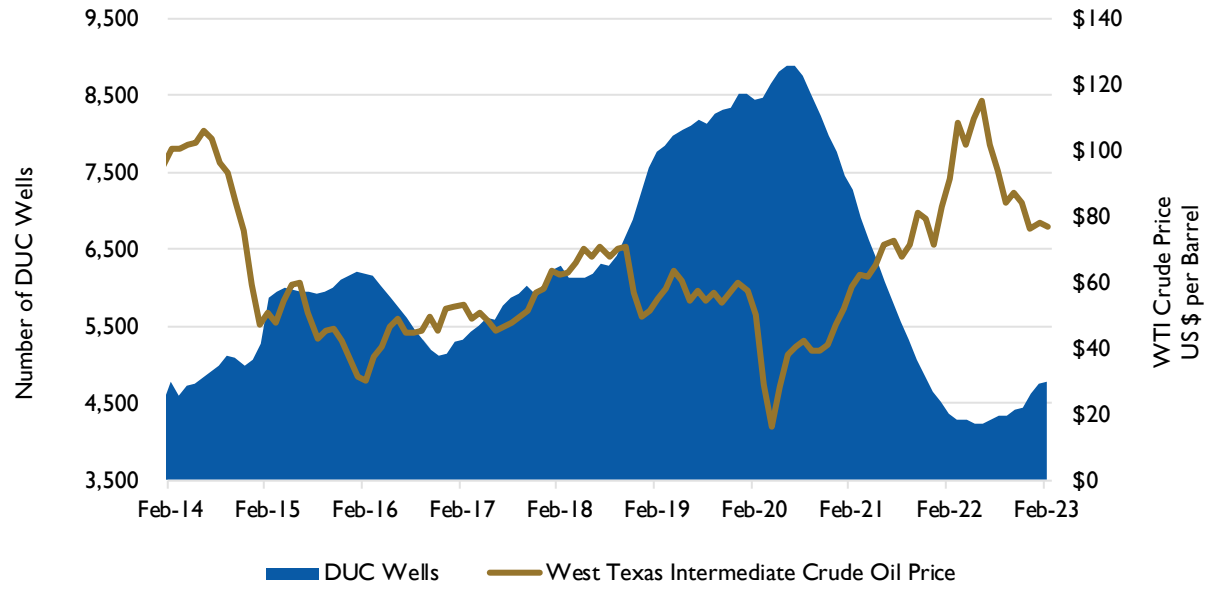
PERCENTAGE OF CRUDE OIL AND NATURAL GAS PRODUCTION PER SHALE REGION (ANNUAL) (33)



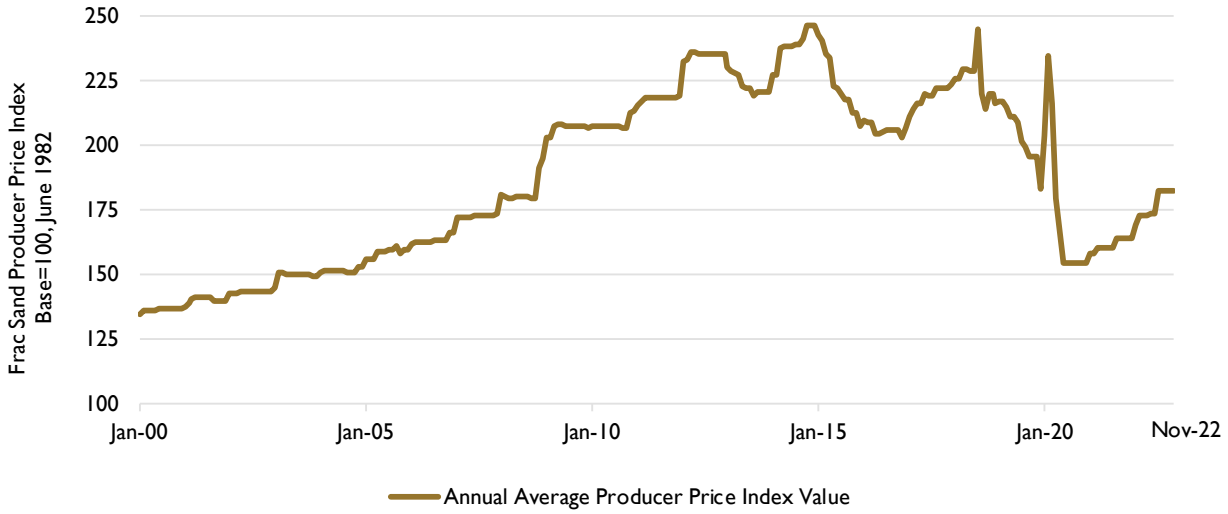
DATA CENTER

DRILLING ACTIVITY

DRILLED BUT UNCOMPLETED (DUC) WELLS VS. CRUDE OIL PRICE (MONTHLY) (34)



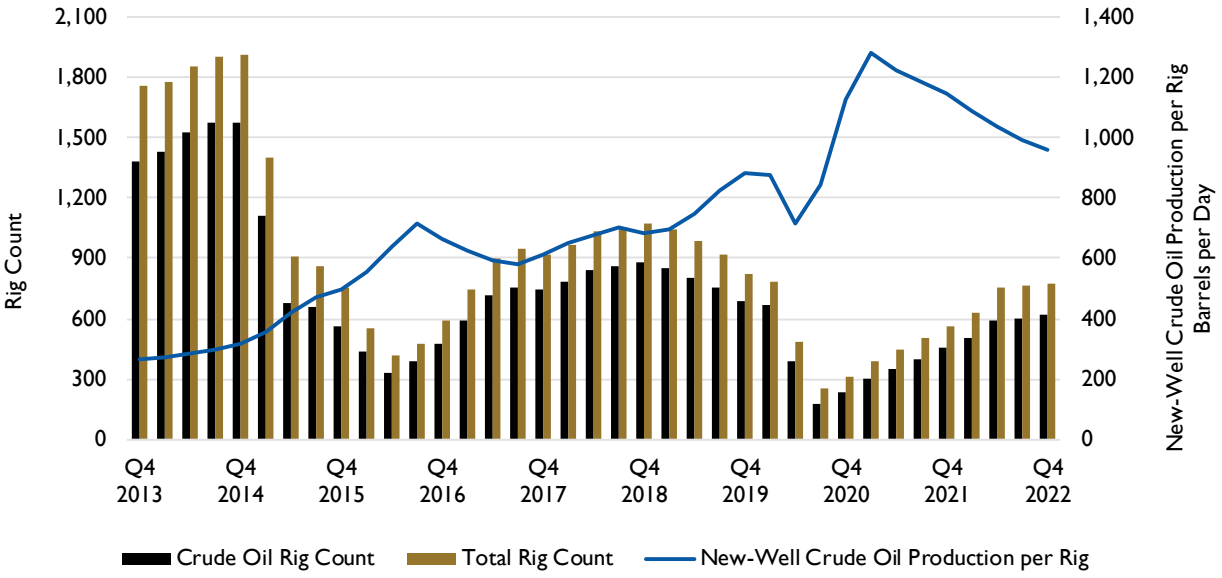
HYDRAULIC FRACTURING SAND PRODUCER PRICE INDEX (MONTHLY) (35)



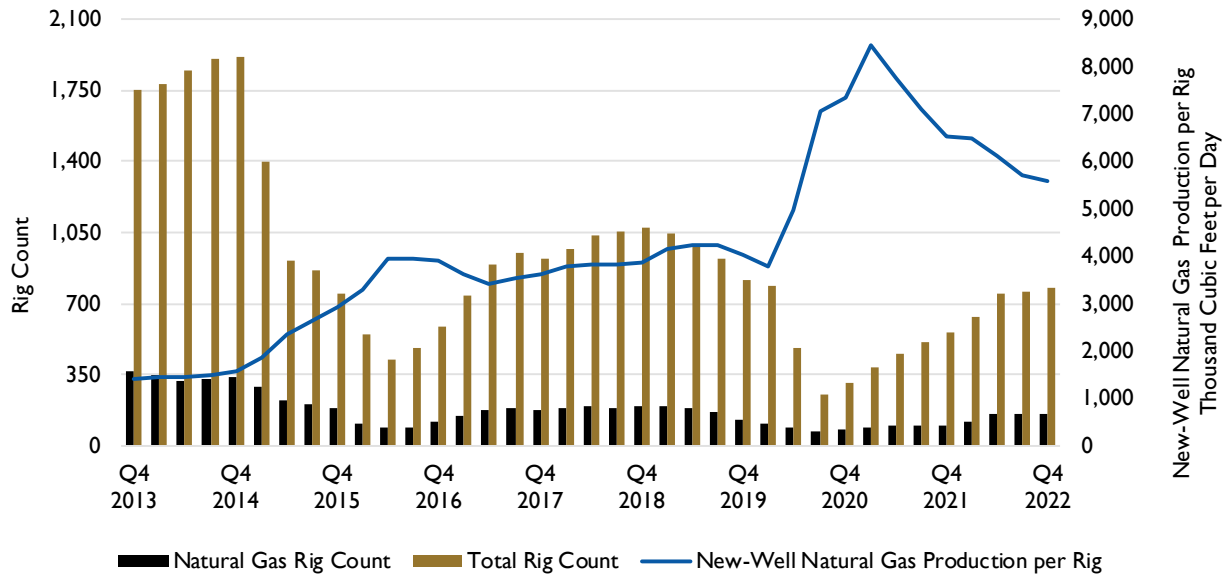
DATA CENTER

DRILLING ACTIVITY

CRUDE OIL PRODUCTION, RIG COUNT AND PRODUCTION PER RIG (QUARTERLY) (36)



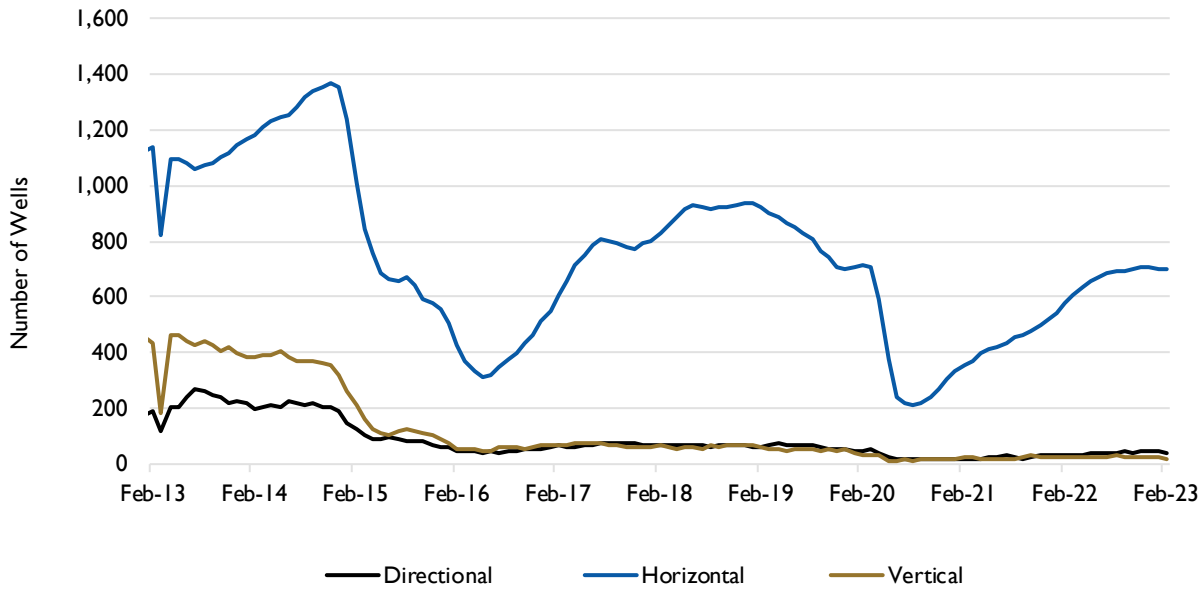
NATURAL GAS PRODUCTION, RIG COUNT AND PRODUCTION PER RIG (QUARTERLY) (37)



DATA CENTER

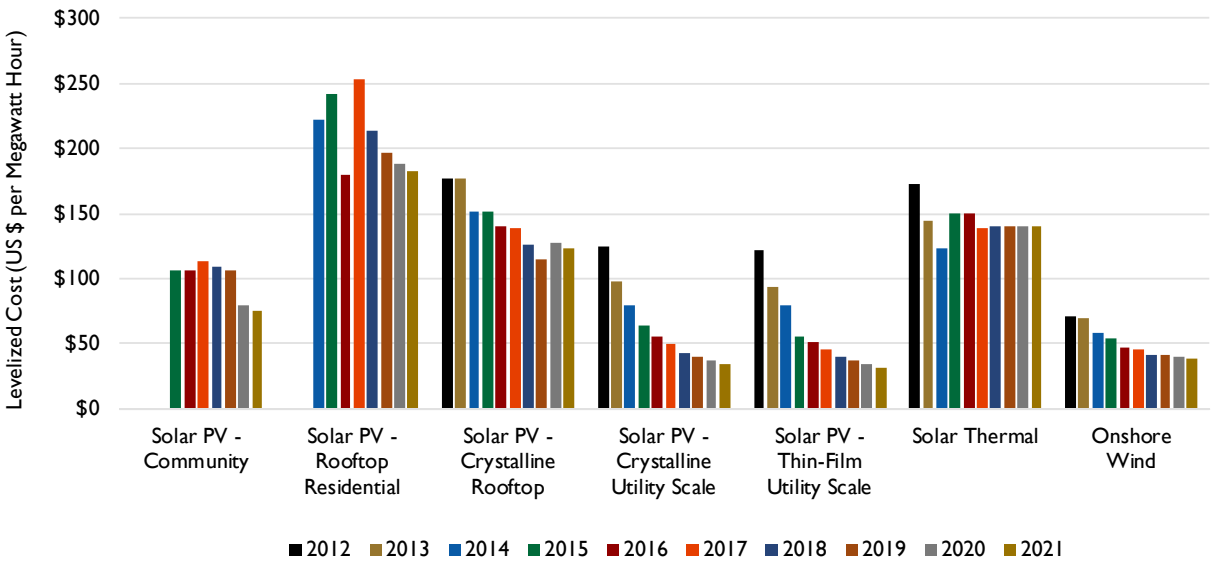
DRILLING ACTIVITY

U.S. DRILLING RIGS BY TYPE (MONTHLY) (38)



RENEWABLES

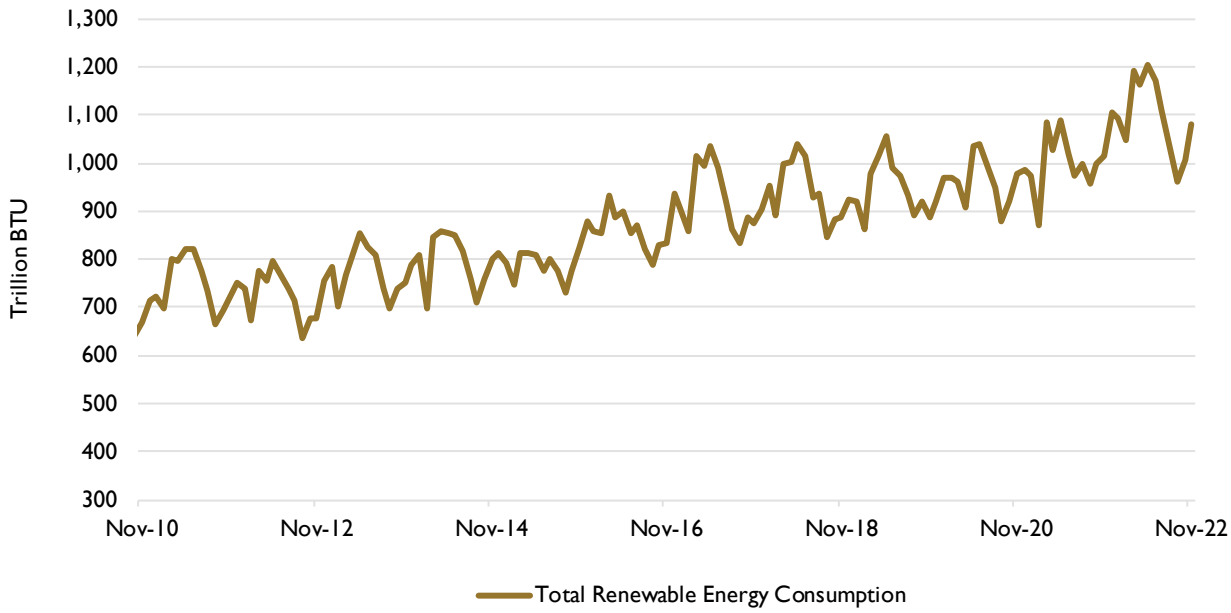
WIND AND SOLAR PRICES (ANNUAL AVERAGE) (39)



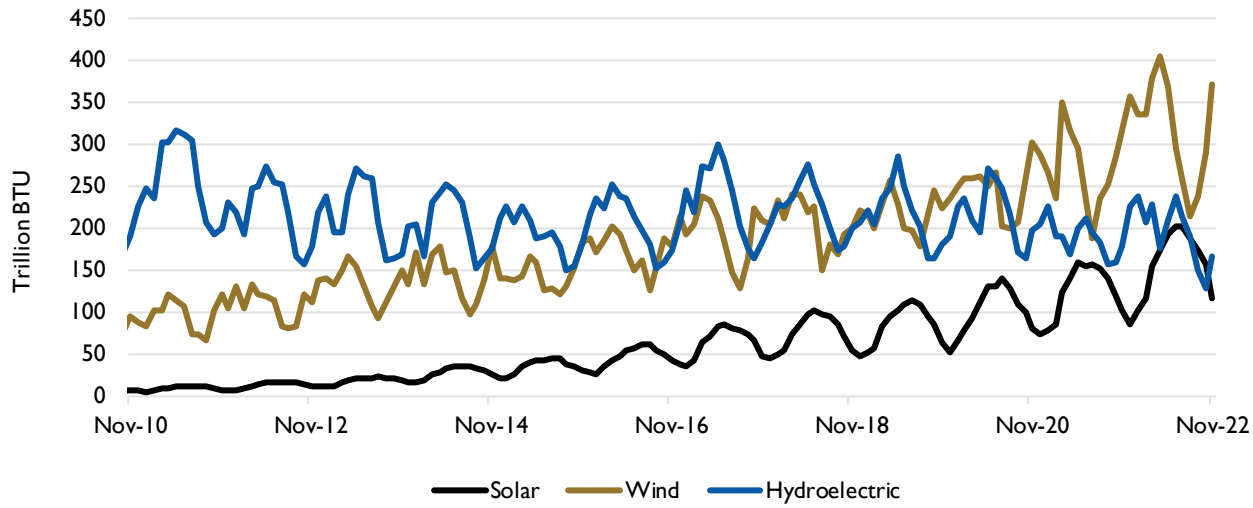
DATA CENTER

RENEWABLES

U.S. TOTAL RENEWABLE ENERGY CONSUMPTION (MONTHLY) (40)



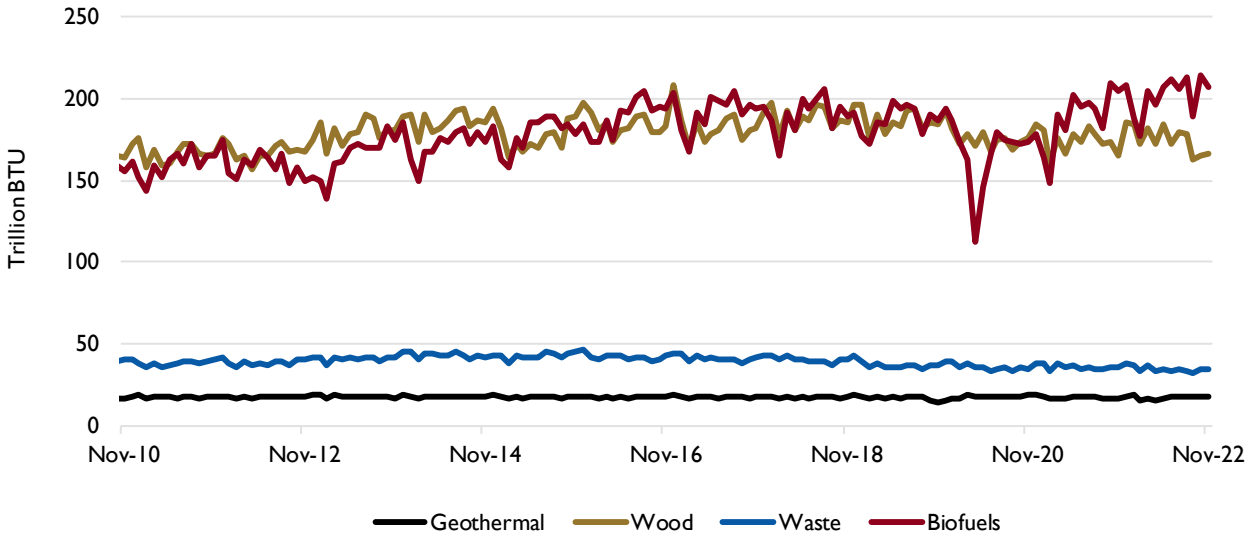
U.S. SOLAR, WIND AND HYRDOELECTRIC ENERGY CONSUMPTION (MONTHLY) (41)



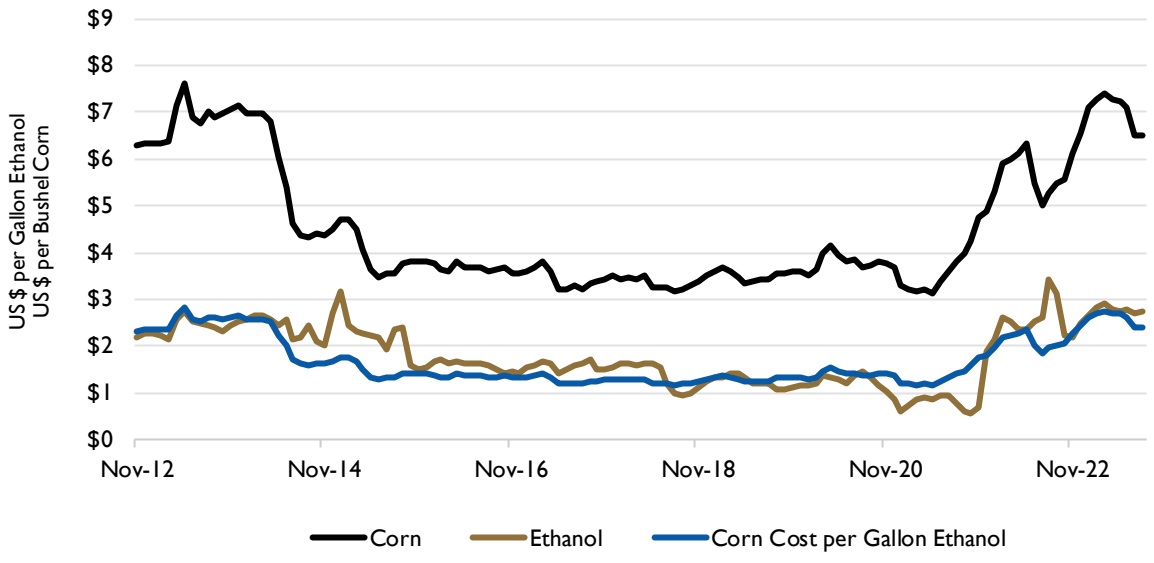
DATA CENTER

RENEWABLES

U.S. WOOD, WASTE, BIOFUELS AND GEOTHERMAL ENERGY CONSUMPTION (MONTHLY) (42)



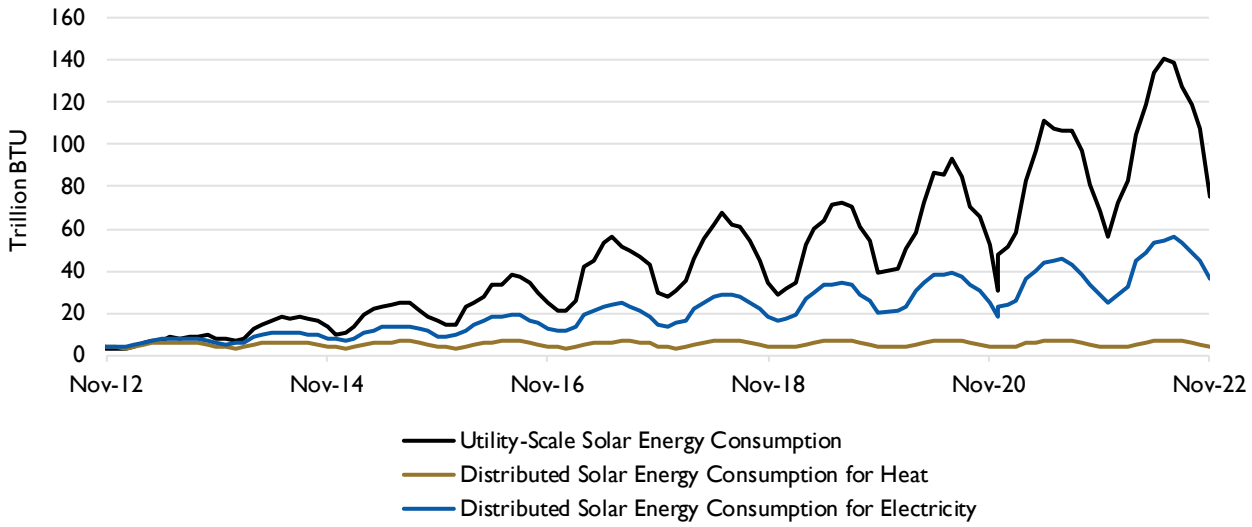
CORN AND ETHANOL PRICES AND CORN COST PER GALLON OF ETHANOL (QUARTERLY) (43)



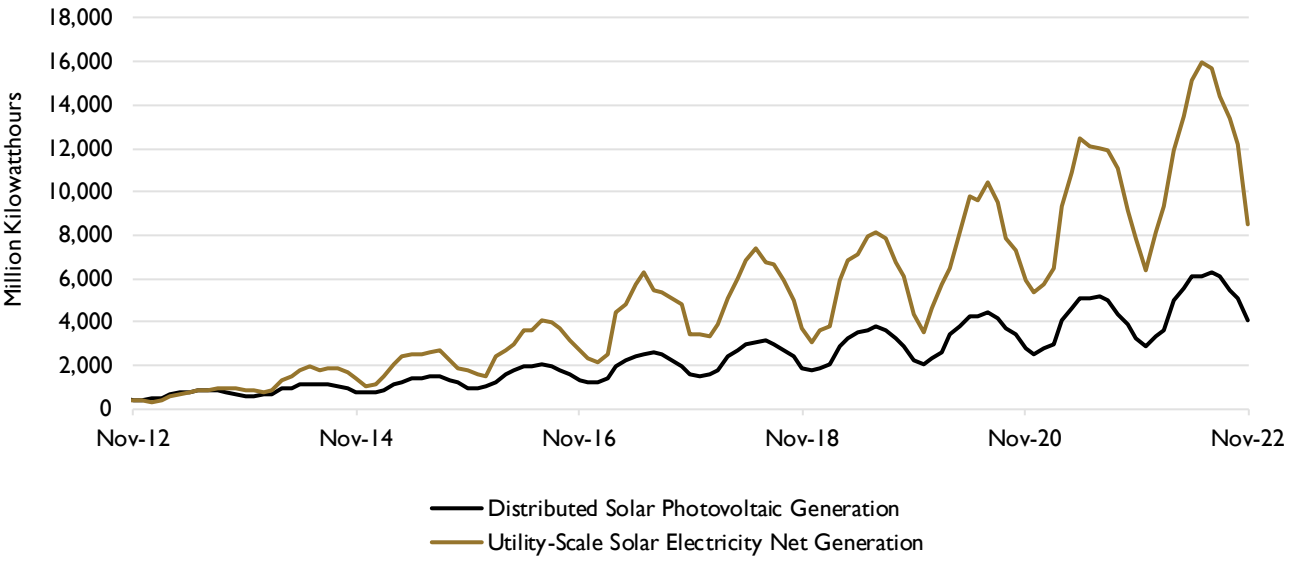
DATA CENTER

RENEWABLES

U.S. Solar Energy Consumption (Monthly) (44)



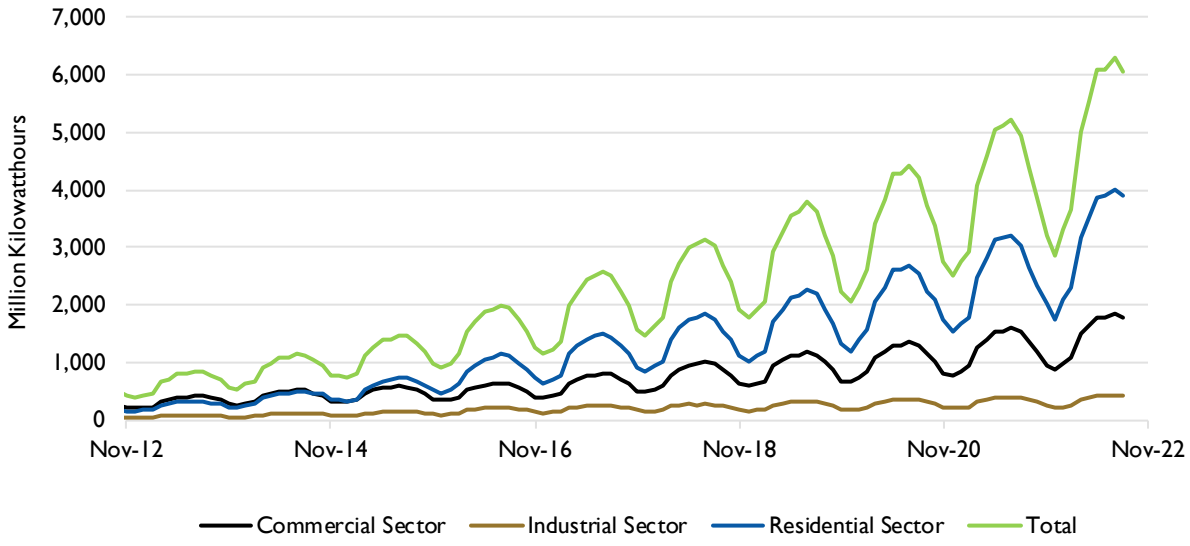
U.S. Solar Energy Net Generation (Monthly) (45)



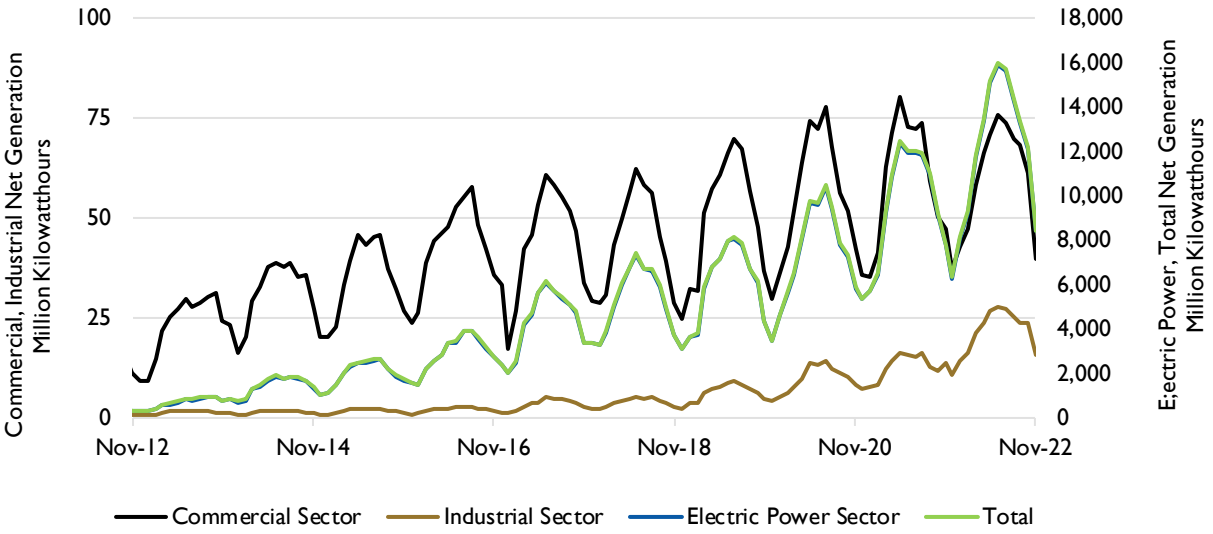
DATA CENTER

RENEWABLES

DISTRIBUTED SOLAR PHOTOVOLTAIC GENERATION BY SECTOR (MONTHLY) (46)



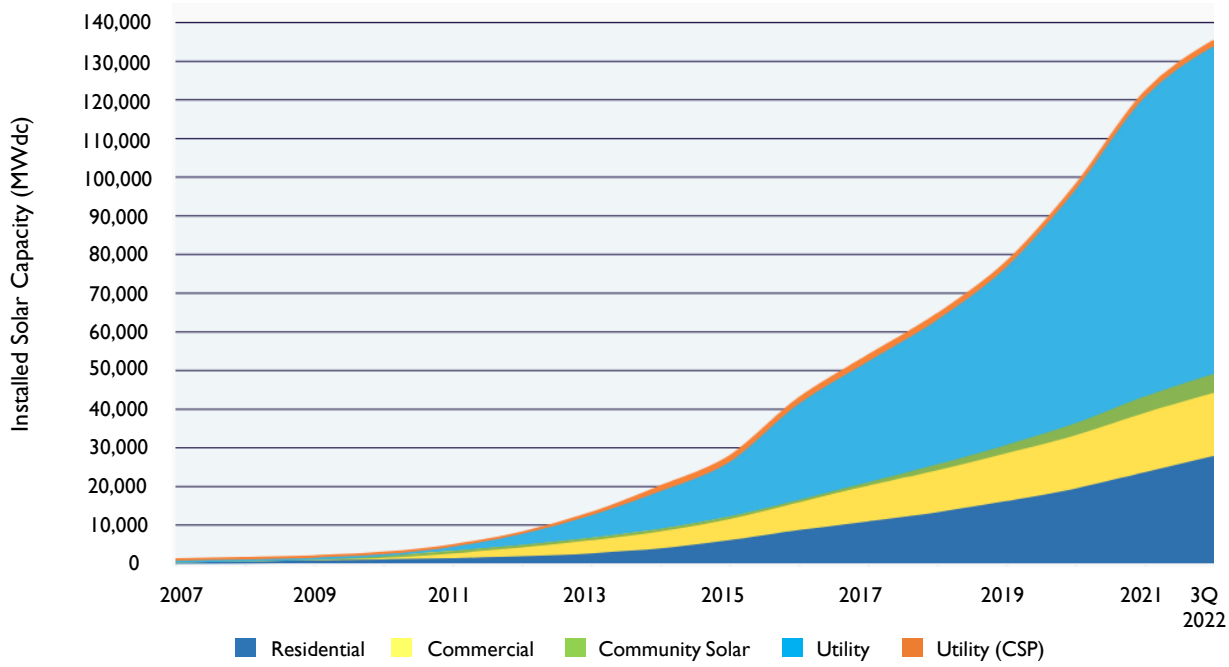
UTILITY-SCALE SOLAR ELECTRICITY NET GENERATION BY SECTOR (MONTHLY) (47)



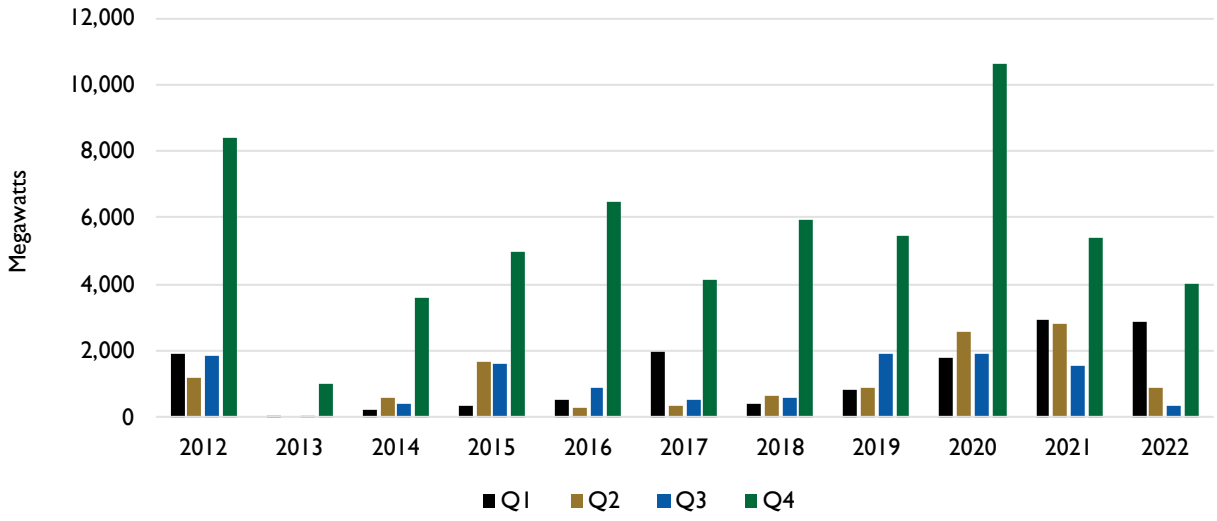
DATA CENTER

RENEWABLES

U.S. Cumulative Solar Installations (Quarterly) (48)



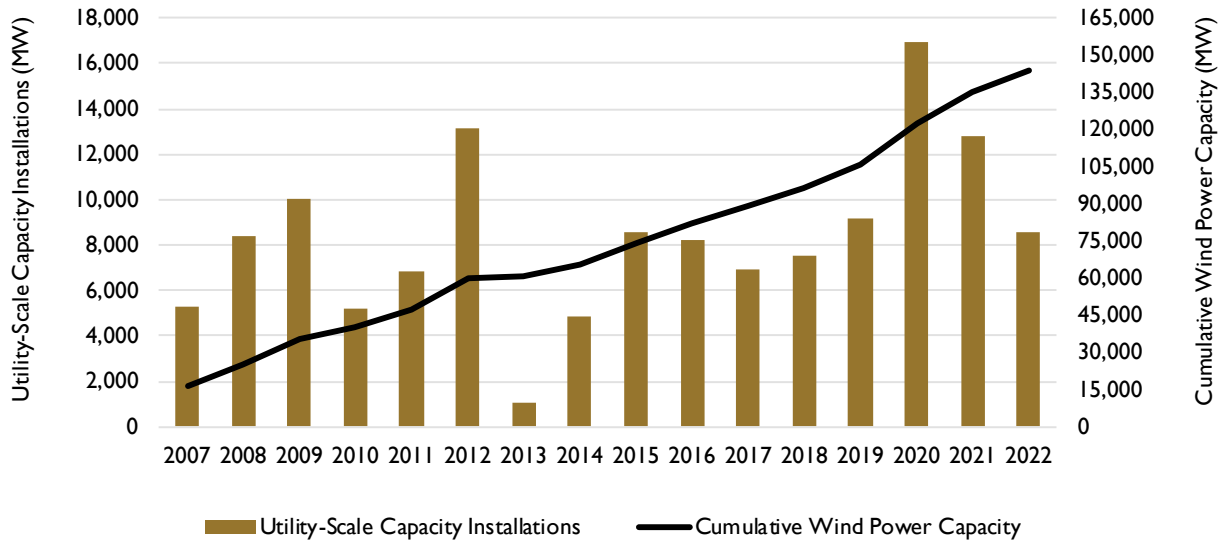
U.S. Wind Power Capacity Installations (Quarterly) (49)



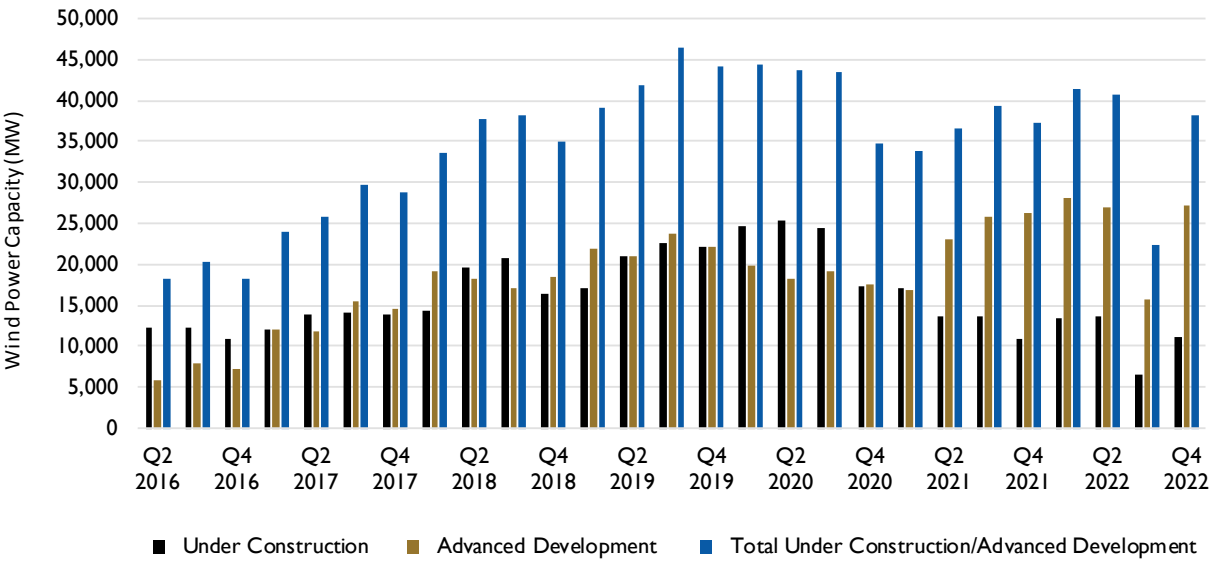
DATA CENTER

RENEWABLES

UTILITY-SCALE WIND POWER CAPACITY INSTALLATIONS (QUARTERLY) (50)



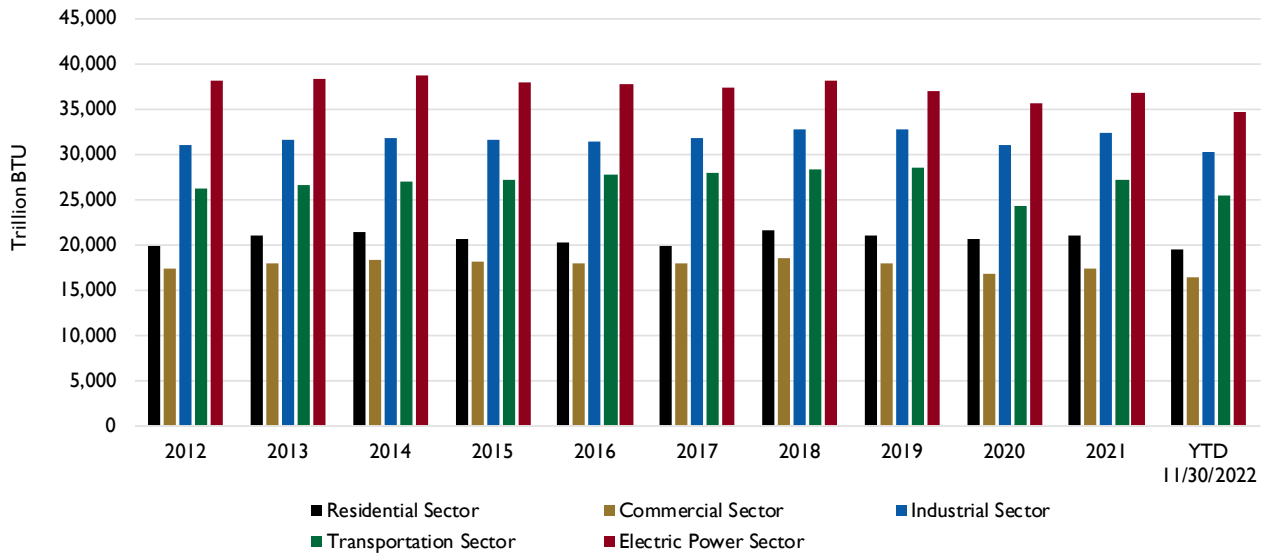
WIND POWER UNDER CONSTRUCTION OR IN ADVANCED DEVELOPMENT (QUARTERLY) (51)



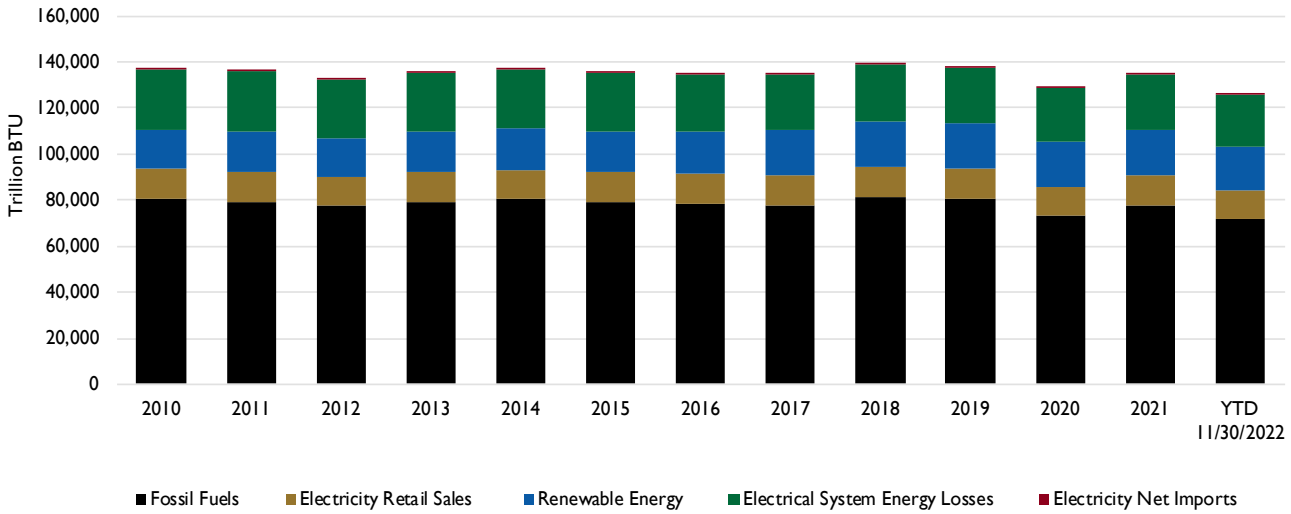
DATA CENTER

U.S. AGGREGATED ENERGY CONSUMPTION

Energy Consumption by Sector (Annual) (52)



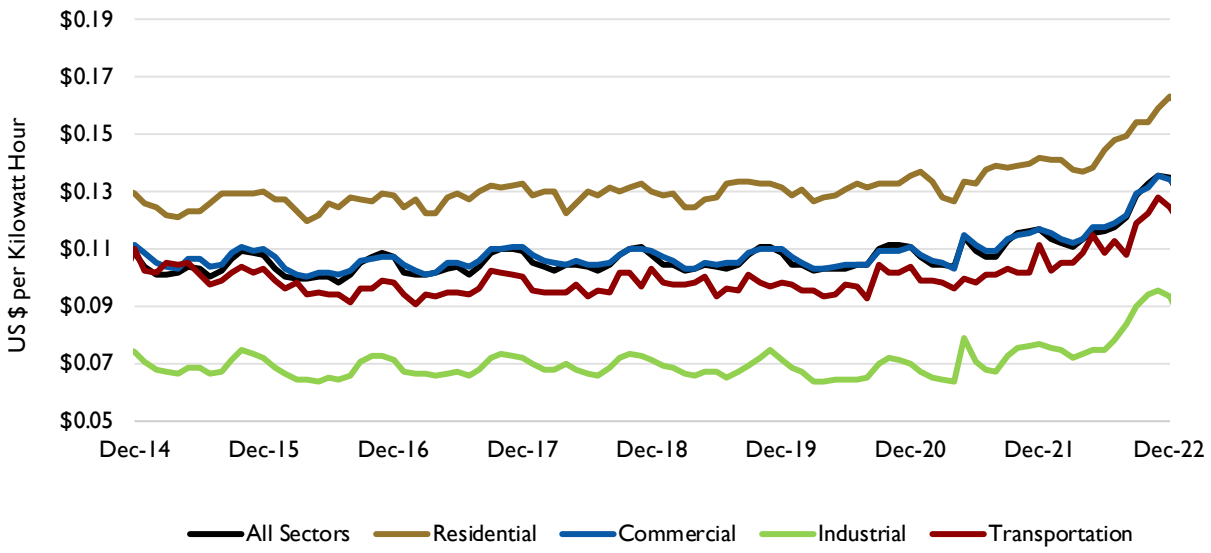
Energy Consumption by Source (Annual) (53)



DATA CENTER

U.S. AGGREGATED ENERGY CONSUMPTION

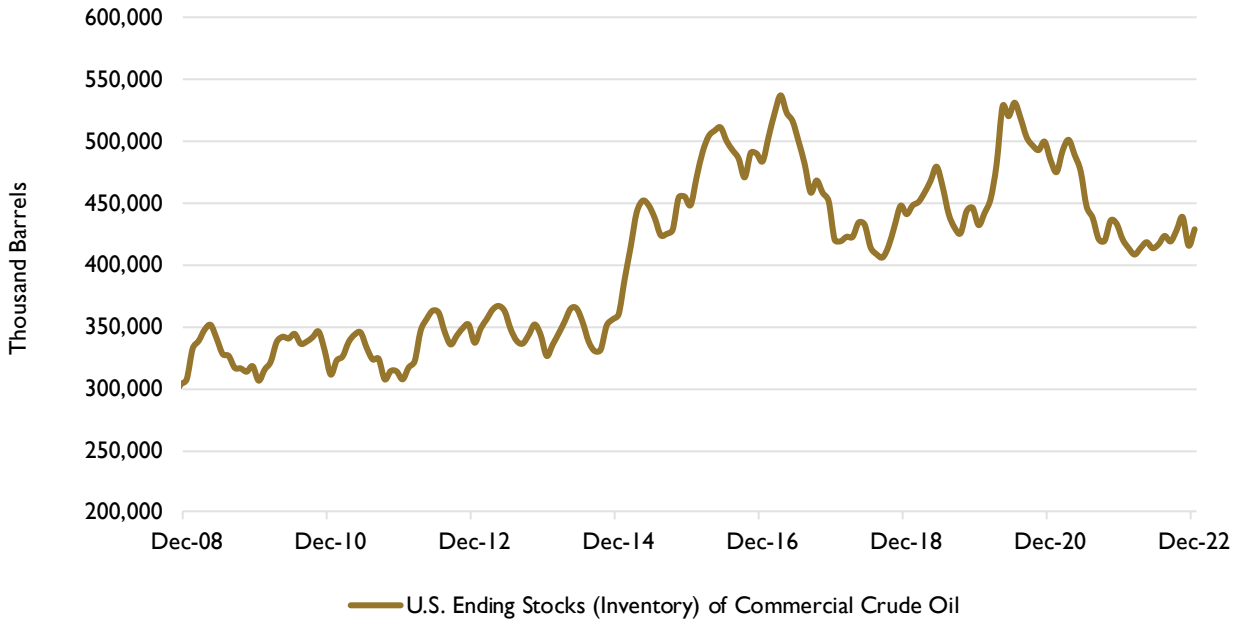
ELECTRICITY PRICES BY SECTOR (MONTHLY AVERAGE) (54)



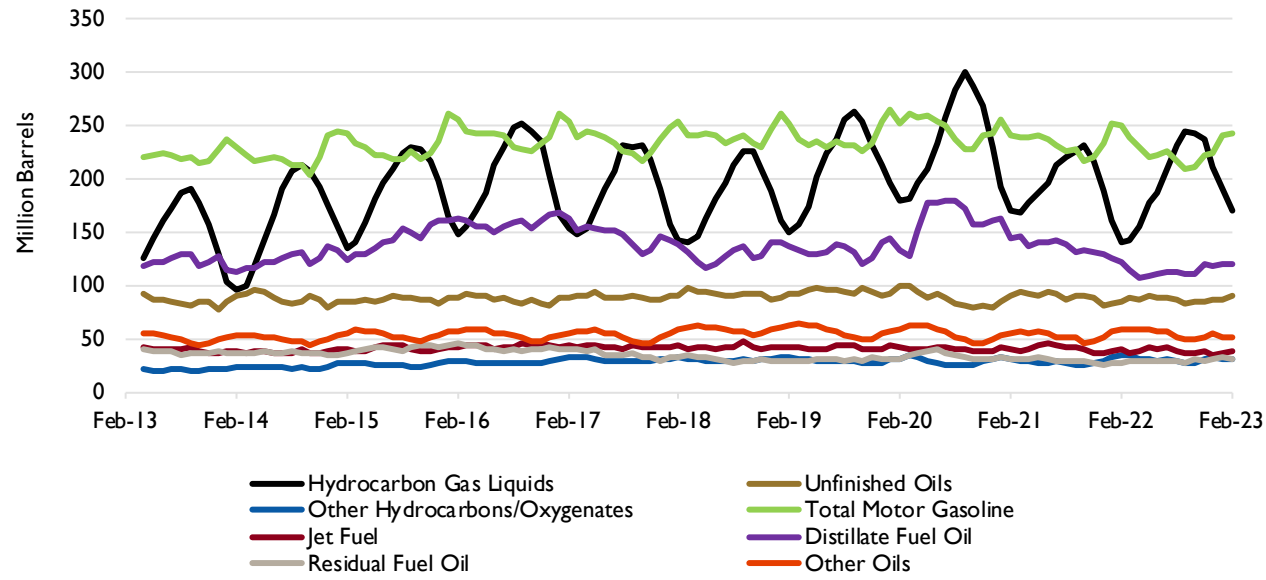
DATA CENTER

LOGISTICS - STORAGE AND TERMINALS

COMMERCIAL CRUDE OIL INVENTORY (MONTHLY) (55)



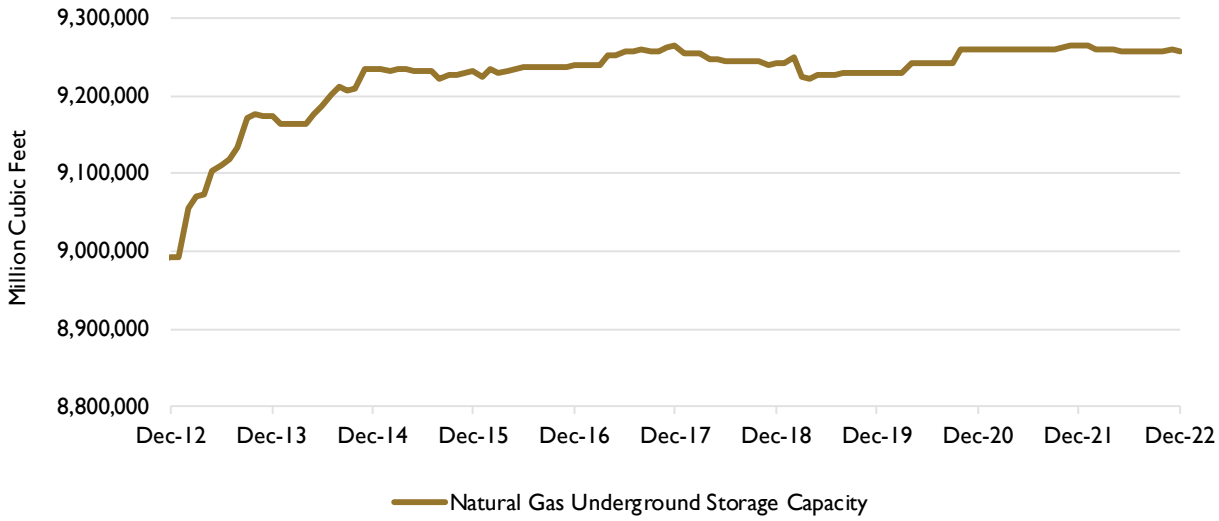
PETROLEUM AND OTHER LIQUIDS COMMERCIAL INVENTORY (MONTHLY) (56)



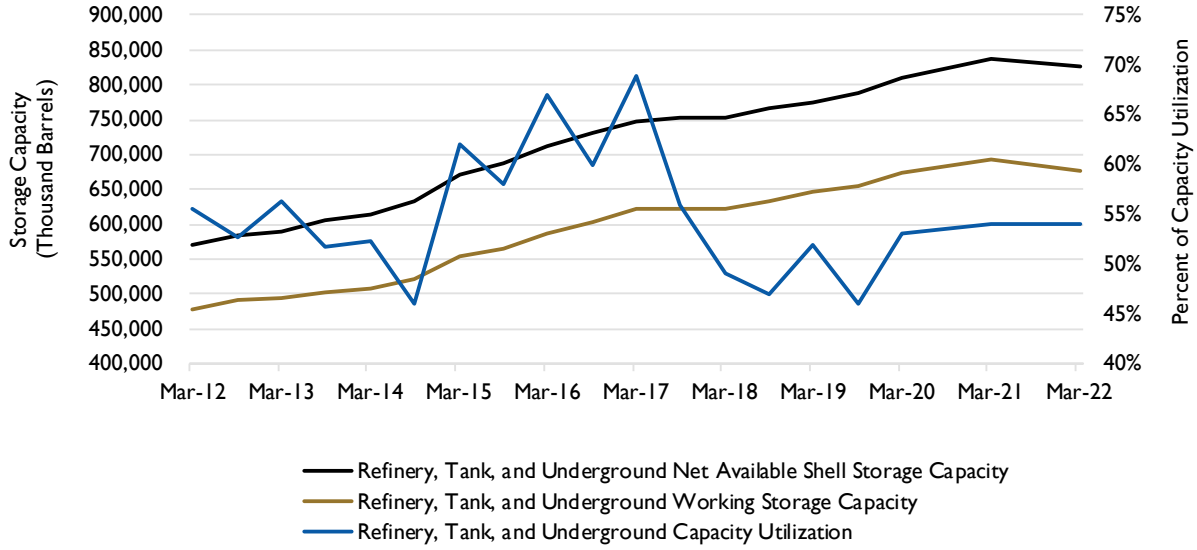
DATA CENTER

LOGISTICS - STORAGE AND TERMINALS

NATURAL GAS UNDERGROUND STORAGE CAPACITY (MONTHLY) (57)



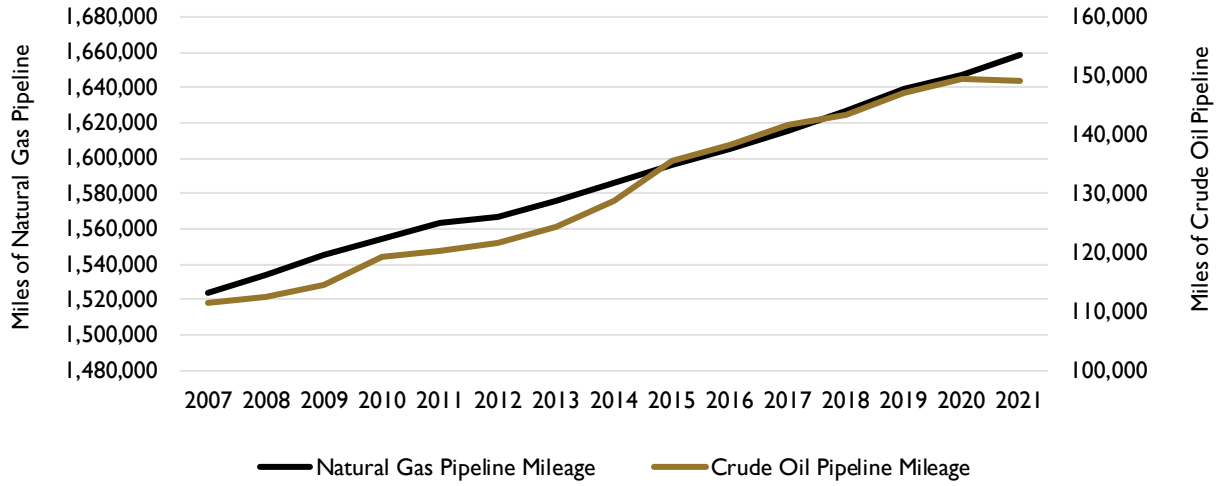
COMMERCIAL CRUDE OIL REFINERY, TANK AND UNDERGROUND STORAGE CAPACITY AND UTILIZATION (ANNUAL) (58)



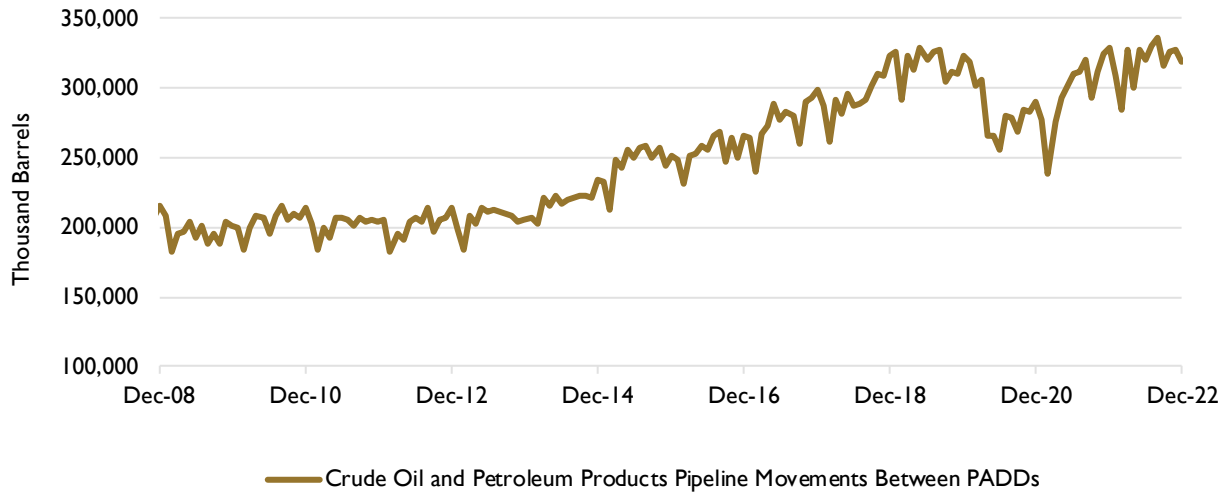
DATA CENTER

LOGISTICS - PIPELINES

CRUDE OIL AND NATURAL GAS PIPELINE MILEAGE (ANNUAL) (59)



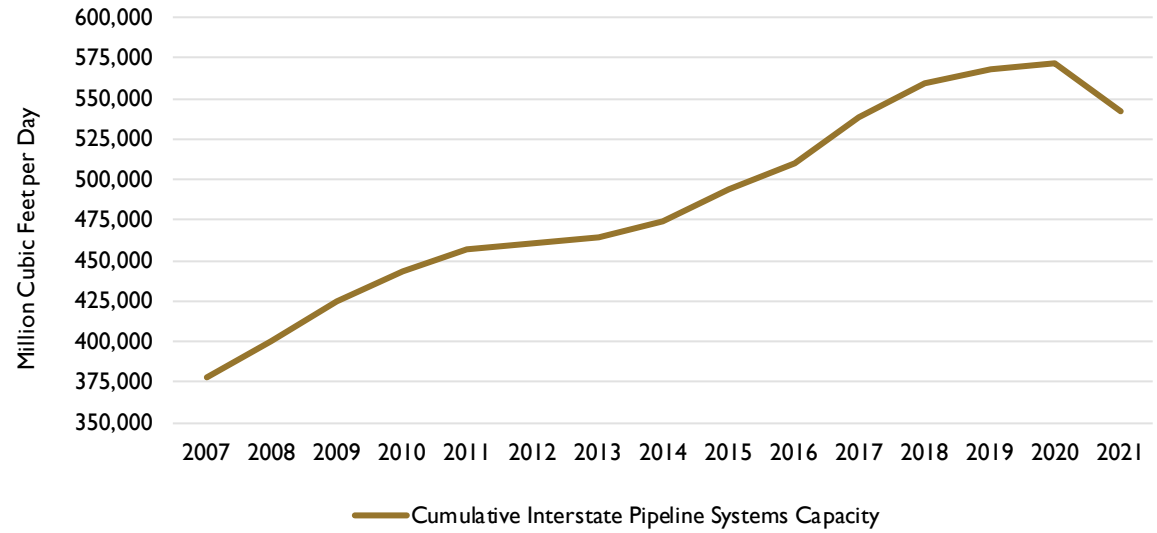
CRUDE OIL AND PETROLEUM PRODUCTS PIPELINE MOVEMENTS BETWEEN PETROLEUM ADMINISTRATION FOR DEFENSE DISTRICTS (PADDS) (MONTHLY) (60)



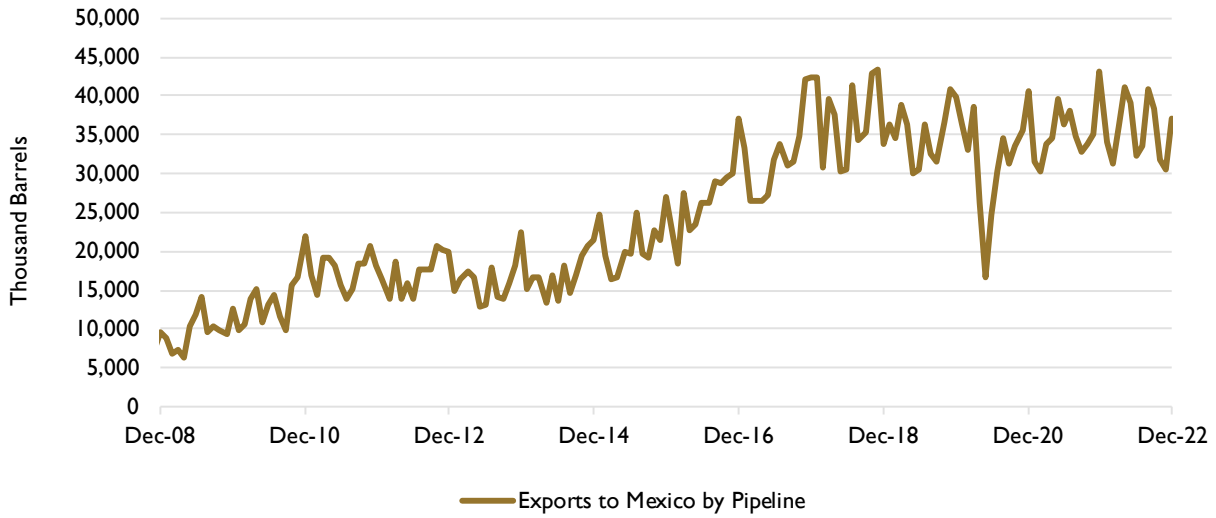
DATA CENTER

LOGISTICS - PIPELINES

NATURAL GAS CUMULATIVE INTERSTATE PIPELINE SYSTEMS CAPACITY (ANNUAL) (61)



CRUDE OIL AND PETROLEUM PRODUCTS EXPORTS TO MEXICO (MONTHLY) (62)

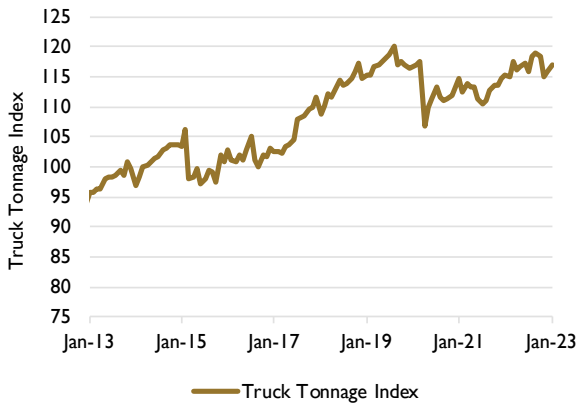


DATA CENTER

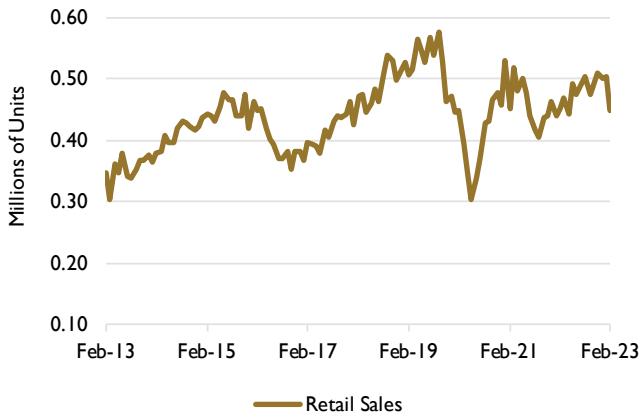
LOGISTICS - TRUCKERS

TRUCK TONNAGE INDEX (MONTHLY) (63)

MEASURES GROSS TONNAGE OF FREIGHT

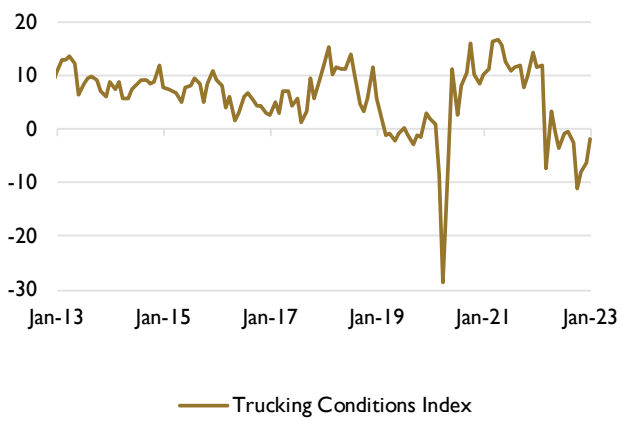


HEAVY TRUCK SALES (MONTHLY) (64)



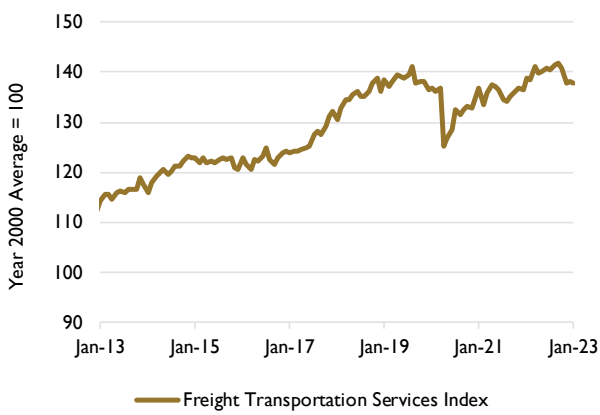
TRUCKING CONDITIONS INDEX (MONTHLY) (65)

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



FREIGHT TRANSPORTATION SERVICES INDEX (MONTHLY) (66)

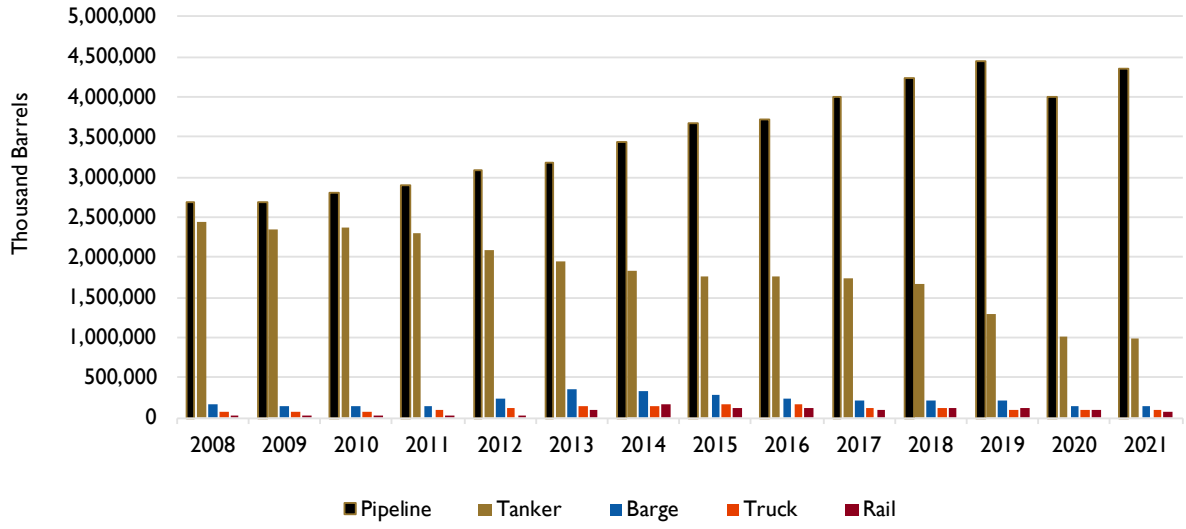
INCLUDES TRUCKING, RAIL, WATERWAYS, PIPELINES AND AIR FRIGHT



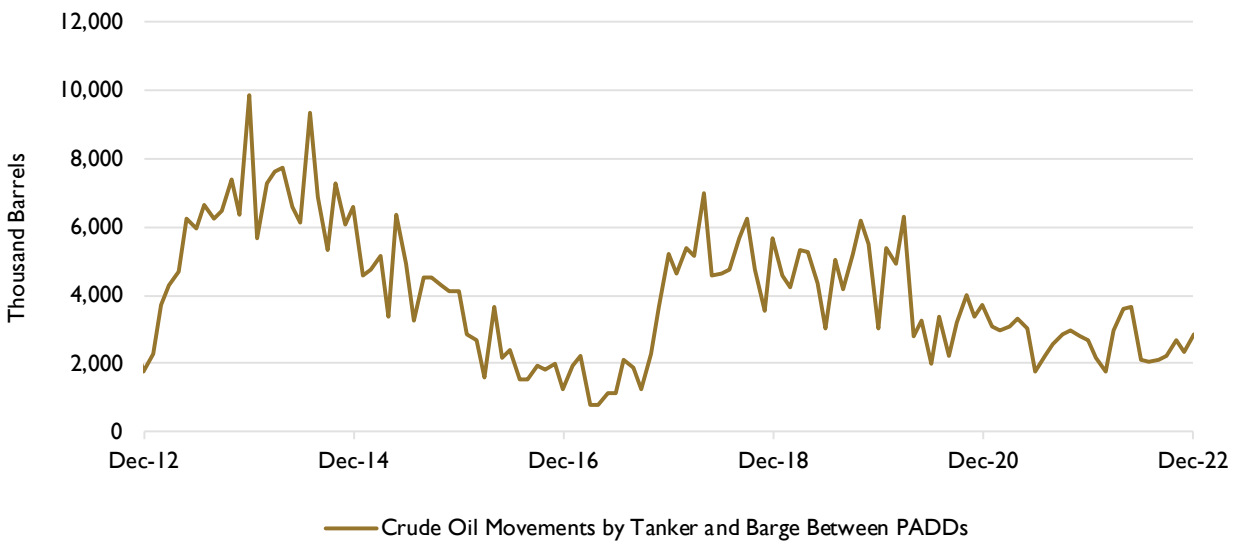
DATA CENTER

LOGISTICS - SHIPPING

CRUDE OIL REFINERY RECEIPTS BY TRANSPORTATION METHOD (ANNUAL) (67)



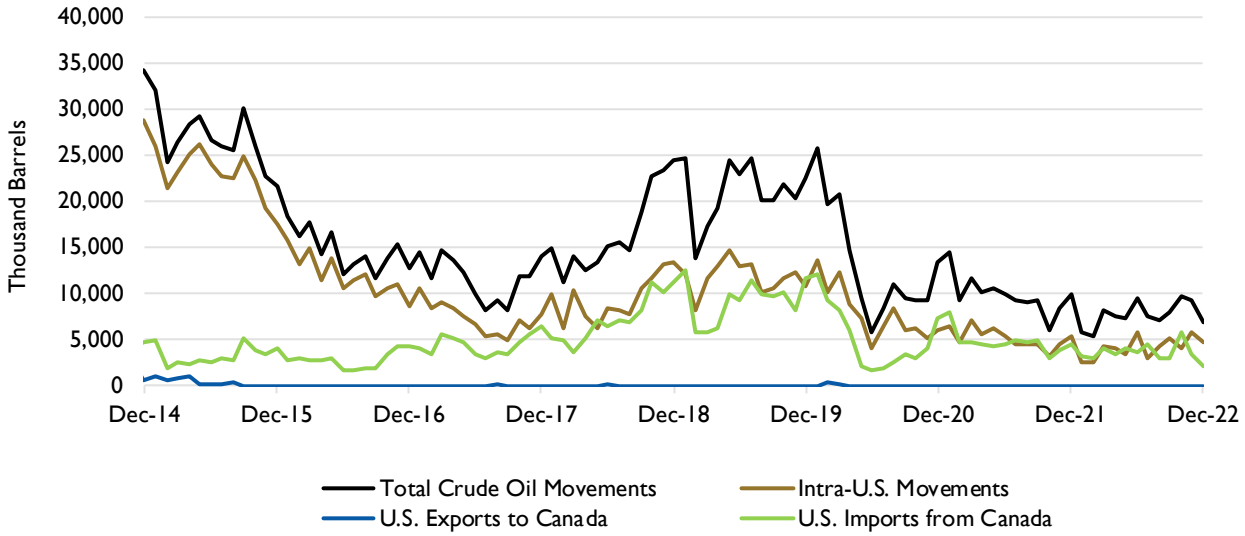
CRUDE OIL MOVEMENTS BY TANKER AND BARGE BETWEEN PETROLEUM ADMINISTRATION FOR DEFENSE DISTRICTS (PADDS) (MONTHLY) (68)



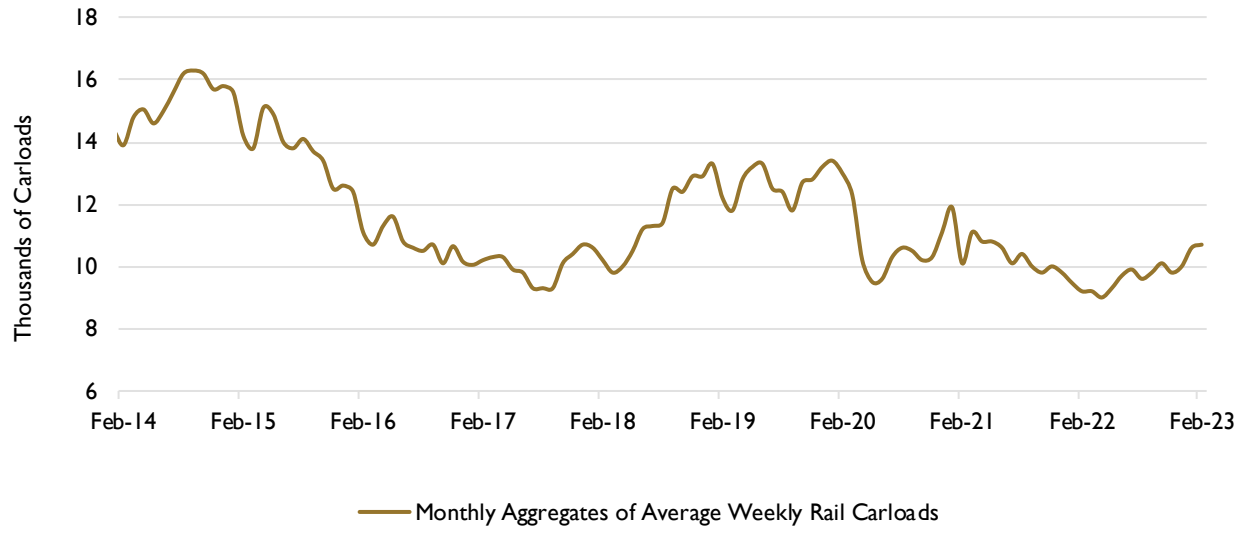
DATA CENTER

LOGISTICS - RAIL

MOVEMENTS OF CRUDE OIL BY RAIL (MONTHLY) (69)



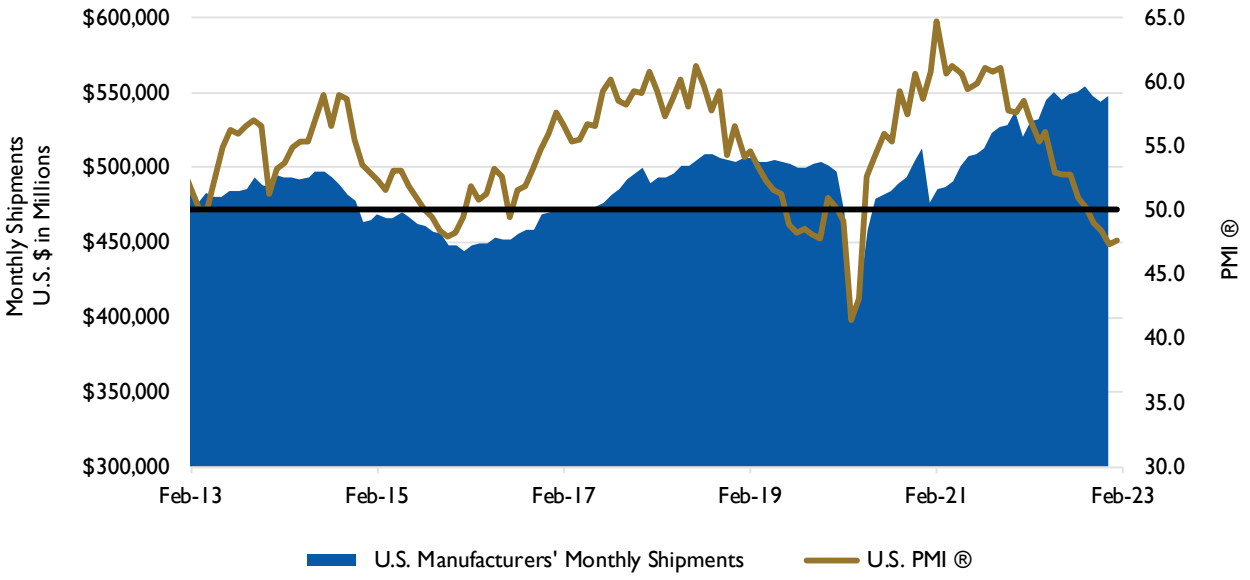
AVERAGE WEEKLY RAIL CARLOADS OF PETROLEUM AND PETROLEUM PRODUCTS (MONTHLY AGGREGATE) (70)



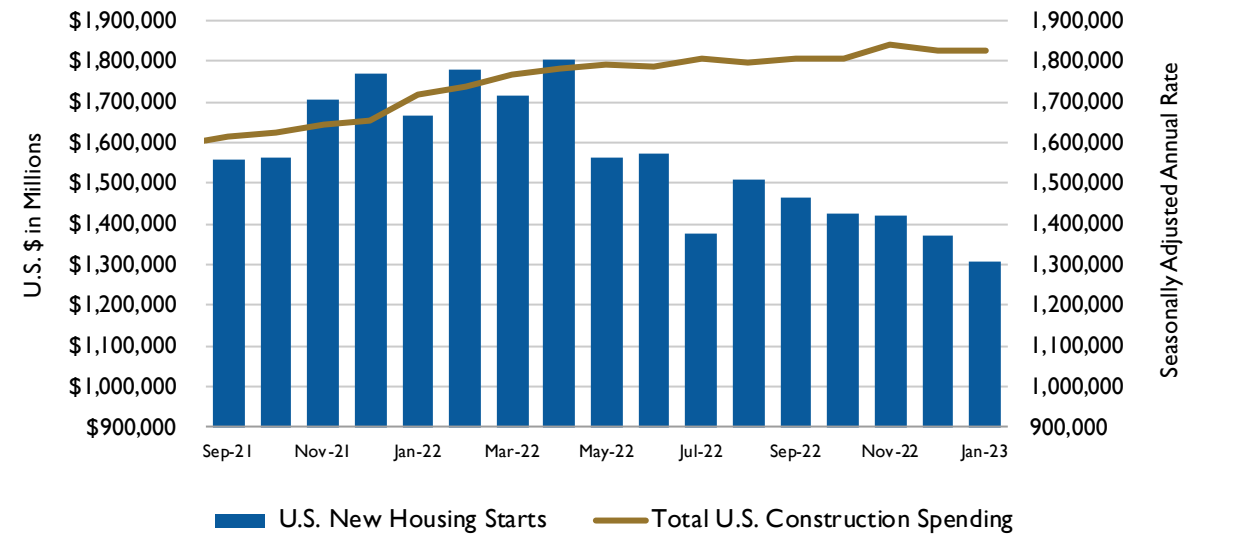
DATA CENTER

ECONOMIC / FINANCIAL

U.S. MANUFACTURERS' MONTHLY SHIPMENTS AND U.S. PURCHASING MANAGERS' INDEX (PMI®) (MONTHLY) (71)



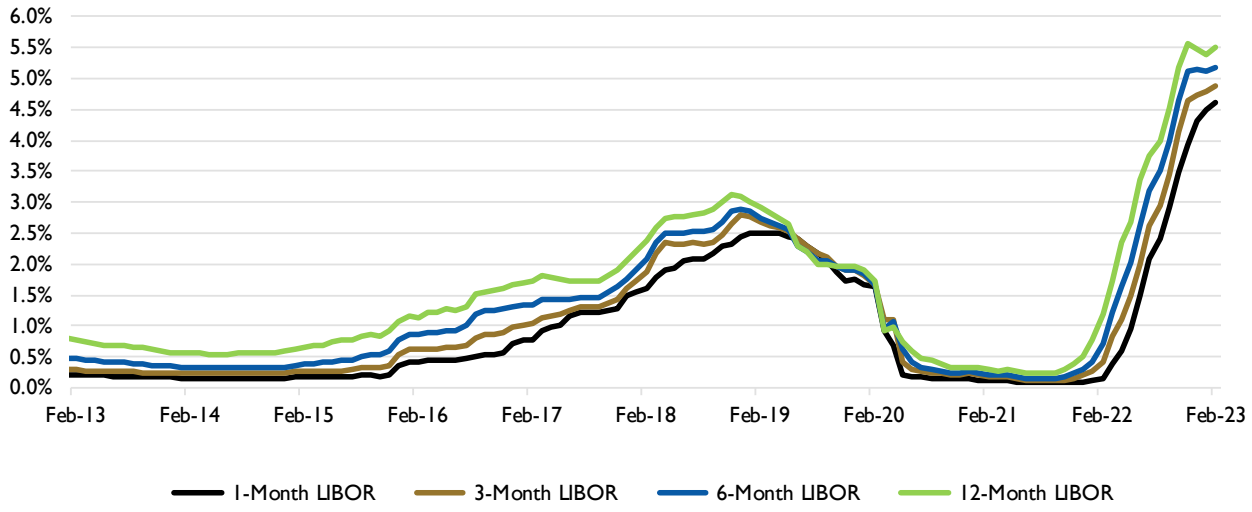
U.S. NEW HOUSING STARTS AND TOTAL U.S. CONSTRUCTION SPENDING (MONTHLY) (72)



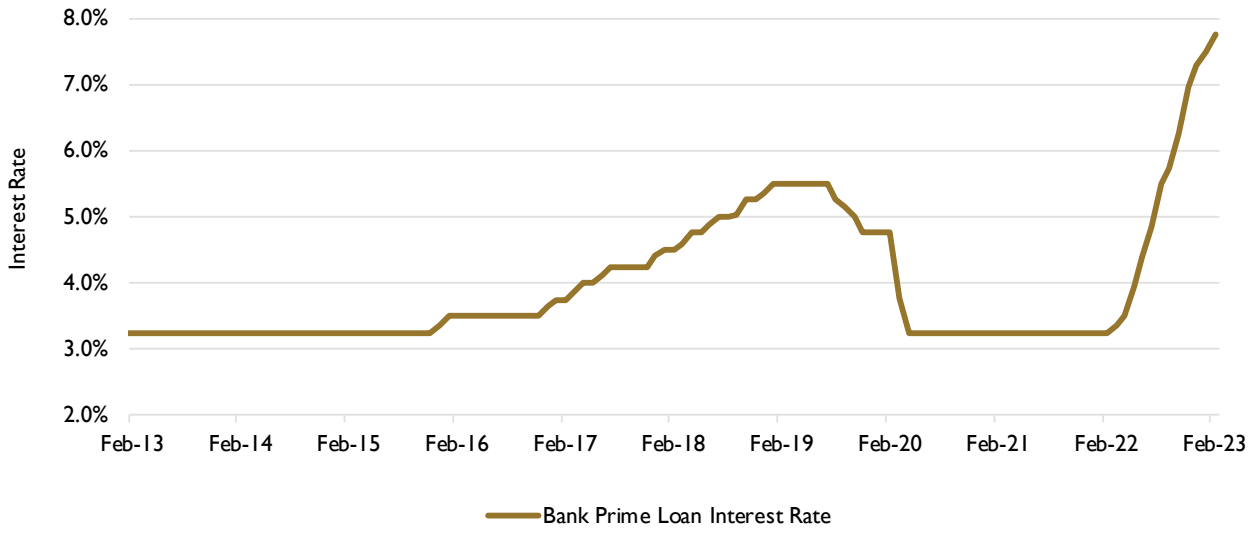
DATA CENTER

ECONOMIC / FINANCIAL

LONDON INTERBANK OFFERED RATE (LIBOR) (MONTHLY AVERAGE) BASED ON U.S. DOLLAR (73)



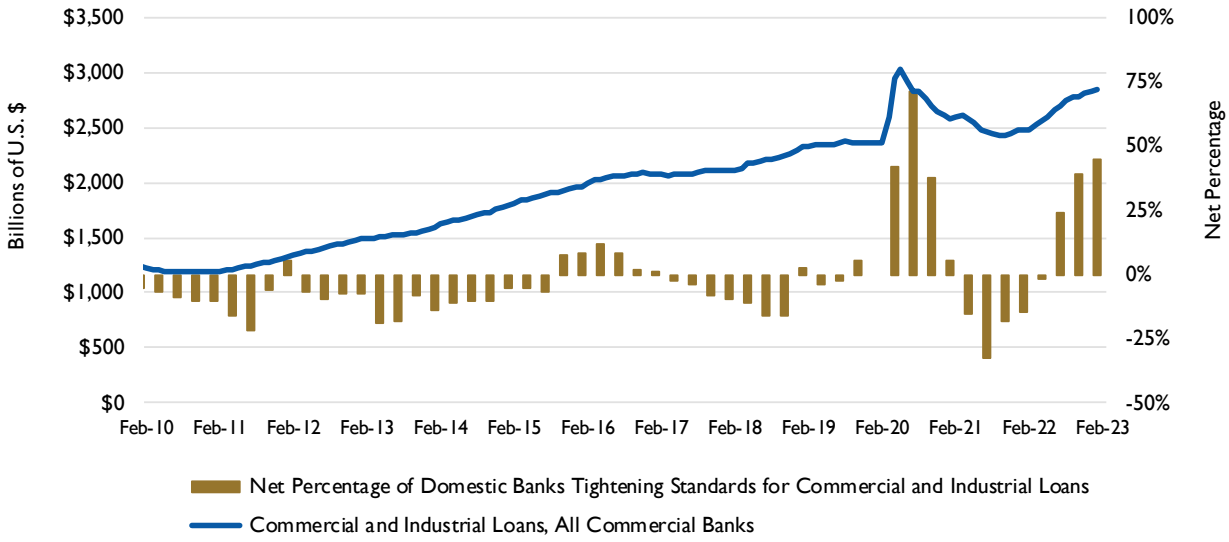
BANK PRIME LOAN INTEREST RATES (MONTHLY AVERAGE) (74)



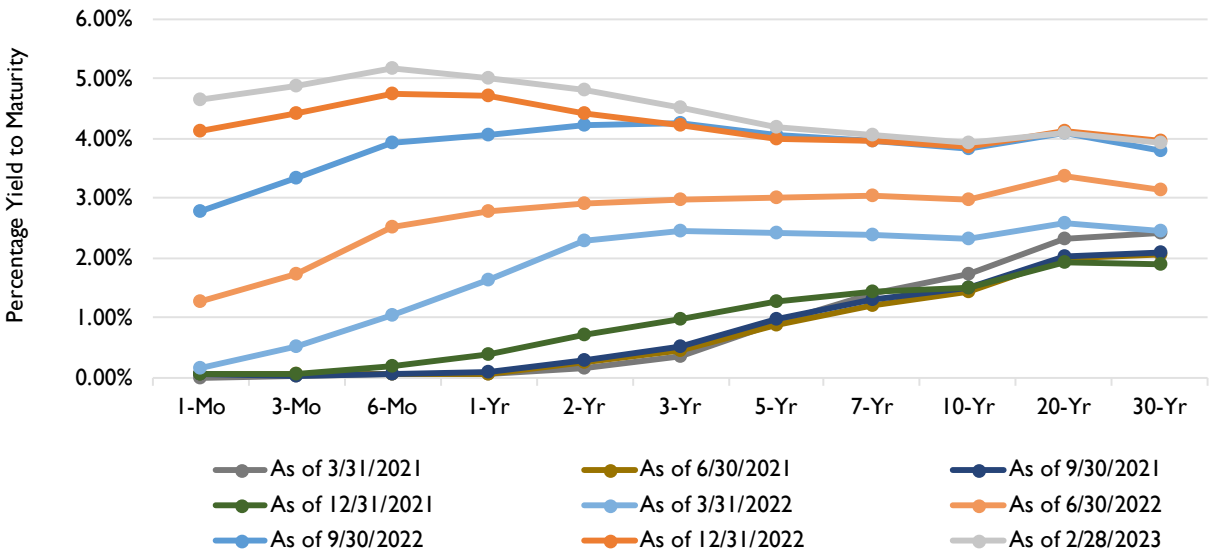
DATA CENTER

ECONOMIC / FINANCIAL

COMMERCIAL AND INDUSTRIAL LOANS VS. BANKING STANDARDS (QUARTERLY, MONTHLY) (75)



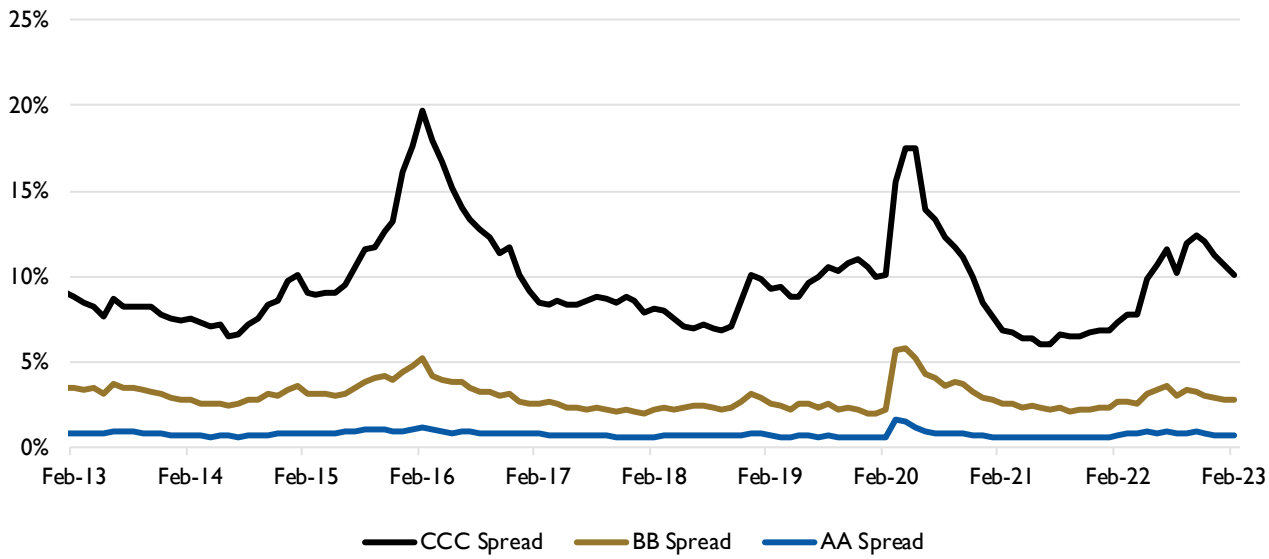
U.S. TREASURY YIELD CURVE (MONTHLY, ANNUAL) (76)



DATA CENTER

ECONOMIC / FINANCIAL

CORPORATE SPREADS TO TREASURIES BY QUALITY (MONTHLY AVERAGE) (77)



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. 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.

(33) 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.

(34) 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.

(35) Hydraulic Fracturing Sand Producer Price Index
- Source: U.S. Bureau of Labor Statistics.
- 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.
- 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.
- Hydraulic Fracturing Sand Producer Price Index Base = 100 at June 1982.
- Not seasonally adjusted.

(36) and (37) 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

(38) 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.

(39) Wind and Solar Prices

- Source: Lazard's Levelized Cost of Energy Analysis 2012-2020.
- 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.

(40) 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.

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

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

(42) 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.

(43) 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

(44) 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.

(45) 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.

(46) 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.

(47) 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.

(48) 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.

(49) 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.

(50) 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

(51) 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.

(52) 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.

(53) 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.

(54) Electricity Prices by Sector

- Source: U.S. Energy Information Administration.

(55) 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.

(56) 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

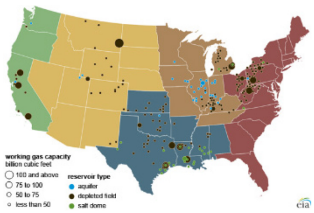
(56) Petroleum and Other Liquids Commercial Inventory (continued)

- 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.

(57) 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)



(58) 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.

(59) 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.

(60) 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

(61) 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.

(62) 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.

(63) 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.

(64) Heavy Truck Sales

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

(65) 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.

(66) 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.

(67) 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.

(68) 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

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

(70) 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.

(71) 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.

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

(73) London Interbank Offered Rate (LIBOR), Based on U.S. Dollar
- Source: ICE Benchmark Administration Limited via Moody's Analytics.
- 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.

(74) 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.

(75) 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.

(76) 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.

(77) 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

ENERGY INFRASTRUCTURE PERMITTING REFORM

Energy infrastructure permitting reform remains one of the industry's top priorities. Current legislative efforts in Washington are probably the best opportunity over the next few years to make progress on eliminating the regulatory hurdles that are preventing major infrastructure projects from moving forward.

The outlook for reform brightened when Speaker Kevin McCarthy declared it his top legislative goal and led the introduction of H.R. 1 on March 15, which passed the full House of Representatives in late March. The bill includes a comprehensive menu of fixes to infrastructure regulatory roadblocks. Its overall objectives are:

1. Increasing domestic energy production
2. Reforming the permitting process for all industries
3. Reversing anti-energy policies advanced by the Biden Administration
4. Streamlining energy infrastructure and exports
5. Boosting the production and processing of critical minerals

The Bill's specific provisions include language to:

- Prohibit the President from banning hydraulic fracturing
- Repeal restrictions on the import and export of natural gas, including LNG
- Prevent states from blocking interstate infrastructure projects
- Repeal $6 billion natural gas tax
- Require the Department of the Interior to resume lease sales on federal lands and waters
- Repeal royalties and fee increases on energy production
- Ensure parity in energy revenue sharing for states with onshore and offshore energy development
- Require publication of the 2023-28 offshore oil and gas lease sales plan/sets deadlines for future 5-year plans

HOT TOPICS

ENERGY INFRASTRUCTURE PERMITTING REFORM (CONTINUED)

Other provisions would reform the currently-broken infrastructure permitting process, specifically:

- Reforms the National Environmental Policy Act (NEPA) permitting process to streamline federal reviews for all sectors of the economy, including at our international borders
- Limits scope of environmental review under NEPA to reasonably foreseeable and economically feasible impacts
- Sets deadlines for completion of NEPA reviews at one year for environmental assessments and two years for environmental impact statements
- Provides certainty by imposing a 120-day deadline on filing litigation on final agency actions concerning energy and mining projects
- Requires that certain low-impact activities and activities in previously studied areas on public lands are not major federal actions under NEPA
- Ends the abuse of the water quality certification process by streamlining the permitting process under Section 401 of the Clean Water Act and limiting review to water quality impacts only
- Enhances America's ability to develop critical energy resources by improving the environmental permitting processes at critical minerals refining and process facilities

The Energy Equipment & Infrastructure Alliance's (EEIA) Board convened in Washington in late March to meet with key leaders in both the House and Senate to hear the latest status and get their ideas about how EEIA can be most effective in helping build majorities to pass meaningful legislation. We met with the House leadership team gathered at a strategy planning meeting called by Majority Leader Steve Scalise and Majority Whip Tom Emmer, including the Chairmen of the key energy infrastructure committees and subcommittees who helped craft H.R. 1, along with leaders of six top energy industry associations. The message was the same: the vocal support of business leaders and workers will be key to passage.

HOT TOPICS

ENERGY INFRASTRUCTURE PERMITTING REFORM (CONTINUED)

The challenge for reforms becoming law now moves to the Senate, where Senate Energy and Natural Resources Committee Chairman Joe Manchin holds the key to crafting a Senate companion bill that can garner the sixty votes needed to avoid a filibuster. Senator Manchin is known to support comprehensive reform, as evidenced by his failed initiative at the end of the last Congress to attach a reform bill to other must-pass legislation.

We expect the process of developing legislation acceptable to a bi-partisan majority in both houses of Congress, and one that is able to gain the President's signature, to continue through spring and summer.

HOT TOPICS

U.S. ENERGY EXPORTS ARE SETTING RECORDS

Russia is among the world's leading suppliers of crude oil, refined petroleum products, and natural gas. Since the Russian assault on Ukraine began in February 2022, Western nations have sought to limit money funding Russia's war by sanctioning its oil and gas trade. This leaves an opening for the United States, now a leading oil and natural gas supplier, to fill some of the void. As global energy supplies tighten, total U.S. exports of crude oil and refined petroleum products hit record highs.

Exports of U.S. crude oil rose by 22% over 2021 to reach a peak of 3.6 million barrels per day (b/d) last year, as greater demand from Europe offset lower exports to India and China.[1] U.S. production of oil rose by 629,000 b/d, or 5.6%, in 2022 to 11.9 million b/d, still off its record high of 12.3 million b/d reached in 2019. However, when this production is combined with 607,000 b/d released from the Strategic Petroleum Reserve last year, overall U.S. crude oil supplied to the market reached 12.5 million b/d, surpassing the 12.4 million b/d supplied in 2019.

South Korea, the Netherlands, the United Kingdom, and Canada were the top destinations for U.S. crude oil. European buyers increased their purchases by 41% over 2021 to substitute for lost Russian supply. Exports to India and China, which purchased cheap Russian oil at a discount, were collectively down 19% on the year.[1]

The boom can be seen at the Port of Corpus Christi, Texas, which is setting back-to-back records for cargo. Driven by a substantial increase in oil exports, which make up the majority of Corpus Christi's business by weight, the port's exporters shipped 49.6 million tons of cargo in the fourth quarter of 2022 -- surpassing a record of 48 million tons set in the third quarter.[2]

The U.S. exported a record 11.8 million b/d of crude oil and petroleum products in the week ending November 25, 2022, including all seaborne ports and pipeline volumes, according to the U.S. Energy Information Administration. TankerTrackers.com calculates that out of that total, a record setting 7.1 million barrels per day left the United States by sea.[3]

In December of last year, the Port of Corpus Christi hit an all-time high for crude oil exports, exceeding 70 million barrels in a month for the first time in its history. In 2022, the port accounted for roughly 60% percent of all U.S. crude oil exports. The Port of Corpus Christi has the largest total revenue tonnage in the United States, and ended 2022 with record tonnage, primarily due to a 21% year-over-year (YOY) increase in refined products and 15% YOY increase in total crude oil. Crude oil exports averaged a record 2 million b/d in 2022, an increase over its 2021 record average of 1.76 million b/d.[2]

In 2021, Russia was the second-largest crude oil and condensates exporting country after Saudi Arabia. At 49%, OECD Europe received most of Russia's exports, while Asia and Oceania received 38%. Russia exported more than 45% of the 10.1 million b/d of crude oil and condensate that it produced in 2021. China received nearly one-third, or 1.4 million b/d, of Russia's exports.[4]

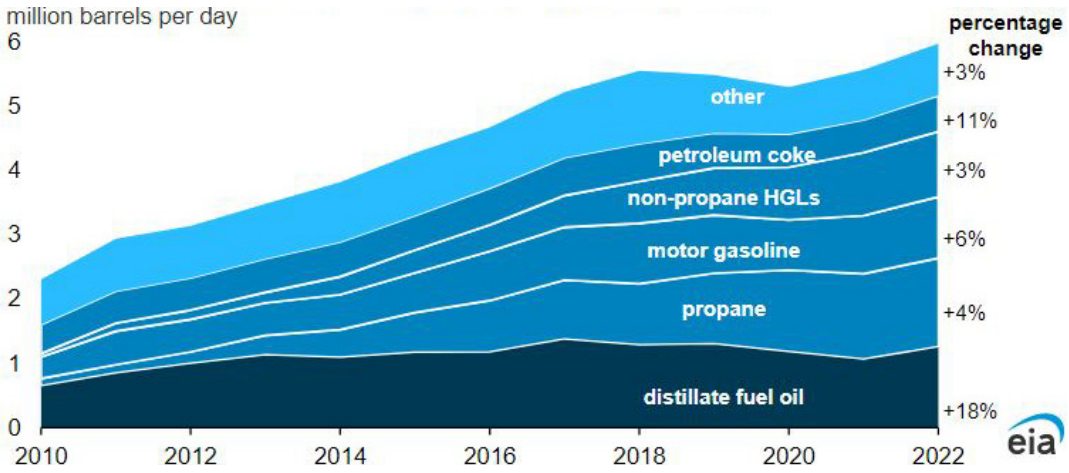
HOT TOPICS

U.S. ENERGY EXPORTS ARE SETTING RECORDS (CONTINUED)

2021 Crude Oil and Condensate Exports from Russia[4]

In addition to the record setting crude oil exports in 2022, the United States set a new record for petroleum product exports last year, up 7% over 2021. Petroleum product exports averaged 5.97 million b/d in 2022, driven by an increase of 18% in distillate fuel oil.[4] Petroleum products – which do not include crude oil -- are produced in refineries and include distillate (diesel fuels and fuel oils), motor fuels (gasoline and jet fuels), naphtha, lubricants and greases, as well as many other products.

Annual U.S. Petroleum Product Exports by Select Types[4]
(percentage change 2021 to 2022)



HOT TOPICS

U.S. ENERGY EXPORTS ARE SETTING RECORDS (CONTINUED)

High demand and low inventories globally, along with economic sanctions against Russia and self-sanctioning by some firms after Russia's invasion of Ukraine, have disrupted global distillate trade.[4] Self-sanctioning refers to a corporate practice of avoiding trade for fear of getting caught by the limits of Western-backed restrictions.

Prices for petroleum products rose in the second quarter of 2022, encouraging refiners globally to increase production. The high volume of U.S. petroleum product exports in 2022 also reflected longer-term growth trends. U.S. exports of total petroleum products more than doubled to 5.97 million b/d in 2022 from 2.31 million b/d in 2010. Propane was the largest commodity export product by volume in 2022, directed primarily to the Asia Pacific region which accounted for more than half of total U.S. propane exports. Japan received the most U.S. propane exports in 2022.[4]

Exports of U.S. crude oil and petroleum products that have been boosted in the aftermath of Russia's invasion of Ukraine will remain elevated this year as Europe and Asia search for supplies. In addition, European Union sanctions implemented in December 2022 that prohibit all seaborne imports of Russia's oil to Europe make it likely that demand for U.S. crude oil will continue in 2023. Therefore, the geopolitical disruptions that occurred in 2022 are likely to continue to affect global trade of crude oil and petroleum products in 2023.

Sources:

1) Reuters· U.S. crude oil exports hit record high in 2022, EIA data shows, March 15, 2023.
2) Port of Corpus Christi, Port of Corpus Christi Finishes Fiscal Year 2022 with Record Tonnage, January 23, 2023.
3) The Maritime Executive, U.S. Sets New Records for Oil Exports as EU Looks for New Supplies, December 5, 2022.
4) U.S. Energy Information Administration.

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 12/31/22	% 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.	$4,553	$133	2.9%	$16.88	82.3%	$1,337	$3,186	0.7x	24.0x	12.4x
Chevron Corporation	244,302	64,642	26.5	179.49	94.6	347,069	356,226	1.5x	5.5x	0.1x
CVR Energy, Inc.	10,896	1,262	11.6	31.34	71.9	3,151	4,372	0.4x	3.5x	0.9x
EnLink Midstream, LLC	9,528	1,319	13.8	12.30	94.2	5,782	11,958	1.3x	9.1x	3.6x
Gibson Energy Inc.	8,154	332	4.1	17.47	85.2	2,513	3,660	0.4x	11.0x	3.6x
Exxon Mobil Corporation	402,217	91,128	22.7	110.30	96.2	454,248	476,212	1.2x	5.2x	0.2x
HF Sinclair Corporation	38,205	4,499	11.8	51.89	78.4	10,416	13,473	0.4x	3.0x	0.5x
Keyera Corp.	5,217	754	14.5	21.86	83.4	5,010	7,885	1.5x	10.5x	3.8x
Marathon Petroleum Corporation	178,236	22,965	12.9	116.39	91.2	54,547	78,779	0.4x	3.4x	0.7x
Parkland Corporation	26,202	1,054	4.0	21.95	75.3	3,862	8,937	0.3x	8.5x	4.4x
Phillips 66	169,990	11,305	6.7	104.08	91.7	49,192	69,463	0.4x	6.1x	1.1x
NuStar Energy L.P.	1,683	719	42.7	16.00	88.6	1,765	6,217	3.7x	8.6x	4.7x
Valero Energy Corporation	171,189	18,267	10.7	126.86	86.4	48,907	58,317	0.3x	3.2x	0.4x
Median			**11.8%**		**86.4%**			**0.4x**	**6.1x**	**1.1x**
Mean			**14.2%**		**86.1%**			**1.0x**	**7.8x**	**2.8x**

SELECTED TRANSACTIONS

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
8/17/2022	DCP Midstream, LP (NYSE:DCP)	Phillips 66 (NYSE:PSX)	$13,227.8	0.7x	7.3x
7/28/2022	PBF Logistics LP (NYSE:PBFX)	PBF Logistics LP (NYSE:PBFX)	$1,661.0	4.8x	7.8x
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

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

PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

NATURAL GAS

EQUITY COMPARABLES (1)

Natural Gas (United States & Canada)

Company	LTM[2] Revenues	LTM[2] EBITDA	LTM[2] Margin	Stock Price 12/31/22	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Alliant Energy Corporation	$4,205	$1,572	37.4%	$55.21	84.5%	$13,859	$22,126	5.3x	14.1x	5.6x
AltaGas Ltd.	10,408	1,085	10.4	17.27	75.0	4,863	12,416	1.2x	11.4x	6.9x
Atmos Energy Corporation	4,673	1,528	32.7	112.07	91.1	15,804	24,122	5.2x	15.8x	5.5x
Avista Corporation	1,710	446	26.1	44.34	94.5	3,271	6,005	3.5x	13.5x	6.6x
Baytex Energy Corp.	1,719	1,025	59.6	4.49	66.4	2,452	3,257	1.9x	3.2x	0.7x
Calumet Specialty Products Partners, L.P.	4,553	133	2.9	16.88	82.3	1,337	3,186	0.7x	24.0x	12.4x
Cenovus Energy Inc.	49,428	9,678	19.6	19.41	84.2	37,246	43,659	0.9x	4.5x	0.5x
Chesapeake Utilities Corporation	681	224	32.9	118.18	80.8	2,097	2,882	4.2x	12.9x	3.6x
Crestwood Equity Partners LP	6,001	699	11.6	26.19	79.5	2,741	7,378	1.2x	10.6x	4.8x
Dominion Energy, Inc.	17,174	7,886	45.9	61.32	69.1	51,096	97,131	5.7x	12.3x	5.8x
EnLink Midstream, LLC	9,528	1,319	13.8	12.30	94.2	5,782	11,958	1.3x	9.1x	3.6x
Enbridge Inc.	39,388	9,413	23.9	39.10	88.7	79,172	146,044	3.7x	15.5x	6.3x
Enterprise Products Partners L.P.	58,186	8,729	15.0	24.12	84.2	52,475	83,055	1.4x	9.5x	3.3x
Epsilon Energy Ltd.	69	53	76.9	6.63	83.0	153	112	1.6x	2.1x	(0.8)x
Eversource Energy	12,289	3,612	29.4	83.84	88.6	29,202	51,170	4.2x	14.2x	6.3x
Genesis Energy, L.P.	2,789	571	20.5	10.21	76.0	1,252	5,824	2.1x	10.2x	6.3x
National Fuel Gas Company	2,298	1,223	53.2	63.30	83.3	5,791	8,460	3.7x	6.9x	2.0x
New Jersey Resources Corporation	2,954	560	19.0	49.62	96.5	4,785	7,911	2.7x	14.1x	6.0x
Northwest Natural Holding Company	1,037	300	28.9	47.59	82.6	1,670	3,120	3.0x	10.4x	5.5x
MDU Resources Group, Inc.	6,974	909	13.0	30.34	94.3	6,170	9,304	1.3x	10.2x	3.4x
OGE Energy Corp.	3,376	1,074	31.8	39.55	92.2	7,918	12,010	3.6x	11.2x	4.2x
ONE Gas, Inc.	2,578	582	22.6	75.72	82.1	4,100	7,192	2.8x	12.4x	5.6x
ONEOK, Inc.	22,387	3,337	14.9	65.70	87.5	29,365	43,134	1.9x	12.9x	4.0x
RGC Resources, Inc.	94	25	26.5	22.05	89.8	217	348	3.7x	13.9x	5.7x
Southwest Gas Holdings, Inc.	4,960	901	18.2	61.88	64.7	4,150	10,378	2.1x	11.5x	6.7x
Summit Midstream Partners, LP	371	165	44.4	16.68	63.6	170	1,532	4.1x	9.3x	9.1x
Targa Resources Corp.	20,930	2,830	13.5	73.50	90.2	16,639	30,050	1.4x	10.6x	4.0x
TC Energy Corporation	11,066	6,441	58.2	39.88	72.5	40,363	83,742	7.6x	13.0x	6.6x
Median			**25.0%**		**83.8%**			**2.7x**	**11.5x**	**5.6x**
Mean			**28.7%**		**82.9%**			**2.9x**	**11.4x**	**5.0x**

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

PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

NATURAL GAS

SELECTED TRANSACTIONS (1)

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
8/17/2022	DCP Midstream, LP (NYSE:DCP)	Phillips 66 (NYSE:PSX)	$13,227.8	0.7x	7.3x
2/24/2022	South Jersey Industries, Inc. (NYSE:SJI)	J.P. Morgan Asset Management, Inc. ; JPMorgan Infrastructure Investments, L.P.	$7,846.1	3.9x	16.6x
10/26/2021	Oasis Midstream Partners LP (NasdaqGS:OMP)	Crestwood Equity Partners LP (NYSE:CEQP)	$1,807.8	4.8x	8.1x
10/14/2021	Southwest Gas Holdings, Inc. (NYSE:SWX)	Icahn Enterprises L.P. (NasdaqGS:IEP)	$8,571.9	2.3x	10.6x
2/17/2021	Enable Midstream Partners, LP (NYSE:ENBL)	Energy Transfer LP (NYSE:ET)	$7,329.7	3.1x	9.5x
1/13/2021	Corning Natural Gas Holding Corporation (OTCPK:CNIG)	Argo Infrastructure Partners LP	$172.0	4.6x	17.2x
7/27/2020	CNX Midstream Partners LP (NYSE:CNXM)	CNX Resources Corporation (NYSE:CNX)	$764.2	5.1x	6.6x
2/27/2020	EQM Midstream Partners, LP	Equitrans Midstream Corporation (NYSE:ETRN)	$4,395.8	7.6x	8.1x
10/21/2019	AltaGas Canada Inc. (TSX:ACI)	Alberta Teachers' Retirement Fund Board; Public Sector Pension Investment Board	$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

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

PUBLIC AND TRANSACTION COMPARABLES BY SEGMENT

PROPANE AND HEATING/FUEL OIL

EQUITY COMPARABLES (1)

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

Company	LTM[2] Revenues	LTM[2] EBITDA	LTM[2] Margin	Stock Price 12/31/22	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Ferrellgas Partners, L.P.	$2,133	$339	15.9%	$7.10	37.9%	$34	$2,099	1.0x	6.2x	6.3x
NGL Energy Partners LP	9,179	578	6.3	1.21	43.2	158	4,565	0.5x	7.9x	5.7x
Spire Inc.	2,457	677	27.5	68.86	86.9	3,615	8,208	3.3x	12.1x	6.9x
Star Group, L.P.	2,166	88	4.1	12.05	98.8	431	696	0.3x	7.9x	4.2x
Suburban Propane Partners, L.P.	1,524	288	18.9	15.18	85.5	964	2,173	1.4x	7.6x	4.3x
UGI Corporation	10,192	1,285	12.6	37.07	78.8	7,774	14,915	1.5x	11.6x	5.8x
Median			**14.2%**		**82.2%**			**1.2x**	**7.9x**	**5.7x**
Mean			**14.2%**		**71.8%**			**1.3x**	**8.9x**	**5.5x**

SELECTED TRANSACTIONS

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
2/16/2023	Propane Distribution Assets of Mountain Flame Propane, Inc.	Superior Plus Corp. (TSX:SPB)	$7.4	-	-
2/16/2023	Acme Propane Gas Co., Inc.	Superior Plus Corp. (TSX:SPB)	$3.3	-	-
9/30/2022	Brown's Gas Company, Inc.	Ferrellgas Partners, LP (OTCPK:FGPR)	$7.5	-	-
8/4/2022	Propane Business in Northern New Mexico	Suburban Propane Partners, LP (NYSE:SPH)	-	-	-
3/28//22	Retail Propane Distribution and Refined Fuels Assets of Quarles Petroleum Inc.	Superior Plus Corp. (TSX:SPB)	$145.0	-	-
7/14/2021	Kamps Propane, Inc.	Superior Plus Corp. (TSX:SPB)	$240.0	-	8.9x
4/22/2021	Assets of Freeman Gas, Inc.	Superior Plus Corp. (TSX:SPB)	$170.0	-	-
2/11/2021	Assets of Highlands Propane Inc.	Superior Plus Corp. (TSX:SPB)	$10.9	-	-
2/11/2021	Miller Propane Inc.	Superior Plus Corp. (TSX:SPB)	$5.9	-	-
1/26/2021	All of the Assets of Holden Oil, Inc.	Superior Plus Corp. (TSX:SPB)	$17.8	-	-
11/11/2020	Assets of Petroleum Heat and Power Co., Inc.	Superior Plus Corp. (TSX:SPB)	$6.1	-	-
10/15/2020	Central Coast Propane, Inc.	Superior Plus Corp. (TSX:SPB)	$12.9	-	-
9/1/2020	Simmons Energy Solutions Inc.	MFA Oil Company	-	-	-
8/25/2020	Rymes Propane & Oils, Inc.	Superior Plus Corp. (TSX:SPB)	$159.0	-	-
7/28/2020	Champagne's Energy, Inc.	Superior Plus Corp. (TSX:SPB)	$27.3	-	-

(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

DRILLING

EQUITY COMPARABLES (1)

Drilling (United States & Canada)

Company	LTM[2] Revenues	LTM[2] EBITDA	LTM[2] Margin	Stock Price 12/31/22	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
AKITA Drilling Ltd.	$128	$17	13.3%	$1.28	58.4%	$52	$118	0.9x	7.0x	3.9x
Baker Hughes Company	21,156	2,937	13.9	29.53	74.2	29,573	32,751	1.5x	11.2x	1.4x
CES Energy Solutions Corp.	1,258	128	10.1	2.04	84.5	520	934	0.7x	7.3x	3.2x
Ensign Energy Services Inc.	1,165	261	22.4	2.52	68.2	464	1,518	1.3x	5.8x	4.0x
Halliburton Company	20,297	3,943	19.4	39.35	89.5	35,732	42,733	2.1x	10.8x	1.7x
Helmerich & Payne, Inc.	2,369	595	25.1	49.57	90.8	5,224	5,458	2.3x	9.2x	0.3x
Independence Contract Drilling, Inc.	187	39	20.6	3.27	44.2	44	178	1.0x	4.6x	3.6x
NOV Inc.	7,237	716	9.9	20.89	86.1	8,206	9,631	1.3x	13.5x	1.8x
Precision Drilling Corporation	1,195	230	19.3	76.63	89.4	1,036	1,973	1.7x	8.6x	3.6x
Secure Energy Services Inc.	5,912	383	6.5	5.19	89.6	1,610	2,430	0.4x	6.3x	2.0x
Valaris Limited	1,603	146	9.1	67.62	96.4	5,084	5,015	3.1x	34.4x	(1.2)x
Median			**13.9%**		**86.1%**			**1.3x**	**8.6x**	**2.0x**
Mean			**15.4%**		**79.2%**			**1.5x**	**10.8x**	**2.2x**

SELECTED TRANSACTIONS

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
5/4/2020	Quintana Energy Services Inc.	KLX Energy Services Holdings, Inc. (NasdaqGS:KLXE)	$49.6	0.1x	2.1x
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

(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

LUBRICANTS AND GREASES

EQUITY COMPARABLES (1)

Lubricants and Greases (United States & Canada)

Company	LTM[2] Revenues	LTM[2] EBITDA	LTM[2] Margin	Stock Price 12/31/22	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Albemarle Corporation	$7,320	$2,868	39.2%	$216.86	64.8%	$25,406	$27,757	3.8x	9.7x	0.6x
Ascent Industries Co.	428	51	11.8	8.67	45.2	88	195	0.5x	3.8x	2.1x
Ashland Inc.	2,404	543	22.6	107.53	94.0	5,835	6,572	2.7x	12.1x	1.7x
Clean Harbors, Inc.	5,167	982	19.0	114.12	91.0	6,171	8,425	1.6x	8.6x	2.2x
CSW Industrials, Inc.	736	164	22.2	115.93	80.5	1,794	2,136	2.9x	13.1x	2.0x
FMC Corporation	5,802	1,407	24.2	124.80	88.5	15,608	18,940	3.3x	13.5x	2.0x
HF Sinclair Corporation	38,205	4,499	11.8	51.89	78.4	10,416	13,473	0.4x	3.0x	0.5x
Ingevity Corporation	1,668	450	27.0	70.44	88.3	2,632	3,762	2.3x	8.4x	3.2x
NewMarket Corporation	2,765	473	17.1	311.11	86.2	3,071	4,071	1.5x	8.6x	2.2x
Quaker Chemical Corporation	1,944	239	12.3	166.90	68.1	2,993	3,777	1.9x	15.8x	3.4x
Stepan Company	2,773	304	11.0	106.46	84.3	2,366	2,829	1.0x	9.3x	1.6x
Valvoline Inc.	1,282	251	19.6	32.65	86.0	5,695	7,811	6.1x	31.2x	8.3x
Median			**19.3%**		**85.2%**			**2.1x**	**9.5x**	**2.1x**
Mean			**19.8%**		**79.6%**			**2.3x**	**11.4x**	**2.5x**

SELECTED TRANSACTIONS

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
6/22/2022	Ocean Bio-Chem, Inc. (NasdaqCM:OBCI)	OneWater Marine Inc. (NasdaqGM:ONEW)	$122.6	1.9x	10.5x
5/11/2022	Trecora Resources (NYSE:TREC)	Balmoral Funds LLC	$254.3	0.8x	8.8x
9/27/2021	Kraton Corporation (NYSE:KRA)	DL Chemical Co., Ltd.	$2,568.0	1.4x	8.3x
12/7/2020	Gabriel Performance Products, LLC	Huntsman Corporation (NYSE:HUN)	$250.0	2.4x	11.0x
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

(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

SOLAR

EQUITY COMPARABLES (1)

Solar (United States & Canada)

Company	LTM[2] Revenues	LTM[2] EBITDA	LTM[2] Margin	Stock Price 12/31/22	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Boralex Inc.	$618	$364	58.9%	$29.57	77.6%	$3,039	$5,402	8.7x	14.9x	6.6x
Capital Power Corporation	2,004	627	31.3	34.23	89.3	4,000	7,053	3.5x	11.2x	4.2x
NextEra Energy Partners, LP	1,211	734	60.6	70.09	81.4	6,065	19,842	16.4x	27.0x	6.9x
NRG Energy, Inc.	31,543	3,125	9.9	31.82	66.5	7,331	15,313	0.5x	4.9x	2.5x
Sunrun Inc.	2,321	(172)	(7.4)	24.02	61.4	5,119	14,234	6.1x	NM	NM
Median			**31.3%**		**77.6%**			**6.1x**	**13.1x**	**5.4x**
Mean			**30.6%**		**75.3%**			**7.1x**	**14.5x**	**5.1x**

SELECTED TRANSACTIONS

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
3/2/2022	New Energy Equity, LLC	ALLETE, Inc. (NYSE:ALE)	$165.5	-	8.3x
6/16/2021	Solarpack Corporacion Tecnologica, S.A. (BME:SPK)	EQT Infrastructure V; EQT Partners AB	$1,543.1	9.5x	20.7x
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

(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

WIND

EQUITY COMPARABLES (1)

Wind (United States & Canada)

Company	LTM[2] Revenues	LTM[2] EBITDA	LTM[2] Margin	Stock Price 12/31/22	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Algonquin Power & Utilities Corp.	$2,622	$912	34.8%	$6.52	43.7%	$4,394	$14,105	5.4x	15.5x	8.4x
Avangrid, Inc.	7,923	1,893	23.9	42.98	83.1	16,617	26,290	3.3x	13.9x	5.0x
Boralex Inc.	618	364	58.9	29.57	77.6	3,039	5,402	8.7x	14.9x	6.6x
Brookfield Renewable Partners L.P.	4,736	2,957	62.4	25.33	64.6	11,999	49,049	10.4x	16.6x	8.2x
Innergex Renewable Energy Inc.	643	409	63.6	11.97	79.2	2,443	6,796	10.6x	16.6x	10.6x
NextEra Energy Partners, LP	1,211	734	60.6	70.09	81.4	6,065	19,842	16.4x	27.0x	6.9x
Northland Power Inc.	1,809	1,222	67.5	27.43	78.8	6,758	11,267	6.2x	9.2x	3.4x
TransAlta Renewables Inc.	414	199	48.2	8.31	57.8	2,219	2,765	6.7x	13.9x	2.6x
Median			**59.7%**	**78.2%**				**7.7x**	**15.2x**	**6.8x**
Mean			**52.5%**	**70.8%**				**8.5x**	**15.9x**	**6.5x**

SELECTED TRANSACTIONS

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
10/28/2022	Bullfrog Power Inc.	Envest Corp.	$25.7	10.4x	13.6x
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) 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

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 12/31/22	% of 52-Week High	Market Cap	Total Enterprise Value(3)	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt(4)/ EBITDA
Archrock, Inc.	$846	$309	36.5%	$8.98	86.0%	$1,397	$2,909	3.4x	9.4x	5.1x
Baker Hughes Company	21,156	2,937	13.9	29.53	74.2	29,573	32,751	1.5x	11.2x	1.4x
Cathedral Energy Services Ltd.	141	19	13.4	0.93	89.4	208	282	2.0x	14.9x	3.9x
CES Energy Solutions Corp.	1,258	128	10.1	2.04	84.5	520	934	0.7x	7.3x	3.2x
Dawson Geophysical Company	34	(15)	(43.6)	1.96	72.9	47	33	1.0x	NM	NM
ENGlobal Corporation	39	(10)	(26.5)	0.78	30.7	28	29	0.7x	NM	NM
Enservco Corporation	19	(5)	(28.0)	1.63	18.6	19	30	1.6x	NM	NM
Ensign Energy Services Inc.	1,165	261	22.4	2.52	68.2	464	1,518	1.3x	5.8x	4.0x
Enterprise Group, Inc.	17	7	39.6	0.28	83.7	15	23	1.3x	3.4x	1.2x
Essential Energy Services Ltd.	111	7	6.7	0.28	68.7	39	49	0.4x	6.6x	0.9x
High Arctic Energy Services Inc	66	3	5.0	1.15	79.5	56	45	0.7x	13.4x	(3.3)x
Innospec Inc.	1,964	232	11.8	102.86	88.9	2,547	2,495	1.3x	10.8x	(0.4)x
Matrix Service Company	780	(44)	(5.7)	6.22	68.1	168	193	0.2x	NM	NM
Mullen Group Ltd.	1,477	226	15.3	10.75	91.1	999	1,576	1.1x	7.0x	2.3x
Newpark Resources, Inc.	816	56	6.9	4.15	86.3	390	546	0.7x	9.7x	2.1x
North American Construction Group Ltd.	569	141	24.8	13.37	82.9	353	663	1.2x	4.7x	1.9x
Parkland Corporation	26,202	1,054	4.0	21.95	75.3	3,862	8,937	0.3x	8.5x	4.4x
Precision Drilling Corporation	1,195	230	19.3	76.63	89.4	1,036	1,973	1.7x	8.6x	3.6x
Profire Energy, Inc.	40	4	9.2	1.06	66.7	50	43	1.1x	11.7x	(1.7)x
ProPetro Holding Corp.	1,280	294	22.9	10.37	61.3	1,188	1,137	0.9x	3.9x	(0.2)x
Secure Energy Services Inc.	5,912	383	6.5	5.19	89.6	1,610	2,430	0.4x	6.3x	2.0x
Select Energy Services, Inc.	1,387	164	11.8	9.24	88.6	1,000	1,162	0.8x	7.1x	0.4x
Shawcor Ltd.	857	61	7.1	10.15	95.3	715	838	1.0x	13.7x	1.9x
Smart Sand, Inc.	256	23	9.1	1.79	36.2	81	124	0.5x	5.3x	1.7x
STEP Energy Services Ltd.	731	125	17.1	3.94	77.8	282	409	0.6x	3.3x	1.0x
USA Compression Partners, LP	705	409	58.0	19.53	95.7	1,914	4,486	6.4x	11.0x	5.2x
Median			**11.0%**		**81.2%**			**1.0x**	**7.9x**	**1.9x**
Mean			**10.3%**		**75.0%**			**1.3x**	**8.3x**	**1.8x**

(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

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 12/31/22	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
AKITA Drilling Ltd.	$128	$17	13.3%	$1.28	58.4%	$52	$118	0.9x	7.0x	3.9x
CSI Compressco LP	340	105	31.0	1.33	76.0	188	828	2.4x	7.9x	6.1x
Enerflex Ltd.	1,314	80	6.1	6.31	88.0	781	946	0.7x	11.8x	11.3x
Forum Energy Technologies, Inc.	700	46	6.6	29.50	92.2	169	425	0.6x	9.2x	5.7x
Geospace Technologies Corporation	102	5	4.5	4.22	47.5	55	39	0.4x	8.5x	(2.5)x
Gulf Island Fabrication, Inc.	130	(5)	(3.7)	5.13	89.4	82	48	0.4x	NM	NM
Halliburton Company	20,297	3,943	19.4	39.35	89.5	35,732	42,733	2.1x	10.8x	1.7x
Helix Energy Solutions Group, Inc.	873	103	11.7	7.38	98.7	1,120	1,437	1.6x	14.0x	2.8x
Key Energy Services, Inc.	238	(15)	(6.5)	0.10	2.7	1	0	0.0x	NM	NM
McCoy Global Inc.	32	3	9.7	0.70	75.4	20	20	0.6x	6.3x	(0.1)x
MIND Technology, Inc.	26	(11)	(40.0)	0.46	26.3	6	45	1.7x	NM	NM
Nabors Industries Ltd.	2,654	709	26.7	154.87	74.6	1,458	4,466	1.7x	6.3x	3.0x
NOV Inc.	7,237	716	9.9	20.89	86.1	8,206	9,631	1.3x	13.5x	1.8x
Natural Gas Services Group, Inc.	79	19	24.1	11.46	76.4	142	142	1.8x	7.5x	(0.0)x
PHX Energy Services Corp.	396	51	12.9	5.74	87.0	292	316	0.8x	6.2x	0.6x
RPC, Inc.	1,602	365	22.8	8.89	68.9	1,897	1,884	1.2x	5.2x	(0.3)x
Schlumberger Limited	28,091	5,820	20.7	53.46	95.4	75,806	85,860	3.1x	14.8x	1.7x
Solaris Oilfield Infrastructure, Inc.	320	76	23.7	9.93	68.0	327	433	1.4x	5.7x	0.2x
Superior Drilling Products, Inc.	18	3	16.7	0.92	50.0	27	33	1.8x	10.9x	1.9x
TechnipFMC plc	6,700	590	8.8	12.19	93.2	5,442	6,969	1.0x	11.8x	2.0x
TerraVest Industries Inc.	460	67	14.5	20.39	98.5	363	570	1.2x	8.5x	2.8x
TETRA Technologies, Inc.	553	54	9.8	3.46	59.5	445	608	1.1x	11.2x	3.3x
Weatherford International plc	4,331	787	18.2	50.92	98.6	3,595	5,221	1.2x	6.6x	1.7x
Median			**12.9%**		**76.4%**			**1.2x**	**8.5x**	**1.9x**
Mean			**11.3%**		**73.9%**			**1.3x**	**9.2x**	**2.4x**

(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

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
3/8/2023	Greene's Energy Group, LLC	KLX Energy Services Holdings, Inc. (NasdaqGS:KLXE)	$33.9	0.5x	2.2x
6/21/2022	U.S. Well Services, Inc. (NasdaqCM:USWS)	ProFrac Holding Corp. (NasdaqGS:PFHC)	$270.6	1.3x	13.3x
2/25/2022	Cordy Oilfield Services Inc. (TSXV:CKK)	Vertex Resource Group Ltd. (TSXV:VTX)	$21.3	1.0x	5.2x
2/14/2022	Macro Enterprises Inc. (TSXV:MCR)	-	$111.9	0.4x	3.4x
1/24/2022	Exterran Corporation (NYSE:EXTN)	Enerflex Ltd. (TSX:EFX)	$758.5	1.2x	5.0x
12/13/2021	Nuverra Environmental Solutions, Inc. (NYSEAM:NES)	Select Energy Services, Inc. (NYSE:WTTR)	$51.9	0.5x	20.2x
10/22/2021	FTS International, Inc. (NYSEAM:FTSI)	ProFrac Holding Corp.	$305.1	0.7x	4.0x
8/4/2021	Alamo Pressure Pumping, LLC	NexTier Completion Solutions, Inc.	$238.0	-	3.4x
3/9/2021	Tervita Corporation (TSX:TEV)	Secure Energy Services Inc. (TSX:SES)	$1,022.9	0.9x	6.7x
12/21/2020	RigNet, Inc. (NasdaqGS:RNET)	Viasat, Inc. (NasdaqGS:VSAT)	$235.7	1.0x	8.6x
12/7/2020	SEACOR Holdings Inc. (NYSE:CKH)	American Industrial Partners	$845.5	1.5x	11.1x
9/1/2020	OneStim Business	Liberty Oilfield Services Inc. (NYSE:LBRT)	$427.8	0.1x	1.5x
9/1/2020	Calfrac Well Services Ltd. (TSX:CFW)	THRC Holdings, LP	$675.7	0.8x	34.9x
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

(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 12/31/22	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Alliant Energy Corporation	$4,205	$1,572	37.4%	$55.21	84.5%	$13,859	$22,126	5.3x	14.1x	5.6x
AltaGas Ltd.	10,408	1,085	10.4	17.27	75.0	4,863	12,416	1.2x	11.4x	6.9x
Chart Industries, Inc.	1,612	246	15.3	115.23	47.5	4,816	5,595	3.5x	22.7x	6.7x
EnLink Midstream, LLC	9,528	1,319	13.8	12.30	94.2	5,782	11,958	1.3x	9.1x	3.6x
Equitrans Midstream Corporation	1,358	1,075	79.1	6.70	59.7	2,900	10,838	8.0x	10.1x	6.5x
Gibson Energy Inc.	8,154	332	4.1	17.47	85.2	2,513	3,660	0.4x	11.0x	3.6x
Green Plains Partners LP	80	50	63.2	12.96	84.6	301	383	4.8x	7.6x	1.7x
Magellan Midstream Partners, L.P.	3,200	1,241	38.8	50.21	92.3	10,290	15,445	4.8x	12.4x	4.2x
MPLX LP	11,137	5,665	50.9	32.84	92.5	32,946	55,214	5.0x	9.7x	3.5x
NuStar Energy L.P.	1,683	719	42.7	16.00	88.6	1,765	6,217	3.7x	8.6x	4.7x
Median			**38.1%**		**84.9%**			**4.2x**	**10.6x**	**4.4x**
Mean			**35.6%**		**80.4%**			**3.8x**	**11.7x**	**4.7x**

(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

STORAGE AND TERMINALS

SELECTED TRANSACTIONS (1)

Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
8/17/2022	DCP Midstream, LP (NYSE:DCP)	Phillips 66 (NYSE:PSX)	$13,227.8	0.7x	7.3x
7/28/2022	PBF Logistics LP (NYSE:PBFX)	PBF Logistics LP (NYSE:PBFX)	$1,661.0	4.8x	7.8x
10/26/2021	Oasis Midstream Partners LP (NasdaqGS:OMP)	Crestwood Equity Partners LP (NYSE:CEQP)	$1,807.8	4.8x	8.1x
8/5/2021	BP Midstream Partners LP (NYSE:BPMP)	BP Midstream Partners Holdings LLC	$1,826.9	14.5x	9.3x
6/1/2021	Stagecoach Gas Services LLC	Kinder Morgan, Inc. (NYSE:KMI)	$1,225.0	-	10.0x
2/17/2021	Enable Midstream Partners, LP (NYSE:ENBL)	Energy Transfer LP (NYSE:ET)	$7,329.7	3.1x	9.5x
2/10/2021	Inter Pipeline Ltd. (TSX:IPL)	Brookfield Infrastructure Partners L.P. (NYSE:BIP)	$13,857.6	6.5x	17.2x
8/24/2020	Cheniere Energy Partners, LP (AMEX:CQP)	Brookfield Infrastructure Partners LP (NYSE:BIP) and Blackstone Infrastructure Partners, LP	$17,027.5	5.1x	11.3x
7/27/2020	CNX Midstream Partners LP (NYSE:CNXM)	CNX Resources Corporation (NYSE:CNX)	$764.2	5.1x	6.6x
2/27/2020	EQM Midstream Partners, LP	Equitrans Midstream Corporation (NYSE:ETRN)	$4,395.8	7.6x	8.1x
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

(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 12/31/22	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Antero Midstream Corporation	$991	$744	75.1%	$10.79	92.9%	$5,163	$8,306	8.4x	11.2x	4.5x
ATCO Ltd.	3,678	1,379	37.5	31.31	87.5	3,541	13,091	3.6x	9.5x	4.9x
Crestwood Equity Partners LP	6,001	699	11.6	26.19	79.5	2,741	7,378	1.2x	10.6x	4.8x
Enbridge Inc.	39,388	9,413	23.9	39.10	88.7	79,172	146,044	3.7x	15.5x	6.3x
Energy Transfer LP	89,876	12,288	13.7	11.87	91.7	36,660	98,890	1.1x	8.0x	4.0x
Enterprise Products Partners L.P.	58,186	8,729	15.0	24.12	84.2	52,475	83,055	1.4x	9.5x	3.3x
Equitrans Midstream Corporation	1,358	1,075	79.1	6.70	59.7	2,900	10,838	8.0x	10.1x	6.5x
Evolve Transition Infrastructure LP	46	34	74.3	0.12	9.6	23	445	9.8x	13.1x	12.5x
Genesis Energy, L.P.	2,789	571	20.5	10.21	76.0	1,252	5,824	2.1x	10.2x	6.3x
Gibson Energy Inc.	8,154	332	4.1	17.47	85.2	2,513	3,660	0.4x	11.0x	3.6x
Kinder Morgan, Inc.	19,200	6,169	32.1	18.08	89.5	40,639	73,656	3.8x	11.9x	5.1x
ONEOK, Inc.	22,387	3,337	14.9	65.70	87.5	29,365	43,134	1.9x	12.9x	4.0x
Plains All American Pipeline, L.P.	57,342	2,526	4.4	11.76	92.2	8,212	21,551	0.4x	8.5x	3.3x
Summit Midstream Partners, LP	371	165	44.4	16.68	63.6	170	1,532	4.1x	9.3x	9.1x
Targa Resources Corp.	20,930	2,830	13.5	73.50	90.2	16,639	30,050	1.4x	10.6x	4.0x
The Williams Companies, Inc.	11,352	5,036	44.4	32.90	86.6	40,083	65,257	5.7x	13.0x	4.6x
TC Energy Corporation	11,066	6,441	58.2	39.88	72.5	40,363	83,742	7.6x	13.0x	6.6x
Western Midstream Partners, LP	3,252	1,932	59.4	26.85	91.0	10,339	17,346	5.3x	9.0x	3.4x
Median			**28.0%**		**87.1%**			**3.6x**	**10.6x**	**4.7x**
Mean			**34.8%**		**79.3%**			**3.9x**	**10.9x**	**5.4x**

(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
8/17/2022	DCP Midstream, LP (NYSE:DCP)	Phillips 66 (NYSE:PSX)	$13,227.8	0.7x	7.3x
7/28/2022	PBF Logistics LP (NYSE:PBFX)	PBF Logistics LP (NYSE:PBFX)	$1,661.0	4.8x	7.8x
2/11/2022	Shell Midstream Partners, L.P. (NYSE:SHLX)	Shell Pipeline Company L.P.	$6,370.5	11.5x	10.0x
8/5/2021	BP Midstream Partners LP (NYSE:BPMP)	BP Midstream Partners Holdings LLC	$1,826.9	14.5x	9.3x
6/1/2021	Stagecoach Gas Services LLC	Kinder Morgan, Inc. (NYSE:KMI)	$1,225.0	-	10.0x
2/17/2021	Enable Midstream Partners, LP (NYSE:ENBL)	Energy Transfer LP (NYSE:ET)	$7,329.7	3.1x	9.5x
2/10/2021	Inter Pipeline Ltd. (TSX:IPL)	Brookfield Infrastructure Partners L.P. (NYSE:BIP)	$13,857.6	6.5x	17.2x
10/5/2020	TC PipeLines, LP (NYSE:TCP)	TC Energy Corporation (TSX:TRP)	$2,213.6	7.4x	9.0x
7/27/2020	CNX Midstream Partners LP (NYSE:CNXM)	CNX Resources Corporation (NYSE:CNX)	$764.2	5.1x	6.6x
2/27/2020	EQM Midstream Partners, LP	Equitrans Midstream Corporation (NYSE:ETRN)	$4,395.8	7.6x	8.1x
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

(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 12/31/22	% of 52-Week High	Market Cap	Total Enterprise Value[3]	TEV / LTM Revenues	TEV / LTM EBITDA	Net Debt[4]/ EBITDA
Adams Resources & Energy, Inc.	$3,264	$39	1.2%	$38.92	93.1%	$95	$46	0.0x	1.2x	(1.3)x
ArcBest Corporation	5,324	527	9.9	70.04	56.5	1,710	1,833	0.3x	3.5x	0.2x
Covenant Logistics Group, Inc.	1,217	138	11.3	34.57	85.6	466	542	0.4x	3.9x	0.8x
Daseke, Inc.	1,773	186	10.5	5.69	43.2	255	879	0.5x	4.7x	3.3x
Heartland Express, Inc.	968	224	23.2	15.34	88.6	1,211	1,635	1.7x	7.3x	1.7x
Hess Corporation	11,216	5,663	50.5	141.82	94.7	43,495	50,820	4.5x	9.0x	1.2x
J.B. Hunt Transport Services, Inc.	14,814	1,976	13.3	174.36	79.9	18,053	19,514	1.3x	9.9x	0.8x
Knight-Swift Transportation Holdings Inc.	7,429	1,660	22.3	52.41	84.4	8,422	10,273	1.4x	6.2x	1.1x
Landstar System, Inc.	7,440	626	8.4	162.90	89.5	5,852	5,833	0.8x	9.3x	(0.3)x
Marten Transport, Ltd.	1,264	248	19.6	19.78	84.4	1,604	1,533	1.2x	6.2x	(0.3)x
Old Dominion Freight Line, Inc.	6,260	2,117	33.8	283.78	78.8	31,352	31,077	5.0x	14.7x	(0.0)x
P.A.M. Transportation Services, Inc.	947	183	19.3	25.90	64.8	575	755	0.8x	4.1x	0.8x
Patriot Transportation Holding, Inc.	90	7	7.6	7.03	80.3	25	19	0.2x	2.8x	(0.6)x
Parkland Corporation	26,202	1,054	4.0	21.95	75.3	3,862	8,937	0.3x	8.5x	4.4x
Ryder System, Inc.	12,011	2,694	22.4	83.57	85.9	4,199	10,726	0.9x	4.0x	2.5x
Saia, Inc.	2,792	628	22.5	209.68	61.1	5,534	5,529	2.0x	8.8x	(0.1)x
Schneider National, Inc.	6,604	982	14.9	23.40	85.1	4,165	3,984	0.6x	4.1x	(0.2)x
TFI International Inc.	8,812	1,235	14.0	100.20	91.1	8,735	10,320	1.2x	8.4x	1.3x
Titanium Transportation Group Inc.	362	30	8.2	1.79	74.5	81	136	0.4x	4.6x	1.8x
Universal Logistics Holdings, Inc.	2,015	305	15.1	33.44	82.0	879	1,355	0.7x	4.4x	1.1x
Werner Enterprises, Inc.	3,290	521	15.8	40.26	82.5	2,545	3,066	0.9x	5.9x	1.2x
Yellow Corporation	5,245	293	5.6	2.51	18.7	130	1,547	0.3x	5.3x	5.0x
Median			**14.4%**		**82.3%**			**0.8x**	**5.6x**	**0.9x**
Mean			**16.1%**		**76.4%**			**1.2x**	**6.2x**	**1.1x**

(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

TRUCKERS

SELECTED TRANSACTIONS (1)

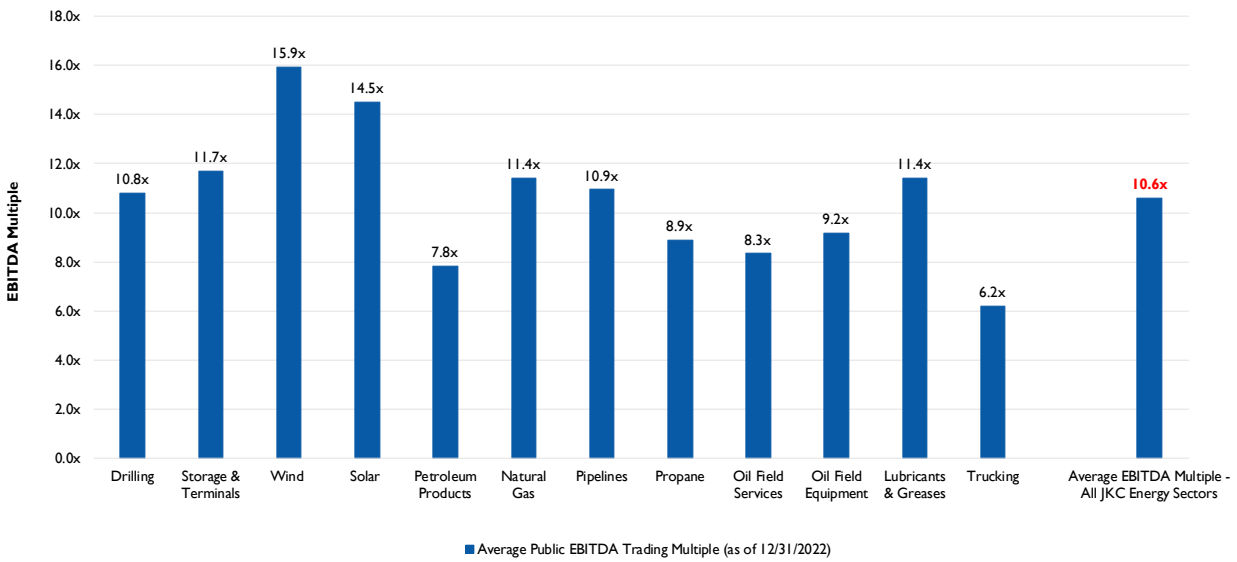
Announced / Closed Date	Target(s)	Acquirer	Total Enterprise Value (TEV)	TEV / Revenues	TEV / EBITDA
6//24/22	USA Truck, Inc.	Schenker, Inc.	$461.3	0.6x	4.7x
2/9/2022	Pilot Freight Services, Inc.	A.P. Møller - Mærsk A/S (CPSE:MAERSK B)	$168.0	-	-
2/9/2022	AAT Carriers, Inc.	Covenant Logistics Group, Inc. (NasdaqGS:CVLG)	$55.0	2.2x	-
1/4/2022	Midwest Logistics Systems Ltd.	Schneider National, Inc. (NYSE:SNDR)	$262.6	1.3x	-
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
10/1/2014	Barr-Nunn Transportation, Inc.	Knight Transportation, Inc. (NYSE:KNX)	$115.9	-	4.5x
7/24/2014	Contrans Group Inc.	TFI International Inc. (TSX:TFII)	$528.2	-	6.8x

(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 12/31/2022)



FACTOIDS: LITTLE-KNOWN FACTS AND STATS

Petroleum Products (1)

- A year after its invasion of Ukraine, Russia is still shipping roughly the same amount of oil to world markets, but its revenues have declined.
- Russia has managed to reroute most of the barrels previously destined for the European Union and U.S. to new outlets in Asia, Africa, and the Middle East.
- The Middle East was the first to emerge as a new outlet, purchasing naphtha and fuel oil very quickly.

Natural Gas (2)

- LNG has played a key role in mitigating the impact of Russia's sharp cuts to pipeline gas supplies to the European Union and played a major role in avoiding a shortage of gas supply in 2022.
- Despite rising by 5.5% in volumetric terms, the value of global LNG trade doubled in 2022 to an all-time high of $450 billion.
- Europe's LNG procurement costs more than tripled compared with 2021 to an estimated $190 billion.
- China's LNG procurement costs rose by almost 20% to over $50 billion, despite a 20% drop in the country's total imports.

Propane and Heating/Fuel Oil (3)

- After it leaves the processing plant, propane is stored underground as a liquid.
- It travels around the country through a network of pipelines, railroad tank cars, tractor-trailers, and barges.
- From regional storage sites nationwide, the propane is then sent to distributors, referred to as local suppliers.
- Finally, propane is pumped into bobtail delivery trucks that deliver it to millions of American homes and businesses.

(1) Oil & Gas Journal.
(2) Oil & Gas Journal.
(3) Propane Education & Research Council.

FACTOIDS: LITTLE-KNOWN FACTS AND STATS

LUBRICANTS AND GREASES (1)

- From 2012 to 2015, there were only four lubricant price increases, ranging from 6%-8%. There have been a total of 15 from 2020 to 2022 -- most in the range of 12%-15%, with some as high as 30%.
- Lubricant price decrease announcements are rare. In fact, there have only been two over the past 15 years: one in 2012 and another in 2015. Both occurred shortly after a notable drop in the price of base oil.
- Another decrease in base oil happened in January 2023. Group II grades dropped by $0.50-$0.60 a gallon, and Group III went down by $0.20. Within weeks, Chevron and CITGO each implemented decreases of up to 8% on the price of finished lubricants, while the prices of many other brands moved down.

SOLAR (2)

- The residential solar market experienced a 40% increase in installed solar capacity in 2022, and now 6% of all homes in the United States have solar. By 2030, that number is expected to grow to 15%.
- Over 1.8 GW of new solar module manufacturing capacity came online in the U.S. in 2022, bringing total domestic manufacturing capacity to 9 GW.
- California, Texas, and Florida were the top three states for new solar capacity additions for the third consecutive year, with California taking back the top spot after Texas led the nation in 2021.

WIND (3)

- Wind power has delivered $135 billion of investment in the last decade. In 2021, the industry invested $12 billion in new projects.
- Wind projects deliver an estimated $1.9 billion in state and local tax payments and land-lease payments each year.
- Wind power helps avoid 340 million metric tons of CO2 emissions annually -- equivalent to 74 million cars' worth of emissions.

(1) Lubes'N'Greases.
(2) Solar Energy Industries Association.
(3) American Wind Energy Association.

FACTOIDS: LITTLE-KNOWN FACTS AND STATS

Oil and Gas Field Services (1)

- Worldwide, the expenditure of oil and gas well drilling and field services industry is forecast to reach $215 billion by 2025 with a total of $950 billion expenditure over 2021-2025.
- Operators in this industry provide support services on a fee or contract basis to companies involved in oil and gas extraction, mining and quarrying. Industry operators provide services such as drilling, taking core samples, and making geological observations at prospective work sites.

Equipment and Physical Technology (2)

- As more utility customers adopt smart energy meters, solar panels, electric vehicles, and other distributed energy technologies, edge computing will help companies determine how customers are consuming energy and when they might be able to sell energy back to the utility.
- Edge computing can help enable a "two-way grid," which is becoming necessary as new technologies and solutions around distributed generation and storage become more prevalent.
- On the operational side, edge computing will aid firms as they deploy more grid-scale renewable energy resources and assets, including wind farms and arrays of solar panels, many of which are in very remote locations.

Storage and Terminals (3)

- Wastewater generated from operations at bulk storage terminals can include process wastewater, secondary containment wastewater, and stormwater management. Dealing with these wastewater streams needs to be carefully managed to avoid unpermitted discharges of harmful chemicals and petrochemicals to the environment.
- One of the main sources of process wastewater is from cleaning operations, washing out tanks to facilitate changeovers or recover product. The primary contaminant from this stream is residues of hydrocarbons or whatever material was stored in the tank.
- Stormwater management creates large quantities of low-strength water. These are carefully regulated by local and national limits and require permit compliance and regular monitoring.

(1) First Research and IBISWorld.
(2) BizTech.
(3) Tank Storage Magazine.

FACTOIDS: LITTLE-KNOWN FACTS AND STATS

PIPELINES (1)

- In 2022, 897 million cubic feet per day (MMcfd) of interstate natural gas pipeline capacity was added collectively from five projects, the least since the U.S Energy Information Administration (EIA) began data collection in 1995.
- Low interstate capacity additions in 2022 are due to two primary reasons:
  - More growth in intrastate capacity (which are not captured in its interstate data).
  - Less overall capital expenditures by oil and natural gas companies.
- Of the five projects EIA listed as increasing interstate capacity to transport natural gas, only one added any new pipe, with the others accomplished entirely through compressor upgrades.

TRUCKERS (2)

- Interact Analysis predicts that the use of hydrogen-powered internal combustion engines (ICE) will grow to 58,000 in 2030.
- Covering all on-road and off-road vehicles (including trains, agricultural equipment, trucks, and passenger cars), this figure is set to see significant growth post 2030, with an estimated 400,000 hydrogen engines in use by 2040.
- While the expense to produce hydrogen engines and the vehicles themselves is relatively low, and comparable to diesel engines, the operating cost is likely to become a limiting factor.

(1) U.S Energy Information Administration.
(2) Fleet Owner.

JORDAN KNAUFF & COMPANY
ENERGY LOGISTICS & DISTRIBUTION TEAM

G. COOK JORDAN, JR.
Managing Principal
Office (312) 254-5901
cj@jordanknauff.com

DAVID A. KAKAREKA
Managing Director
Office (312) 254-5907
dkakareka@jordanknauff.com

LORI A. CALLAWAY
Vice President of Research and Publications
Office (312) 254-5914
lcallaway@jordanknauff.com

ANDRES J. BALLESTEROS
Analyst
Office (312) 254-5906
aballesteros@jordanknauff.com

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.

JKC JORDAN KNAUFF & COMPANY

200 West Madison Street, Suite 980
Chicago, Illinois 60606-3414
tel: (312) 254-5900 ▪ *fax*: (312) 254-5999
web: www.jordanknauff.com

ENERGY EQUIPMENT & INFRASTRUCTURE ALLIANCE

TOBY MACK
President and Chief Executive Officer
(202) 870-7715
tmack@eeia.org

MARTI DE GRAAF
Executive Vice President and Chief Operating Officer
(312) 806-0664
mdegraaf@eeia.org

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. Its members include companies, trade associations and labor organizations operating in the energy sector. EEIA advocates for 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 energy resources in their communities and with their political leaders.

ENERGY EQUIPMENT & INFRASTRUCTURE ALLIANCE

The Voice of the Energy Supply Chain

ENERGYBUILDERS

601 Pennsylvania Avenue NW
Suite 900
Washington, DC 20004
(202) 870-7715
info@eeia.org ▪ www.eeia.org