Energy and the Economy
Markets in Transition

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We connect global participants to an ecosystem that covers data, trading, clearing and capital raising.

**Markets**
- Future Exchanges
- Securities Exchanges
- OTC Markets
- Listings

**Clearing**
- Central Clearing Houses
- Located in:
  - US
  - UK
  - EU
  - Canada
  - Singapore

**Data**
- Pricing & Analytics
- Desktops & Connectivity
- Exchange Data

- Agriculture
- Connectivity
- Desks
- Energy
- Fixed Income & Futures Reference Data
- ICE Chat
- ICE Mobile
- Interest Rates
- Precious Metals
- Corporate listings
- Digital currencies
- Equities / Index / Options
- Exchange Traded products
- FX
- Indices

5 themes for consideration

1. What are the impacts of the United States becoming a net energy exporter on the global stage?

2. What is the state of innovation for tradeable energy based products?

3. What are future areas of innovation needing further investment in the energy space?

4. How have the debt markets responded to the current activity within the global energy markets?

5. Where are the energy markets likely headed from here?
Global oil complex
The largest, most liquid global crude complex

Differentials allow risk management at the point of production or consumption

**Global Crude Market Share**

- **North America**: 20%
- **Europe**: 89%
- **Asia**: 90%

**The growth of ICE Brent, WTI and Dubai**

- **ICE Brent Futures OI**
- **ICE WTI Futures OI**
- **ICE Dubai Related Contracts OI**

- **2/3** of global crude prices off Brent
- **76%** of global crude cleared volume

**ICE Global Crude Complex**

- 164 contracts, 11 crudes, 21 market pairs

**ICE Brent**

- Commercial traders with physical long or short positions value the physical volumes. Approximately 70% of global crude is priced directly or indirectly off Brent.

**ICE WTI**

- 77 crude contracts and eight crack spread contracts cover locations across Canada to the Permian to the Gulf Coast

**ICE (Platts) Dubai**

- Emerged as the key contract for commercial end users across Asia. The contract’s growth over the past years resulted in its inclusion in ICE’s most liquid market in April 2019.
The largest, most liquid global refined complex

75%+ of global open interest, 54% of ADV for refined products market

Gasoil anchors global distillate price discovery

117 contracts connect...

- The U.S., Europe and Asia
- Refined products from jet fuel to diesel
- Crack spreads vs a range of crudes
- A range of spread products that connect regional refined markets to global crude and gasoil benchmarks
Global crude benchmarks

Brent
Brent is the price barometer for up to two-thirds of global crude, with broad accessibility as its waterborne supply is easily transported around the world. ICE’s Brent complex has expanded to more than 500 related hedging instruments, since the contract launched 30 years ago.

Dubai Platts
As the principal for the Middle Eastern and Asian crude oil markets, Platts Dubai futures provides critical price discovery and risk management.

ICE Permian WTI Futures (HOU) & Permian WTI Storage (HOS) Contracts

U.S. Shale Revolution

Permian WTI
Permian WTI futures contract brings a light sweet U.S. crude to the global market, with delivery and storage in Houston enabling efficient transportation to domestic and foreign buyers.

Record Delivery 2,081,000 bbls in May 2019
Record Daily Volume 5,234,000 bbls on April 22, 2019
Record Open Interest 9,803,000 bbls on May 16, 2019
Deferred Interest extends to April 2020 contract

Deferred Interest extends to April 2020 contract
Dubai: Taking its place as global benchmark into Asia

Unmatched crude and regional refined benchmarks for commercial traders

- Dubai futures witnessed 10-fold growth in volumes over 5 years, and still growing - far and away the most consistently liquid instrument for the ME barrel
- Open interest averages 20+ times its closet Asian competitor, genuine forward curve
- Expect more innovation and growth in ME/AG market places
- NOCs on modernising influences- downstream, more product orientation and trade
Dubai: Taking its place as global benchmark into Asia

10x
Dubai open interest growth

70%
Dubai share of gross open interest by commercial traders

74%
Asian refined products market share
Linkages – Benchmarks as ‘Anchor’ points for related prices
A co-dependency of price through fundamentals

ICE Global Oil Complex

Global Crude Complex
- Brent
- WTI
- Dubai

Related Derivatives

Global Refined Products Complex

Gasoil
- N. Am: Heating Oil, Jet, Diesel, Biodiesel
- Europe: EU Gasoil, Jet, Diesel, FAME
- Asia: Sing. Gasoil, Jet

Regional Refined Products Complex
- NWE Fuel Oil, Eurobob, Naphtha
- Sing. Fuel Oil, Mogas, Naphtha

Number of contracts introduced each year

Open interest growth outpaces oil demand

Oil Demand

Open Interest

Oil Demand M Bbls/day

Day 1

Day 2

Day 3

Day 4

Day 5

Day 6

Day 7

Day 8

Day 9

Day 10

Day 11

Day 12

Day 13

Day 14

Day 15

Day 16

Day 17

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Day 82

Day 83

Day 84

Day 85

Day 86

Day 87
Global natural gas complex
Global natural gas benchmarks

64 basis markets
235+ physical markets

North America
The Shale revolution has amplified the importance of ICE’s basis markets as Henry Hub prices diverge from key Shale basins. Our 64 basis markets trade at prices reflective of regional supply and demand dynamics. North America’s status as a key exporter of natural gas continues to strengthen.

Key
- ICE’s Key NA Basis Markets
  - TETCO ME
  - Dominion South
  - Chicago Citygates
- ICE’s Key LNG Contracts
  - Gulf Coast Market (GCM)
  - TTF and NBP First Lines
  - JKM

Europe
Northwest Europe’s natural gas markets are a crucial driver for balancing the LNG market, with their diverse energy supply and flexible infrastructure. ICE’s NBP and TTF are the most liquid natural gas trading hubs in Europe.

Asia Pacific
Asia is driving global gas demand due to its fast-growing economies and environmental concerns. Our JKM LNG contract is the benchmark for natural gas across the region.
A new landscape for natural gas benchmarks

TTF and JKM

![Graphs showing TTF Natural Gas and JKM LNG traded volume (MMBtu) over time.](image-url)
A new landscape for natural gas benchmarks

Growth rates across benchmark hubs (2015=100)
U.S. LNG market takes centre stage in global gas

Prices of Henry Hub and Gulf Coast LNG are disconnected.
U.S. Natural Gas

2019 highlights

• Increased production has caused a steady move downward in prices this year despite upticks in demand from LNG and power burn.

• While volumes are down year over year, open interest in Henry Hub and 60 other locations, remains strong relative to last year.

• Physical natural gas volumes are up 776 bcf year over year, an increase of 9.5%. The rise is reflective of continued a spike in domestic production and ICE’s commitment to increasing it’s offering of trading locations.

• Physical natural gas trading activity on ICE has occurred at 196 unique locations through July 2019 versus 180 locations for the same time period in 2018.
U.S. Power

2019 highlights

• Open interest covering all U.S. Power is at 1.3B MWh’s, its highest level since May of 2017, and a 14% increase from the start of the year.

• Options average daily volume for 2019 is currently 2.8M MWh’s, representing a 41% increase from 2018.

• YTD, 260 separate entities have executed an ICE cleared power trade across 220 distinct futures and options contracts.
Additional market indicators
Energy company bond price and issuance trends

2018
- ICE BofAML Global Energy Index recorded negative returns and lagged government bonds by 300+ basis points
- Bond deals begin to trend downwards. However, the amount issued spikes H2 2018 / H1 2019 driven by a small number of large deals

2019
- Solid price returns with the ICE BofAML Global Energy Index outperforming a concurrent rally in government bonds
- Price recovery does not translate into increased deals and amount issued is now trending downwards

Sources: Returns data from ICE Data Indices, displaying the ICE BofAML Global Energy Index (GIEN), comprised of approximately 1,200 investment grade bonds with aggregate face value of approximately $900 billion. Issuance data from ICE Data Services Reference Data.
Energy company bond trading activity

U.S. trading volume and trade counts for investment grade oil and gas company bonds have trended upward through 2019 and most of 2018.

![Trade Volume for Oil & Gas Company Bonds](chart.png)

Source: ICE Data Services, based on FINRA TRACETM data. Trade volume amounts retrieved from TRACE were adjusted upward to estimate actual sizes of trades impacted by FINRA’s $5mm size cap for public dissemination.
Energy company credit spreads and clearing volumes

2017 and earlier:
- CDS levels spike dramatically during the 2015/2016 oil price crash, followed by a recovery (spreads tightened) through 2017
- ICE Clear Credit volumes fall through 2015/2016 as the CDS contracts are more expensive to trade, but recover through 2017 reflecting tighter spreads and subsequent increase in trading

2018:
- Sector CDS levels move wider. However, trading and clearing volumes continue trending upward

2019:
- CDS levels reverse a spike from Q4 2018

Sources: CDS levels from ICE Data Derivatives (averaged across 103 entities, BBB to AA). Clearing volume and open interest data from ICE Clear Credit.
The energy transition

Summary

• We’re witnessing increased competition between fuels amid the general shift to cleaner energy sources.

• Demand for U.S. crude and a liberalizing global gas market is seeing demand and supply dynamics become globalized.

• The broadest range of energy products is needed to help build and support the energy transition.