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# U.S. Natural Gas: A Catalyst for Change
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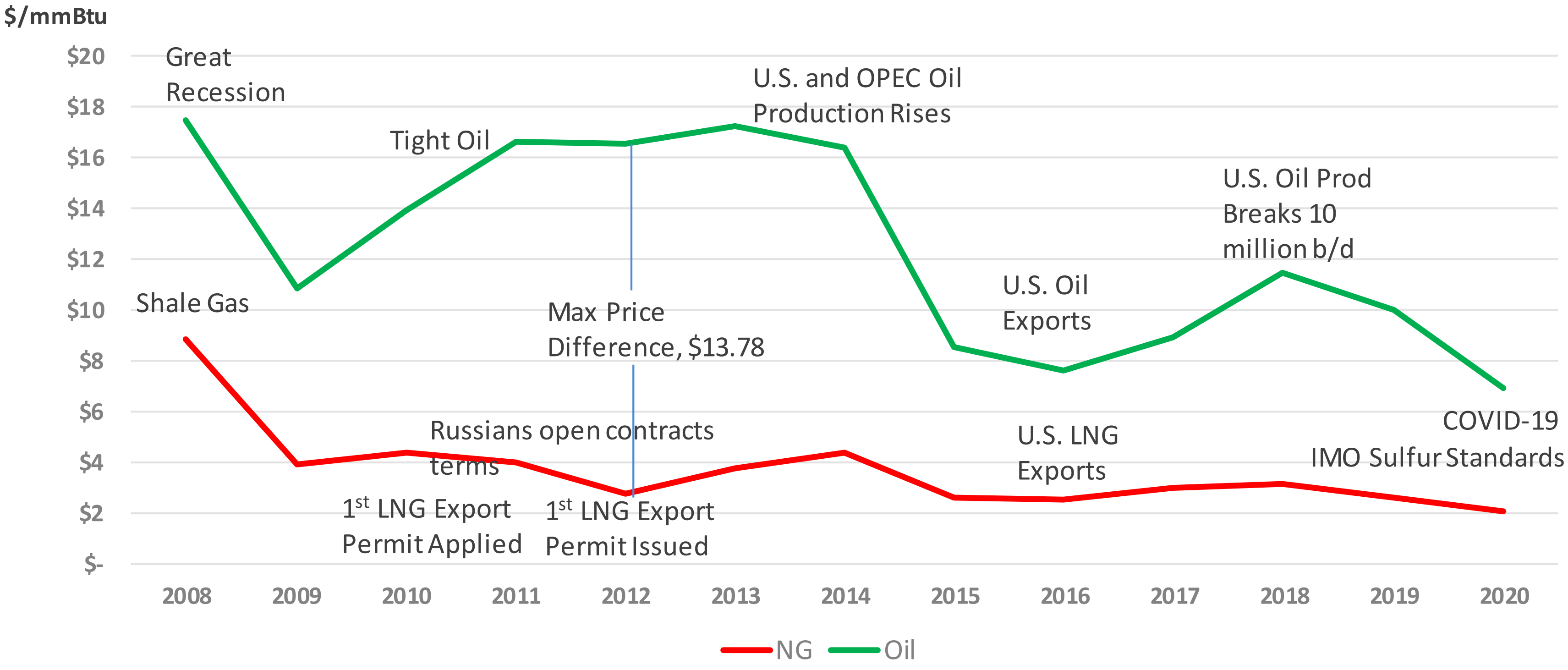
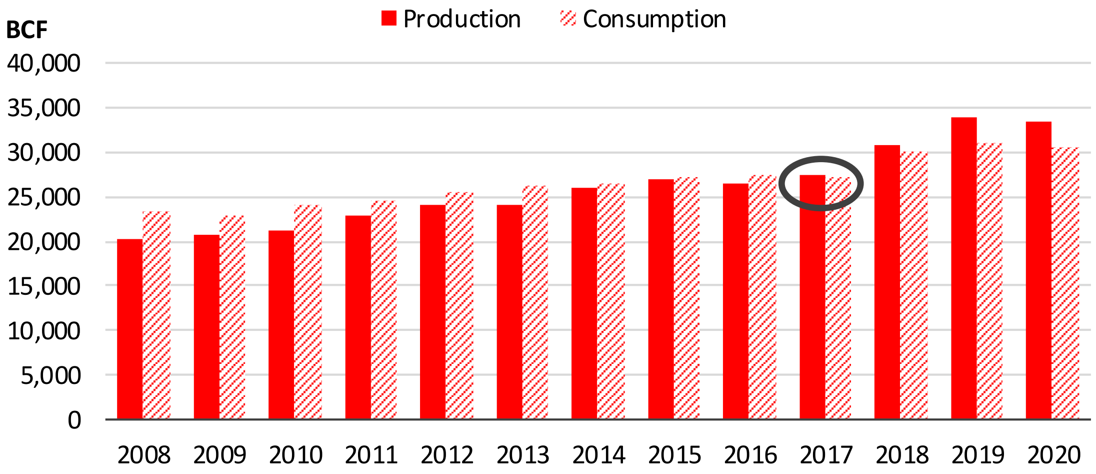
# Comparative Prices

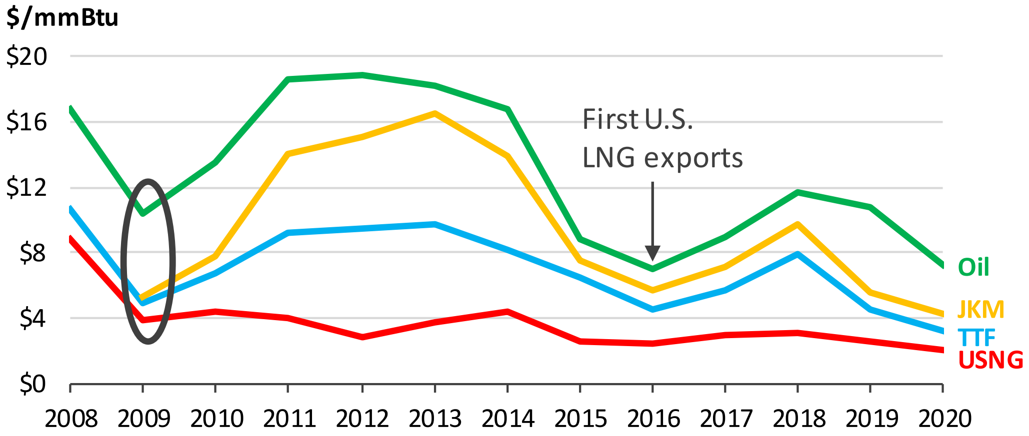


# The Rise of Shale Gas



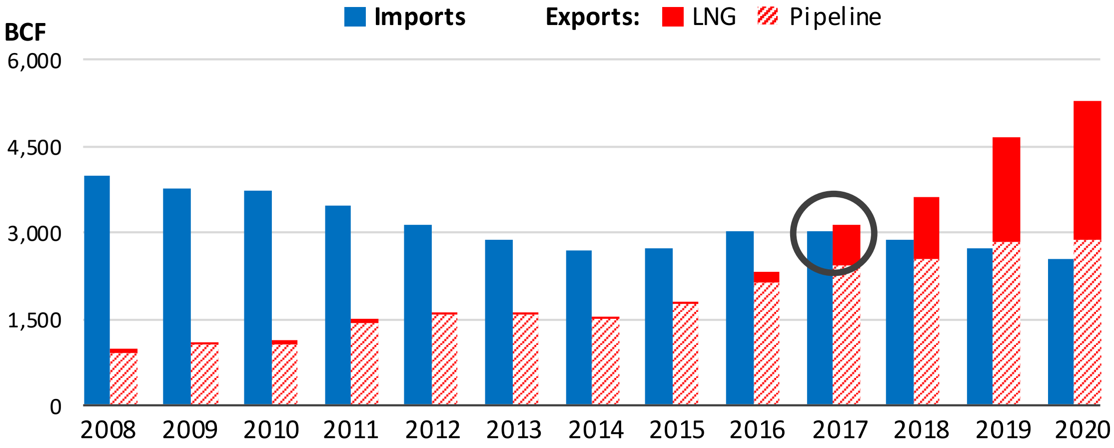

- U.S. production and consumption rise
  - Most production now from shale formations
- Production rises despite falling prices

# U.S. Price Advantage




- U.S. prices stay relatively low compared to the rest of the world, including oil
  - Search for new demand centers
- Prices are beginning to converge again

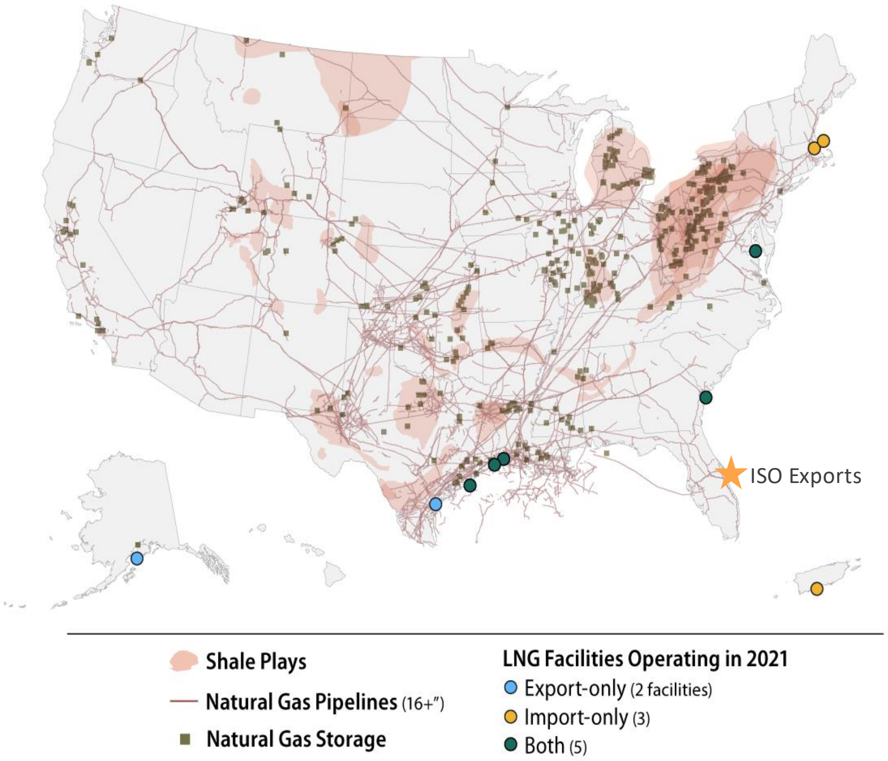
# Excess Supply, Then Export




- First lower-48 LNG exports in 2016
  - LNG drives exports
- Net exporter in 2017
- U.S. now third largest exporter of natural gas

# U.S. Natural Gas Infrastructure

- 3 million miles of mainline and other pipelines
- 7 LNG export terminals
  - 4 new or expansions approved and under construction
  - 14 new or expansions approved, but not under construction
- 156 LNG cargoes exported by ISO container in 2021
  - Approximately 500 million cubic feet
  - Prices about <u>double</u> of exports by vessel



# Oil by Rail

| Year | Crude by Rail | Total U.S. Production | Rail as a % of Total Production |
|---|---|---|---|
| 2010 | 15.5 | 5,484 | 0.3% |
| 2011 | 54.0 | 5,674 | 1.0% |
| 2012 | 283.1 | 6,523 | 4.3% |
| 2013 | 587.7 | 7,498 | 7.8% |
| 2014 | 792.1 | 8,792 | 9.0% |
| 2015 | 707.0 | 9,441 | 7.5% |
| 2016 | 376.3 | 8,844 | 4.3% |
| 2017 | 233.0 | 9,357 | 2.5% |
| 2018 | 273.6 | 10,941 | 2.5% |
| 2019 | 342.5 | 12,289 | 2.8% |
| 2020 | 254.3 | 11,283 | 2.3% |

Source Data: U.S. Energy Information Administration, units = ‘000 barrels of oil per day, except where noted.

# What's Next?

- Moving towards a global gas market
  - Rise in spot cargoes, shorter contracts, less destination clauses, and non-oil indexed pricing
- Role of natural gas in the energy transition
  - Uncertain
  - Importance of associated gas production
- Natural gas pipeline permits are getting more difficult to obtain
- LNG by rail may play a part in certain locations for limited amounts of time


Source Data: U.S. Energy Information Administration