

The future demand and pricing for natural gas markets



8th Annual Marcellus & Manufacturing Development Conference

April 9, 2019 | Morgantown, WV

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U.S. Energy Information Administration



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EIA does not propose or advocate any policy positions.



Natural Gas Monthly

With data for January 2019 >

What's New

Quarterly Coal Distribution Report (QCDR) – Fourth-Quarter 2018
Apr 01, 2019

U.S. Movements of Crude Oil By Rail
Mar 29, 2019

Underground Natural Gas Working Storage Capacity
Mar 29, 2019

[More >](#)

Coming Up

U.S. Natural Gas Imports & Exports

Domestic Uranium Production Report

Uranium Marketing Annual

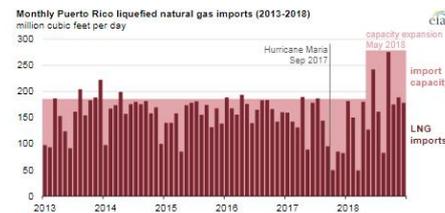
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Today in Energy

Posted April 8, 2019

Puerto Rico's LNG imports returned to pre-Hurricane Maria levels in late 2018 >

In 2018, Puerto Rico's liquefied natural gas (LNG) imports neared 2016 annual levels, according to the recently released *LNG Annual Report* published by the U.S. Department of Energy's Office of Fossil Energy. Imports into Puerto Rico were disrupted in 2017 after Hurricane Maria made landfall as a Category 4 hurricane on September 20, 2017. Puerto Rico imported 60.3 billion cubic feet (Bcf) of LNG in 2018, a level similar to the total LNG imports of 61.3 Bcf in 2016. [More >](#)



Source: EIA, based on U.S. Department of Energy's Office of Fossil Energy

Data Highlights

WTI crude oil futures price
4/5/2019: \$63.08/barrel
 ▲ \$2.94 from week earlier
 ▼ \$0.46 from year earlier

Natural gas futures price
4/5/2019: \$2.664/MMBtu
 ▲ \$0.002 from week earlier
 ▼ \$0.011 from year earlier

Weekly coal production
3/30/2019: 10,520 million tons
 ▼ 0.707 million tons from week earlier
 ▼ 3.871 million tons from year earlier

Natural gas inventories
3/29/2019: 1,130 Bcf
 ▲ 23 Bcf from week earlier
 ▼ 228 Bcf from year earlier

Crude oil inventories
3/29/2019: 449.5 million barrels
 ▲ 7.2 million barrels from week earlier
 ▲ 24.2 million barrels from year earlier

Annual Energy Outlook 2019

- Key takeaways
- U.S. natural gas markets in the Reference case
- Drivers of natural gas price differences in side cases

The Annual Energy Outlook provides long-term energy projections for the United States

- Projections in the *Annual Energy Outlook 2019* (AEO2019) are not predictions of what will happen, but rather modeled projections of what may happen given certain assumptions and methodologies.
- The AEO is developed using the National Energy Modeling System (NEMS), an integrated model that captures interactions of economic changes and energy supply, demand, and prices.
- Energy market projections are subject to much uncertainty because many of the events that shape energy markets as well as future developments in technologies, demographics, and resources cannot be foreseen with certainty. To illustrate the importance of key assumptions, AEO2019 includes a Reference case and six side cases that systematically vary important underlying assumptions.

AEO2019 also includes a range of side cases

- High and low world oil price
 - The 2050 Reference case price is \$108/bbl, increasing to \$212/bbl in the High Oil Price case and falling to \$50/bbl in the Low Oil Price case
- High and low macroeconomic growth
 - High Economic Growth and Low Economic Growth cases have projected GDP growth rates of 2.4% and 1.4%, respectively, from 2018–50, compared with 1.9%/year growth in the Reference case.
- High and low oil and natural gas resource and technology
 - The 2050 Reference case gas price is \$4.87 per MMBtu, rising to \$8.24 per MMBtu in Low Oil & Gas Resource and Technology case and falling to \$3.39 per MMBtu in the High Oil & Gas Resource and Technology case

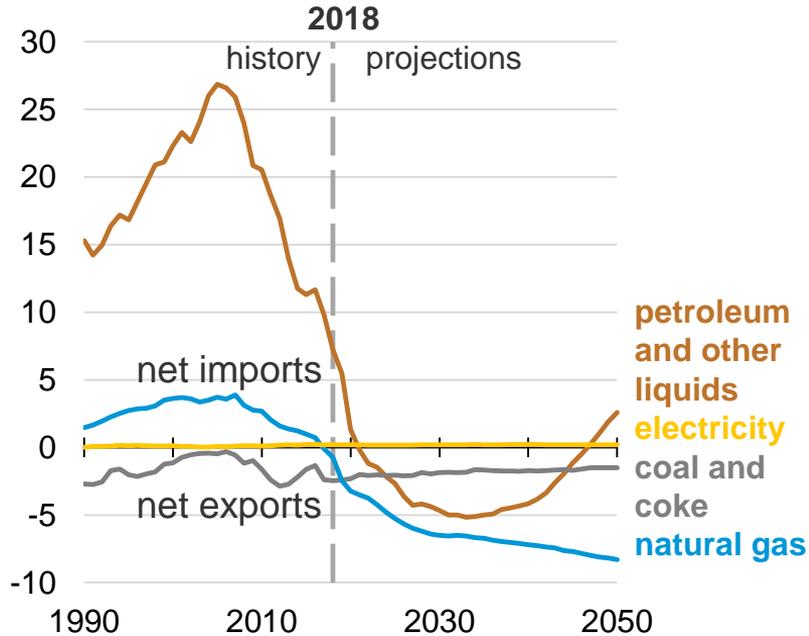
Key findings from AEO2019

- The United States becomes a net energy exporter in 2020 and remains so throughout the projection period as a result of large increases in crude oil, natural gas, and natural gas plant liquids production coupled with slow growth in consumption.
- Of the fossil fuels, natural gas and NGPLs have the highest production growth, and NGPLs account for almost one-third of cumulative U.S. liquids production during the projection period.
- Natural gas prices remain comparatively low during the projection period compared with historical prices, leading to increased gas use across end-use sectors and increased liquefied natural gas exports.
- Increasing energy efficiency across end-use sectors keeps U.S. energy consumption relatively flat (0.2% average annual growth between 2018-2050), even as the U.S. economy continues to expand.

The United States becomes a net energy exporter after 2020 in the Reference case

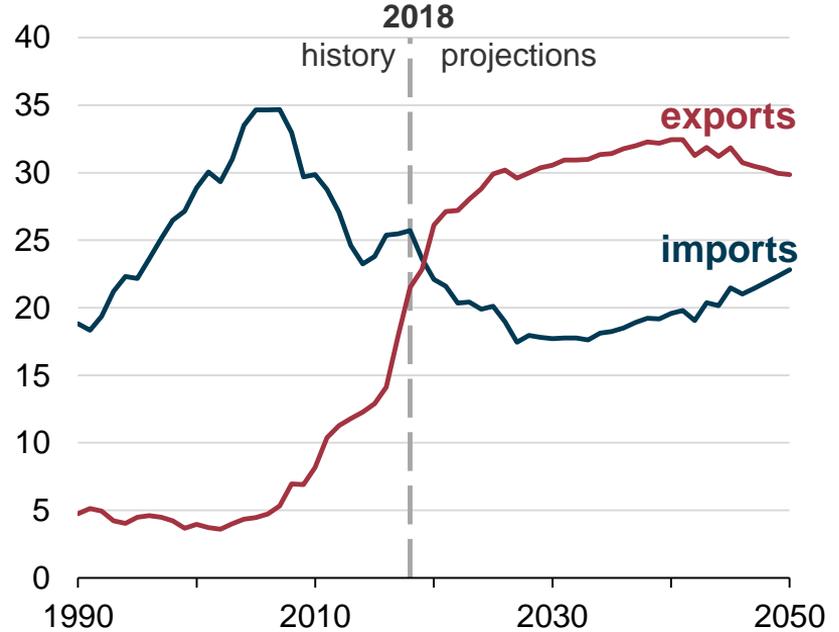
Net energy imports (Reference case)

quadrillion British thermal units



Gross energy trade (Reference case)

quadrillion British thermal units

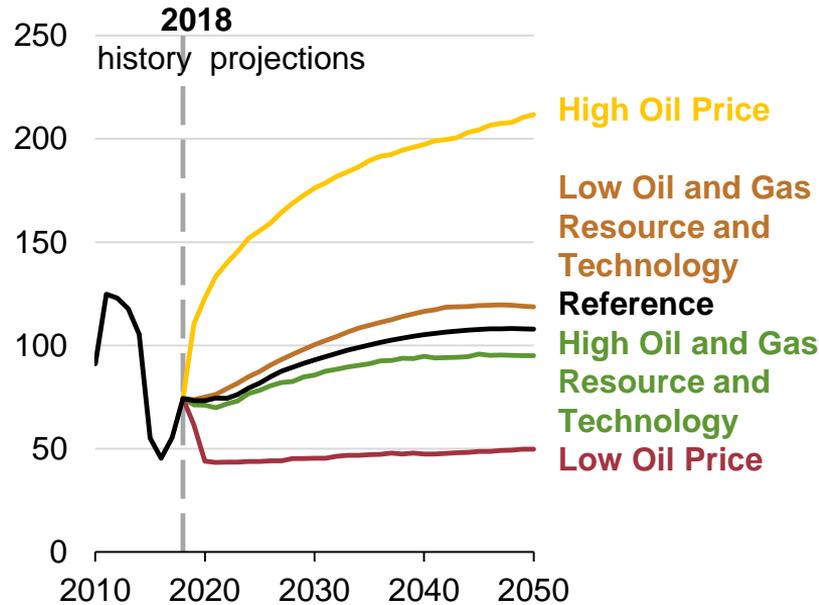


Source: U.S. Energy Information Administration Annual Energy Outlook 2019

Oil and natural gas prices are affected by assumptions about international supply and demand and the development of U.S. shale resources

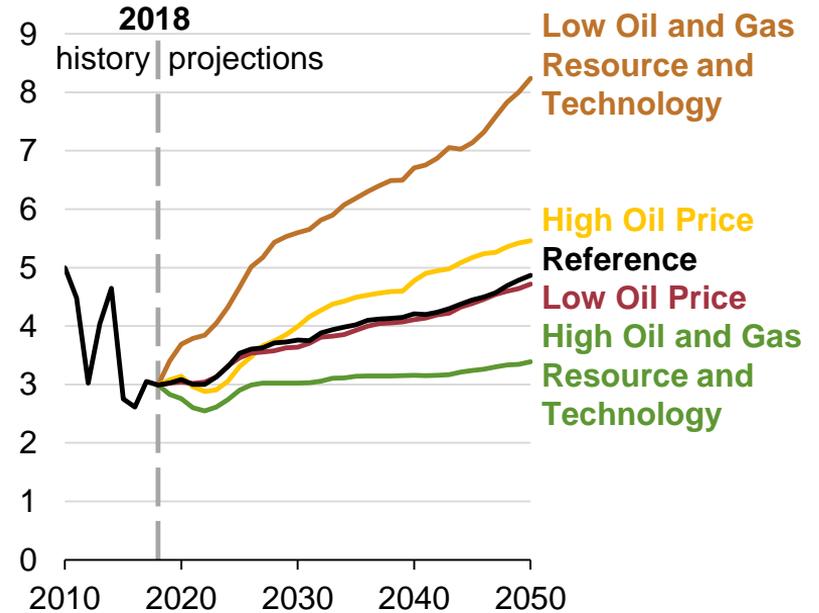
North Sea Brent oil price

2018 dollars per barrel



Natural gas price at Henry Hub

2018 dollars per million British thermal unit

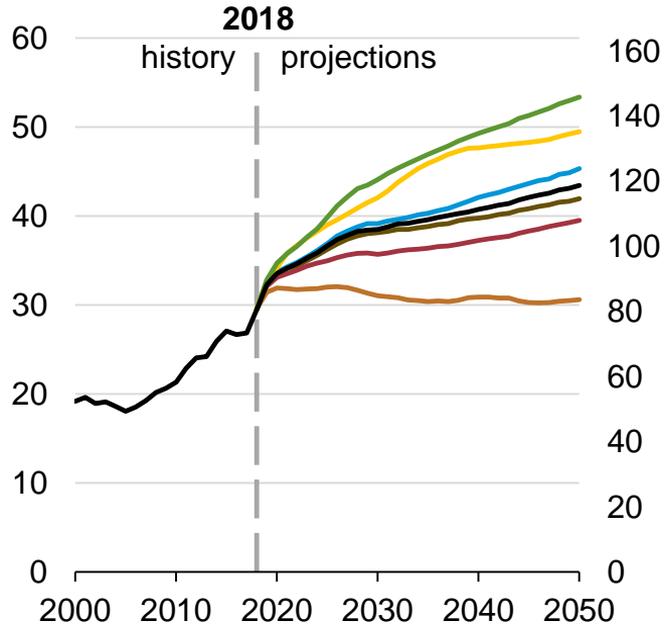


Source: U.S. Energy Information Administration Annual Energy Outlook 2019

U.S. natural gas consumption and production increase in most cases with production growth outpacing natural gas consumption in all cases

Dry natural gas production

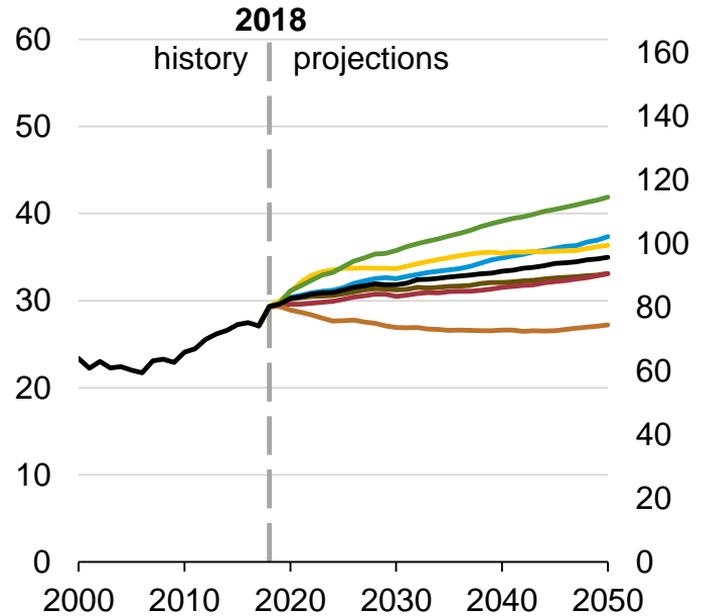
trillion cubic feet billion cubic feet per day



High Oil and Gas Resource and Technology
 High Oil Price
 High Economic Growth
 Reference
 Low Economic Growth
 Low Oil Price
 Low Oil and Gas Resource and Technology

Natural gas consumption

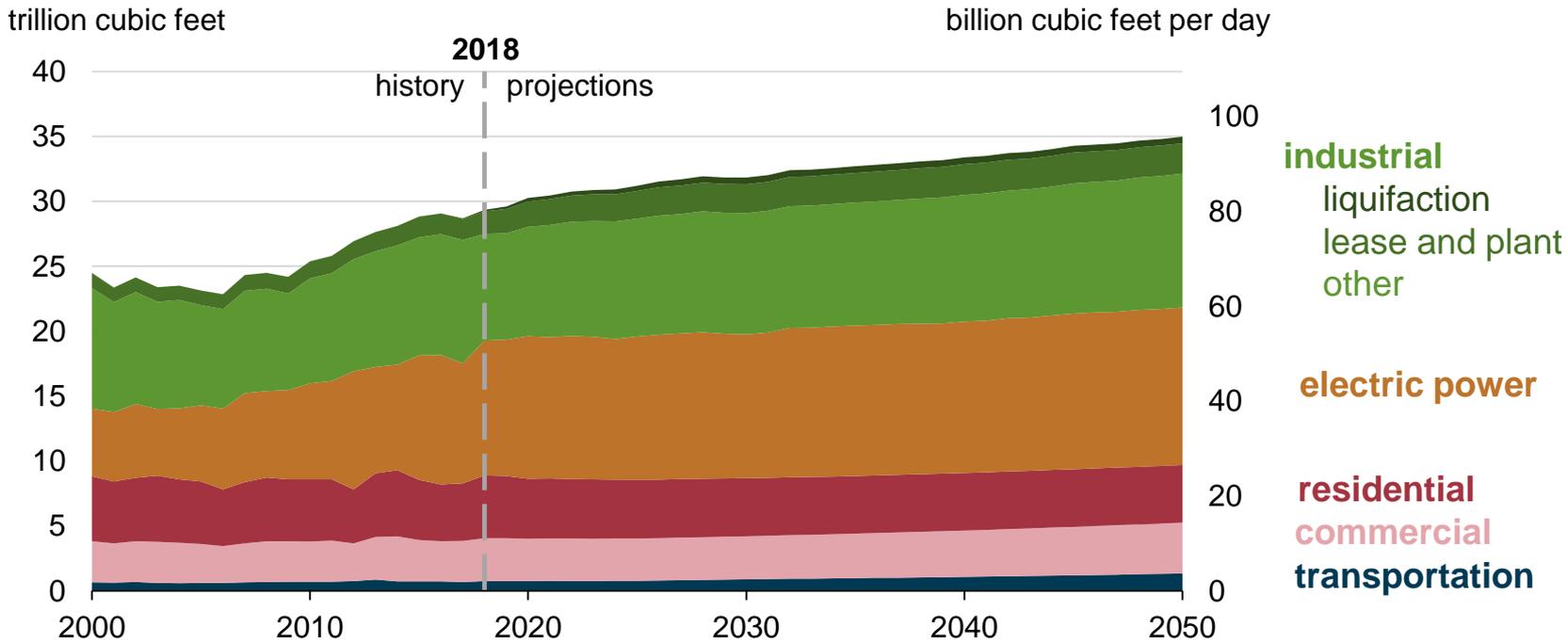
trillion cubic feet billion cubic feet per day



Source: U.S. Energy Information Administration Annual Energy Outlook 2019

The industrial sector, followed by the electric power sector, drives U.S. natural gas consumption growth

Natural gas consumption by sector (Reference case)

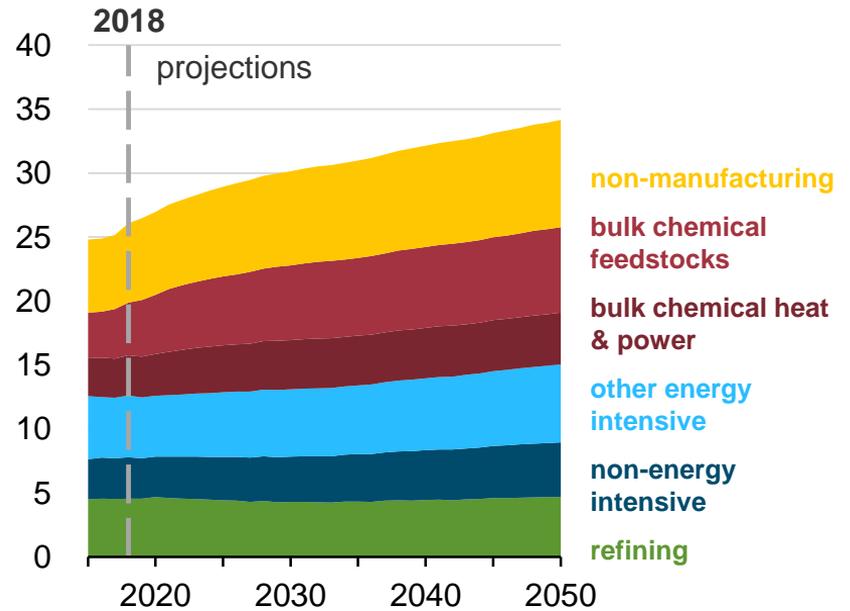
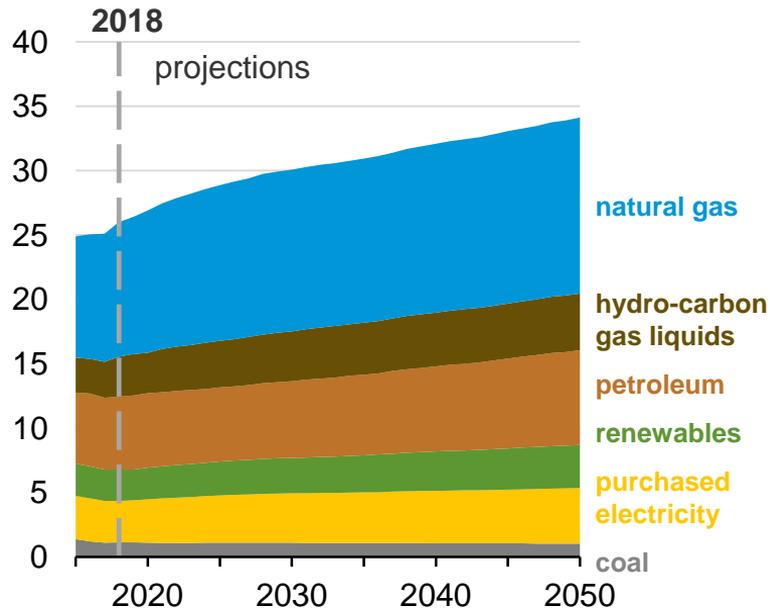


Source: U.S. Energy Information Administration Annual Energy Outlook 2019

Natural gas continues to be the largest energy source for the industrial sector, with bulk chemicals and non-manufacturing industries driving growth

Industrial energy consumption by energy source and subsector

quadrillion British thermal units

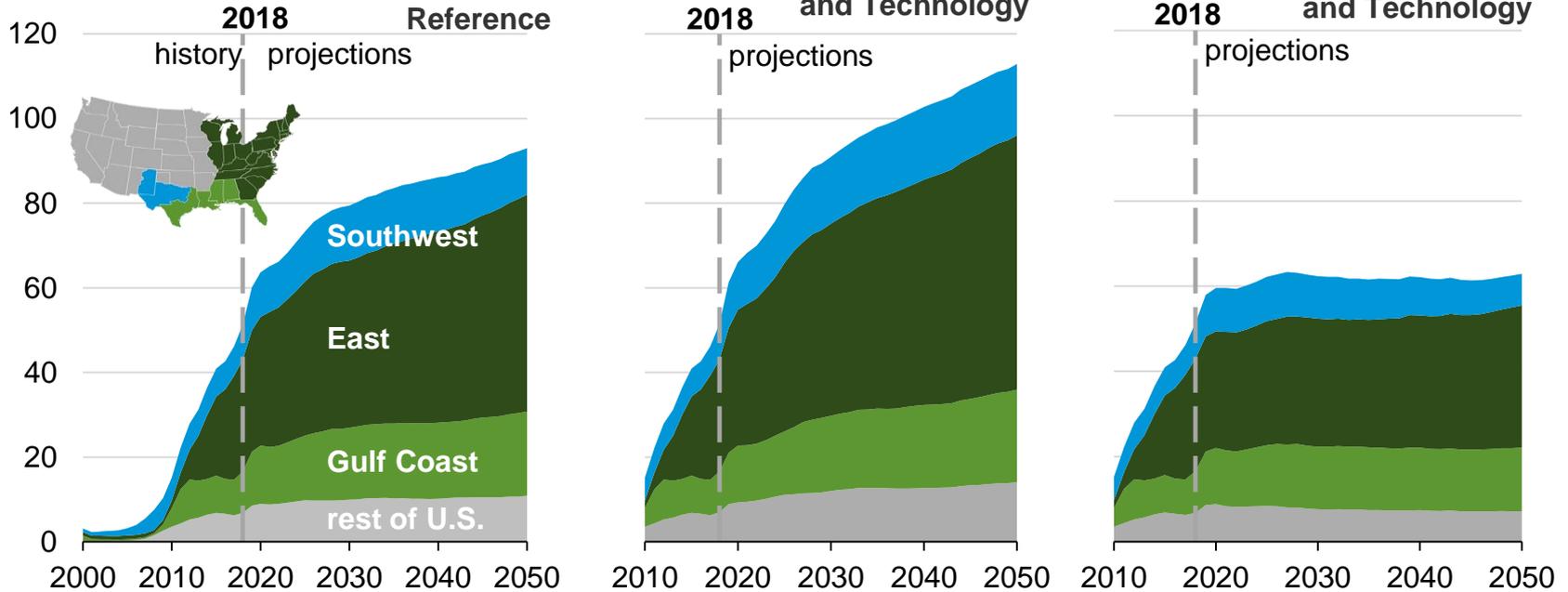


Source: U.S. Energy Information Administration Annual Energy Outlook 2019

Eastern U.S. production of natural gas from shale resources leads growth in the Reference case

Dry shale gas production by region

billion cubic feet per day

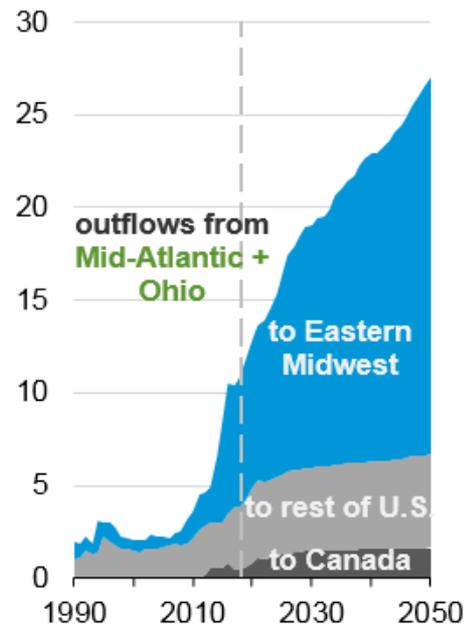
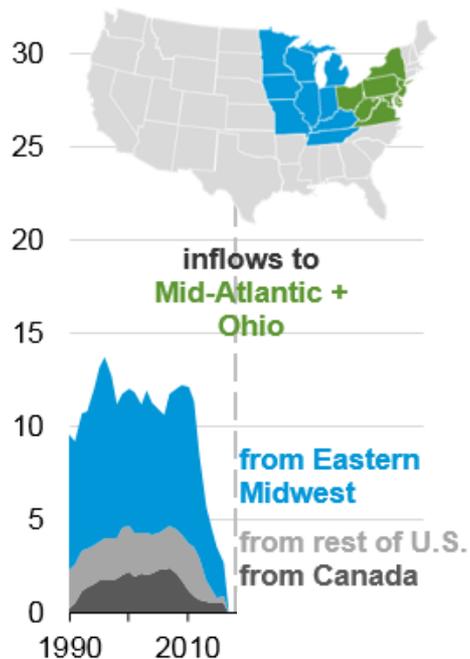
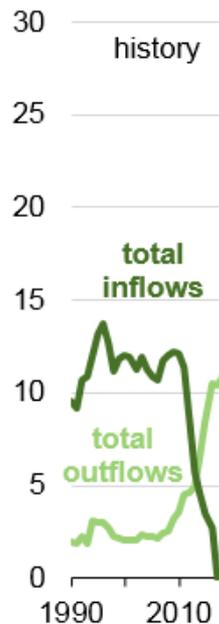


Source: U.S. Energy Information Administration Annual Energy Outlook 2019

Increases in natural gas production from Appalachia affect natural gas flows at a national level

Regional natural gas flows to and from Mid-Atlantic + Ohio region (1990-2050)

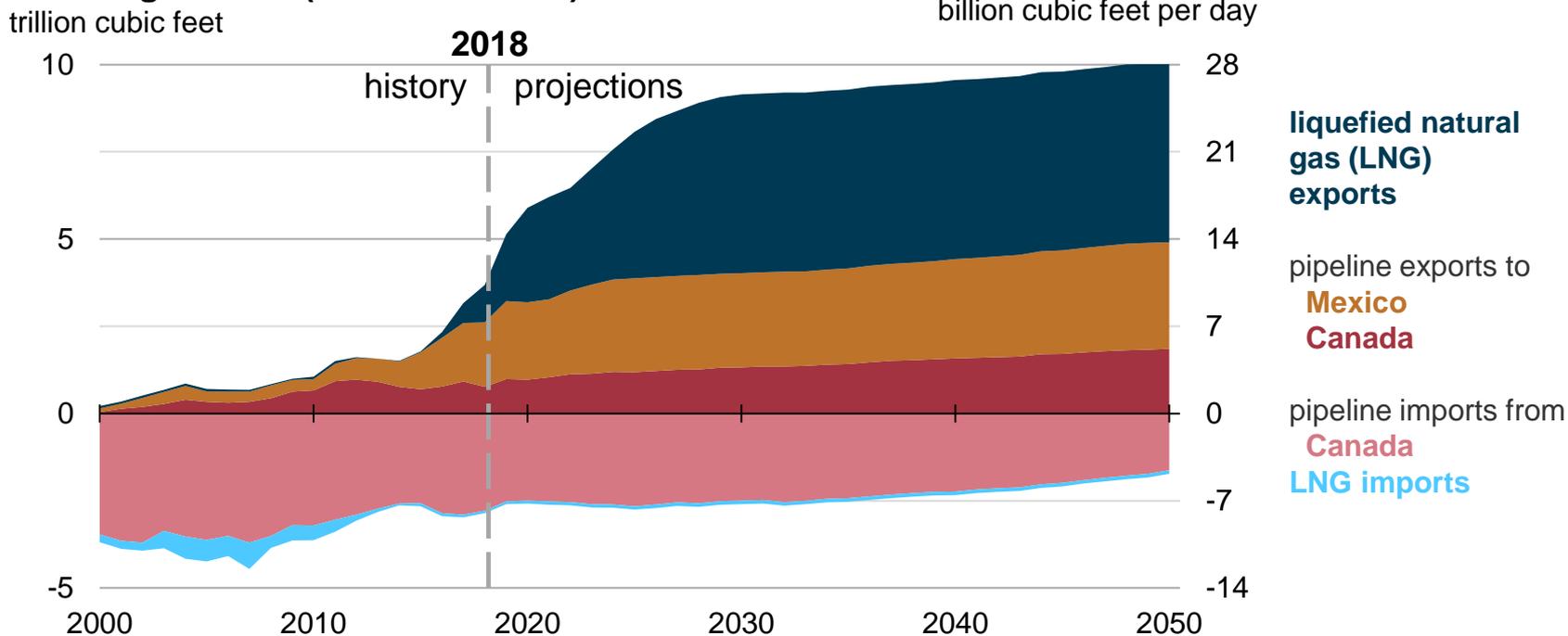
billion cubic feet per day



Source: U.S. Energy Information Administration, *Natural Gas Annual and Annual Energy Outlook 2019*

U.S. net exports of natural gas continue to grow in the Reference case, led by growth in LNG exports to overseas markets

Natural gas trade (Reference case)

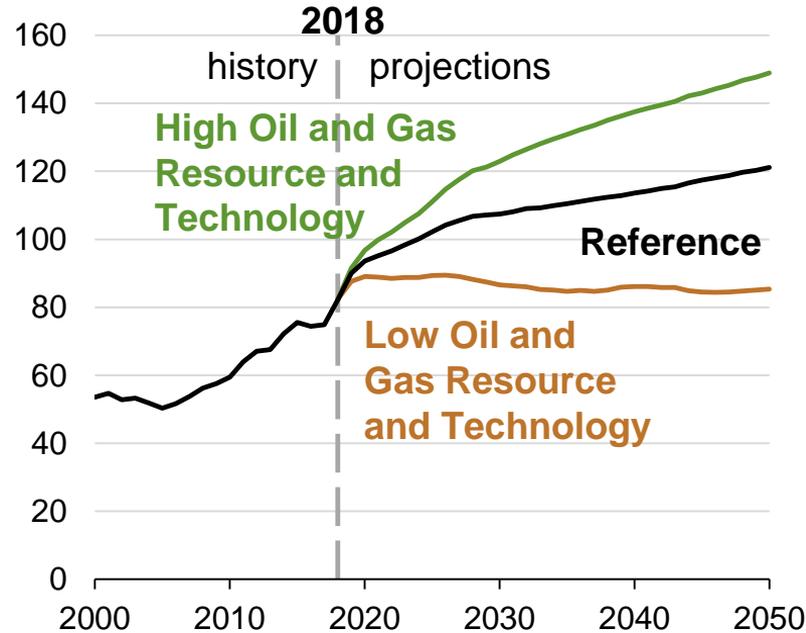


Source: U.S. Energy Information Administration Annual Energy Outlook 2019

Natural gas prices across cases are dependent on resource and technology assumptions

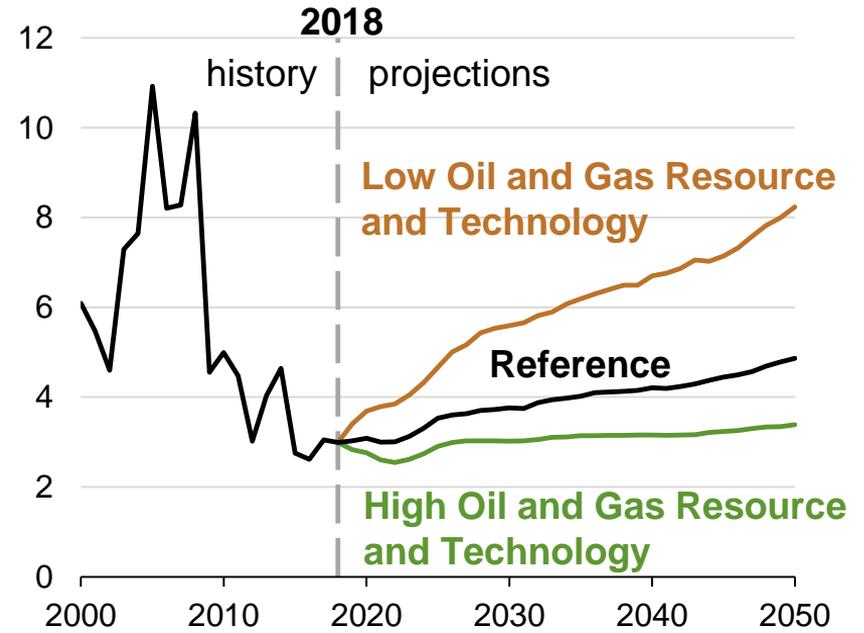
Dry natural gas production

billion cubic feet per day



Natural gas spot price at Henry Hub

2018 dollars per million British thermal unit

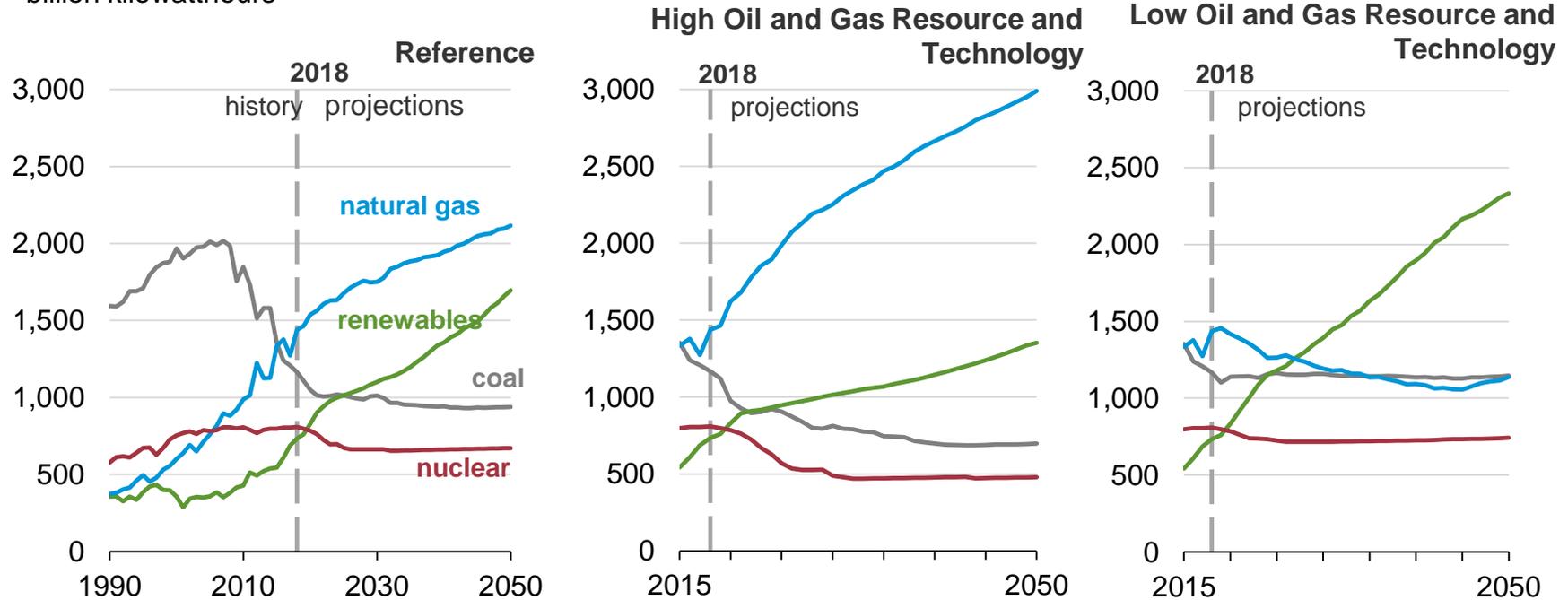


Source: U.S. Energy Information Administration Annual Energy Outlook 2019

The level of natural gas growth in the generation fuel mix is driven by natural gas prices

Electricity generation from selected fuels

billion kilowatthours

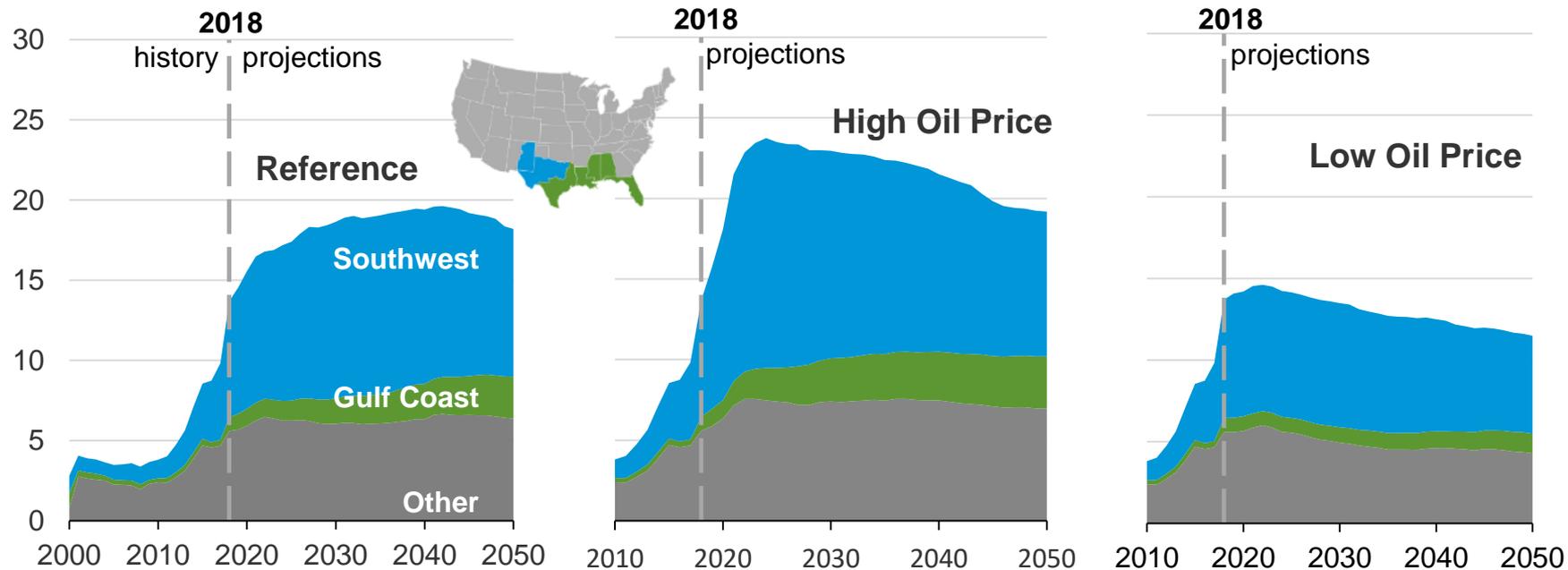


Source: U.S. Energy Information Administration Annual Energy Outlook 2019

The United States continues to produce large volumes of natural gas from oil formations, even with relatively low oil prices, impacting natural gas prices

Dry natural gas production from oil formations

billion cubic feet per day

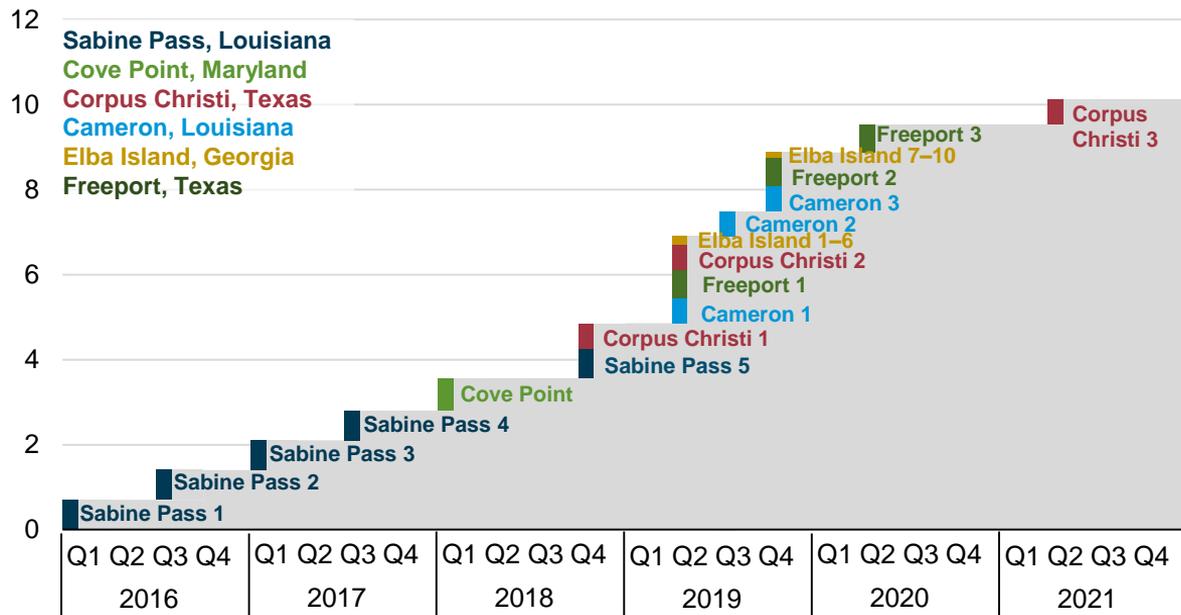


Source: U.S. Energy Information Administration Annual Energy Outlook 2019

U.S. liquefaction capacity expansions through 2021 may put upward pressure on natural gas prices

U.S. liquefied natural gas export capacity, 2016-2021

billion cubic feet per day



- Currently 7 operational LNG trains in the U.S. with a cumulative LNG capacity of 4.9 Bcf/d
- Major expansion in 2019 as 3 more projects start commissioning, adding 4.0 Bcf/d
- In 2020-21, the remaining 2 trains will come online, expanding U.S. LNG capacity to 10.2 Bcf/d

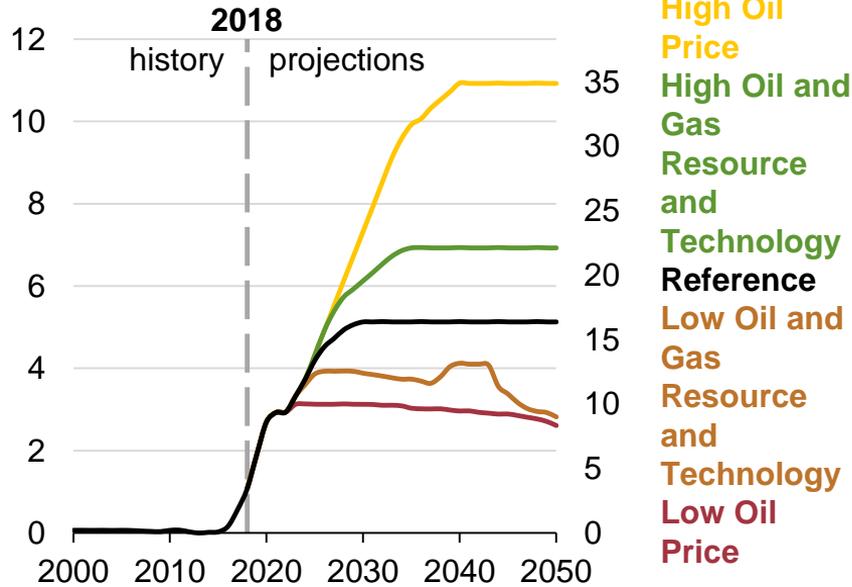
Source: U.S. Energy Information Administration

The wide range of projected U.S. LNG export volumes across cases results from its sensitivity to both oil prices and natural gas prices

Liquefied natural gas exports

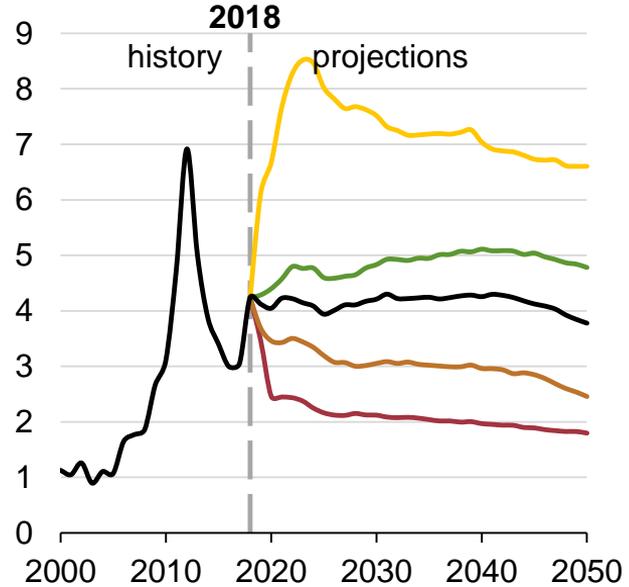
trillion cubic feet

billion cubic feet per day



Brent crude oil price to Henry Hub natural gas price ratio

energy-equivalent terms

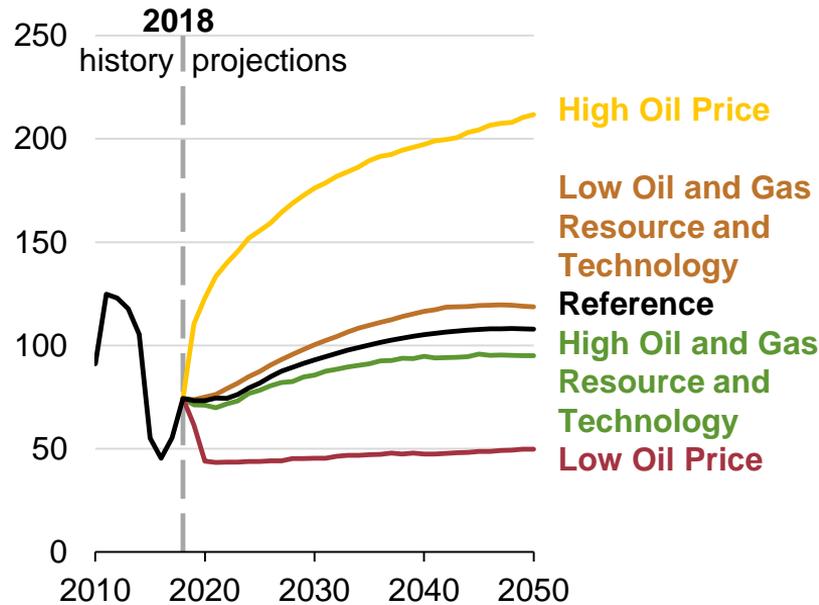


Source: U.S. Energy Information Administration Annual Energy Outlook 2019

Oil and natural gas prices are affected by assumptions about international supply and demand and the development of U.S. shale resources

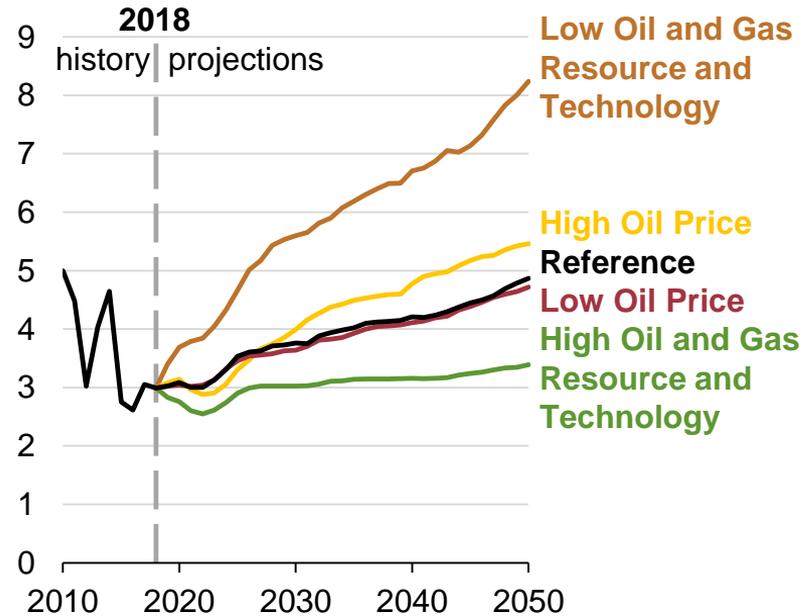
North Sea Brent oil price

2018 dollars per barrel



Natural gas price at Henry Hub

2018 dollars per million British thermal unit



Source: U.S. Energy Information Administration Annual Energy Outlook 2019

For more information

U.S. Energy Information Administration home page | www.eia.gov

Annual Energy Outlook | www.eia.gov/forecasts/aeo

Short-Term Energy Outlook | www.eia.gov/forecasts/steo

International Energy Outlook | www.eia.gov/forecasts/ieo

Today In Energy | www.eia.gov/todayinenergy

Monthly Energy Review | www.eia.gov/totalenergy/data/monthly

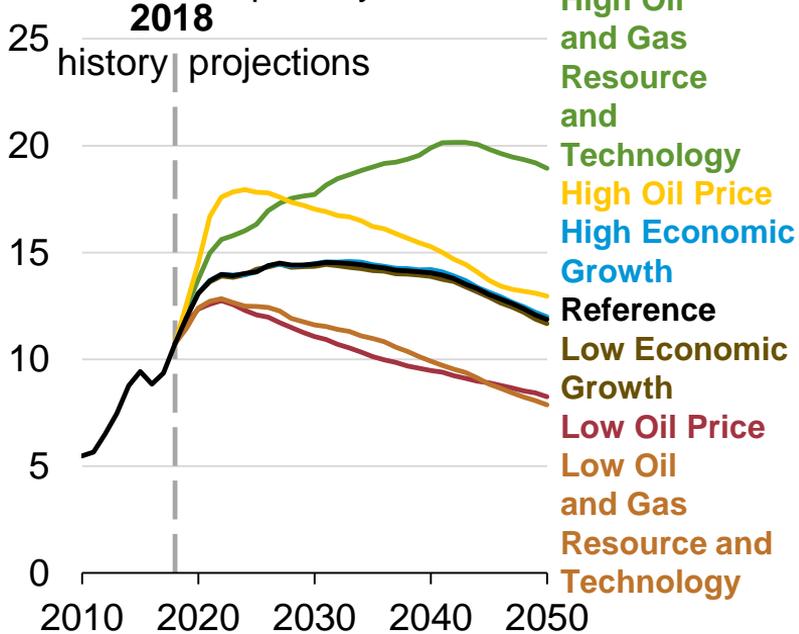
State Energy Portal | www.eia.gov/state

Supplemental

Production of U.S. crude oil and natural gas plant liquids continues to grow through 2025 in the Reference case

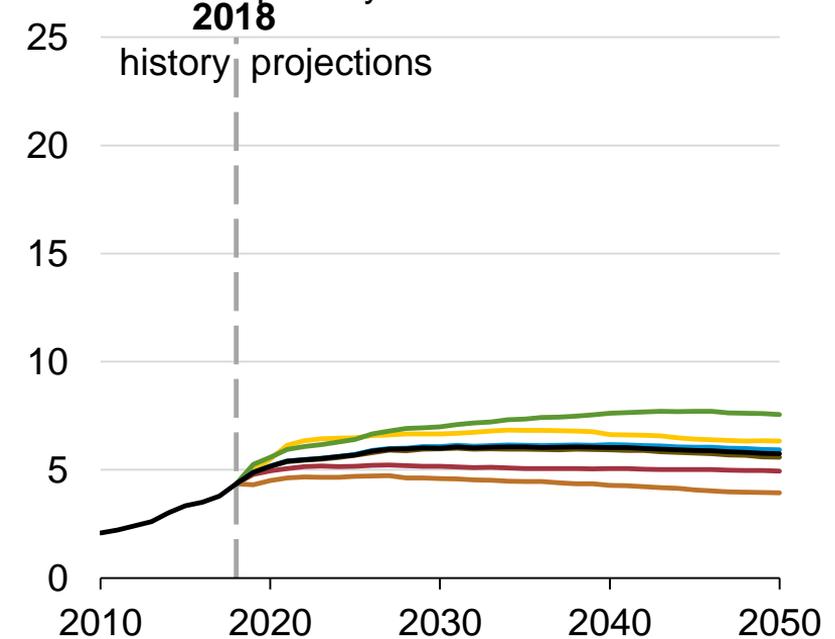
U.S. crude oil production

million barrels per day



U.S. natural gas plant liquids production

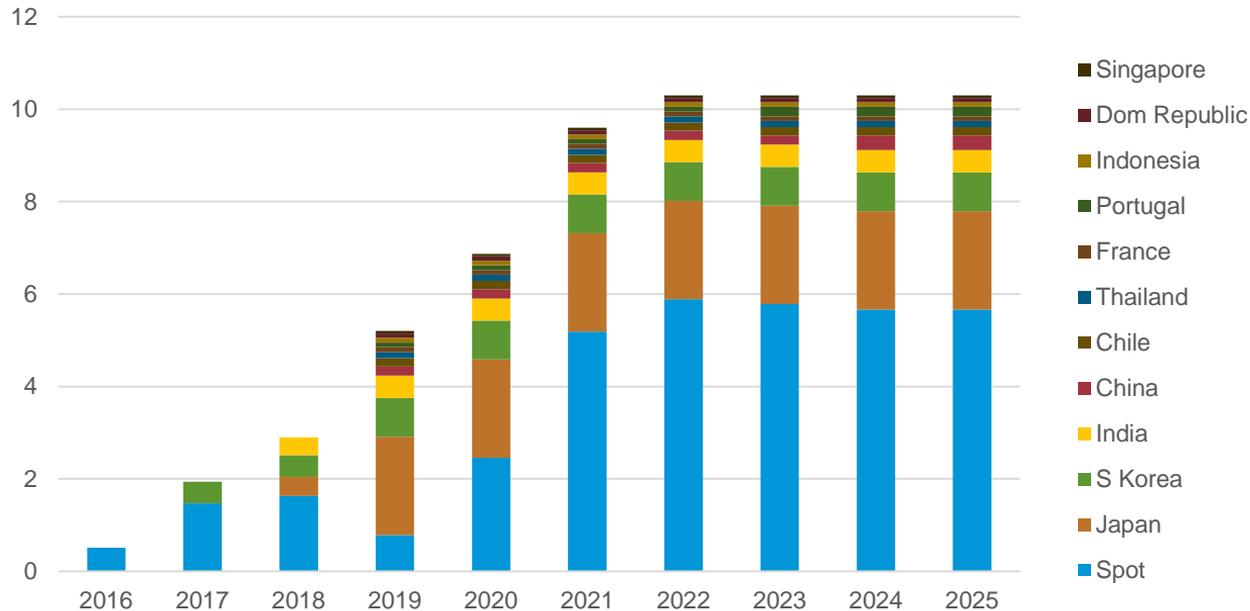
million barrels per day



More than 50% of U.S. LNG exports will be supplied on a spot basis

U.S. actual and projected LNG exports by destination country, 2016-25

billion cubic feet per day



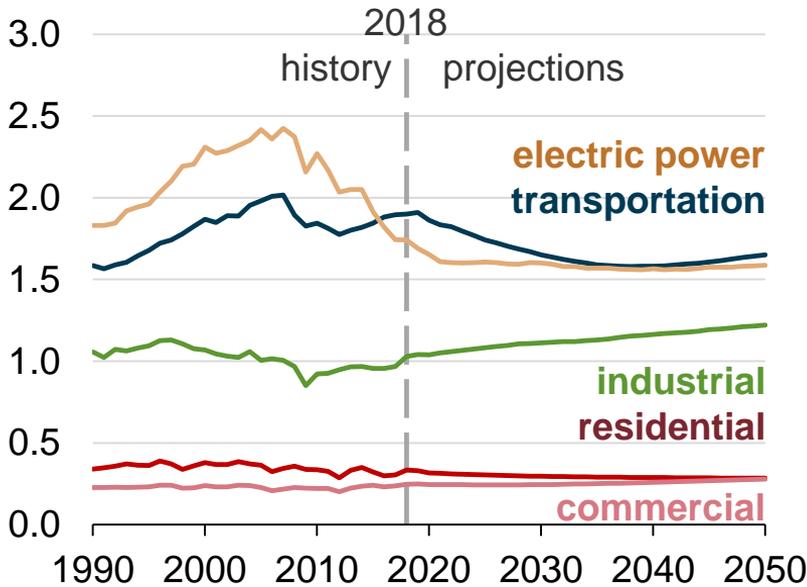
Source: U.S. Energy Information Administration, GIIGNL

- More than 95% of U.S. LNG has been contracted long-term by 37 buyers.
- Only a few of these buyers have a designated import country.
- Most of U.S. LNG will be traded in the global spot markets.
- Some buyers with a designated country are unlikely to take all LNG to that country (for ex., Japan).

Total CO2 emissions grew in 2018, but are projected to decline in the near term, and remain relatively flat for most sectors

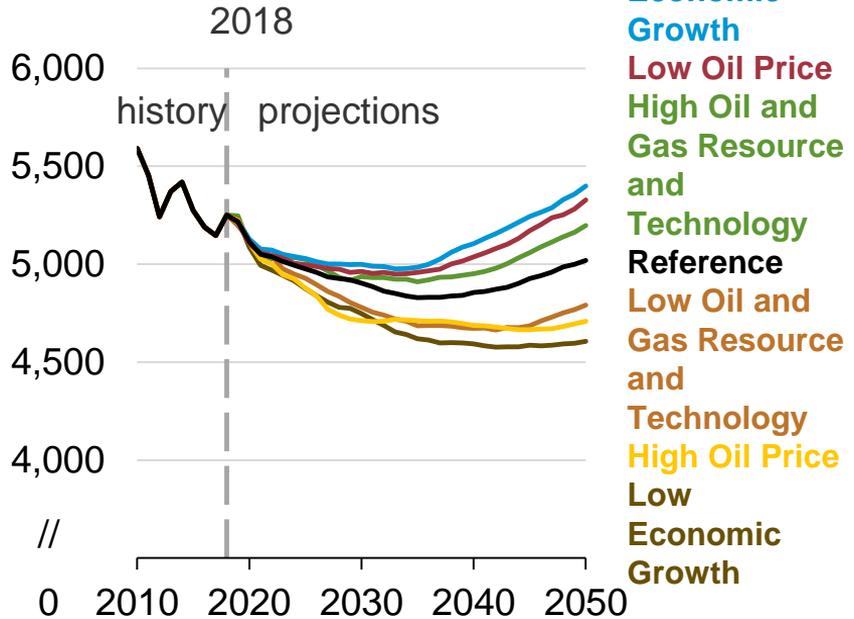
Energy-related carbon dioxide emissions by end-use sector (Reference case)

billion metric tons of carbon dioxide



Total carbon dioxide emissions

Million metric tons



U.S. dry natural gas production increases as a result of continued development of tight and shale resources

Dry natural gas production by type

trillion cubic feet

