

The Future of Natural Gas

Presentation to:
2019 Wyoming Oil and Gas Fair

By:
John Harpole

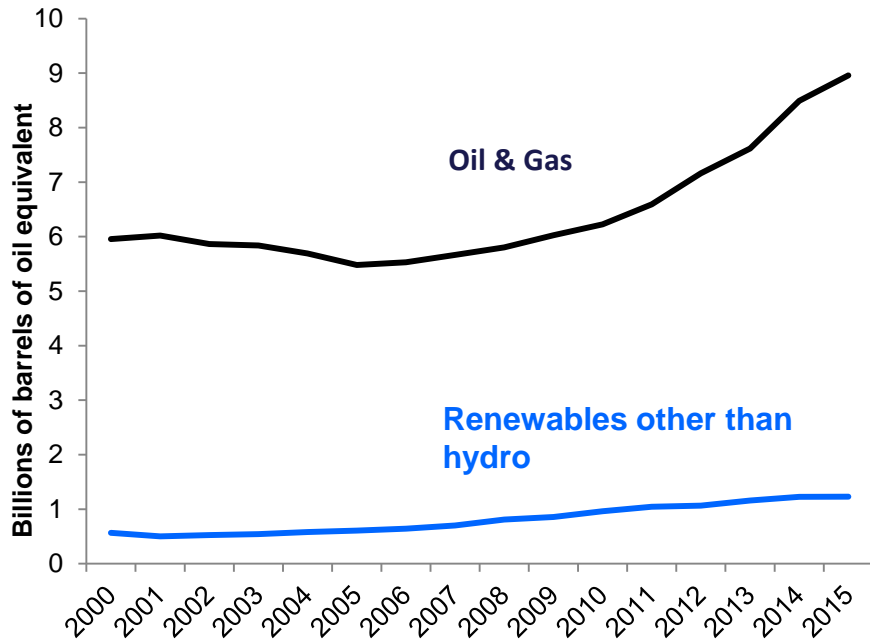


Mercator Energy_____

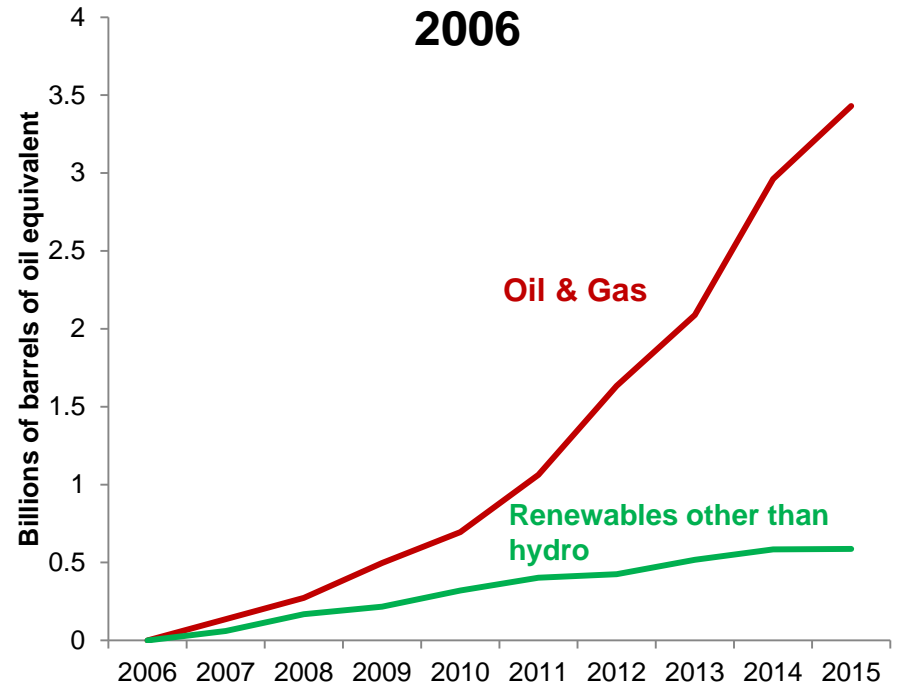
September 11, 2019

America's Soaring Gas and Oil Output

Total Production Since 2000



Growth in Production Since 2006

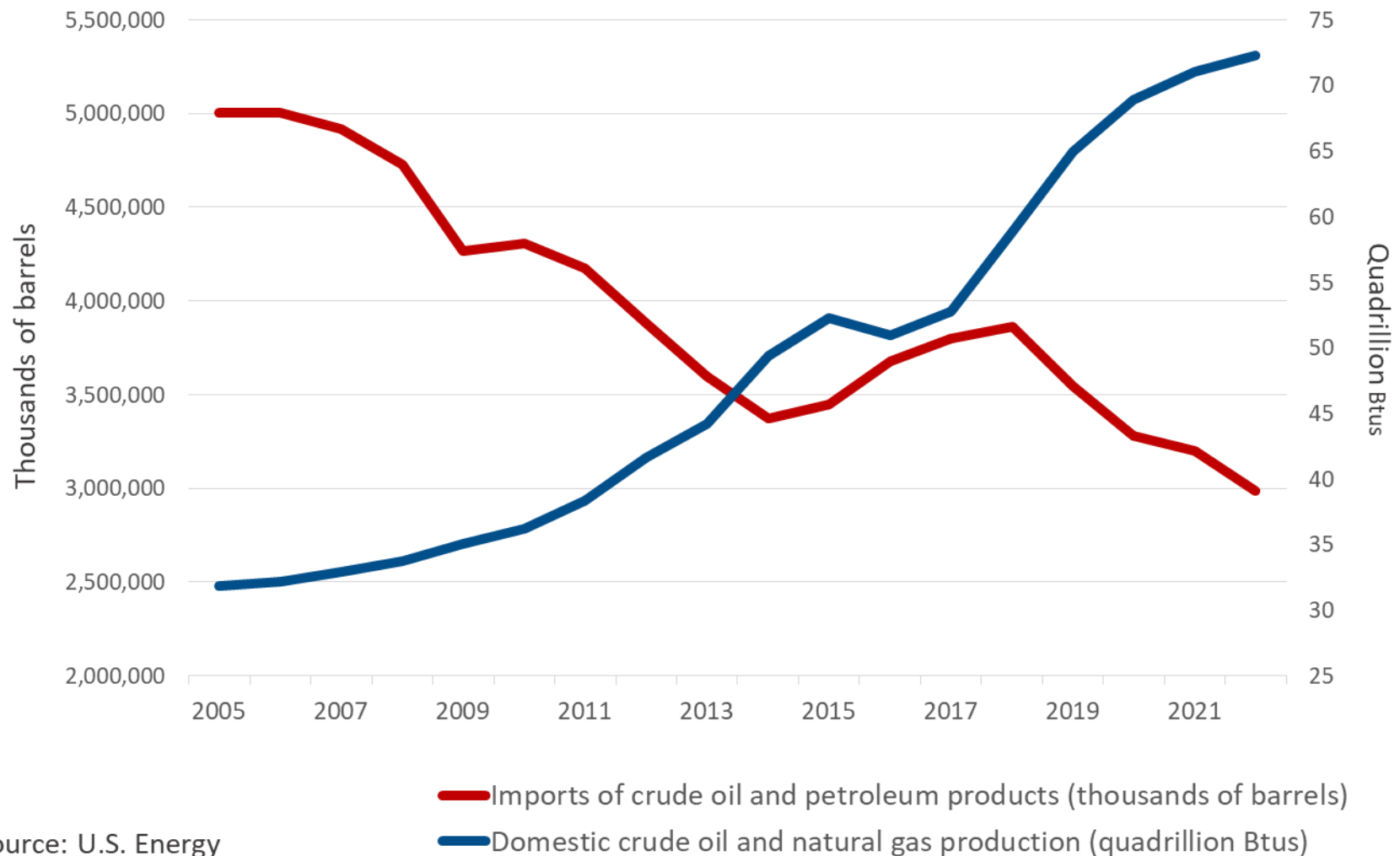


The growth in oil & gas production in the eight years exceeds by nearly two fold the total current production of energy from all renewable resources (excluding hydro dams). Most recent annual data through 2015.

Source: Energy Information Administration, Monthly Energy Review

Oil Imports Plunge

Oil Imports Plunge As U.S. Oil and Natural Gas Production Increases



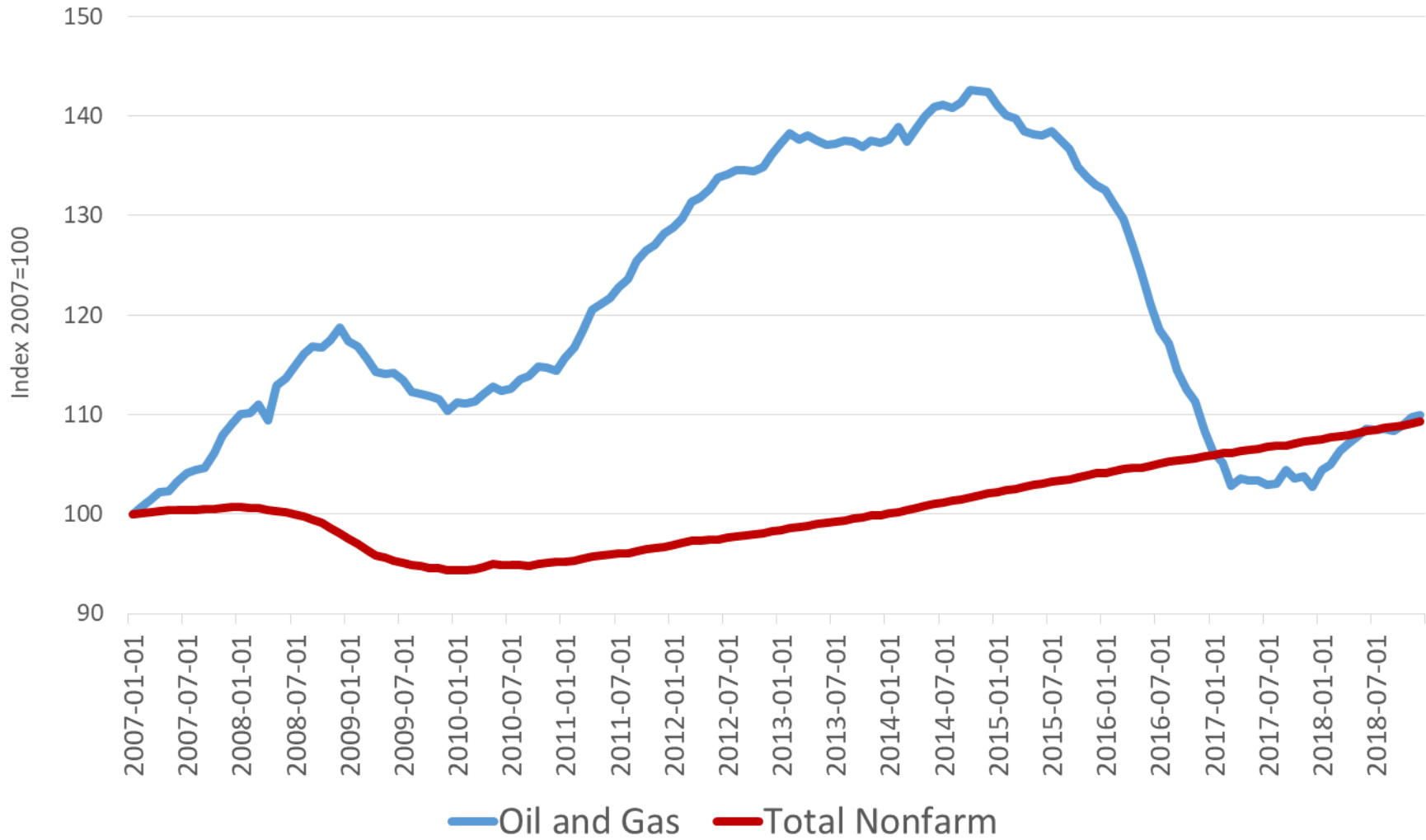
Source: U.S. Energy Information Administration



Source: "Trumponomics," Stephen Moore, September 2019

America's Oil Boom

Growth in Oil & Gas Employment Outpaces the Rest of the Economy



Source: Federal Reserve Bank of St. Louis



Source: "Trumponomics," Stephen Moore, September 2019

US Natural Gas Prices (Henry Hub) (\$/mmbtu)

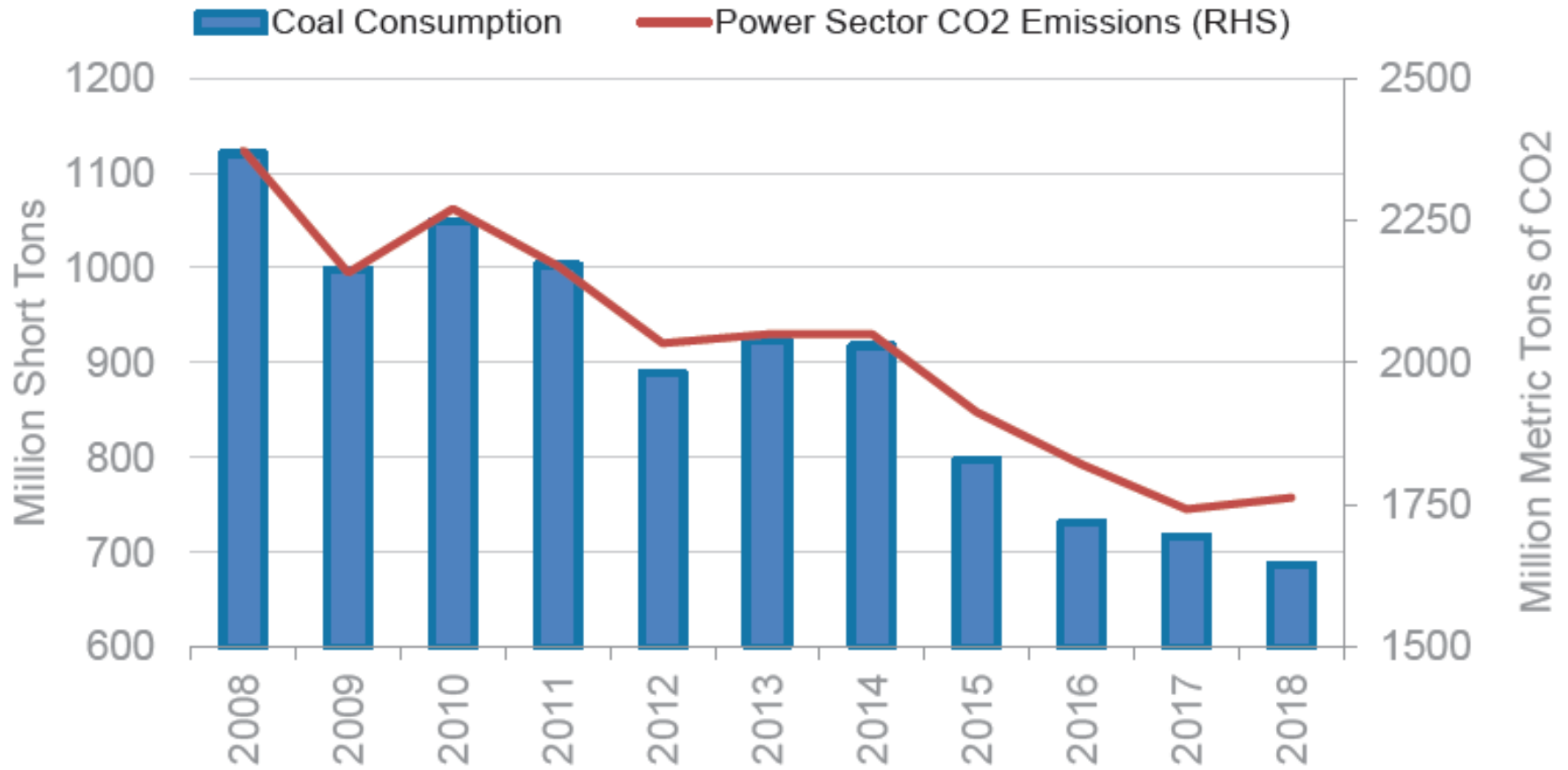


Source: Eikon, Morgan Stanley Research

The Impact?

- U.S. coal consumption has collapsed by nearly 50% since 2008
- During that same time period, there has been a 25% reduction in U.S. power sector carbon emissions
- 66 GW (20% of installed capacity) of U.S. coal-fired electric generation retired permanently

US Coal Consumption and Power Sector Emissions



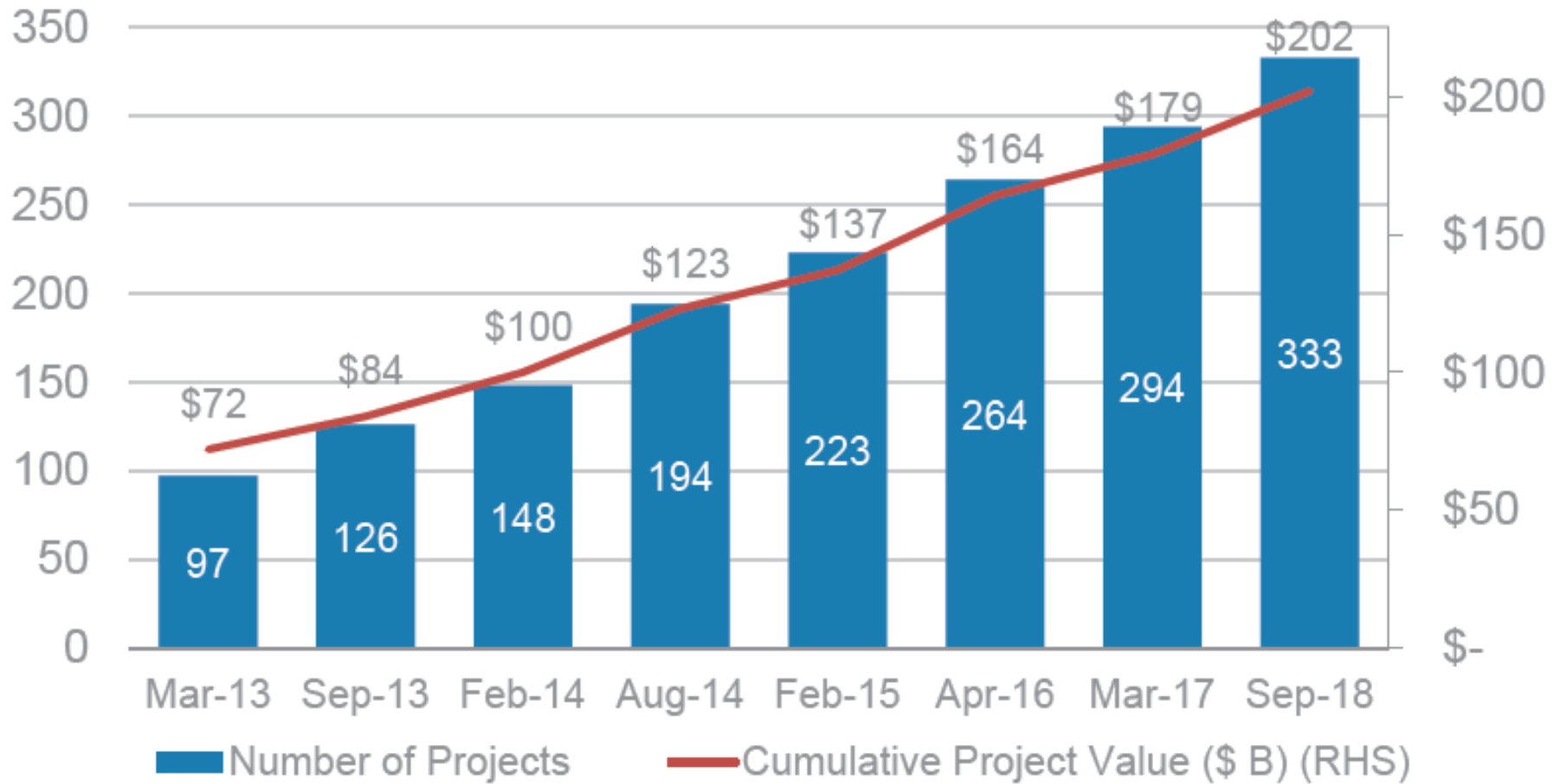
Source: EIA, Morgan Stanley Research

State Economic Outlook Ranking

Rank	Top Ten States	Rank	Bottom Ten States
1.	Utah	41.	Oregon
2.	Idaho	42.	Maine
3.	Indiana	43.	Montana
4.	North Dakota	44.	Minnesota
5.	Arizona	45.	Hawaii
6.	Florida	46.	New Jersey
7.	North Carolina	47.	California
8.	Wyoming	48.	Illinois
9.	South Dakota	49.	Vermont
10.	Virginia	50.	New York

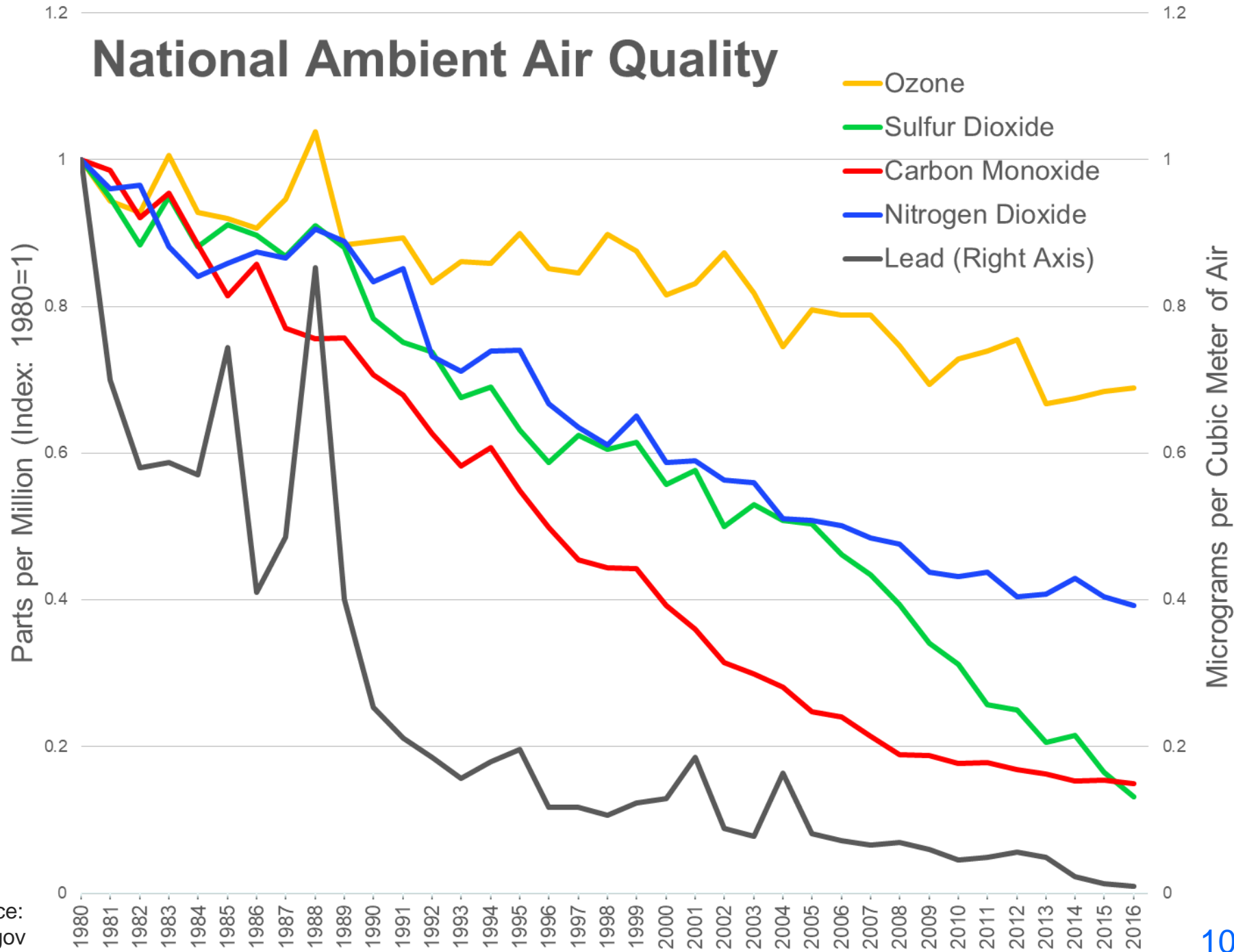
Source: Rich States Poor States, Eleventh Edition, American Legislative Exchange Council

Cumulative Value of US Shale-Based Chemical Projects



Source: ACC, Morgan Stanley Research

National Ambient Air Quality



Source: epa.gov

No EU Countries Meeting Targets for Paris Agreement Emission Reduction



Source: Climate Action Network Europe

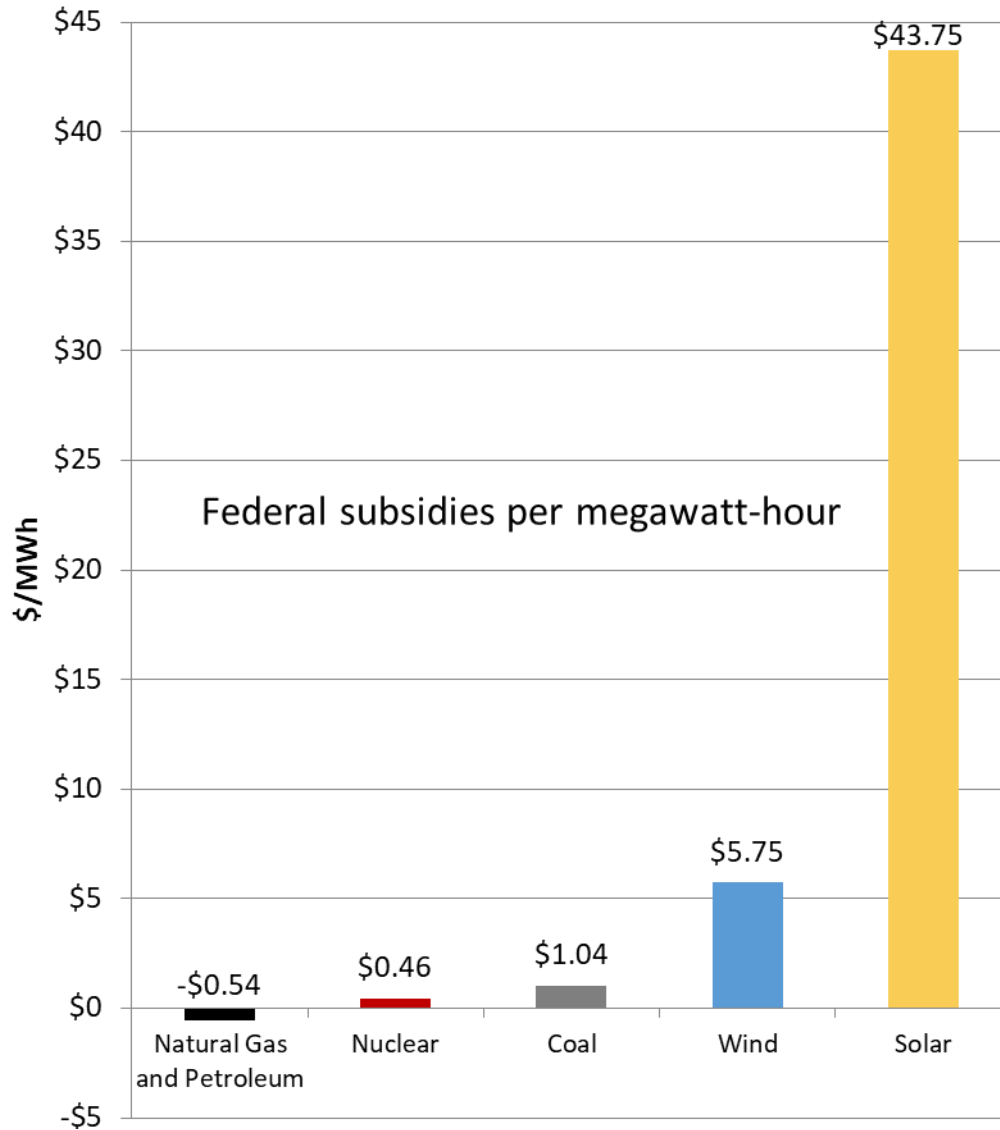
Source: "Trumponomics," Stephen Moore, September 2019

Big Shoulders for Natural Gas

- Lower commodity costs for consumers have allowed the utility sector to invest \$800 billion into infrastructure without an increase in average inflation-adjusted electric and gas rates



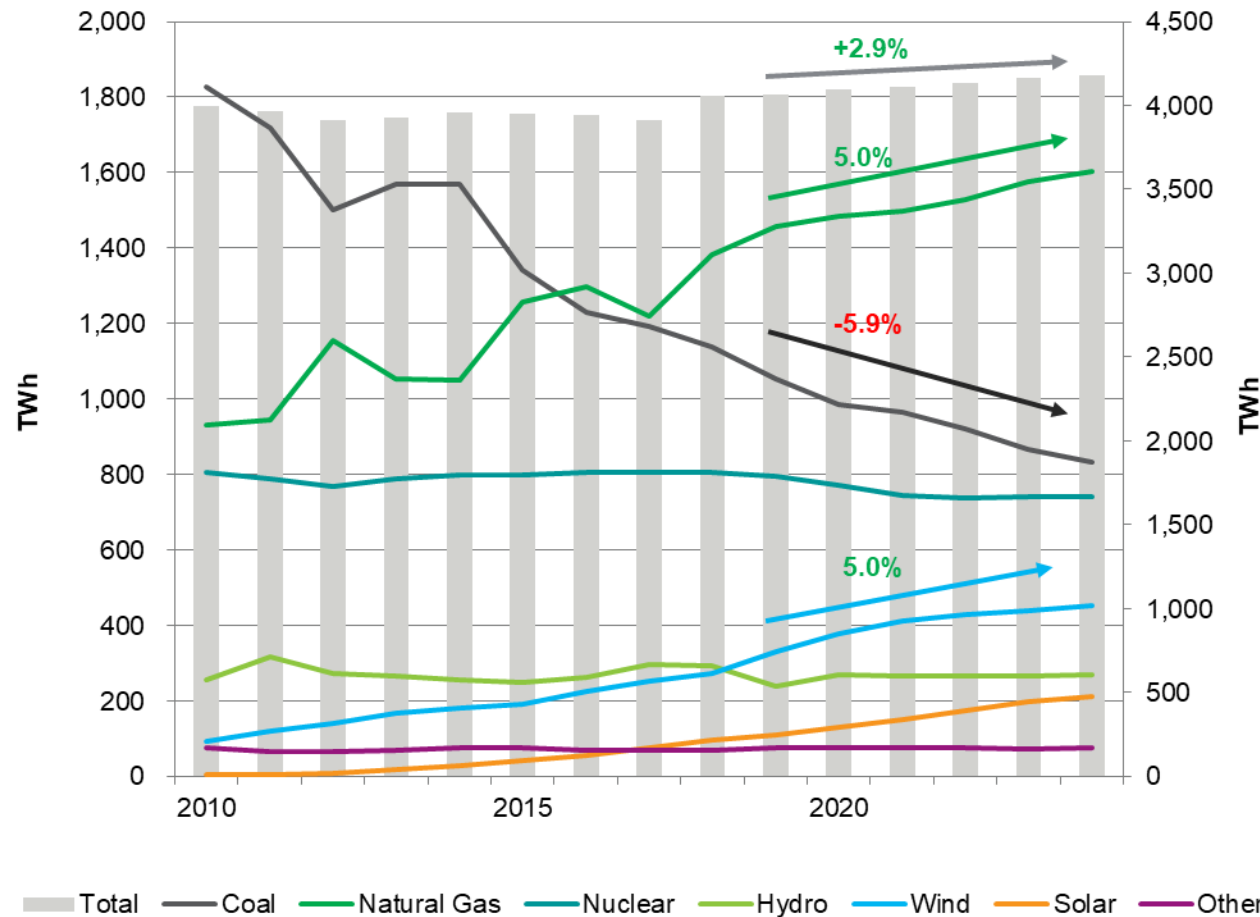
Who Gets Taxpayer Subsidies?



Source: EIA (FY 2016)

Renewables and gas compete for falling coal generation

US lower-48 generation by fuel source



Source: IHS Markit, EIA for historical data

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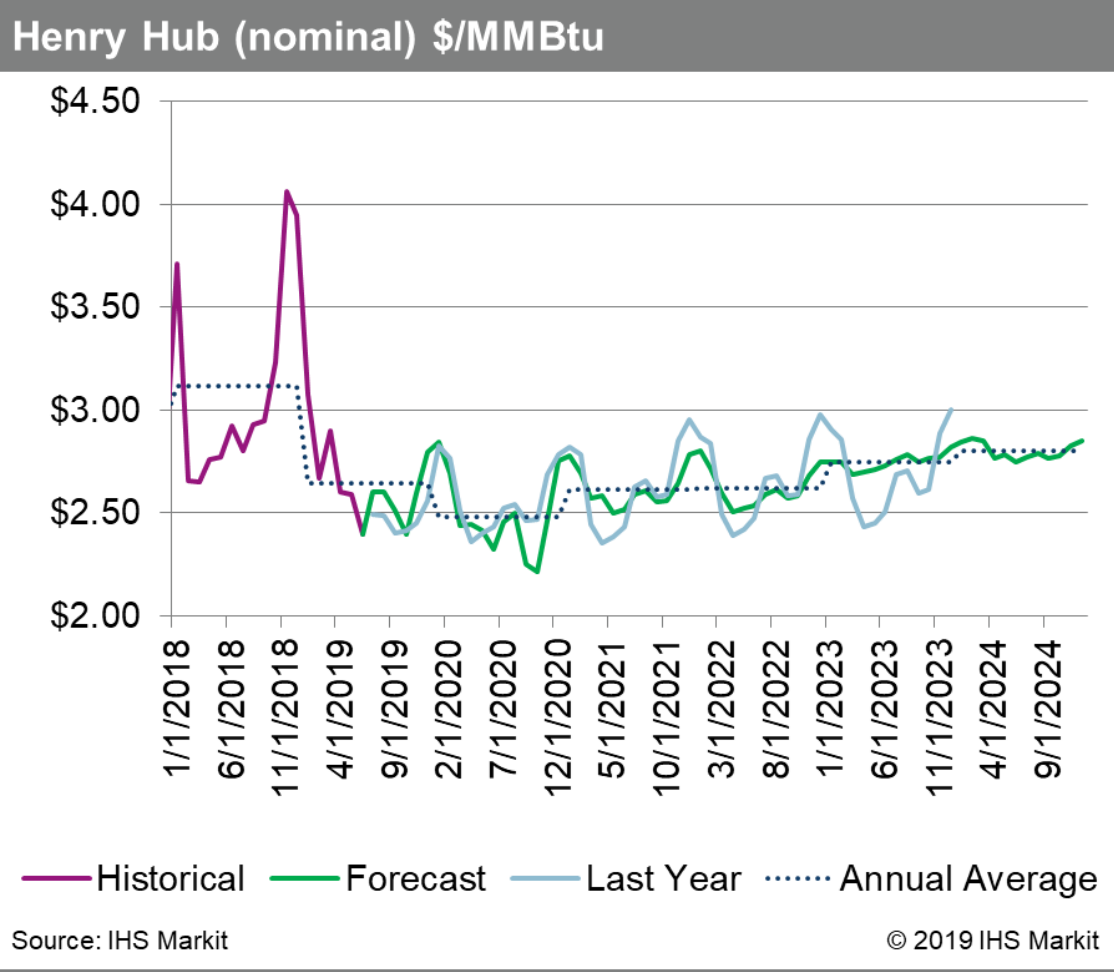
Between 2019 and 2024 overall power generation grows only 2.9%.

Coal fired generation falls from 25.9% in 2019 to 20% by 2024.

Solar and wind grow from 10.9% to 15.9% total market share between 2019 and 2024.

Gas fired generation grows from 36.3% in 2019 to 38.3% in 2024.

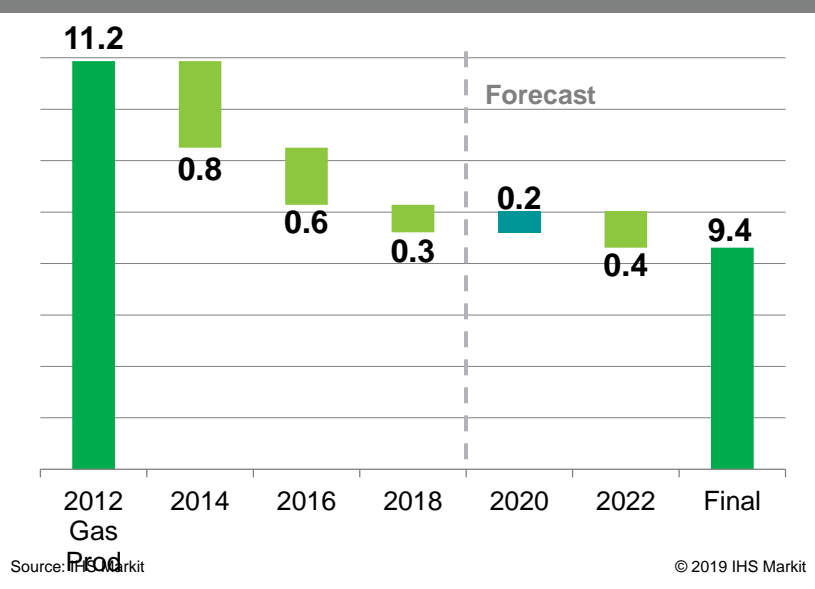
Henry Hub – lower for longer and longer and...



- For the duration of this forecast period the market is in a supply push environment driven by rapid increases in Permian production.
- This also defines the major risk to this forecast – associated gas production, primarily from the Permian.
 - If it underperforms, then prices must signal more dry gas production from Haynesville and Marcellus.
 - If it is stronger than forecast, prices move even lower.
- On the demand side, the large driver, and the large risk, is LNG exports.
- Henry Hub prices will likely become more volatile as market expectations react to changes in domestic and global drivers.

Rockies Production Slide

Rockies Dry Gas Production (Bcf/d)



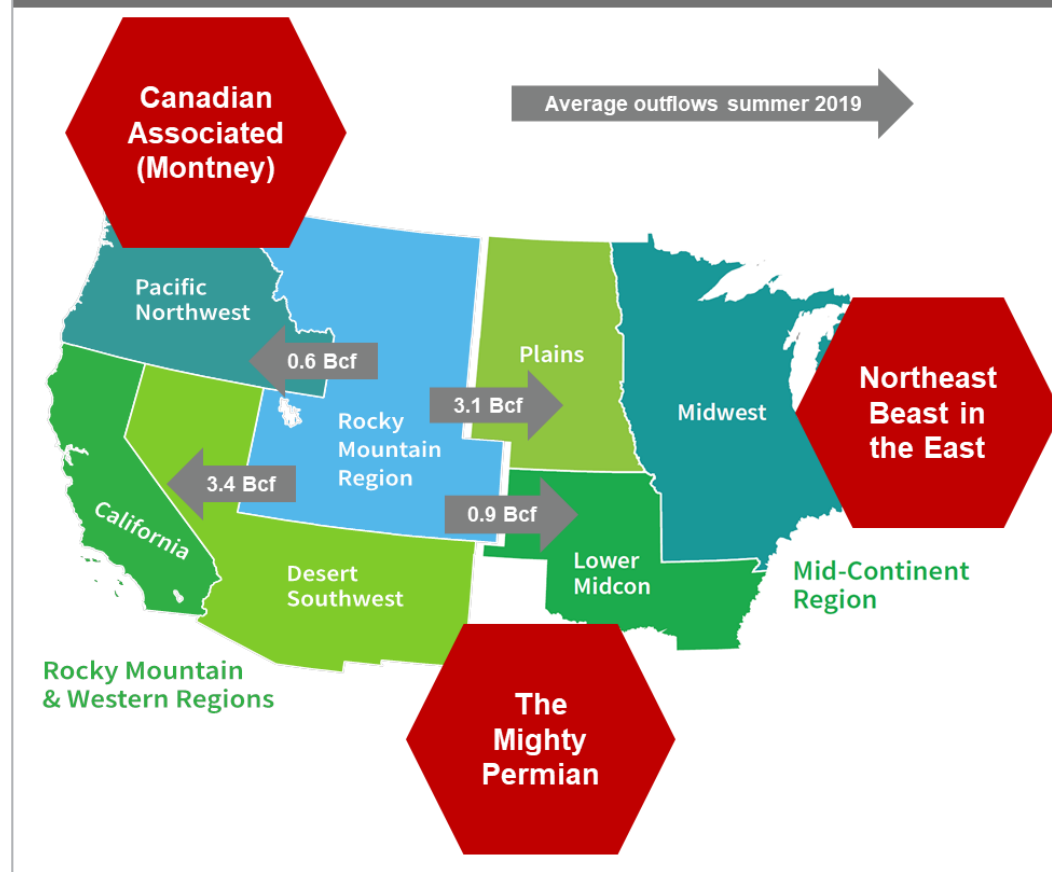
Cheaper Associated Gas Production On All Sides:

In a lower for longer price environment, traditional dry producing areas will see severe competition from “near zero” cost associated gas.

Rocky Mountain Regional Demand Stifled:

Moderate growth in domestic demand in the Rockies and downstream markets in California and the Midcontinent are not promising.

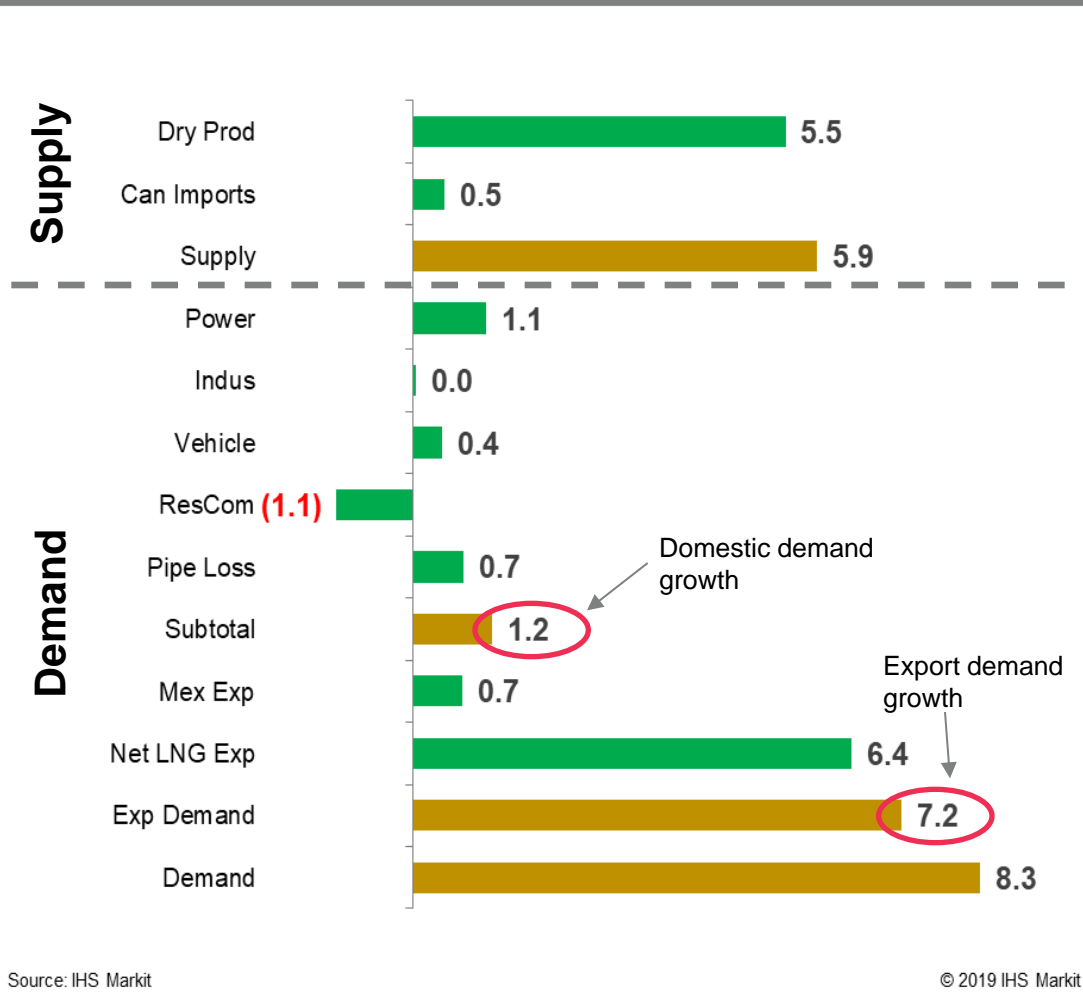
Barriers to Rockies Production Growth



Source: PointLogic Flow Data and LNG project Tracker

LNG demand growth dominates forecast

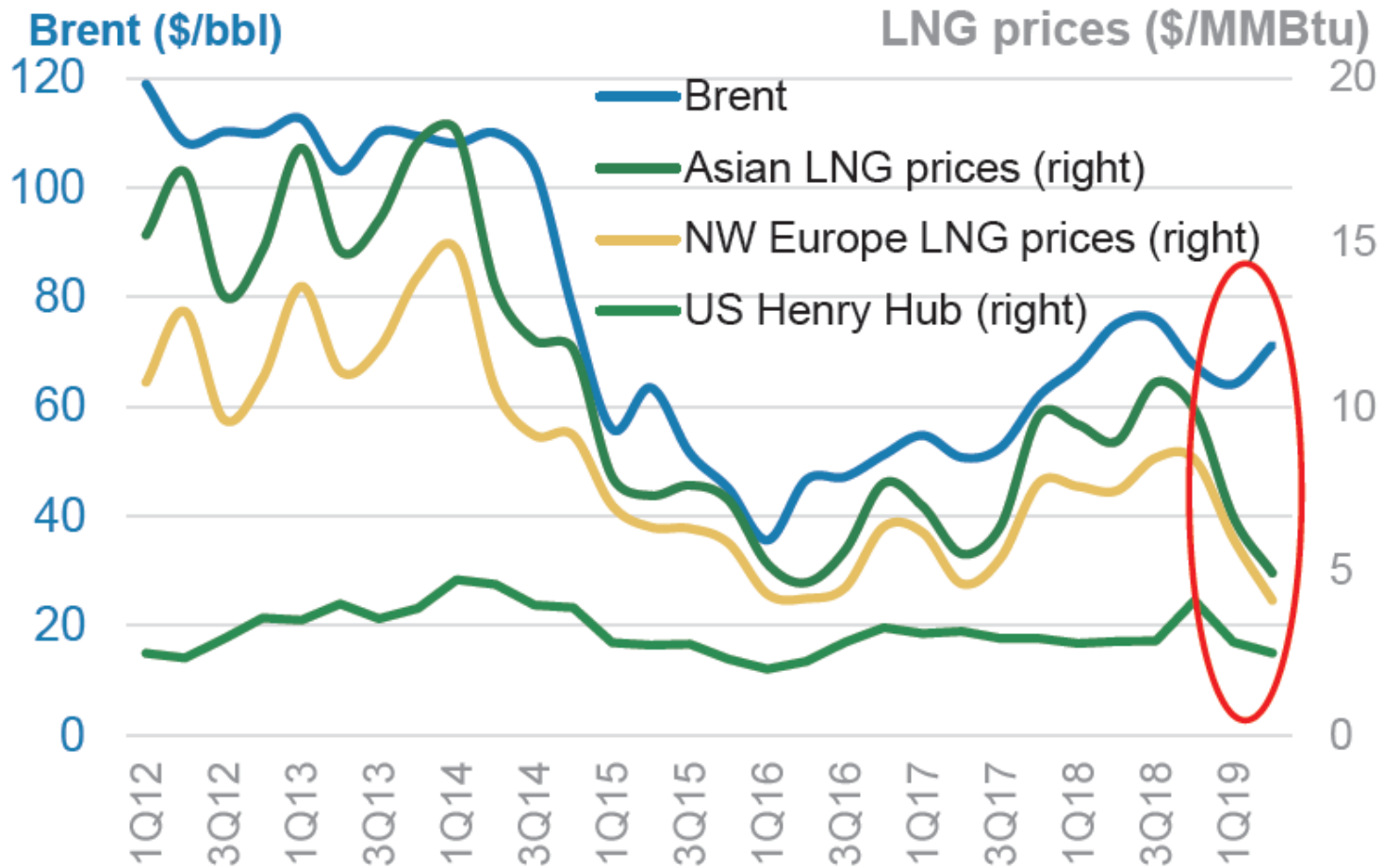
L48 Supply and Demand Change 2019-2024 (Bcf/d)



- Rapid production growth in 2018 ‘front ran’ growth in demand leading to rapid pace of storage injections this summer.
- **Nearly 90% of demand growth over the forecast period is from exports, primarily LNG export volumes.**
- **Production growth is substantial, but muted** compared to the strong trajectory over the past few years.
- Domestic demand growth is led by power generation.

De-Coupled

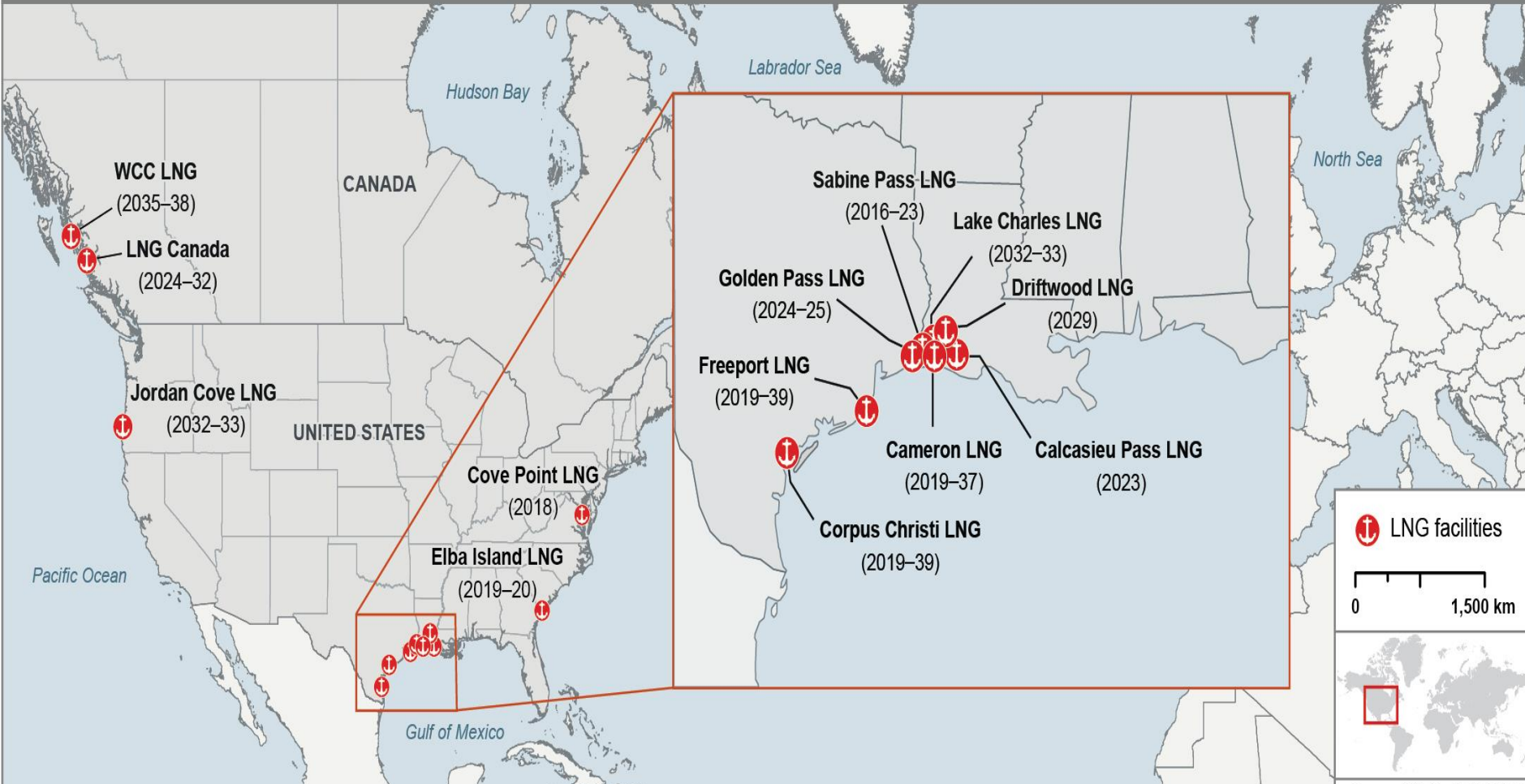
- U.S. shale gas and U.S. LNG exports have caused worldwide oil and natural gas prices to be de-coupled



Source: Eikon, Platts, Morgan Stanley Research

North American LNG projects and forecast in-service dates in the current outlook

North American regasification facilities and advanced liquefaction projects

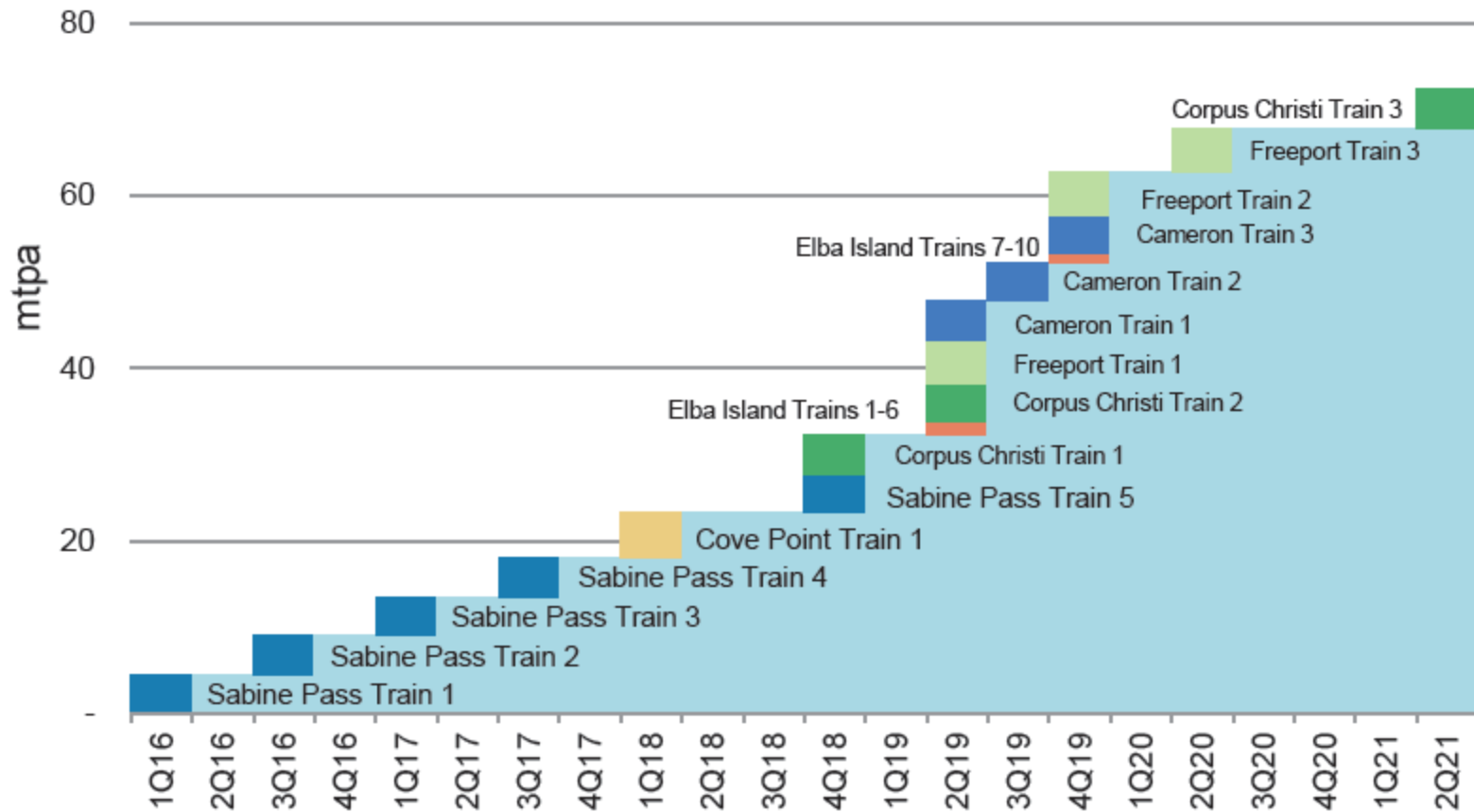


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Source: IHS Markit/1737436

U.S. LNG Export Buildout

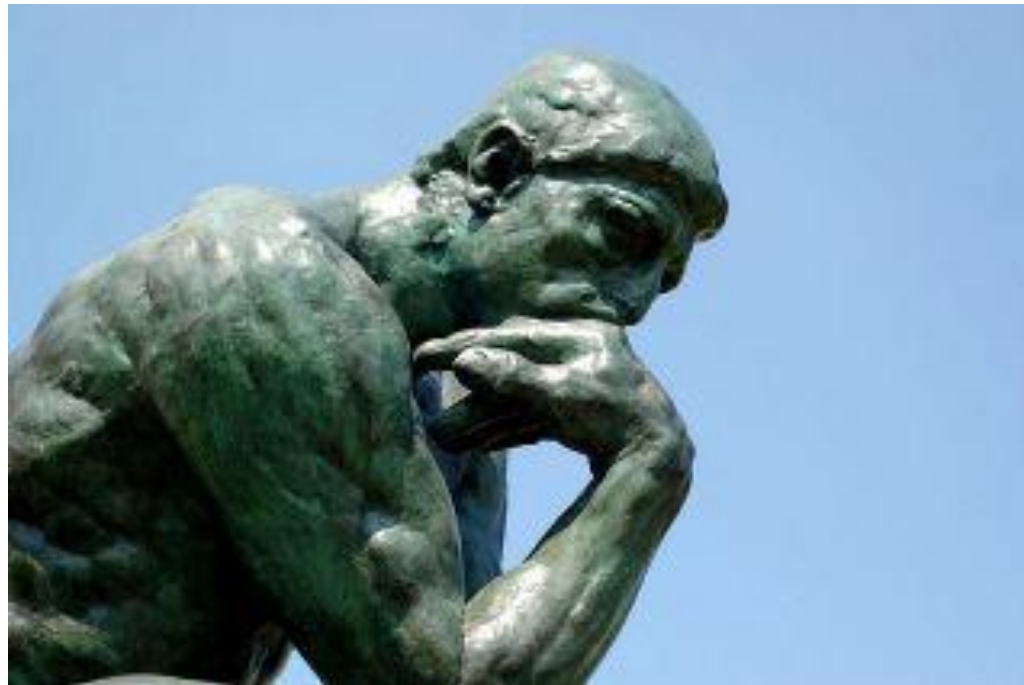
- Forecast of \$40 billion invested each year in the next 5 years on U.S. LNG projects



Source: Morgan Stanley Research estimates

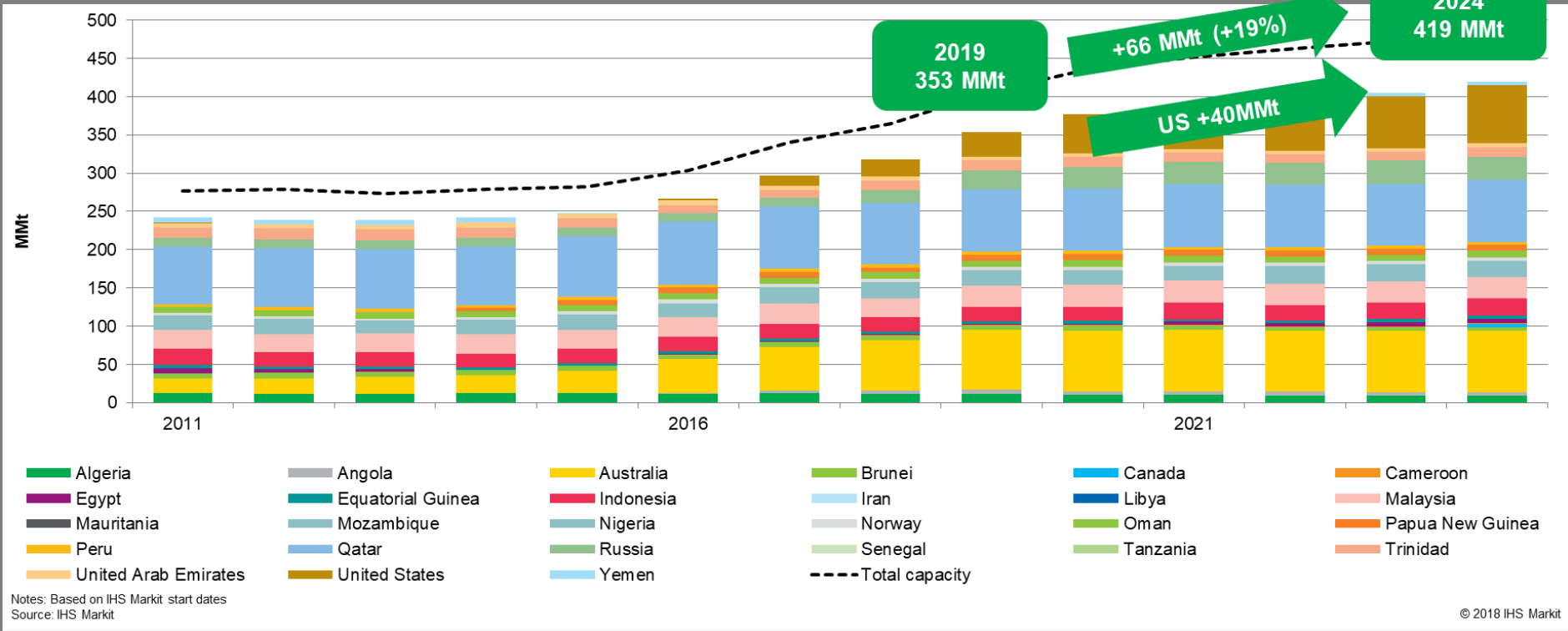
Conversion – MTPA to BCF/day

10 Million tonnes LNG per year (MTPA) = 1.32 BCF/day

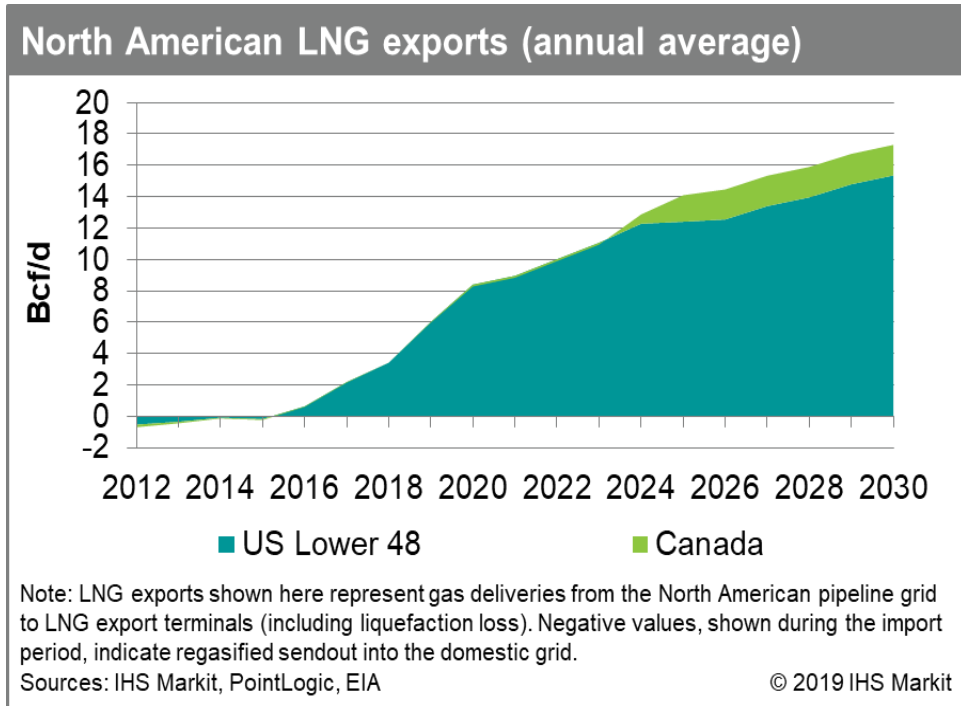
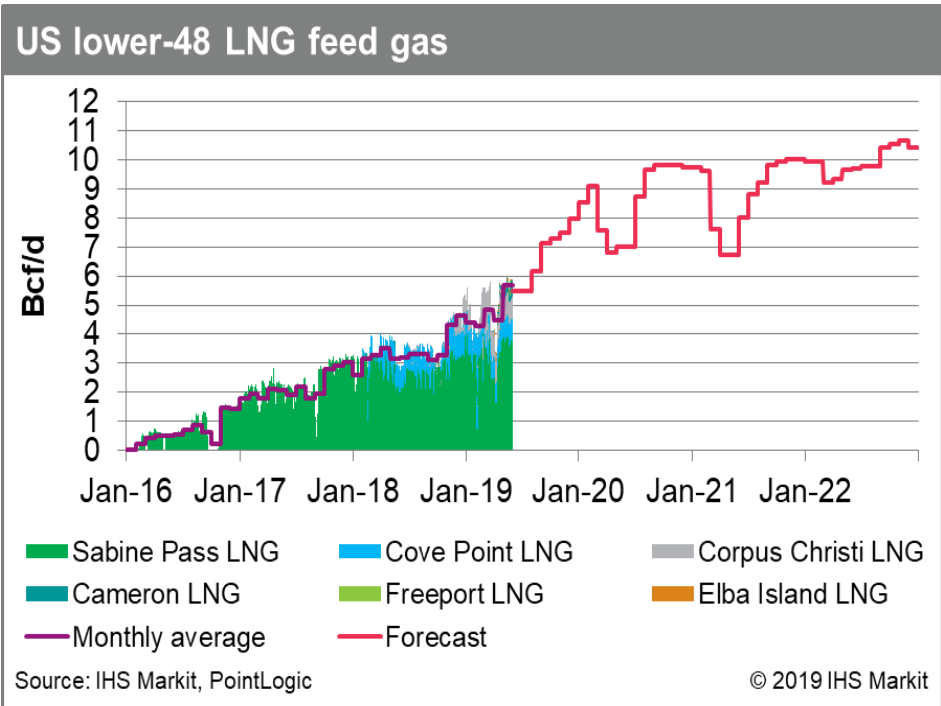


United States leads growth in global LNG supply

Global LNG exports by country versus total capacity



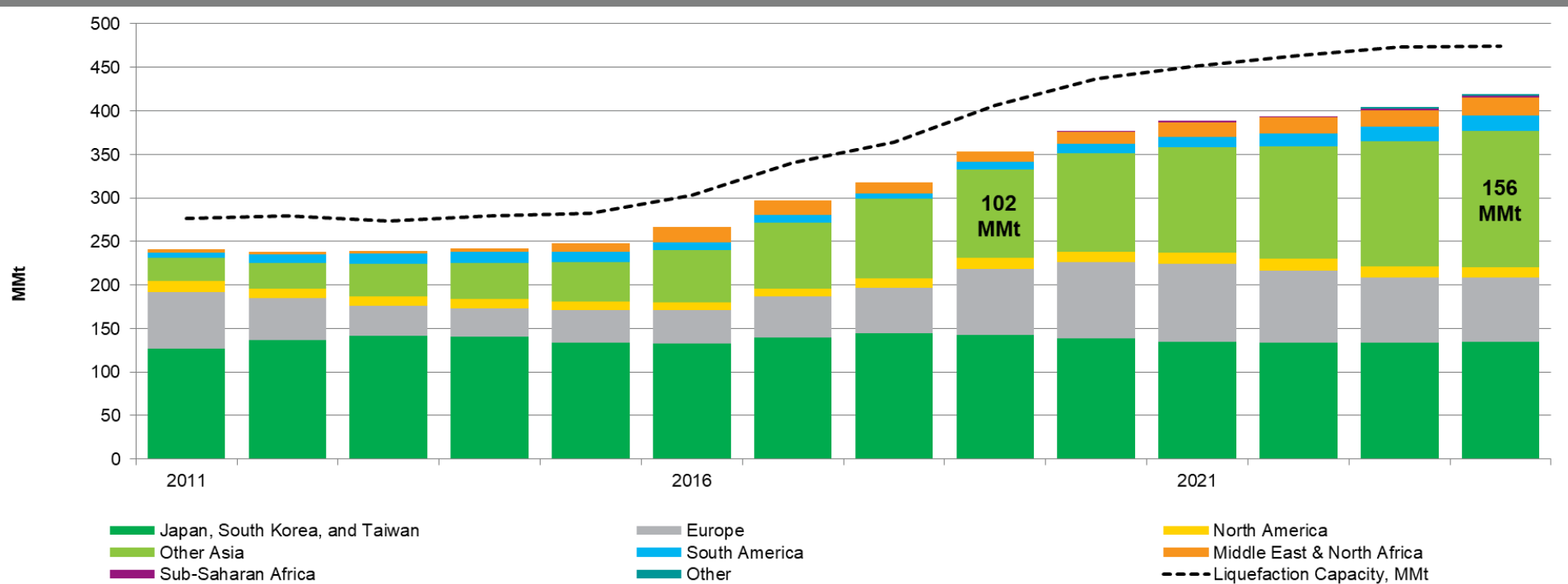
North American LNG becomes a global player in the 2020s



North American LNG is expected to provide 15.6 Bcf/d (117 million metric tons per annum [MMtpa]), or 21%, of the supply needed to meet consumption in 2030, with 1.8 Bcf/d (13.2 MMtpa) coming from Canada and 13.8 Bcf/d (103.8 MMtpa) coming from the US Lower 48.

China, India, Pakistan, Thailand, Bangladesh, Thailand, and Singapore lead increase in LNG demand

Global LNG demand by region versus capacity

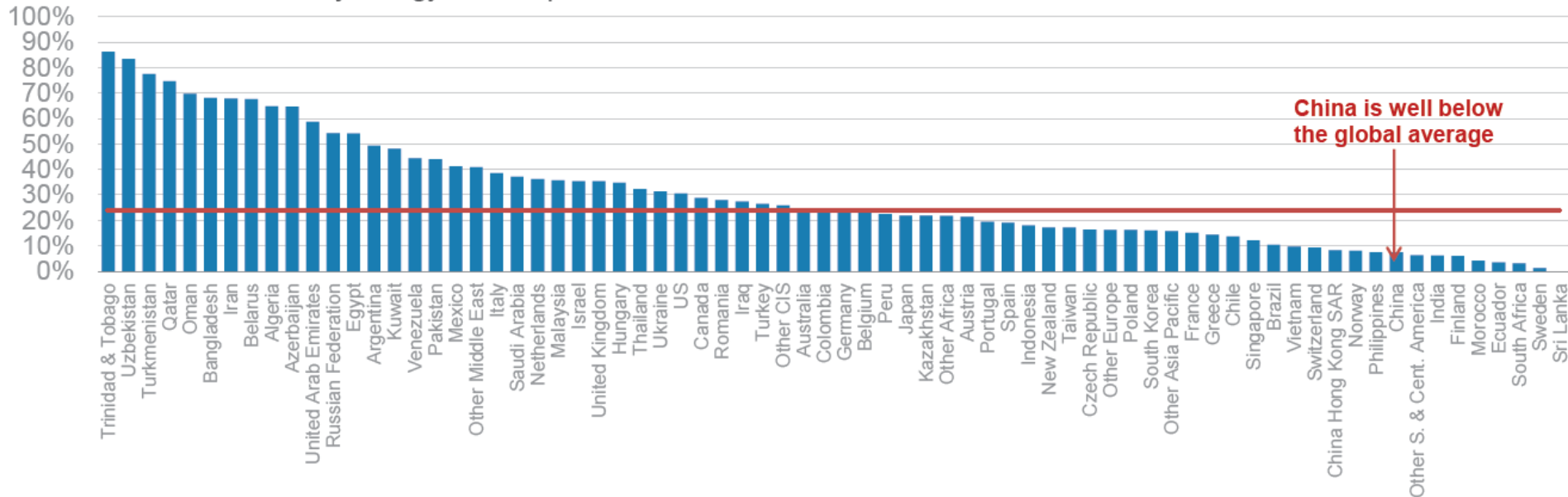


Notes: Based on IHS Markit estimated start date
Source: IHS Markit

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Natural Gas as % of Primary Energy Consumption

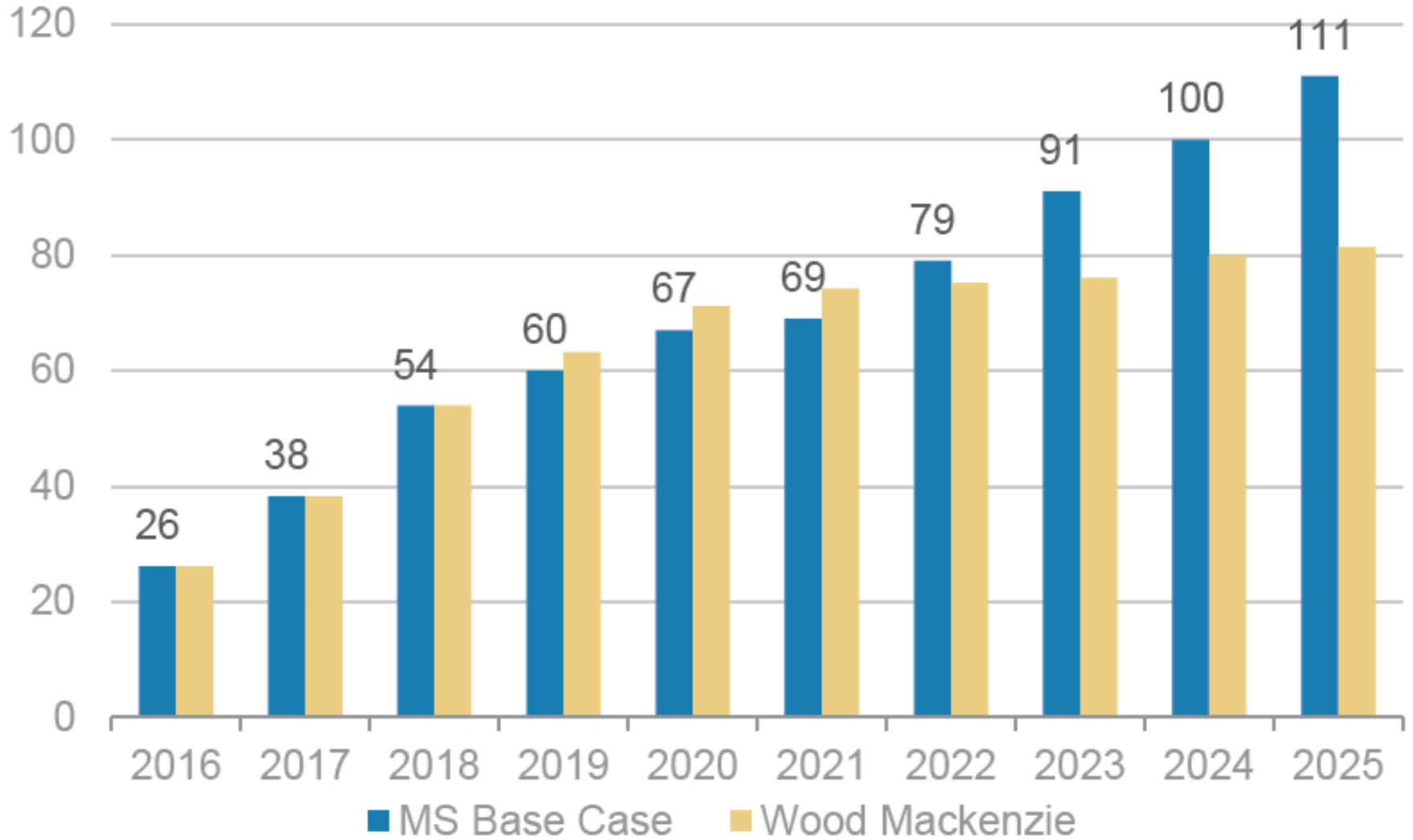
Natural Gas as % of Primary Energy Consumption



China is well below the global average

Source: BP Statistical Review of World Energy, Morgan Stanley Research

China LNG Demand



Source: Wood Mackenzie, Morgan Stanley Research Estimates

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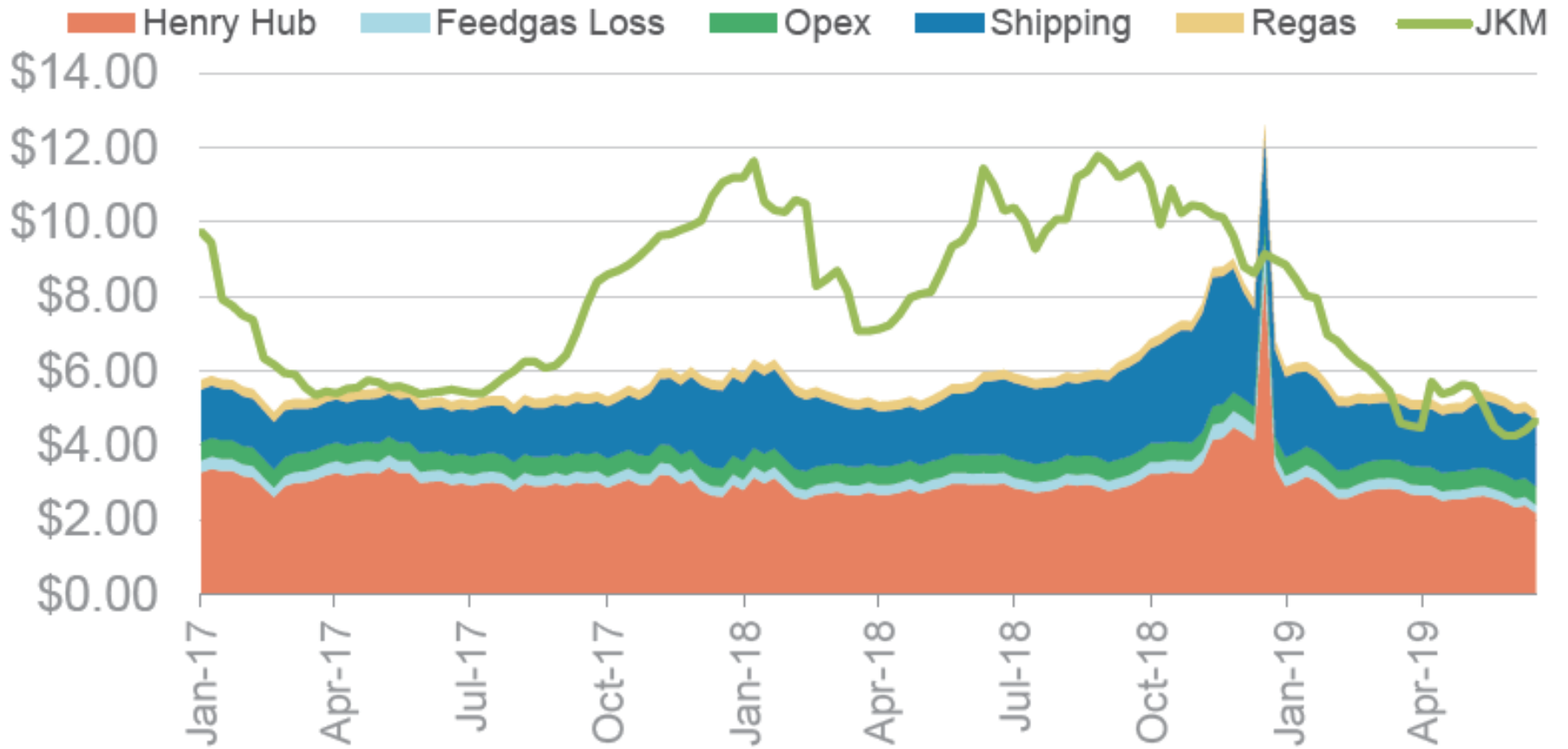
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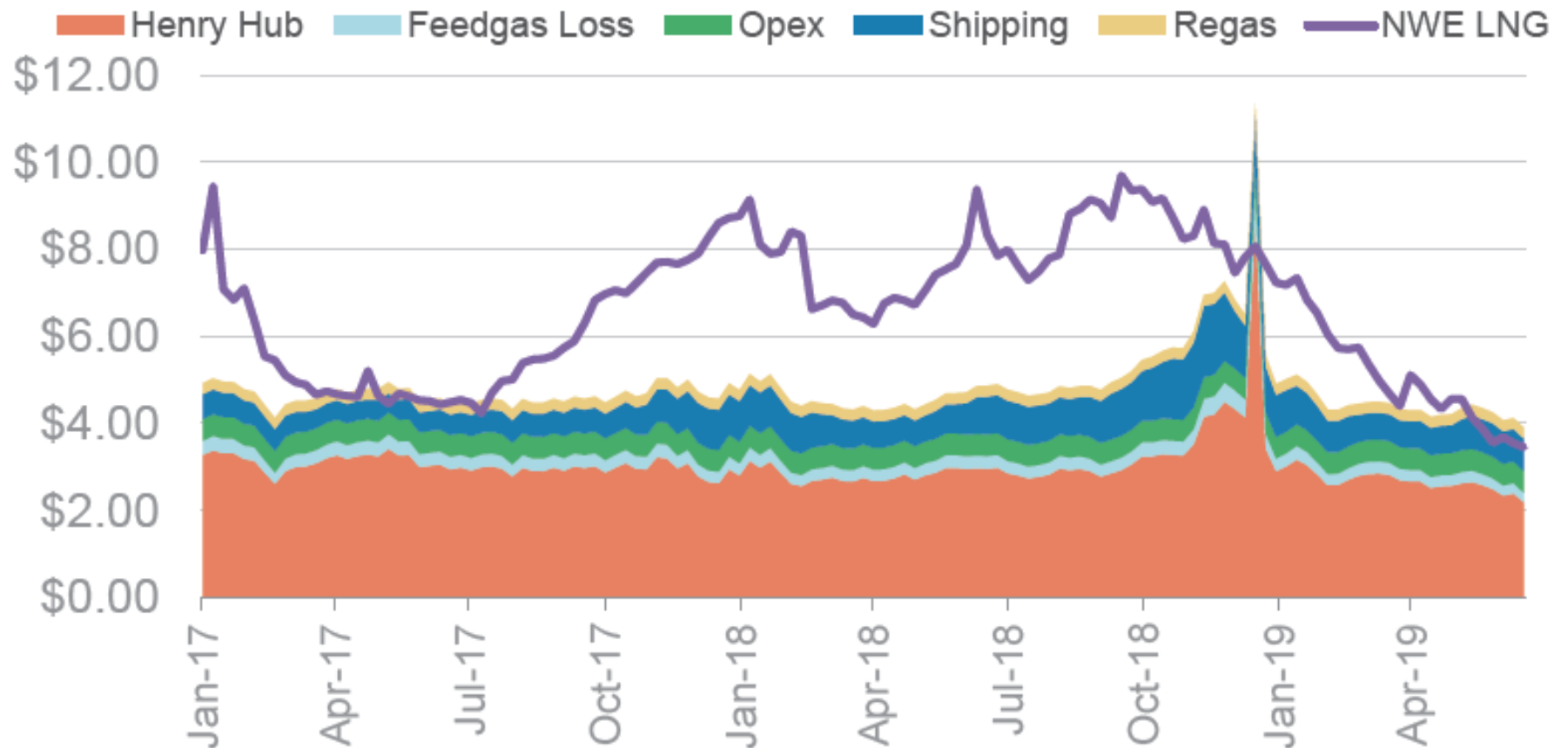


Marginal Cost of US LNG in Asia (\$/mmbtu)



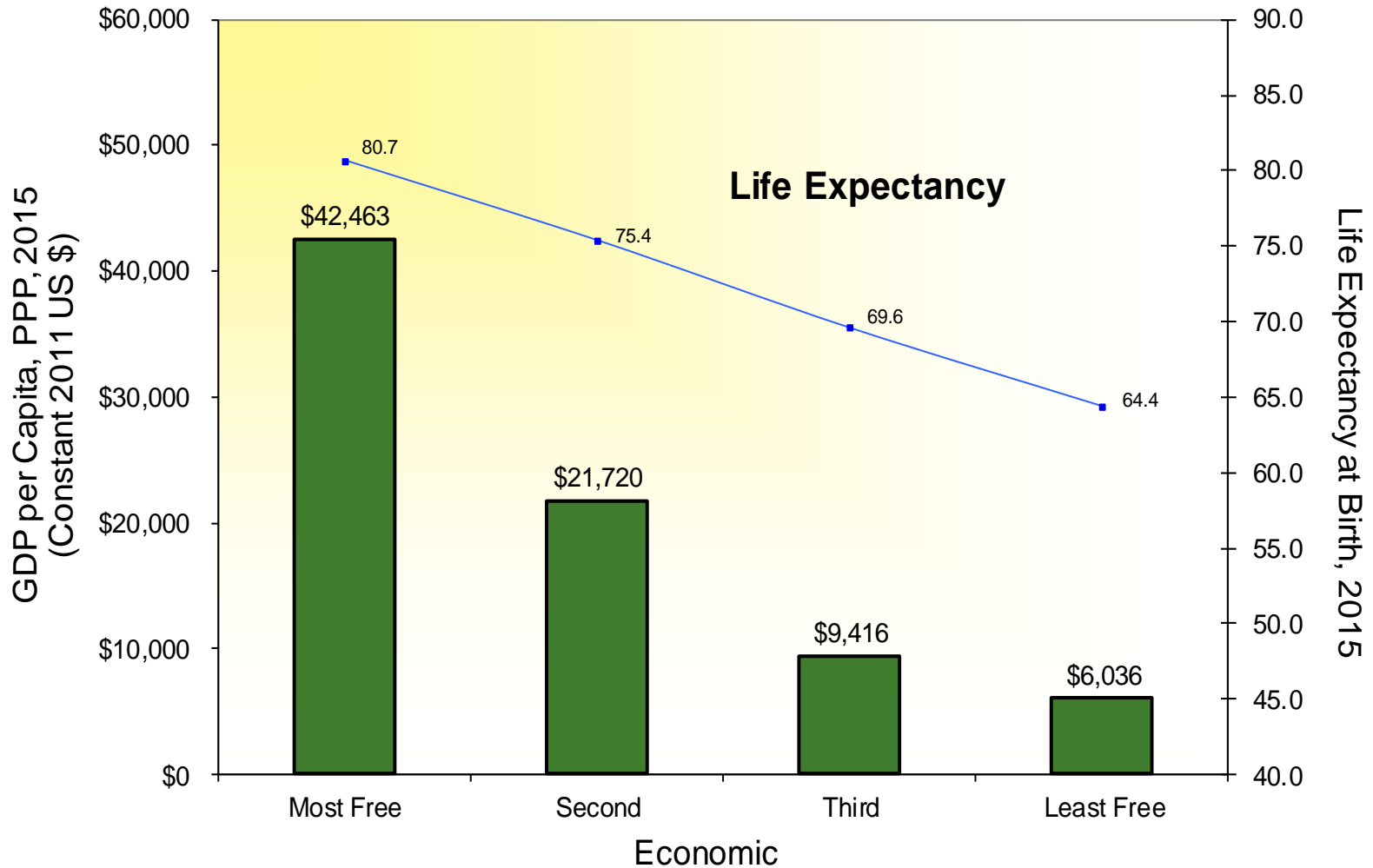
Source: Platts, Morgan Stanley Research

Marginal Cost of US LNG in Europe (\$/mmbtu)



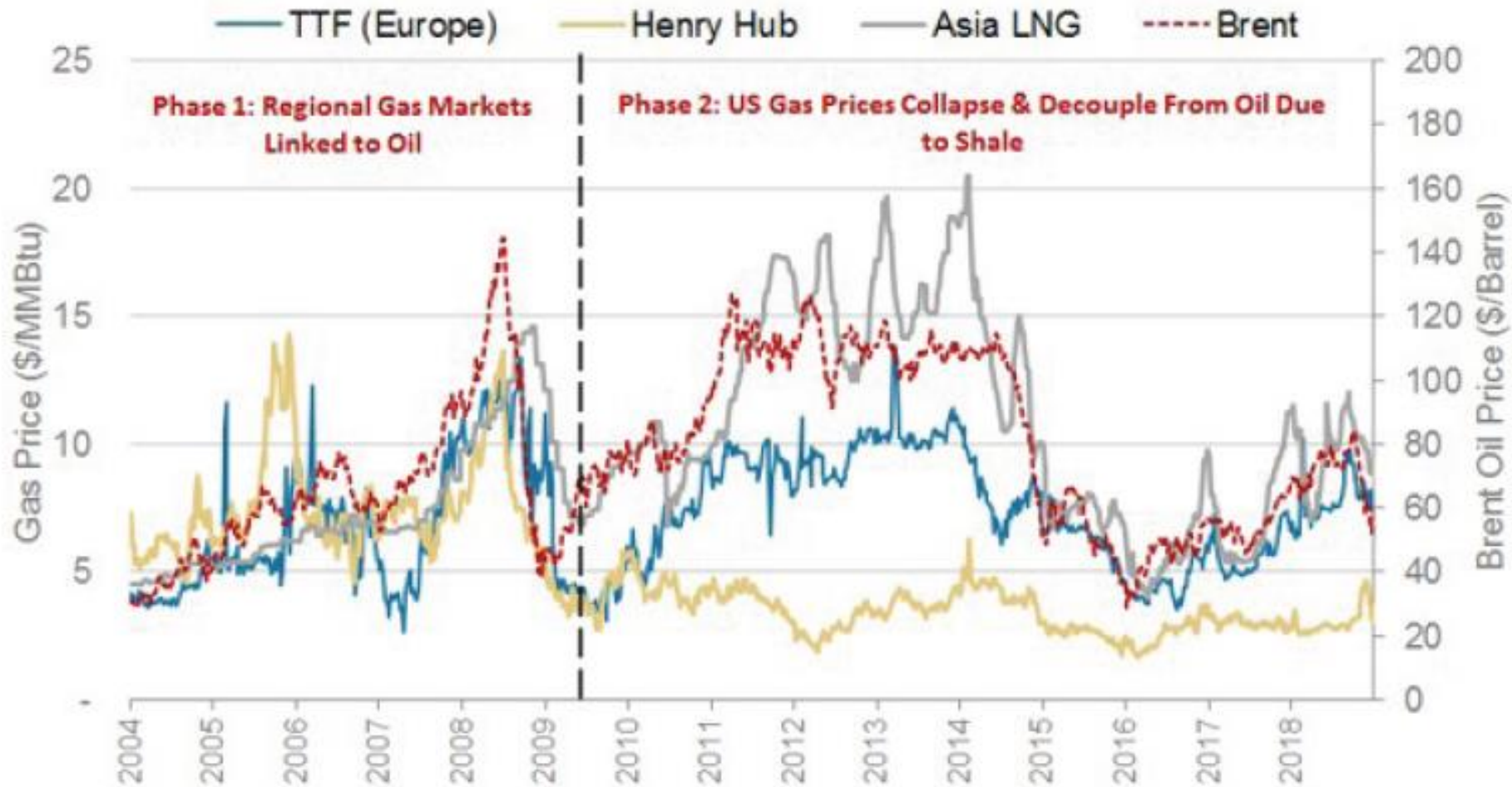
Source: Platts, Morgan Stanley Research

Free Countries are Wealthier and Healthier



Source: *Cato Institute and Fraser Institute, Economic Freedom of the World, 2017.*

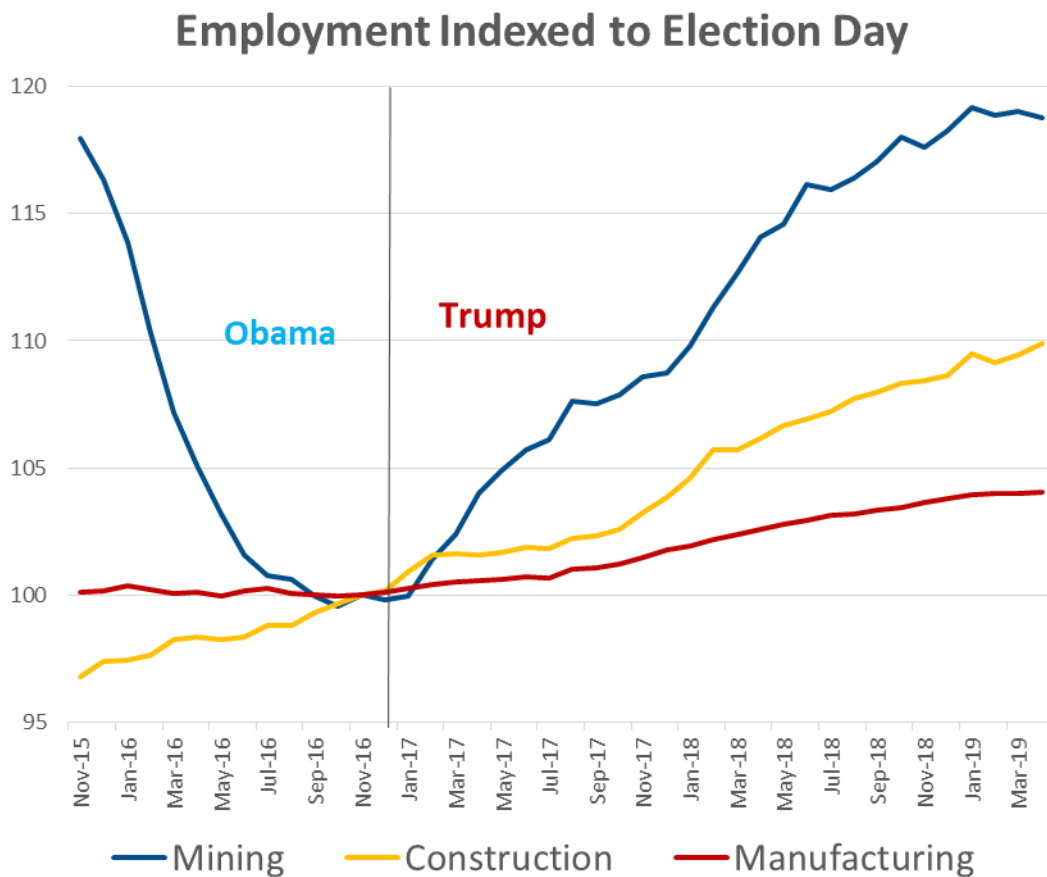
Global Gas & Oil Prices



Source: IHS Markit, Platts, Eikon

Growth in Manufacturing, Mining, Construction Since Election

1,326,000 Blue-collar Jobs Added Since Election Day



Source: Bureau of Labor and Statistics

Manufacturing has added 515,000 jobs

Construction has added 697,000 jobs

Mining has added 114,300 jobs