U.S. Manufacturing Climate Success Story and Decarbonization Challenges

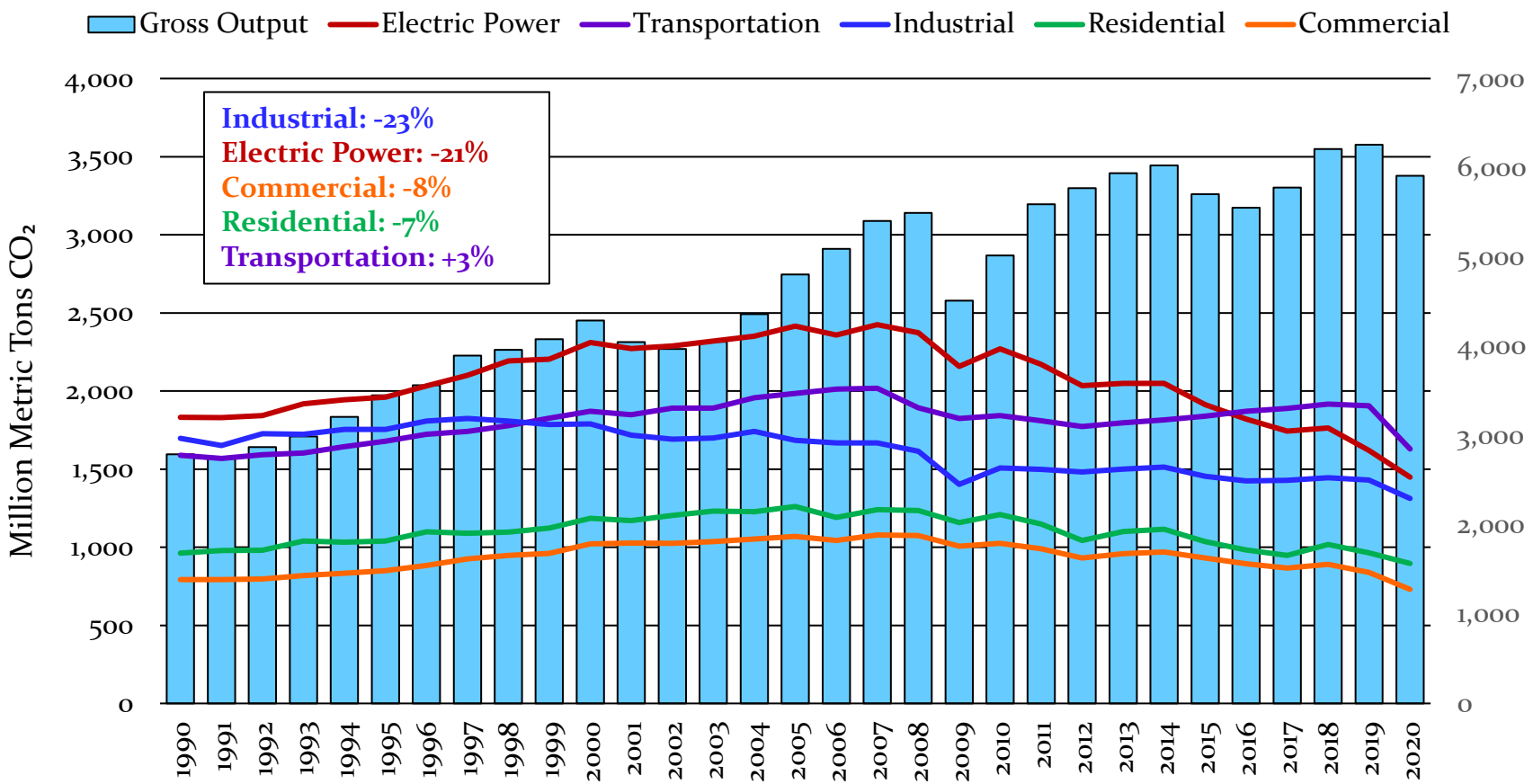
---

Industrial Energy Consumers of America

2021

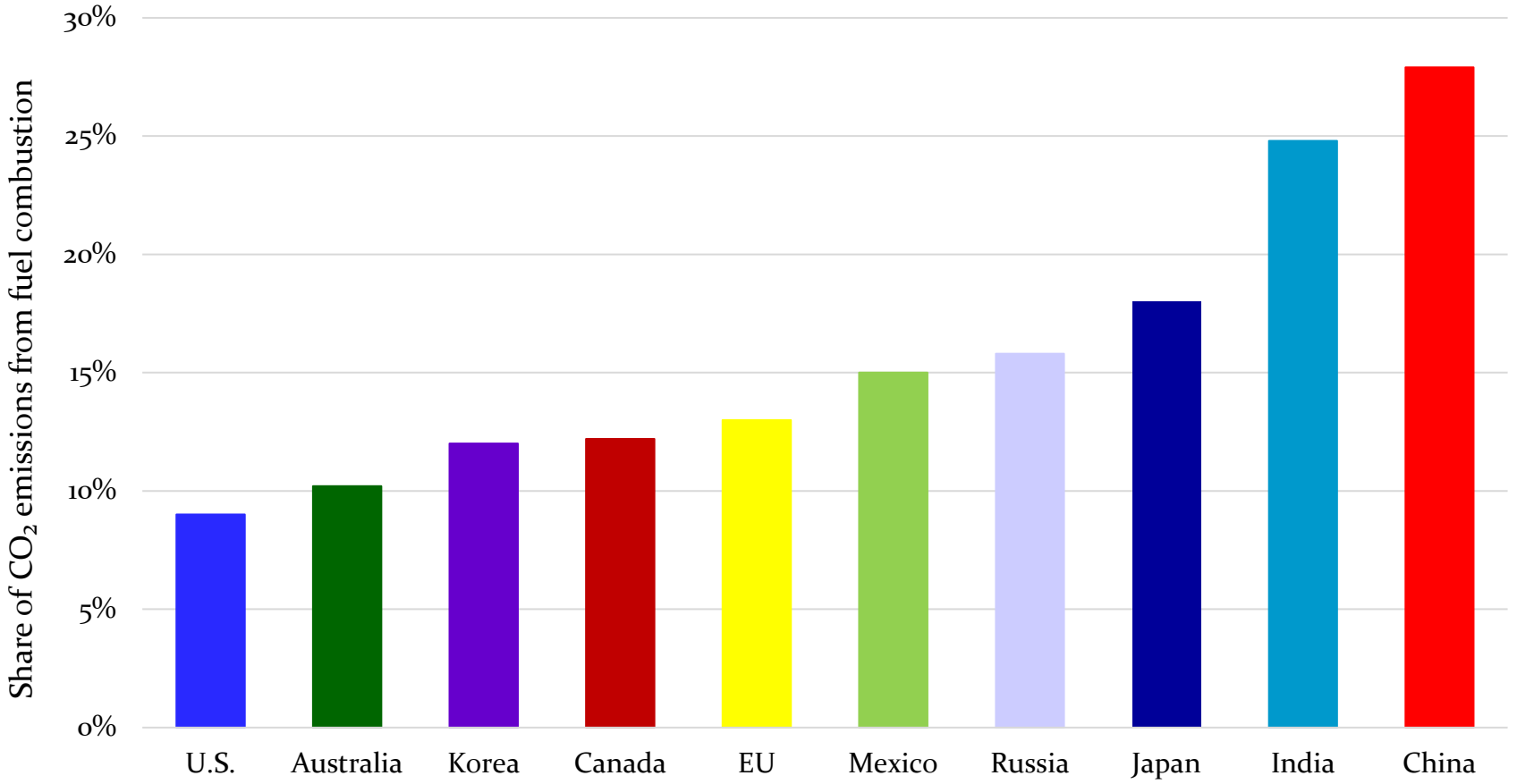
U.S. Manufacturing Outperforms Other Sectors on Climate Change

Since 1990, U.S. Manufacturing Has Reduced CO_2 Emissions by 23% More Than Any Sector, While Manufacturing Gross Output Increased by 112%



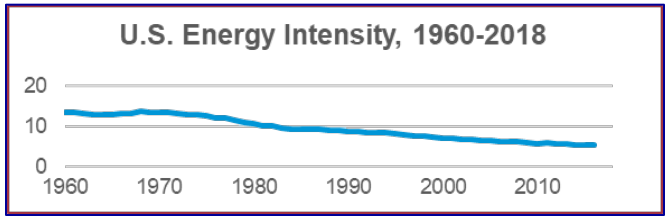
Source: Monthly Energy Review, U.S. Energy Information Administration (EIA); U.S. Bureau of Economic Analysis (BEA)

U.S. Industrial Fuel Consumption CO_2 Emissions are the Lowest in World (2018)



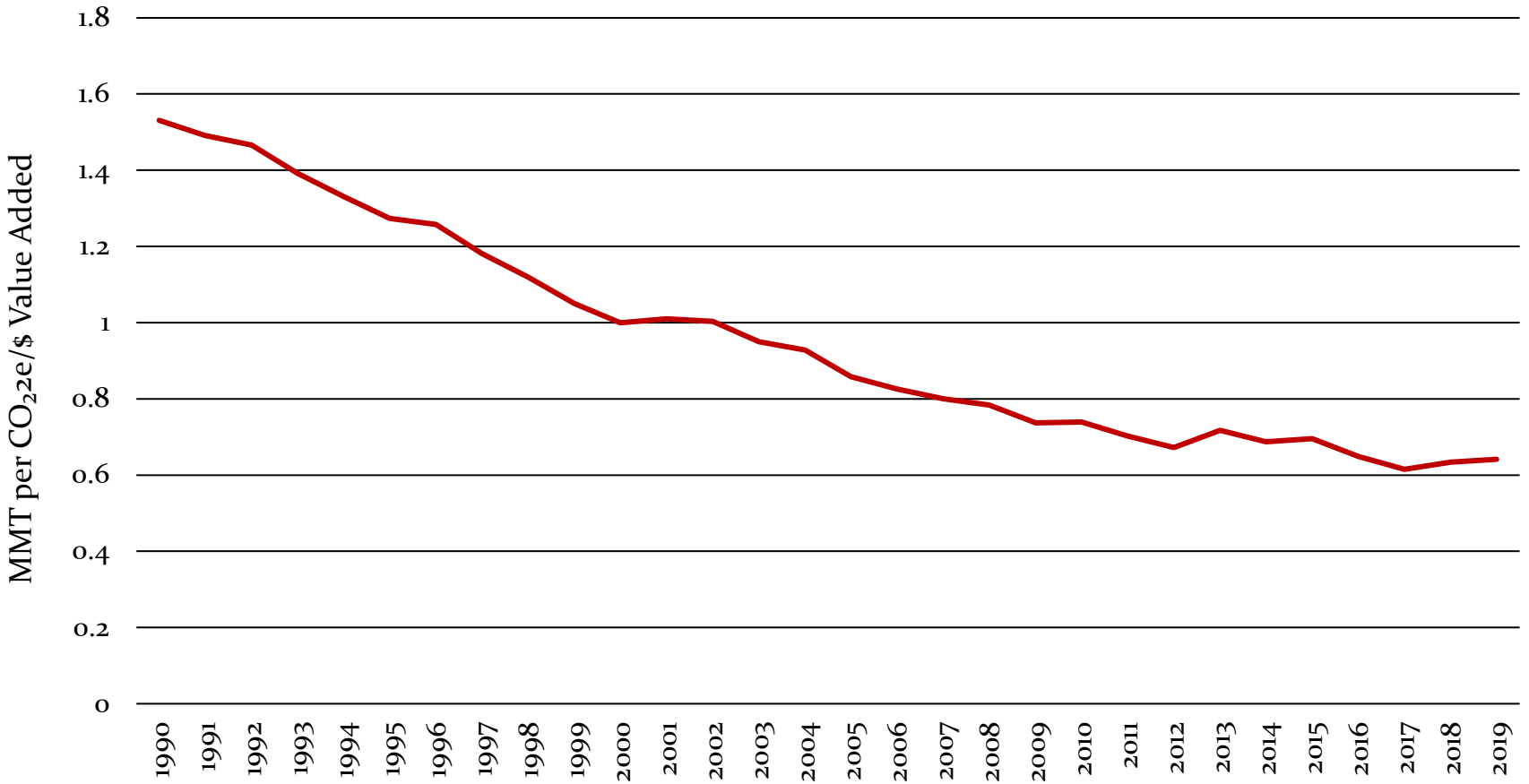
Source: CO2 emissions from fuel combustion by sector in 2018, International Energy Agency (IEA)

U.S. Manufacturing Direct and Indirect Energy Consumption Has been Flat for 50 Years



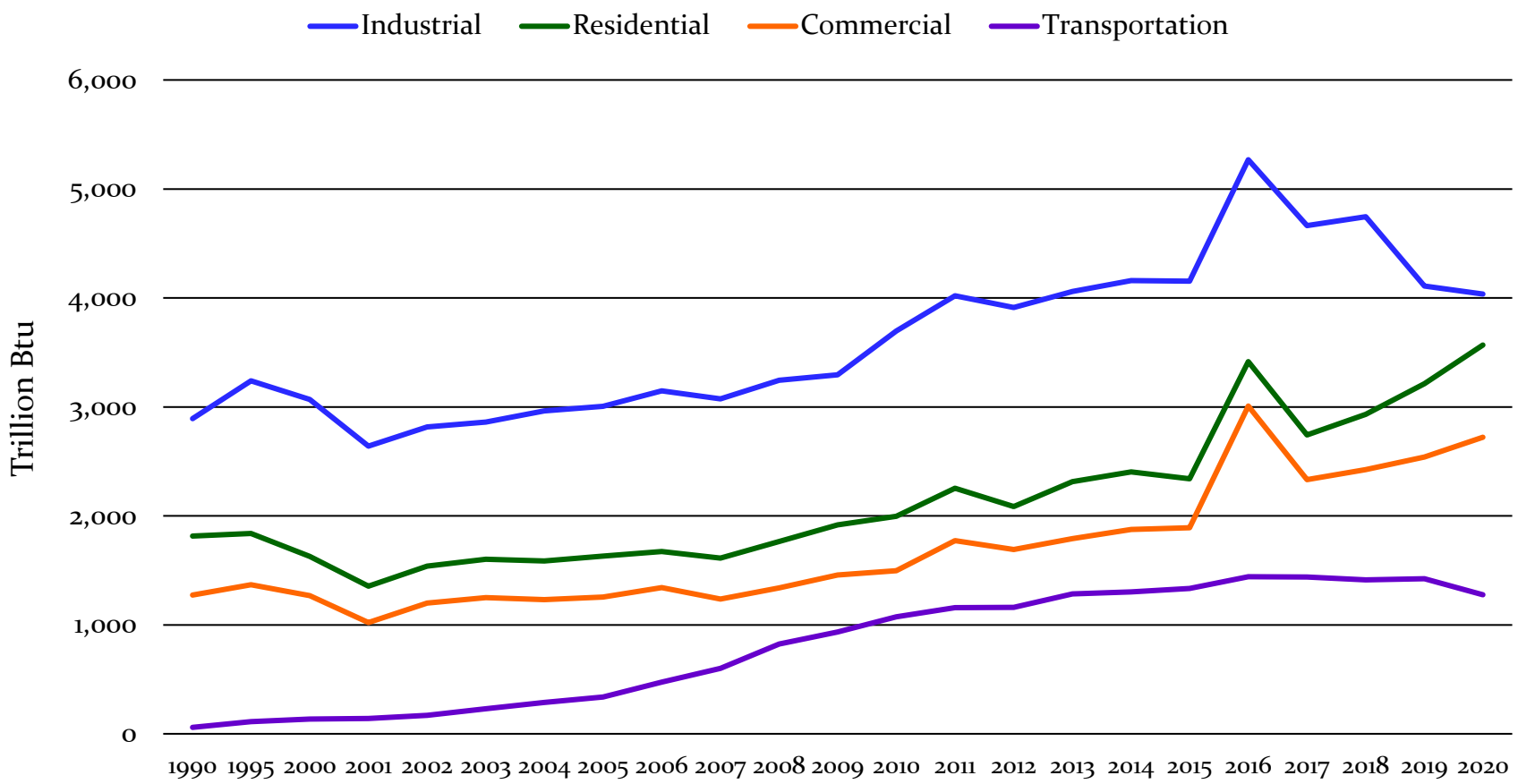
Source U.S. Energy Information Administration (EIA)

Since 1990, U.S. Manufacturing GHG Intensity Declined by 58% (Value Added)



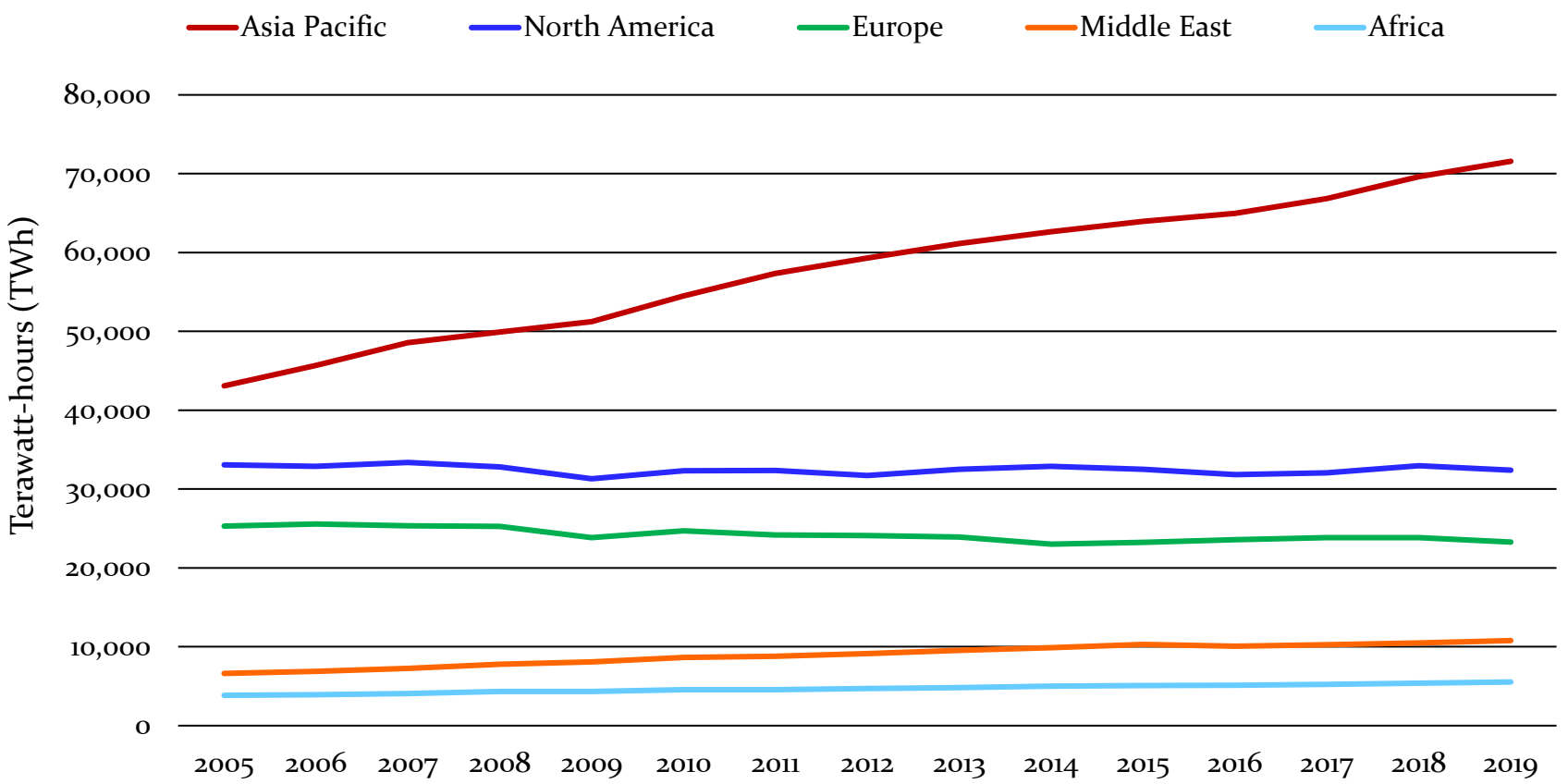
Source: U.S. Environmental Protection Agency (EPA), U.S. Bureau of Economic Analysis (BEA)

Since 1990, U.S. Manufacturing Has Increased Renewable Consumption by 40%



Source: Total Energy, U.S. Energy Information Administration (EIA)

Asia-Pacific Has the Highest Electricity Consumption Growth



Source: Energy Production & Changing Energy Sources, Our World in Data

China Manufacturing CO_2 Emissions/Value Added are 350% Higher Than U.S. Manufacturing

Country	Manufacturing – Value Added ($Billions, 2019)	Manufacturing Industries and Construction (Million tonnes of CO_2, 2018)	Million Tonnes of CO_2/Manufacturing Value Added
EU	2,306.8	378.8	0.16
Korea	416.9	72.0	0.17
Japan	1,028.0	191.7	0.19
U.S.	2,317.2	458.8	0.20
Mexico	219.9	66.7	0.30
Canada	151.7	69.2	0.46
Australia	78.8	39.3	0.50
China	3,823.4	2,673.5	0.70
Russia	222.5	250.6	1.10
India	391.5	571.4	1.50

Source: CO_2 Emissions from Fuel Combustion 2018, International Energy Agency (IEA)
The World Bank, http://data.worldbank.org/indicator/NV.IND.MANF.CD

Value added: The gross output of an industry or a sector less its intermediate inputs; the contribution of an industry or sector to gross domestic product (GDP). Value added by industry can also be measured as the sum of compensation of employees, taxes on production and imports less subsidies, and gross operating surplus.

Eleven Challenges to U.S. Energy-Intensive Trade-Exposed (EITE)/Manufacturing Decarbonization

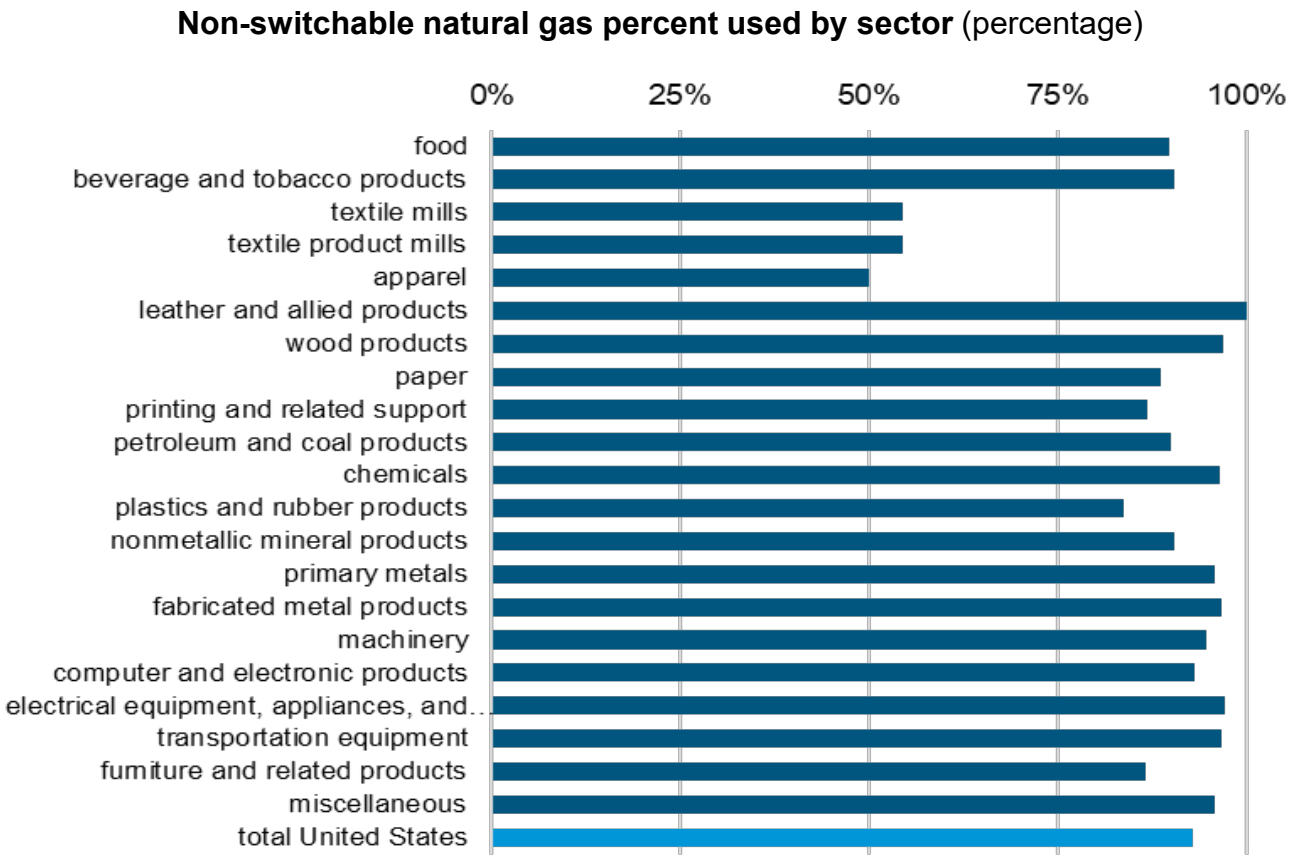
U.S. EITE/Manufacturing Decarbonization Challenges

1. Must have a level playing field with global competition or manufacturers will shift production, jobs, and GHG emissions offshore. This is called *GHG leakage*.
2. Economic decarbonization *process technology does not currently exist* to make our products.
3. Manufacturing equipment processes are designed for natural gas, not electricity.
4. Cost of electricity on a Btu basis is substantially higher than natural gas.
5. All upstream GHG compliance costs imposed on electricity and energy producers are passed onto us.

U.S. EITE/Manufacturing Decarbonization Challenges

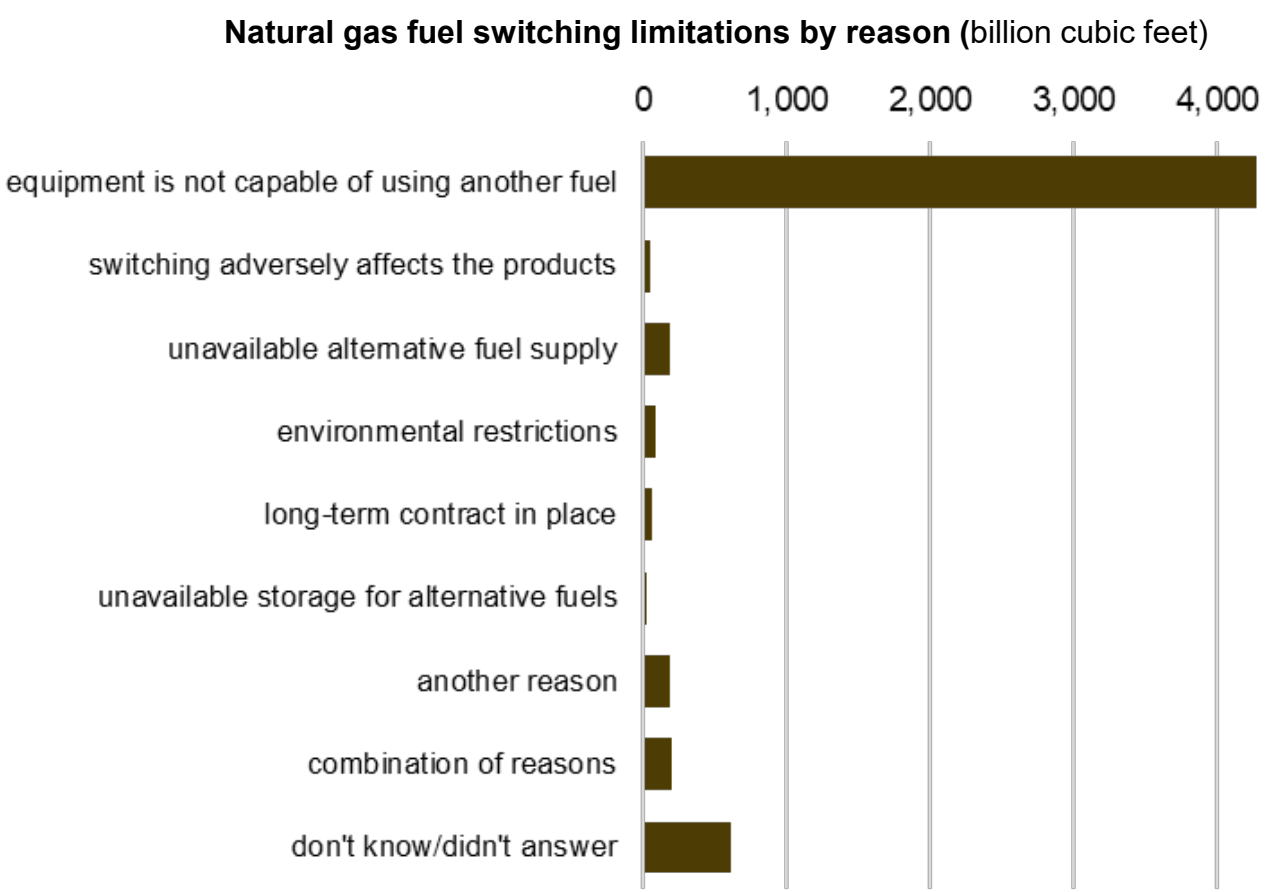
6. GHG costs must be border adjusted and globally enforceable.
7. GHG investments must be cost-effective or we lose competitiveness and jobs.
8. Almost no opportunities left to switch coal to natural gas.
9. At large, we are dependent upon our suppliers for less carbon-intensive electricity, natural gas, and feedstock.
10. Use of hydrogen as a substitute for natural gas produces NOx and conflicts with our ability to stay within air permits.
11. Except for CHP/WHP and CCS, there are no federal energy efficiency tax incentives for manufacturing.

EIA Reports that Most U.S. Manufacturing Sectors Cannot Switch from Natural Gas to Another Fuel



Source: U.S. Energy Information Administration (EIA) MECS 2018

EIA Reports that Due to Equipment Limitations, Most Natural Gas Cannot Be Switched to Another Fuel

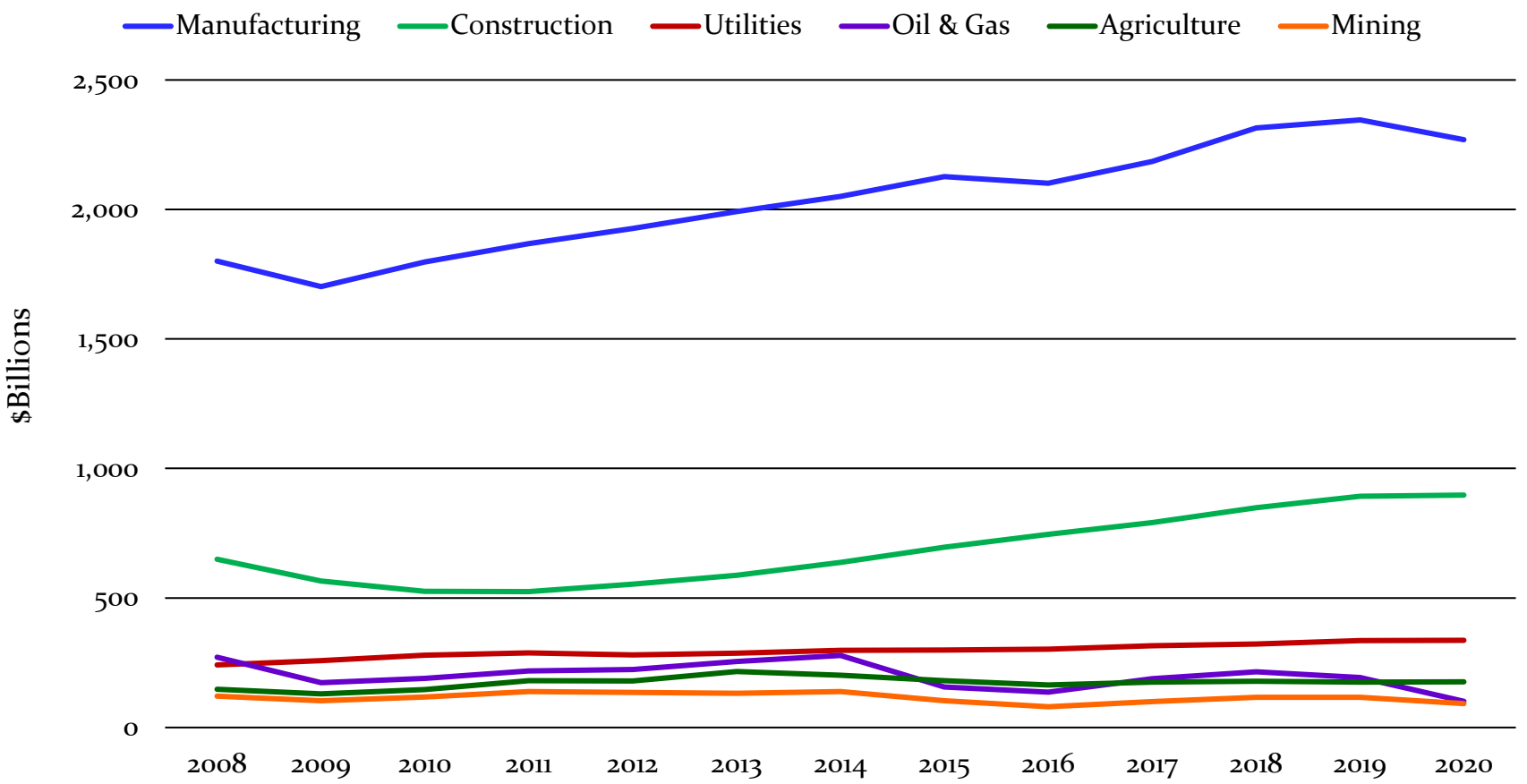


Source U.S. Energy Information Administration (EIA) MECS 2018

Manufacturing is Important to the U.S. Economy

The U.S. manufacturing sector is one of the largest contributors to the U.S. GDP at $2.2 trillion in 2020.

U.S. Manufacturing is a Significant GDP Contributor



Source: U.S. Bureau of Economic Analysis (BEA)

Facts on U.S. Manufacturing

- For every $1.00 spent in manufacturing, another $2.79 is added to the economy. That is the highest multiplier effect of any economic sector.
- There are 12.3 million manufacturing workers in the United States.
- World trade in manufactured goods has multiplied 2.7 times between 2000 and 2019, from $4.8 trillion to $12.8 trillion.
- Taken alone, manufacturing in the U.S. would be the eighth-largest economy in the world.

Source: National Association of Manufacturers (NAM)

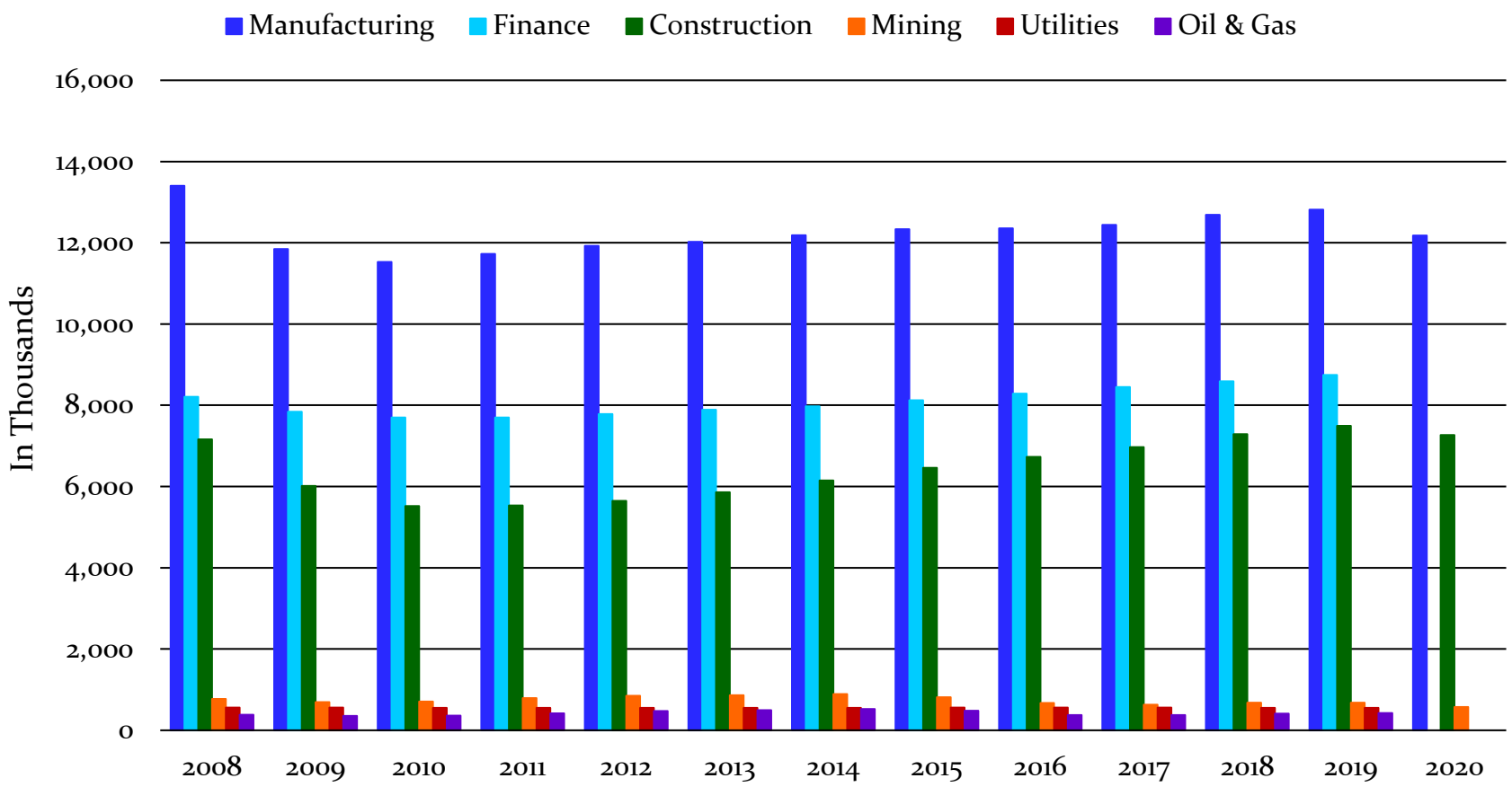
Facts on U.S. Manufacturing

- The U.S. manufacturing sector competes globally and often with state-owned enterprises (SOEs) and foreign companies that are subsidized. We are not.
- Because of fierce global competition, industrial companies have an incentive to invest in energy efficiency to drive down energy consumption, which reduces energy and GHG intensity.
- The industrial sector has a track record which proves that it does not require mandates to reduce GHG emission intensity.

U.S. Manufacturing Pays Family Sustaining Wages

In 2020, the average manufacturing worker in the U.S earned $88,406 annually, including pay and benefits. The average worker in all nonfarm industries earned $71,390.

U.S. Manufacturing is a Significant Employer



Source: U.S. Bureau of Labor Statistics (BLS)

The Industrial Energy Consumers of America is a nonpartisan association of leading manufacturing companies with $1.1 trillion in annual sales, over 4,200 facilities nationwide, and with more than 1.8 million employees. It is an organization created to promote the interests of manufacturing companies through advocacy and collaboration for which the availability, use and cost of energy, power or feedstock play a significant role in their ability to compete in domestic and world markets. IECA membership represents a diverse set of industries including: chemicals, plastics, steel, iron ore, aluminum, paper, food processing, fertilizer, insulation, glass, industrial gases, pharmaceutical, building products, automotive, independent oil refining, and cement.

Contact Info

Paul N. Cicio
President and CEO
Industrial Energy Consumers of America (IECA)
(703) 216-7402
pcicio@ieca-us.org
www.ieca-us.org