

CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES (CSIS) REPORT

Strategic Equilibrium: The United States' Manufacturing Resurgence and the Role of Natural Gas in a Carbon-Competitive World As government policies and market opportunities continue to promote reindustrialization, the Center for Strategic and International Studies (CSIS) conducted a study to explore how U.S. natural gas resources can support manufacturing growth and maintain energy security on the path to a low-carbon economy. As the United States embarks on an unprecedented expansion in strategic manufacturing sectors, including semiconductors and electric vehicles (EVs), this report highlights the critical role of natural gas and gas infrastructure in bolstering manufacturing competitiveness, ensuring energy reliability, and advancing carbon reduction goals in a rapidly evolving global economy. 1

Key Findings

- 1 Low natural gas prices are associated with manufacturing competitiveness.
- 2 Energy and Electricity Requirements are Growing due to investments in strategic manufacturing, including semiconductors and electric vehicles.
- 3 Reliable energy systems are critical to attracting and maintaining manufacturing competitiveness.
- 4 Expanding and modernizing natural gas infrastructure is essential for manufacturing growth and energy security.
- 5 U.S. manufacturing has a lower carbon footprint compared to competitors like China and strengthens the U.S. position in international trade as carbon considerations become increasingly significant.
- 6 Policy and technological advancements are crucial to allowing U.S. manufacturing to evolve and compete.

Natural Gas: Fueling Reliable Energy Infrastructure

- Over the next ten years, NERC is forecasting higher electricity growth forecast than at any point in the past decade,
 - Including summer peak demand growth of 79 gigawatts (GW) and winter peak demand growth of 91 GW
- Goldman Sachs expects natural gas to meet about 60 percent of additional load growth from expanding data centers and artificial intelligence.
- Energy reliability is a key priority for semiconductor manufacturers, as a "stoppage at any of its manufacturing stages can result in wasted batches." The cost of a supply disruption can be significant.
 - The need for an uninterrupted supply of electricity could accelerate interest from manufacturers in these sectors to seek on-site power generation assets.

🛠 \$43.3M Loss

Samsung reportedly incurred a \$43.3 million loss in 2018 when a regional transmission cable failed, leaving its chip plant without power for **30 minutes**.

 $^{\mbox{1}}$ The report was developed with support from the American Gas Foundation

https://www.csis.org/analysis/strategic-equilibrium-united-states-manufacturing-resurgence-and-role-natural-gas-carbon with the states of th

Reshoring Manufacturing: Catalyzing Economic Prosperity

- Since 2020, investments in new manufacturing facilities have accelerated in the United States, driven by two key sectors: semiconductors and electric vehicles (EVs).
- By April 2024, project announcements reached \$367.9 billion for semiconductor manufacturing and \$84.4 billion for EV manufacturing.
- Data from multiple papers surveyed by CSIS suggests the need for 44 kilowatt-hours (kWh) of average energy consumption to produce 1 kWh of EV battery capacity.
- At that intensity, the 1,000 GWh of potential battery manufacturing capacity forecasted for 2030 would require 44,000 GWh of energy consumption, or approximately 150 trillion British thermal units (Btu).

U.S. Manufacturing's Low-Carbon Advantage

- Both Democratic and Republican leaders see benefits in highlighting how efficient the U.S. economy and manufacturing specifically are with respect to emissions.
- U.S. industry produces semiconductors and EV batteries with less carbon than China thanks to cleaner energy generation
- A 2019 report comparing steel industry emissions across the 15 top steel-producing countries found that U.S. production is one of the least carbon-intensive, while China ranked last.
- Similarly, North American aluminum production emits about half the global average rate, according to industry data.

Natural Gas Consumption

CSIS Recommendations for Policymakers

- 1 Energy and Electricity Requirements are Growing Improved data aids in forecasting energy needs and planning infrastructure, reducing risks of misaligned investments and ensuring efficient resource allocation.
- 2 Accelerate Emissions Reduction from Manufacturing Facilitates the transition to low-carbon fuels and innovative technologies, decreasing greenhouse gas emissions while maintaining industrial competitiveness.
- 3 Support CCS Readiness in Natural Gas Power Plants Encourage utilities and developers to plan for Carbon Capture and Storage (CCS) and proactive planning ensures natural gas remains a viable and environmentally responsible energy source in a carboncompetitive future.
- 4 Modernize Infrastructure Permitting Processes Streamline permitting procedures for energy infrastructure to keep pace with manufacturing growth allowing for expedite development, ensuring energy supply meets increasing demand, supporting economic growth, and enhancing national security.



Net Generation by Energy Source

Electric Utilities, 2022 (Thousand MWh)



Industrial Sector Energy Consumption (Trillion Btu)



Chart Source: Center for Strategic and International Studies (CSIS), "Strategic Equilibrium: The United States' Manufacturing Resurgence and the Role of Natural Gas in a Carbon-Competitive World," September 2024. https://www.csis.org/analysis/strategic-equilibrium-united-states-manufacturing-resurgence-and-role-natural-gas-carbon