Falling Further Behind

How a **Failure to Transition to Green Steel** Could Cost US Steelmakers, Western Pennsylvania Communities, and the Environment

The economic and political landscape around industrial decarbonization has changed dramatically in the United States since our first report on green steel in 2023. In that report, we estimated that a conversion from traditional coal-based processes to one based on green hydrogen could not only benefit the environment by eliminating emissions from primary steel production in Pennsylvania but could also retain steel jobs, create new renewable energy jobs, and give the state a first-mover advantage in global markets.

But without large-scale investment and political willpower, the opportunity for a US renaissance in steelmaking, driven in part by decarbonization investments, may be slipping away. As this report highlights, China has come to dominate traditional steel markets since 2000, while US steel jobs are in decline. Now, driven in part by its own climate commitments and global trade pressure for decarbonized steel, China is signalling it may begin its pivot toward industrial decarbonization at scale. Other regions are following suit, and **the US risks not only losing the opportunity to lead the 21st-century steel market, but falling even further behind.**

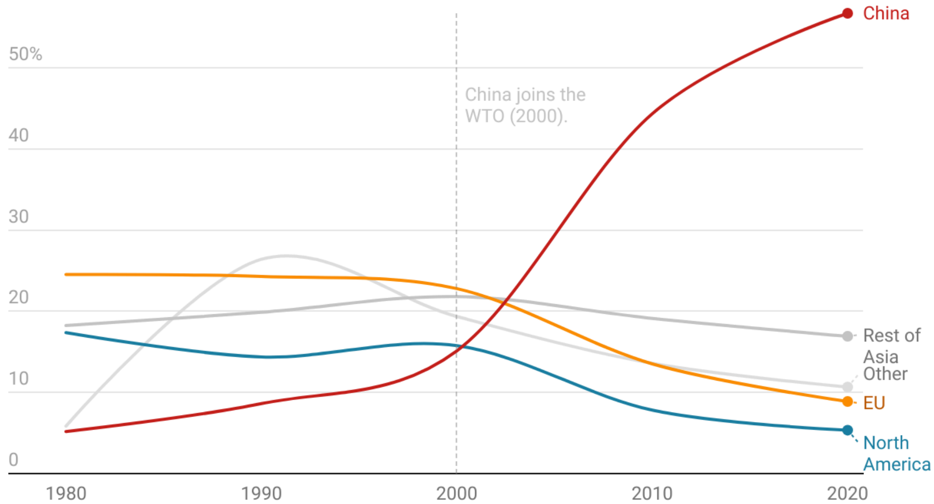
Key Findings:

- Recent legislation that seeks to undo much of the federal government's investment in industrial decarbonization **risks implicitly doubling down on traditional steelmaking,** where the US has already lost considerable ground to China and other Asian producers.

- China currently produces over 50% of the world's crude steel as of 2024, up from 36.6% in 2005. The rest of Asia collectively produces approximately 20% of crude steel, while the US produces only 4.2%, down from nearly 8% in 2005.

The steel landscape has changed dramatically.

Share of global crude steel production by region, 1980-2024



"Other" includes countries in South America, Africa, Australia, the Middle East, and non-EU Europe that produce at least 2 million metric tons of steel annually.

Chart: Ohio River Valley Institute • Source: World Steel Association • Created with Datawrapper

- China's rapid rise in the global steel market over the past two decades has occurred nearly simultaneously with a large decline in US steel and iron employment. While not the sole factor, China's increasing dominance in the steel industry has played a role in the loss of American steel jobs. **American steel employment has declined by over 50,000 jobs over the last several decades** and, as our 2023 report found, many of these job losses occurred in primary steel communities like Western Pennsylvania and Gary, Indiana.

Steel employment in the US is on the decline.

US iron and steel mill & ferroalloy employment, 1987-2024

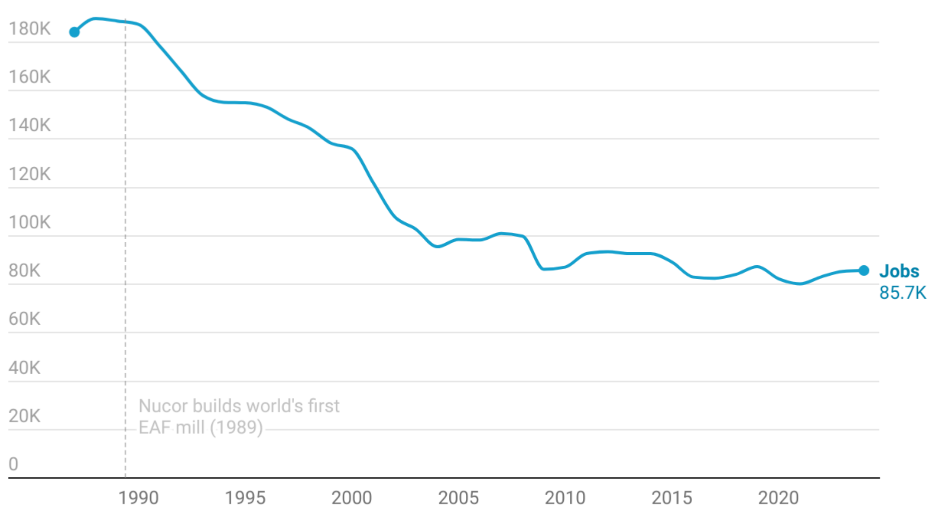


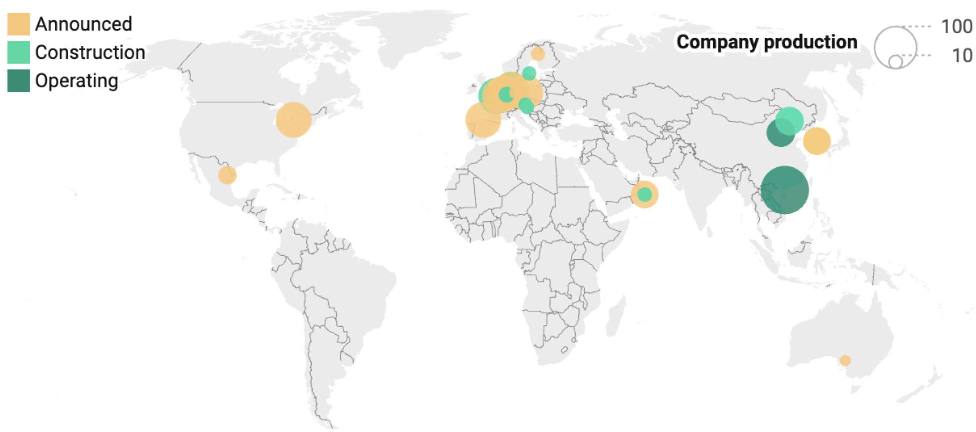
Chart: Ohio River Valley Institute • Source: US Bureau of Labor Statistics • Created with Datawrapper

- **Steel prices and demand have taken a downturn in recent years** as China's real estate and construction boom has chilled. A global glut of cheap Chinese steel has made profitable operations more difficult for American steelmakers, even though the US imports little steel directly from China. Tariffs, which have a long history in the US steel industry, have created additional uncertainty that may help steelmakers in the short term but could also hamper demand by creating headwinds for the broader economy.

- **Emerging global demand for low-carbon green steel can create new market opportunities for steelmakers.** Many regions of the world have pressed ahead with investments in both decarbonizing industries like steelmaking and investing in green hydrogen technology. Additionally, governments in the European Union seeking to meet their climate emissions reduction targets have implemented import fees that account for the emissions intensity of products. This carbon border adjustment mechanism (CBAM) will hurt the competitiveness of high-emissions-intensity, traditionally made steel in European markets, where the US already ranks outside of the top 10 importing nations.

Decarbonization efforts are underway globally.

Map of full-scale low-carbon steel projects by company production (million USD)



Map: Ohio River Valley Institute • Source: Industry Transition • Get the data • Created with Datawrapper

- **The recent approval of US Steel's sale to Japanese steelmaker Nippon offers a potential opportunity to reverse course and invest in modernizing the US steel industry.** As part of its agreement to acquire US Steel, Nippon has committed to invest $5.5 billion between the Mon Valley Works in Pennsylvania and the Gary Works in Gary, Indiana, over the next three years. It has also committed to spending an additional $1 billion to construct a new mill in a location "to be determined." This could provide the capital spark needed to convert facilities to modern processes that would make the US competitive in emerging markets rather than relining old blast furnaces and continuing to lose ground in the competition with China. Investments in lower-emissions steelmaking now could position US steelmaking operations for more long-term market success.

This report represents one of the most extensive current overviews of the state of the global steel industry and the potential economic opportunities to continue the pursuit of green steel, in particular. Our aim is to provide the reader with a deeper understanding of both historical trends and a slew of recent, rapid developments that have generated immense uncertainty for American steelmakers, workers, and the communities reliant on these companies.

We do not pretend that these investments will be cheap or easy. In fact, as has been the case with most pillar US industries from automobiles to agriculture, making this transition will, in the long run, require significant government backing in addition to sound strategic decision making. **However, making the green steel transition may also provide the single best opportunity for US steel companies and steel communities to reverse several decades of eroding steel jobs, wages, and market share.**