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SUSTAINABLE BUSINESS

Green Steel Is Coming. Europe Is Leading the Charge Thanks to New Carbon Taxes.

By 2030, the continent is expected to be home to nearly 50 low-carbon steel projects, while just two are planned in the U.S.

By Yusuf Khan

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Coils of steel at a German factory. The need for conversion to low-carbon steel production is greater in Europe, where 57% of steel is produced in coal-fired blast furnaces. In the U.S., that is closer to 30%. PHOTO: FABIAN STRAUCH/SHUTTERSTOCK

Steel is one the world's most polluting industries, but Europe is leaping forward in making the metal green.

By 2030, the continent is expected to be home to nearly 50 green and low-carbon steel projects, according to the Leadership Group for Industry Transition's compilation of projects. In comparison, the U.S. only has two such projects.

"There is certainly more investment in European green-steel capacity, driven by the fact carbon has a cost in Europe," said Colin Richardson, steel lead at Argus Media, a commodities-pricing agency. "EU policy is essentially designed to mean that cost rises over

time, incentivizing polluters to reduce the amount of emissions [allowances] they need to purchase."

Some of Europe's push toward green steel is driven by policies, including the European Union's Carbon Border Adjustment Mechanism, which entered a trial phase on Oct. 1. CBAM eventually will require importers to pay the bloc's carbon tax on select imports, including steel, if they are from countries where emissions aren't similarly taxed. Free carbon allowances for EU steel producers are being phased out as the carbon border tax on imports is phased in.

By the end of this decade, a quarter of Europe's steel needs are going to be met from low-carbon sources, according to Brussels-based think tank Bruegel. In the U.S., just 10% is going to come from similar projects, according to research from the Rocky Mountain Institute, an energy think tank. Last year, Europe produced 152 million metric tons of steel while the U.S. made 80 million tons, according to industry bodies Eurofer and Worldsteel.

The need for conversion to low-carbon systems is greater in Europe, where 57% of steel is produced in coal-fired blast furnaces and the rest from electric-arc furnaces. In the U.S., the ratio is more like 30% coal and 70% electric furnaces.

But as most American mills are powered by fossil-fuel-based electricity, European investment would see the continent leapfrog the U.S. in low-carbon steelmaking, giving it a much larger local supply of green steel.

"The European policy environment is much more advanced, which means we can be that [much] more ambitious," said Nicola Davidson, vice president of sustainable development and corporate communications for steel giant ArcelorMittal, at a recent conference in London. Davidson specifically mentioned the EU's CBAM.

Cleaning up the industry is crucial to meeting climate goals, because steel is heavily used in developing the infrastructure and technologies needed for the energy transition. It accounts for 7% of global carbon emissions, according to the International Energy Agency. The technology is available to make low-carbon steel, but production needs to be scaled up to reduce costs. Investments in Europe are advancing quickly because of carbon pricing, stricter emissions policy and rising customer demand.

Demand from steel buyers has also been important in driving investment. Swedish-based startup H2 Green Steel has signed deals to supply low-carbon steel to IKEA, Mercedes-Benz,

BMW and Scania. It has also secured more than €5 billion, or over $5.3 billion, in financing through private-equity and debt sources.

H2 Green Steel lowers its carbon emissions by using hydro and wind power to fuel its operations and expects to start production by the end of 2025. “If you include Scope 3 emissions, which includes mining emissions, it goes from 2,600 kg of CO_2 per ton of steel to 400 kg per ton of steel,” said Henrik Henriksson, the company’s chief executive.

Henrik Henriksson, chief executive of H2 Green Steel. PHOTO: MIKAEL SJOBERG/BLOOMBERG NEWS

“We are a company with no balance sheet and no income. How do you raise €5.5 billion from nothing?” Henriksson said. Customers of H2 Green Steel have been willing to support the project based on their own green targets and their end-customers’ willingness to pay a green premium, he said.

Green steel enables carmakers and other buyers to cut the embedded emissions in their products.

“To reach net carbon neutrality, decarbonizing our steel supply chain is a major lever,” said Gunnar Güthenke, head of procurement and supplier quality at Mercedes-Benz’s car division. Green sources of steel will be vital to achieving the company’s aim to make its fleet of new vehicles carbon-neutral by 2039.

However, European-made low-emission steel is going to cost more. H2 Green Steel said it would charge a €150 premium, while Swedish steelmaker SSAB expects to charge double that. Both figures are forecast to fall as more production comes online.

While Europe is ahead, the Inflation Reduction Act is providing huge tax incentives to establish low-carbon steel production. Research from the Rocky Mountain Institute suggests the IRA will encourage green steel investments that would, by 2030, produce about eight million tons of low-carbon steel, or nearly 10% of U.S. steel demand.

The Great Lakes, Texas or the Pacific Northwest regions are being touted as places where green steel hubs could be set up, although grid and renewable energy capacity will need to be brought online.

“The IRA is a formidable challenge for Europe...The kind of subsidies and speed which they are given is much bigger than Europe” said Simone Tagliapietra, senior fellow at Bruegel. High energy costs could put the region’s producers at a disadvantage, compared with the U.S., he added.

While the U.S. and Europe are important steel producers, more than half the world’s production remains in China. Currently, more than 90% of Chinese production comes from blast furnaces, according to Worldsteel. This is expected to fall to 75% by 2030, meaning coal- and natural gas-powered operations are likely to remain dominant, according to Paul Lim, Asia steel editor at Fastmarkets.

Efforts are afoot to use more efficient raw materials and to add carbon capture and storage, he said, but the economics of blast furnaces mean they remain the most efficient and cost-effective option for producers.

“China will not be moving from blast furnaces for a long time,” Lim said.

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