

The Global “Green Revolution”: “Green Steel” on the Rise

The global “Green Revolution” is strongly impacting the steel business

A critical development in the past two years is the loss of confidence on the part of many owners of “legacy” steel mills — that, outside of China, have roughly 300 million metric tons of capacity (or, about 50% of non-Chinese annual integrated steel mill capacity of about 600 million metric tons). These plants are apparently not positioned to be reconfigured to emit far less CO₂. As a consequence, a number of these plants are being sold at bargain prices — such as ArcelorMittal’s sale of its U.S. steel plant asset to Cleveland-Cliffs for about US\$1.4 billion.

Longer term, with the industrial structure of societies being revamped to make use of renewable energy, the rise in steel demand can be substantial, perhaps as much as 50 million metric tons per year. Huge investments are needed to create renewable electric energy — wind and solar power outside of China, plus nuclear power in China.

Some “Green Revolution” pros and cons for the steel mills include:
Positives:

- Policymakers in many countries over the past two years have become more supportive of steel mills’ huge capital needs, and a 20–50% rise in operating expenses, if they are to sharply pare CO₂ emissions. Hence, they are more prone to erecting trade barriers to protect their steel mills.
- Steel mills the world over are “talking a good game” when it comes to their plans to reduce CO₂ emissions. They are demonstrating flexibility in their choice of solutions to reduce CO₂ emissions — based on the availability of hydrogen and/or the capture,

processing and sequestration of CO₂.

- Policymakers in the European Union are in an advanced stage of imposing carbon border taxes on imported steel products based on the generation of CO₂ during the manufacture of the product. Such an effort requires the existence of a “carbon exchange” on which the price of a metric ton of CO₂ is determined.
- China is best positioned to pare CO₂ emissions given the immense funds that can be diverted to this effort. Similar to huge infrastructure projects, the near-term return on investment is only of minor consequence to Chinese policymakers.
- The Green Revolution challenge will boost many countries’ “steel intensity” via the mechanism of rising fixed asset investment as a share of GDP.

Negatives:

- The funds needed by the steel mills to become carbon-neutral producers is prodigious — along with a massive infrastructure spending on the part of their governments to provide renewable electric power at a low price. Capital spending needs for the global steel industry to achieve its CO₂ reduction goals exceed US\$1 trillion in the next 20 years.
- The companies need major government support in order to achieve a low-CO₂-emission status — no matter which political party in their country may be in power in the future.
- A “level playing field,” in which policymakers in all countries in the next 30 years pursue complementary actions to reduce CO₂ emissions, is most probably a



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WSD’s steel experience, steel database and availability of steel statistics are the principles for performing steel forecasts, studies and analysis for international clients. WSD seeks to understand how the “pricing power” of steel companies the world over will be impacted by changes in the steel industry’s structure. The views and opinions expressed in this article are solely those of World Steel Dynamics and not necessarily those of AIST.

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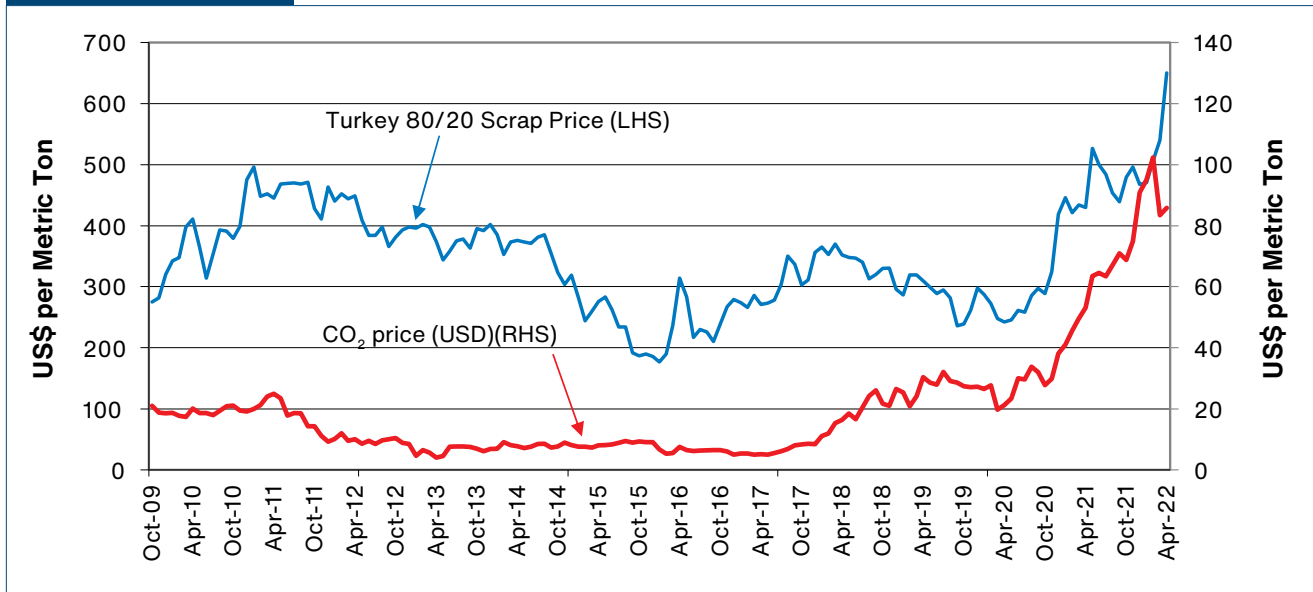
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Figure 1



CO₂ European emission allowance price in USD and Turkey 80/20 HMS 1/2 scrap spot prices. Sources: WSD PriceTracker and SteelBenchmarker™, Reuters, Market Business Insider, Ember Climate.

“pipe dream.” Hence, steel producers in countries with less severe mandates to cut CO₂ could have a cost advantage.

- If CO₂ emissions are to be largely eliminated, the rise in operating costs — when the process route makes use of hydrogen to produce the steel and/or to capture, process and sequester the CO₂ that’s emitted — will typically range from 25% to 50% for an integrated steel plant. For EAF-based steelmakers, its operating costs will be inflated by the high prices for prime steel scrap and related products (direct reduced iron and purchased pig iron).
- Many countries will not meet their renewable energy production targets because they lack the funds to accomplish such an undertaking.
- Nuclear plants may be the best way to create renewable energy sources because only a small amount of CO₂ is emitted when the nuclear fuel is

processed. But, in a number of countries/regions outside of China, these plants are not included as a renewable energy source.

- Higher steel prices will accelerate efforts by steel users to engineer their steel-intensive products to use lesser amounts of steel — i.e., price allocates resource.
- The price of carbon is now impacting steel prices in the European Union, which will cause them to be higher than in many other parts of the world. Since 2018, as indicated in the accompanying graphic, the European price of carbon was so low that it had little correlation with the price of 80/20 steel scrap delivered to Turkey. However, this situation changed once the EU carbon price started to rise sharply in 2018 and peaked in February 2022, the price has since been trending down in the last few weeks (see Fig. 1).

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