

Energizing the Future: Hydrogen in the Age of Trumpism, Part 2 (and Final...)

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Dear Associates,

as expected, there is global policy news this month concerning the development of green hydrogen in Central Asia. Undoubtedly, Kazakhstan's weak point in participating in green hydrogen supplies to Europe lies in logistics. As we have already discussed in the past months, and we only reiterate it to make the article easier to read, transporting green hydrogen is much cheaper and more efficient than transporting 'green' energy via power lines. The problem is that there are no transport pipelines from Kazakhstan to Europe, other than those that cross the territory of Russia, and end up in the hubs to Belarus and Ukraine. Moreover, Russia has not stood idly by in terms of sustainability, and although there is a kind of iron curtain that those of my generation remember well, Russia ranks high in terms of technological readiness and development of the green hydrogen concept. There are plans more than five years ago to start blending gas to Europe, and only the well-known geopolitical events have probably prevented Russia from becoming a privileged supplier of green hydrogen to Europe.



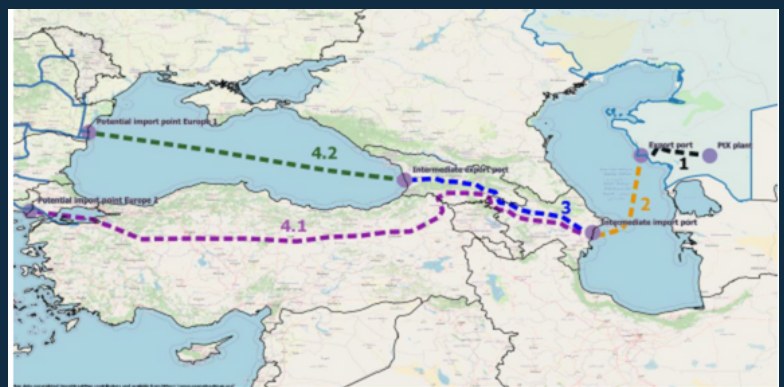
So for Kazakhstan the problem of how to send the potential production of green hydrogen to Europe is the issue. The EU has promised to solve the problem, but those who know the dynamics of the Caspian do not believe in a solution in a reasonable time, just think that there is not even a gas or oil pipeline between the two shores of the Caspian...

The issue of hydrogen in Kazakhstan is therefore closely linked to the issue of transport logistics. At least until today. A few days ago the news came out that a Chinese group has finally decided to start installing a DRI plant for the production of green steel in Kazakhstan. The plant, with a capacity of 1 million tons per year, would be one of the largest on the market, and outlines a new strategy of the Chinese government regarding green steel.

Direct reduction steel and its more transportable twin, hot briquetted steel, have lingered in the wings of traditional steel production as a high quality, low residue input for furnaces for almost 60 years.

We wanted to talk a bit about green ammonia and e-methanol, but this news is definitely appetising. Direct reduction plants for steel production can run on a variety of fuel types, but hydrogen is definitely the most interesting. Combined with hydrogen instead of traditional natural gas and linked to efficient furnaces powered by renewable energy, they have the potential to provide the most effective way to produce 'green' steel, whether low-carbon or zero-carbon. This is important in a hard-to-reduce sector that accounts for up to 11% of all global CO₂ emissions. Blast furnace steel production, which accounts for two-thirds of global crude steel production of as much as 1.95 billion tonnes in 2021, typically produces 2.0 tonnes/CO₂ per tonne of crude steel. DRI with hydrogen brings this value below 0.5 tonnes/CO₂ per tonne.

In the European Union, the race to make green steel commercially viable has begun. The EU's overall greenhouse gas emission reduction target for 2030 requires sectors covered by the Emissions Trading Scheme, including steel, to reduce their emissions by 43% from 2005 levels.



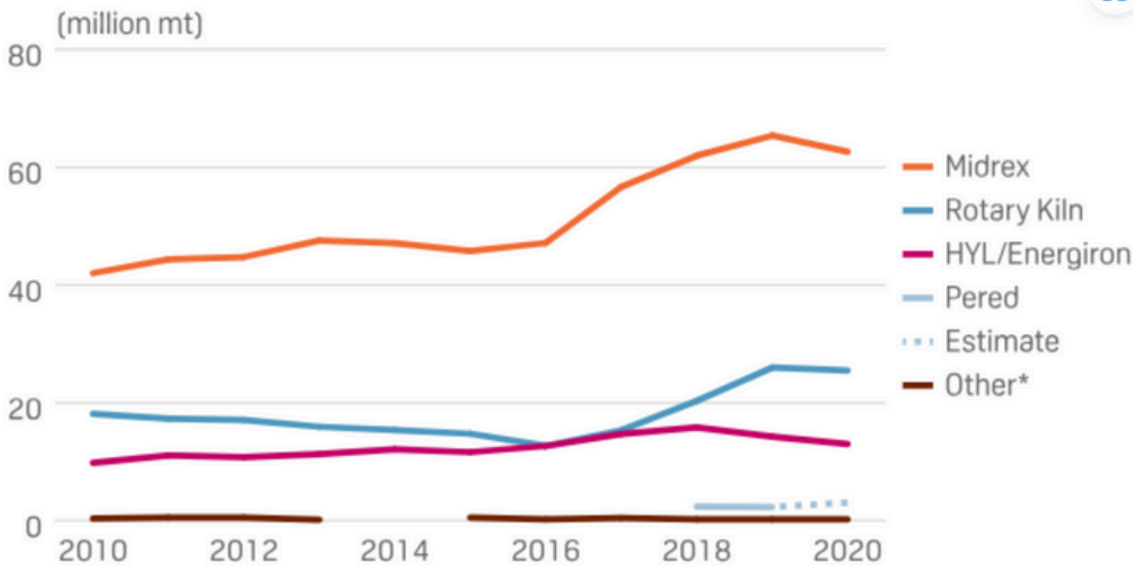
Free ETS allowances for steel producers will be phased out between 2026 and 2030, leaving plants with rising costs as they simultaneously adapt to new technologies, with consumers facing price premiums on green steel.

Steel production via DRI and HBI promises to be a winner in this race. As a production route, it is already well established. Hydrogen-based DRI was produced on a commercial scale in Trinidad and Tobago using a fluidised bed reactor process back in the early 2000s. Now the process needs to be improved and accompanied by a truly fossil-fuel-free energy source.

Here, then, this investment in Kazakhstan bursts onto the scene, suddenly making HyrAsia l's Giga plant plans relevant and no longer a pipe dream.

This is the same strategy that Ursula Von Der Leyen proposed to the countries of North Africa, seeking to locate steel production where green hydrogen is cheaper. But if China decides to enter the market in this way, and using resources present in neighbouring countries or not, such as Kazakhstan for example, it requires careful consideration of both the effective development of green hydrogen as a technology hub and as a commodity functional to decarbonisation at source and not only downstream in the supply chain.

WORLD DRI PRODUCTION BY PROCESS 2010-2020



*Other includes a variety of processes using retorts, shaft furnaces, fluidized bed furnaces and hearths

Source: Midrex Technologies Inc., 2021