

5-7 NOV 2024

MESSE ESSEN | ESSEN, GERMANY

24

EUROPEAN STEEL FORUM

NEAR-TERM CHALLENGES,
LONG-TERM OPPORTUNITY

BY SAM KUSIC

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HATCH KÜTTNER

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Put a few steel industry experts together in a room, ask them about decarbonization, and inevitably, the questions of “how” will arise. How will the industry reduce its carbon intensity? How will it find the proper raw materials and clean energy? How will the industry pay for it?

Critical questions, certainly. But as José Noldin, chief executive officer of French ironmaking startup Gravithy, sees it, the “why” of steel industry decarbonization is just as important, if not more. Yet, as he told attendees of the 2024 AIST European Steel Forum, the why is a question often overlooked.

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José Noldin, GravitHy

**“Let’s not
forget — we
are doing this
to save the
world.”**

— José Noldin,
GravitHy; AIST
European Member
Chapter Chair

So why is the industry undertaking this monumental effort, he asked.

“Let’s not forget,” he said, “we are doing this to save the world.”

“We are doing this because we need to decarbonize the economy. We are doing this because we ought to be tired of every week seeing ‘the worst ever.’ The worst ever flooding in Brazil. The worst ever fire in Canada. The worst ever. That must stop.”

It was an urgent call to arms for an industry and a continent that are wrestling with the how, and at a time of policy and market uncertainty. To wit:

Green hydrogen supplies, as well as the market and infrastructure for it, have yet to materialize. Questions remain around the effectiveness of the current Carbon Border Adjustment Mechanism (CBAM) to disincentive imports from higher-carbon-emitting steel producers. Some promising technologies are years away from commercialization, and it’s still not clear whether buyers are even willing to pay a premium for green steel.

As ArcelorMittal founder and executive chairman Lakshmi Mittal wrote in an op-ed for the *Financial Times*: “The sober truth is that the European steel industry has never been so challenged, caught as it is between the pincers of decarbonization costs and the fallout from severe overcapacity, especially in China, which has resulted in increased imports.”



The op-ed followed ArcelorMittal's early December announcement that it would delay final investment decisions on a number of hydrogen-ready direct reduced iron-electric arc furnace (DRI-EAF) facilities in Europe, citing unfavorable policy as well as energy and steel market dynamics.

The uncertainty provided the basis for much of the conversation during the annual gathering of European steel industry's business and technical leaders. The three-day conference took place in Essen, Germany, drawing more than 230 people.

The conference sessions delved into a number of familiar challenges: raw materials, clean energy and effective technologies. With steelmakers investing billions of euros — both public and private — into comprehensive projects, the ability to generate a return on investment was a key focus during the two-day discussion.

At issue was whether steel users will pay a premium for steel products produced by way of less carbon-intensive, or carbon-free, processes. The jury remains out, it seems, based on the opinions of ESF speakers.

Nicole Voigt, a managing director and partner at Boston Consulting Group, said that there is, in fact, demand for green steel (and actually something of a shortage for the greenest of steels, based on her firm's estimate) and a willingness to pay for it.



Peter Weber,
Hatch Küttner



L-R: Nicole Voigt, Boston Consulting Group; René Gissinger, Pipe GmbH & Co. KG; Marc Delobelle, Volvo Group; Mauro Milocco, Danieli Germany



Saeed Al Ghafri,
Emirates Steel

“But it varies significantly by region and by customer,” she said.

A consumer survey conducted by her firm, for example, found that a majority of steel end users in China indicated that they’d be willing to pay a premium of up to 9% for green products. In the U.S., the tipping point was at 3%.

Michael Bott, decarbonization project director at Dillinger Hütte AG, said that in his view, the willingness to pay a premium depends on the market that steel buyers are serving. Offshore wind tower makers certainly will, he said, and the automotive sector so far seems to be. “But there are fields where they are absolutely not interested in paying a green premium,” he added. But even if some are willing to pay a premium now, they might not be in the future.

“We think as soon as there is overcapacity in the green steel production route, the green premium will evaporate.”

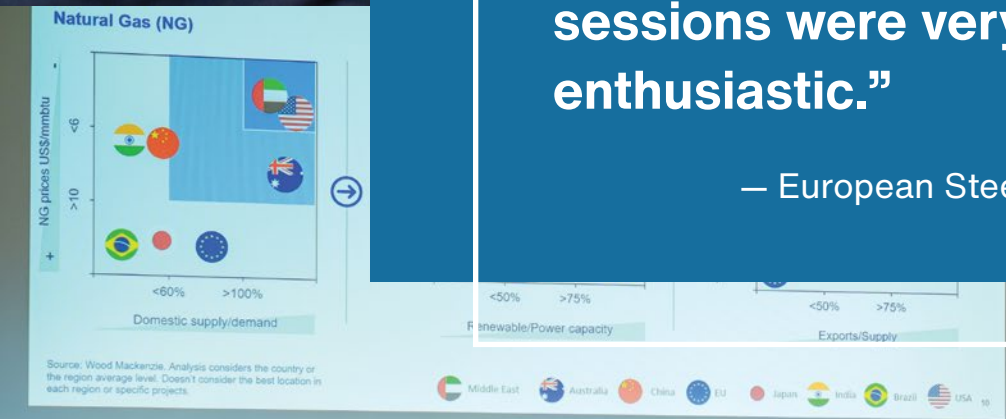
Offering perspectives from North America, Traci L. Forrester, Cleveland-Cliffs Inc. executive vice president for environmental and sustainability, said, “With the current environment, I don’t see a green steel



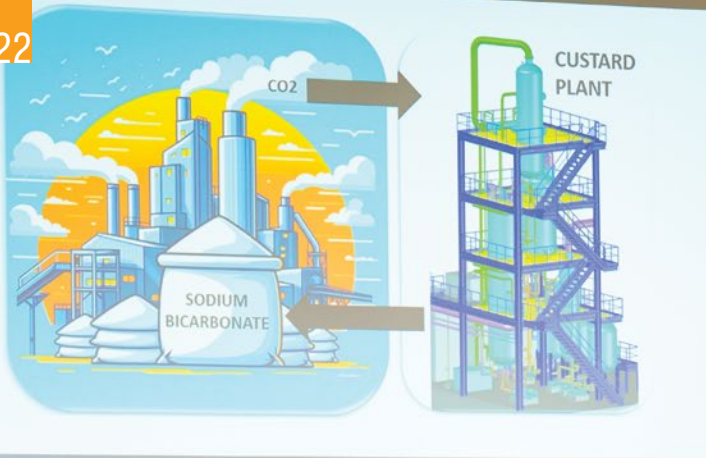
Siddhartha Sengupta,
Hatch Advisory

“This was the best conference I have ever attended. The discussions during and after the sessions were very intense and enthusiastic.”

— European Steel Forum 2024 attendee



L-R: Gilberto Cardoso, Tarraco Commodities Solutions; Carolina Lasse, DB Cargo AG; Saeed Al Ghafri, Emirates Steel; José Noldin, Gravithy; Felix Flrsbach, Badische Stahl-Engineering GmbH; Daniel Carvalho, Wood Mackenzie



L-R: Nils Voermann, Hatch; Harald Holzgruber, INTECO group; Mauro Bianchi Ferri, Acciarium Srl; Rolando Paolone, Danieli & C. SpA



premium being paid in the United States across all segments. Steel purchasing remains a cost-driven decision for now.”

But Al Behr, Nucor Corp.’s executive vice president for raw materials, said there are a few customer segments willing to pay extra, especially those that are selling to consumers. Among those, he said, are automotive manufacturers.

“We see that they do pay a premium when they can make a point of it to their customers as part of their commercial strategy,” he said.

As there is disagreement on whether European steelmakers can generate a return on green steel investments, so too is there disagreement over which technologies will best optimize financial returns and CO₂ reductions.

Noldin, who also is chair of the AIST European Member Chapter,

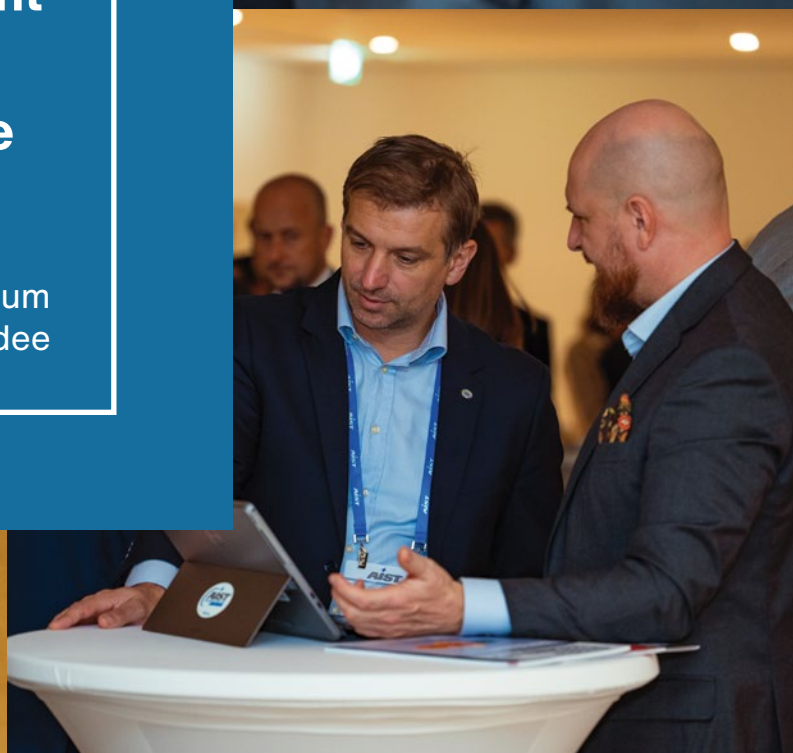


“Every session was very informative and interesting. The different approaches each company is taking were interesting to hear.”

— European Steel Forum
2024 attendee



L–R: Gerald Wimmer, Primetals Technologies Austria GmbH; Christian Fröhling, SMS group; Paolo Argenta, Tenova; Mauro Bianchi Ferri, Acciarium Srl



is betting on transformational ironmaking technologies, rather than steelmaking technologies. His company, GravitHy, in fact is aiming to build a hydrogen-fueled hot briquetted iron plant in France.

The plant, which would include on-site hydrogen electrolysis, is to open in 2028 and will produce 2 million metric tons on a merchant basis.

“I don’t believe there will be a transformation of steel production without really transforming ironmaking,” Noldin said. “There will be no decarbonization if we don’t really transform ironmaking.”



“The high level of panel members and the honesty of some challenges were refreshing.”

— European Steel Forum
2024 attendee

That opinion was supported by Hatch Advisory principal Siddhartha Sengupta, who pointed out that while there are dozens of steel decarbonization technologies in various stages of development, only one is of sufficient technological maturity to significantly reduce CO₂ reductions — the DRI-EAF route.

And this, he said, presents a problem. Although the DRI-EAF route is readily deployable, it requires a higher-grade feedstock than the classic blast furnace, creating a potential pinch point.

Based on his firm’s estimates, the world, by 2040, will need an additional 200 million tons of pellets suitable for the DRI-EAF route, pellets with high iron content and low gangue content. Although there are 130 million tons’ worth of projects in the pipeline, the risk is that CO₂ reduction targets are moved forward, and demand winds up outpacing capacity.





L-R: Al Behr, Nucor Corp.; Michael Bott, Stahl-Holding-Saar; Traci Forrester, Cleveland-Cliffs Inc.; Kristian Notebaert, ArcelorMittal Europe – Flat Products; Tom Toner, SSAB Americas and AIST president



Joe Petrolito, Hatch



L-R: Martin Pei, SSAB; Sebastian Börner, Stahl-Holding-Saar; Boris Kohnen, thyssenkrupp Steel Europe AG; Thomas Bürgler, K1-Met; Kristian Notebaert, ArcelorMittal Europe – Flat Products; Jürgen Cappel, Cappel Stahl Consulting GmbH

“What the data is telling us is that DR pellets will become the choke point for the decarbonization of the steel industry,” he said.

As demand for direct reduction (DR)-grade pellets appears set to grow, it could potentially account for 40% to 50% of the seaborne market, said Tarraco Commodities Solutions chief executive officer Gilberto Cardoso.

Cardoso said the winners in the new landscape will be regions such as the Middle East and North Africa, which have access to cheap natural gas and growing hydrogen production capabilities. Given that, he said, major exporters of DR-grade pellets, such as Iran and Qatar, will likely play an increasingly important role in the global market, providing critical supplies to Europe and Asia.

That point was embodied in a presentation by Saeed Al Ghafri, chief executive officer of Emirates Steel.



L-R: Karsten Pinkwart, Fraunhofer-Institute for Chemical Technology & University of Applied Sciences Karlsruhe; Christian Koulic, TotalEnergies SE; Bettina Hübschen, Saarländische Wasserstoffagentur GmbH; Guido Schumacher, CWP Global; Johannes Schenk, Montanuniversität Leoben; Johann Rinnhofer, thyssenkrupp-nucera Australia Pty. Ltd.



L-R: Matthias Winkler, ING; Klaus Houben, Export Development Canada; Tim Langenbach, KFW; Ekaterina Ksoll, Rothschild & Co.; Jonathan Lee, Hatch



Carl Orrling, SSAB AB



“The best green steel conference I’ve ever attended. It was a good balance of breadth and depth about the key aspects of green steel.”

— European Steel Forum 2024 attendee



The company aims to lead in clean iron production, and to that end, is aiming to establish an export-oriented iron ore hub in Abu Dhabi. Al Ghafri shared with attendees some of the company’s early steps, which include the inauguration of a pilot-scale, solar-powered hydrogen electrolysis unit.

“It’s the first of its kind in the Middle East. It’s now in operation, and we are testing it and trying to scale and understand and learn what can we do about it in the future. And we’re even thinking about how we can scale it to become better.”

Meanwhile, back in Europe, domestic steel producers are continuing to advance their own green projects, even in the face of market uncertainty.

For instance, SSAB’s board gave the go-ahead on a EUR4.5 billion mini-mill in Luleå, Sweden. The new mill will have a capacity of 2.5 million tons per year and consist of two electric arc furnaces, advanced secondary metallurgy, a direct strip rolling mill to produce SSAB’s specialty products, and a cold rolling complex to serve the mobility segment with a broader offering of premium products.



The mill will make use of SSAB's hydrogen reduced iron. SSAB chief technical officer Martin Pei told the audience that its work on developing hydrogen reduced briquettes is bearing fruit.

He said tests are showing that its sponge iron pellets have significantly better transport, storage and melting properties compared to sponge iron reduced with conventional natural gas-based processes.

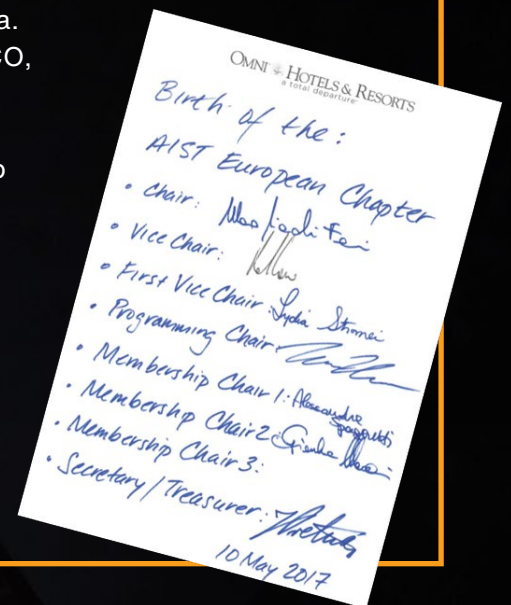
Tests also show that the product has very good and stable chemical properties, with a high degree of metallization (98–99%). Low iron oxide content and 0% carbon give the sponge iron robust mechanical properties.

“Measurements show that they have higher compressive strength than pellets produced with natural gas. They

At this year's conference, **Mauro Bianchi Ferri**, Acciarium Srl, was recognized as one of the initiators, founding members and inaugural chair of the European Member Chapter. Bianchi Ferri was elected as chair when the chapter was formalized in May 2017 and served for the eligible term of seven years for a newly established international chapter. The chapter is grateful for his vision, dedication and leadership.

AIST began exploring the potential for a European chapter in 2009, when members in Italy began discussing the need for a regionally based chapter to expand the reach of AIST's programs and services. At that time, a steering committee was formed, and over the next eight years, it thoroughly investigated whether an AIST European chapter could offer value-added programs, conferences and training that would be complimentary to other European steel associations.

As part of that effort, five European-oriented Steel Forums in Italy were held and championed by Pomini Tenova. Other host companies have included Danieli, INTECO, TenarisDalmine, and for the forum's first time in Germany, this year's host Hatch Küttner. Each year, the chapter's executive committee works to develop a cutting-edge program that provides exceptional content for attendees. The AIST European Member Chapter would like to thank Hatch Küttner, as well as the sponsors, participants, and attendees for making this year's event the largest to date. The chapter is already in preparations for next year's European Steel Forum, hosted by IDOM in Bilbao, Spain, in October 2025.





“AIST European Steel Forum provided a wealth of information and perspectives on important topics such as green steel along and pollution reduction. Discussions around financing, infrastructure, technology and steelmaking were insightful.”

— European Steel Forum 2024 attendee





also show high mechanical strength in drop tests. The value chain is based on a new sponge iron product with unique properties.”

thyssenkrupp also has plans to complete a DRI plant already under construction that will replace two blast furnaces in Duisburg with 2.2 million metric tons per year of EAF production.

To the south, voestalpine is running the largest CO₂ reduction project in Austria, with up to a 5% national decrease in greenhouse gas emissions. The company plans to install two EAF units with a production capacity of 1.6 million tons per year in Linz and 0.8 million tons per year in Donawitz by 2027.

While those companies are looking to step away from blast furnace production, ArcelorMittal said it believes there will continue to be a need for blast furnace output. So it is working on creating one that emits much less CO₂.

Kristian Notebaert, chief technology officer decarbonization for ArcelorMittal’s European flat products business, said the company is conceptualizing what it is calling a “renaissance” blast furnace, a furnace that would be enhanced with a variety of novel and carbon-mitigating features.

Those features include top gas recycling, gas preheating and injection, biochar injection, and full O₂ injection.

While there are many paths to decarbonization, they might all lead to one unintended outcome: easier recruitment.

As both Bott and AIST president and SSAB Americas vice president of operations Tom Toner noted, the work that the industry is doing seems to resonate with young workers who are settling on a career path.

“Since we started to tell our decarbonization story, it has created significant interest from the younger generation,” Toner said.

Bott agreed.

“If you (undertake) the transformation, (we’ve found) that young men and women are interested to join us,” he said.

But, of course, that narrative comes with a price, as decarbonization requires billions in capital. Moreover, it will require policy clarity to make those investments, as Mittal cautioned in his December op-ed.

“My message is clear. Europe should not walk away from its industrial heritage, handing over future industrial growth to other regions,” he wrote. “There is considerable investment into the green transition waiting to be quickly activated, once the requisite policy clarity is achieved. If the right decisions are taken, Europe can be at the vanguard of the technology over the next 50 years. Don’t let that opportunity pass.”

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