



eugenie.ai

THRIVE SUSTAINABLY



**From Carbon-Intensive to
Carbon-Neutral:
5 game-changing benefits
of digital twins for
Steel Makers**

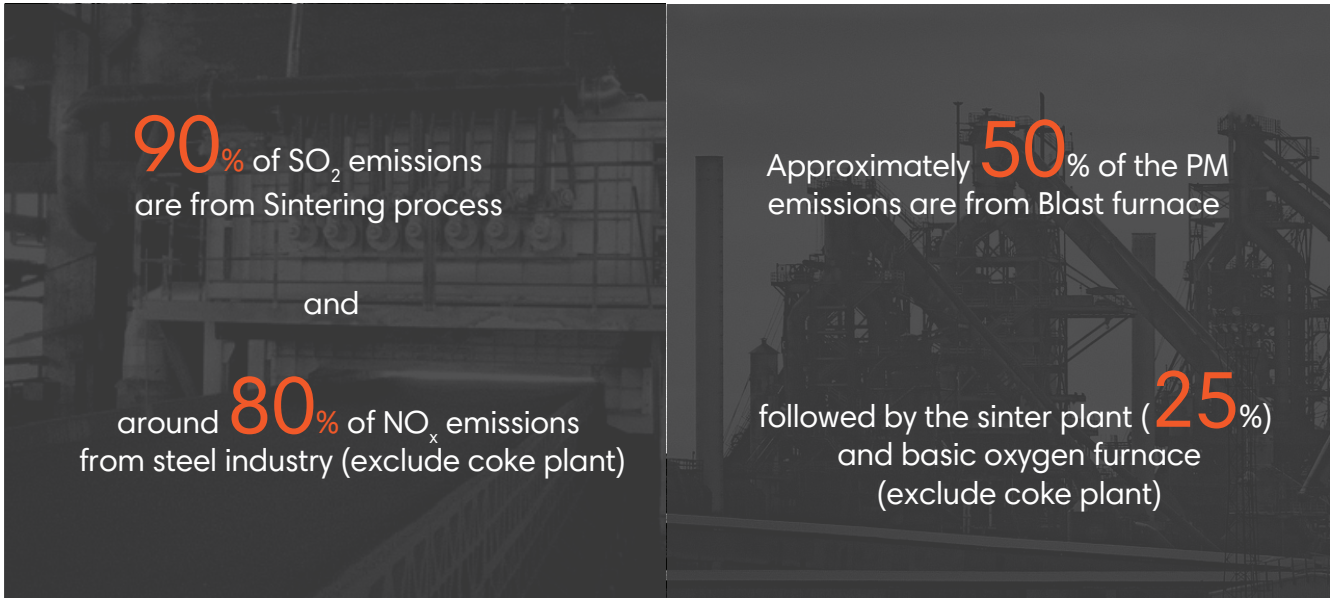
■ support@eugenie.ai

■ <https://www.eugenie.ai>

■ +1 (669) 306-1914

■ +91 (81975) 97975

Steel is used in almost every industry and can have a tremendous economic and environmental impact. Steel is a highly emission-intensive industry. In 2020, 1.89 tonnes of CO₂ were released into the environment for every tonne of steel produced. A total of 2.6 billion tonnes of direct emissions from the industry were generated in 2020, accounting for 7% to 9% of all anthropogenic CO₂ emissions worldwide.



Decarbonizing steel can be a complicated process, with many new and innovative technologies at the forefront. As of now, the technologies have not made it to market in their entirety. This is especially true for emerging economies, where commercially available technologies remain under-utilized. Hence, the steel industry cannot transition to green steel in the same way across different regions.

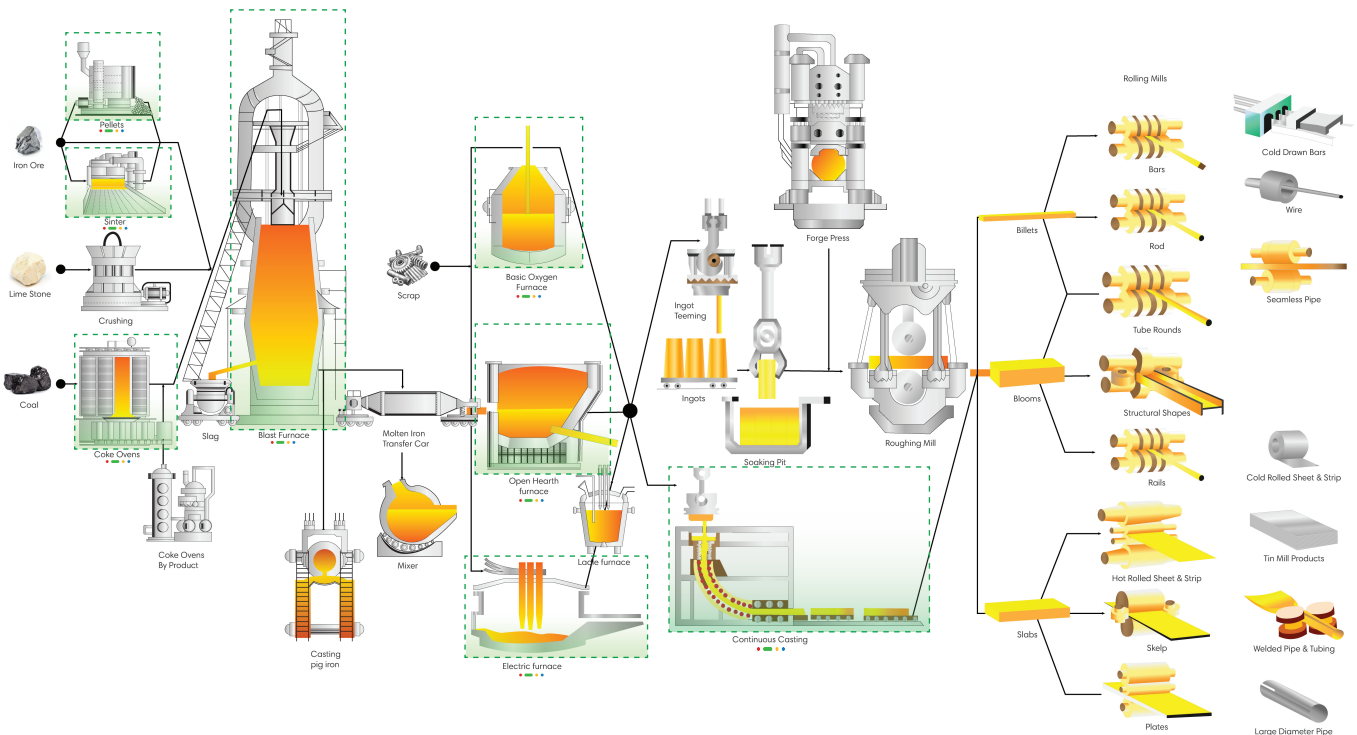
The steel production industry as a whole lags behind other industries in terms of sustainable operations and practices. Steelmaking requires a massive amount of energy, and the energy needed for it is typically produced by burning fossil fuels, a process that has been worsening the global climate crisis due to carbon emissions. Even though many steel producers have already begun the transformation process, switching to green steel won't happen overnight because it would require large amounts of investments in terms of process transformation. The length of this shift, such as the adoption of green hydrogen-based steel, is also unknown.

The development of new technology further increases the difficulties for steelmakers. For instance, green hydrogen-based steel necessitates a large increase in the capacity of power produced from renewable sources. Steel producers should start today and adjust their business practices for higher efficiency rather than waiting for the availability of drastically new production processes.

Application of Eugenie’s digital twins across the steel manufacturing value chain

Steel companies should focus on incremental improvements in order to decrease energy input, reduce carbon emissions, and increase material efficiency. Given how large the steel industry’s carbon footprint is, even small improvements can make a big difference in moving the industry closer to carbon neutrality.

Eugenie’s AI-based digital twins tackle the problem of fugitive emissions in asset-heavy industries like steel. The asset and process control digital twins track the performance and resultant emissions of machines and processes. The digital twins also enable to map of relationships between these machines and processes and simulate the impact of



 Eugenie’s application across the steel plant

Steel manufacturers need digital twins to help them make better, faster, and data-driven decisions. As the industry has been struggling to keep up with innovation due to its largely manual processes such as legacy planning tools and systems, increasing the traceability of steel products and executing faster and more efficient processes requires digitalization across the supply chain.



How Eugenie's digital twins are helping in steel decarbonization

As a pioneer in sustainability technology, Eugenie's goal is to reduce emissions, wastage, and carbon footprint for machines and processes. We do this by improving efficiency, and asset reliability and thus saving OpEx. Eugenie's patented products, which include AI-driven digital twins monitor the performance of machines and processes and track the resulting emissions. By analyzing the data collected by these digital twins, companies can simulate how changes to operational variables impact both-output and emissions.

Here are the five reasons steelmakers need to utilize the cutting-edge technology of Eugenie's digital twins to jumpstart as well as accelerate their decarbonization journey.

Operational Excellence: With digital twins, steelmakers can simulate, analyze, and optimize operational scenarios before investing time and resources in new processes. Digital twins provide a comprehensive, real-time view of the entire steel making process, allowing steel makers to identify areas where they can reduce emissions and optimize operations. For instance, steel plants can use a plant-wide digital twin that connects assets and process data to investigate opportunities for collective improvement and identify areas where efficiency can be increased. As a result, the business can decrease energy consumption or discover ways to enhance production capacity without needing additional resources.

Simulation Testing: Traditionally, steel makers have had to rely on physical testing and experimentation to optimize their processes. This can be time-consuming, expensive, and often results in significant waste. With digital twins, steel makers can conduct virtual testing and optimization, allowing them to identify the most efficient and sustainable processes without the need for physical experimentation.

Optimizing steel manufacturing processes: Blast furnaces play a significant role in the production of iron and steel, but they also contribute heavily to greenhouse gas emissions. In the past, the industry relied on trial and error to optimize blast furnace operations, leading to high carbon emissions. However, with digital technology, we can now simulate the behaviour of blast furnaces and predict their performance under different conditions, reducing emissions. Eugenie's digital twins can optimize fuel usage, reduces coke consumption, and minimizes hot metal production - all of which help to cut down on emissions and create a more sustainable manufacturing process.

Collaboration and knowledge sharing: The issue of staff turnover affects almost all industries. Each time a knowledgeable employee quits, they nearly invariably take their expertise with them, which affects production. By using a digital twin, steel companies can remotely monitor and support most of these issues. Experts located off-site can also monitor operating equipment using digital twin ecosystems. Digital twins facilitate collaboration and knowledge sharing by providing a common platform for stakeholders to share data and insights, accelerating the pace of innovation and progress.

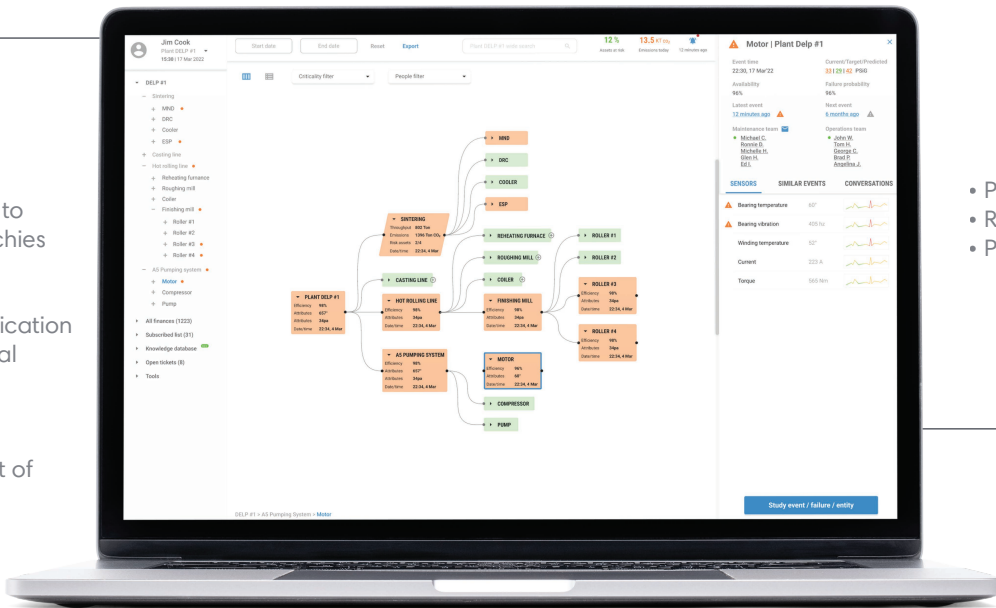
Predictive Maintenance: Maintaining steel making equipment is crucial to ensuring efficient and sustainable operations. However, traditional maintenance approaches often result in equipment downtime and inefficient use of resources. Digital twins enable predictive maintenance, allowing steel makers to identify potential equipment failures before they occur and schedule maintenance activities in a way that minimizes disruption to operations.

Asset and Process control digital twins from Eugenie

Eugenie offers SaaS-based digital twins for heavy industries which have helped companies across industries in reducing their carbon footprint and improving operational efficiency by 15 to 20%.

The asset control digital twin of Eugenie offers a holistic view of the complex asset hierarchies with easy navigation. Operations teams get insights and alerts to identify abnormalities during operations. The probability of unexpected machine failure, leading to downtimes and revenue loss is reduced drastically with Eugenie’s asset control digital twins.

- Easy navigation to complex hierarchies
- Accurate Identification of the operational issues
- Visual alignment of child KPIs with top-line KPIs



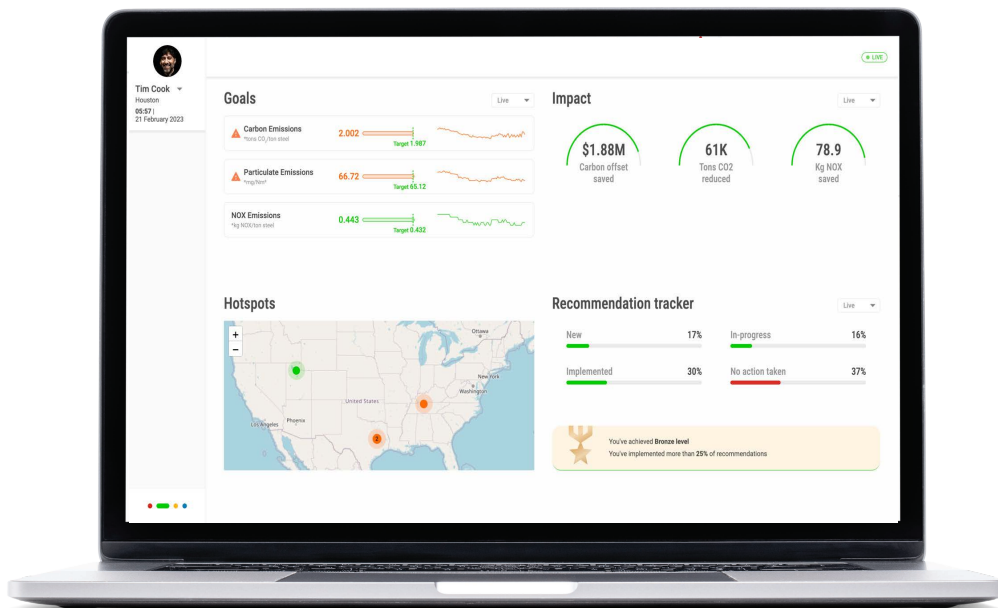
- Prescriptive Analytics
- Real-time Alerts
- Predictive Insights

Asset Control Digital Twin



Eugenie's process control digital twin enables monitoring and tracking of real-time process dynamics, quality throughput, and emissions. The solution continuously checks the target KPIs identify the root causes of process deviations and recommended corrective actions through process controls.

With Eugenie, integration of asset and process control digital twins can be done seamlessly to achieve the accurate tracking of plant operations and emissions. Both digital twins are based on our award-winning patented AI.



Process Control Digital Twin

Conclusion

Steel is one of the most sustainable materials; it's permanent, reusable, and can be recycled. Going forward, preference for 'Green Steel' – steel made with less carbon footprint will be evident, largely due to pressures from investors, customers, governments, and regulators.

As the global decarbonization drive picks up speed, lowering carbon emissions is crucial for steelmakers. Steelmakers who act now to enhance the sustainability of operations can benefit from environmental, social, and governance (ESG) indicators to gain a competitive advantage and stay ahead of changing carbon restrictions.

Sign up for our product demo to discover how you can transform your steel manufacturing plant operations for efficiency, resilience, and sustainability.

About Us

A pioneer of Sustainability Technology, Eugenie is a forefront provider of operational reliability and sustainability solutions. The end-to-end and secured products suite of Eugenie is created with a vision to achieve economic and ecological sustainability.

Incubated in 2018 by Fractal AI Inc, Eugenie has catered to over 10 Fortune 100 clients globally. The strategic partners of Eugenie include Intel Plugin Alliance, NASSCOM DeepTech Club, Forbes Technology Council, Greentown Labs, Microsoft, Earth5R, SusTech Mafia, FICCI, DevNetwork, Society of Petroleum Engineers, Middle East Energy Club.

Eugenie's offerings have been featured in Forrester Tech Tide™, Q2 2021, Gartner: Competitive Landscape - Data and Analytics Service Providers, 2020, and The Forrester Wave™: Specialized Insights Service Providers, Q2 2020.

Eugenie was awarded as the best company in AI innovation by Forbes and Microsoft in 2020. Recently, Eugenie has won the prestigious award of NASSCOM Emerge 50, 2021 in the strategic category. In 2023, Eugenie.ai has been selected by Google for Startups Accelerator: Climate Change, in its 2023 cohort.

Awards and Recognition

FORRESTER®

Forbes

Gartner®

Bloomberg

Google for Startups

 **siliconANGLE**

 **Analytics Insight**

nexa
MINING
LAB



Contact Us



- support@eugenie.ai
- +1 (669) 306-1914 || +91 (81975) 97975
- Cupertino, California, USA || Mumbai, India


eugenie.ai
THRIVE SUSTAINABLY