



# Green Steel



# Mapping your pathways to sustainable green steel.



Designated as a hard-to-abate sector, steel production accounts for 7-10% of global greenhouse gas emissions. Over 130 countries, including the 27-nation European Union, have committed to becoming carbon neutral by 2050, with more countries proposing to reduce CO<sub>2</sub> emissions to mitigate climate change. Many steel companies and their related suppliers plan to exceed these commitments.

Transitioning steel production to low-emission processes is critical as steel will remain core to the fabric of society and integral to delivering a green future. The transition will require innovation, new technology development and world-class project execution.

## How can Hatch help you?

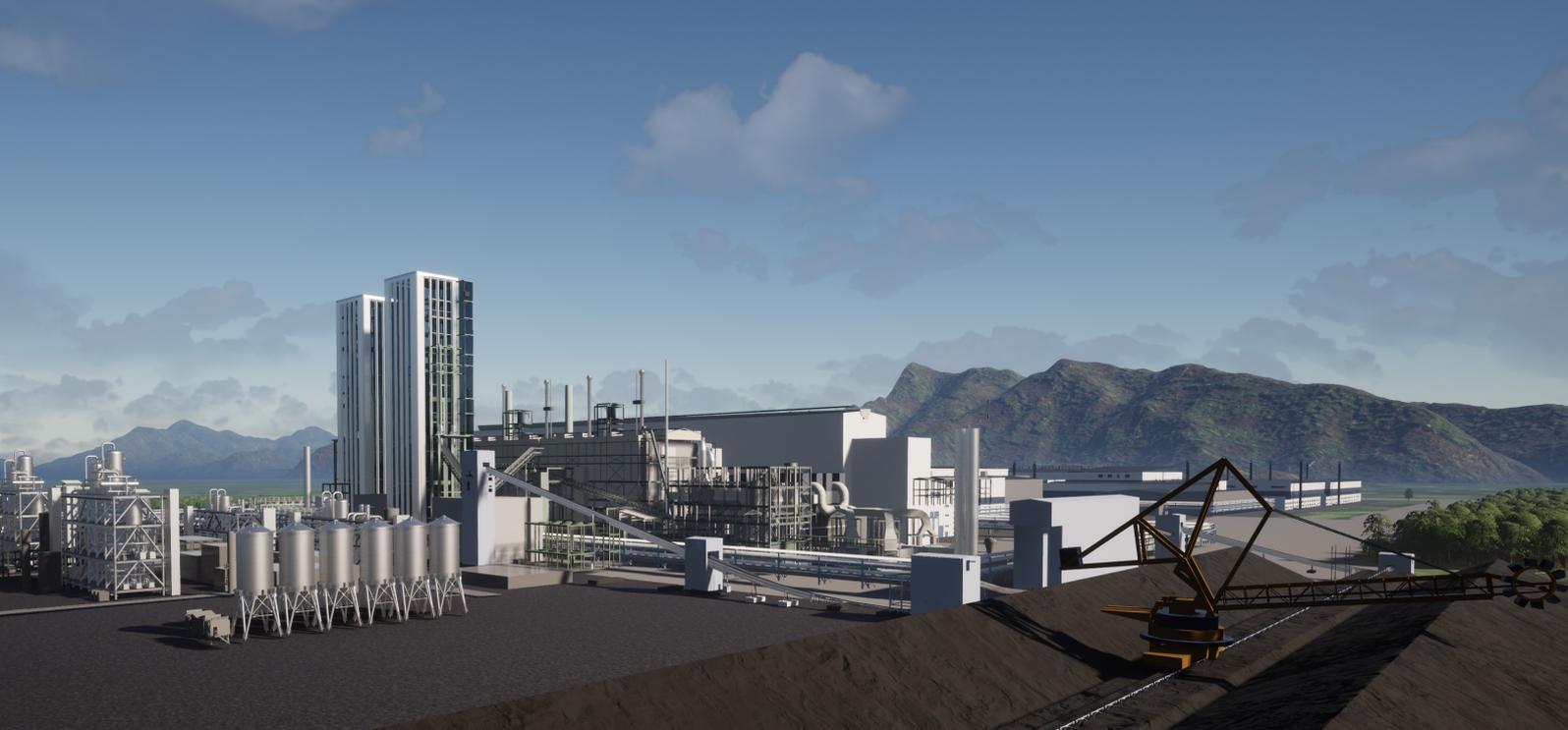
We have unique experience, expertise, and cross-sector capabilities to assist you in navigating every aspect of transitioning to green steel production. Our steel, energy, and climate change expertise combined with our unwavering focus on technology and innovation, will help you transition to a low-emission future and increase sustainability up and down the value chain.

# Carbon reduction requires a trusted partner, and expertise.



Reducing carbon dioxide emissions in the iron and steel industry is challenging as carbon is used as both a fuel for heating and as a chemical to convert iron ore to metallic iron. We offer unique pathways to reduce the carbon footprint of each unique steel plant, building on the plant's local needs and requirements. Multiple strategies are needed to achieve substantial decarbonization, as these approaches are not mutually exclusive. **They include:**

- Process optimization to enhance the steel production process to reduce energy consumption and emissions.
- Defining raw material opportunities that lead to less fossil-fuel use in established steel production.
- State-of-the-art understanding of iron and steelmaking and emerging technologies that can be deployed to transform a brownfield steel plant or develop a new greenfield operation.
- Skills in technology development, including pilot plant design and operations with a focus on scalability.
- Emissions reduction strategy development, transition road mapping, technology evaluation and product carbon declarations.
- Experience in hydrogen production, handling, and storage technologies.
- Transformational technologies like our CRISP+ electric smelting furnace that electrify the iron and steelmaking processes.
- Defining electrification opportunities in each steel plant, and supply and delivery of green and carbon-neutral electricity to site. Hatch brings practical experience in renewable power solutions in addition to the working on the latest small modular reactor (SMR) technologies.
- Deep knowledge and experience of carbon capture, utilization, and storage (CCUS) to capture carbon dioxide emissions from the steelmaking processes, cycling it within the steel plant, utilizing it in other industrial processes, or sequestering it safely.
- Deep chemical engineering experience in converting carbon-rich off-gases to a variety of fuels, integrating with the hydrogen and renewable fuel economies to meet society demands.



# Projects

Getting projects from concept level through feasibility study and into execution is at the core of what we do. Our unrivaled portfolio of services truly makes us a one-stop shop, minimizing interfaces and accelerating the time to market. Our services include:

- Market assessments, due diligence reviews, and business case development
- Pre-concept and feasibility studies
- Construction planning and extensive modularization experience
- Financial modeling and life cycle costs for carbon abatement
- Full engineering, procurement, and construction management (EPCM) delivery – we execute some of the largest mega-projects in the world
- Earth sciences – geo-technical, hydrotechnical, hydrogeology, lab services
- Data-centric digital project delivery experience
- Commissioning planning and start-up assistance
- Business and operational readiness
- Capital program management
- Environmental services for project permitting support
- Community engagement



# CRISP+ ushers in a new era of innovative technology.

Welcome to the future of steelmaking with CRISP+! Our team has leveraged over 65 years of smelting experience to develop the Continuous Reduced Iron and Steelmaking Process (CRISP+), an innovative technology that represents a major step forward for the industry.

At the core of the CRISP+ process is a large, stationary electric furnace that continuously melts direct reduced iron and scrap to produce carbon-bearing hot metal. By using blast furnace-grade iron ores and recycled materials, steel producers can create their entire range of products, including high-quality, low-nitrogen grades, while utilizing their existing steelmaking assets and raw material resources. CRISP+ slag can be sold to cement

producers, further improving the sustainability and economics of the process while also reducing cement-related greenhouse gas emissions.

The CRISP+ smelting technology dramatically reduces emissions, with just a quarter of the emissions generated by traditional blast furnaces. Additionally, the CRISP+ ironmaking furnace can be converted into the CRISP direct steelmaking furnace, eliminating subsequent electric and oxygen steelmaking steps.

CRISP+ direct steelmaking is compatible with future hydrogen direct reduced ironmaking, making it a unique pathway to achieving net-zero emission steel production. With CRISP+, steelmaking has entered a new era of innovation and efficiency, bringing both environmental and economic benefits to the industry.



## A Complete Green Steel Service Offering





## About Hatch

Whatever our clients envision, our teams can design and build. With over six decades of business and technical experience in the mining, energy, and infrastructure sectors, we know your business and understand that your challenges are changing rapidly. We respond quickly with solutions that are smarter, more efficient, and innovative. We draw upon our 10,000 staff with experience in over 150 countries to challenge the status quo and create positive change for our clients, our employees, and the communities we serve.

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