# Iron & Steel

HATCH

# Your challenges, our solutions

Changing market conditions, overcapacity in steelmaking, a transition towards green steel, and shareholder demands are driving iron and steel producers to achieve more with the assets they have now, in addition to planning for a green future. Capital investment dollars are increasingly limited, making it more important than ever to select the best strategic projects, mitigate their risks, and execute them on time, on budget.

In addition, the technology and data-analysis methods that are now commercially available promise to enable a step-change in productivity and overall operational efficiency. The priority placed on operational performance is higher as steelmakers look for greater production capacity while driving down operating costs and continuing to produce high-quality products. To address these issues effectively, you need a comprehensive and innovative approach to problem solving.

Finally, environmental requirements worldwide are becoming more stringent with companies seeking to decarbonize their operations. There is an increased demand for advanced control technology for greenfield plants and retrofits. Steelmakers are looking beyond guidelines and regulations to achieve best-in-class environmental performance today, while positioning themselves for tomorrow's challenges.

Whether it's finding new technologies and tools, or adapting and modernizing existing ones, it's about credibility to achieve smarter solutions. We can help.

We take today's best practices to the next level, applying innovative solutions to make you more competitive and drive your vision for the future. You will get our full support with:

- Process consulting, project conceptualization, and process optimization expertise
- Project development, implementation, and operational readiness services
- Business improvement and turnaround services
- Advisory consulting
- Digitalization solutions
- Decarbonization solutions
- Technology and automation solutions

Through our sustaining capital program, we have been providing specialist technical support to U.S. Steel for many years and have been able to reduce average EPCM costs as well achieve outstanding safety results.

# Global presence, local focus

To remain competitive, you need to ensure that your operation is continuously focused on innovation and process improvement. We can help assess your existing equipment for condition improvements, drive opportunities for modernization, and keep your facility running safely, smoothly, and efficiently.

## ALPA project, Vale

Brazil

ALPA is an integrated steel plant located in the northern Brazilian State of Pará that is designed to produce 2.5 Mtpa of slabs. We prepared the conceptual and basic engineering phases of the project, including the process review, utilities design, and administrative buildings, and supplied business models for outsourcing, solid waste management, operational cost, CAPEX integration, and the project execution plan. We also designed a safe plant using best engineering practices, with layout and process configuration to minimize CAPEX, and helped develop communications to enhance stakeholder engagement.

## Business Transformation Program, Middle Eastern Steelmaker

Middle East

We delivered a transformation program to improve return on capital employed (ROCE) from -7% to +12%. The scope of the engagement covered: market assessment and positioning; sales and marketing; ironmaking; steelmaking; long and flat rolling and finishing; maintenance; supply chain; procurement; cost modelling and product costing; financial modelling; organizational effectiveness; and digital services. In a three-and-a-half-month diagnostic, the joint Client/Hatch team completed a gap analysis on 400 key performance indicators across 16 workstreams, which generated 250 opportunities. These were prioritized and consolidated into 80 initiatives. In the twelve months following, the Client/Hatch team implemented the initiatives and improved EBITDA from -7% to >10%.

## Sustaining Capital Program, U.S. Steel

United States

For 6 years, we provided engineering, project management and specialist technical support to U.S. Steel under an Engineering Alliance Agreement. We delivered a value-driven program of capital projects over the course of the contract in excess of $1.5 Billion of value, representing approximately 8.5 million person-hours with ZERO Lost-Time Injuries. These projects were delivered under a common system for all of U.S. Steel's operating facilities, increasing reliable performance and outcomes. This reliability is indicated by our under-run of the budgeted capital spend amount by over $100 million. Our Alliance contract contained a detailed value assessment scorecard by which projects were scored on key performance indicators such as safety, schedule, and cost. Over the final 3 years of the program, the average score of 98.4% indicated the high performance being set and significant value realized by U.S. Steel. For the projects initiated during the Alliance and completed in the final 3 years of the contract, Hatch demonstrated project savings in excess of 100% of our EPCM fees.

## Integrated Steel Mill $CO_2$ Reduction Project, Algoma Steel

Canada

This engagement comprised technical and economic packages for a portfolio of $CO_2$ reduction projects including heat recovery, biomass usage, and by-product improvement projects. We assisted Algoma Steel with submission of government funding applications as part of the Target Greenhouse Gas (GHG) Industrial Program. This program was intended to support demonstration projects with industrial emitters and help Ontario meet its 2020 targets for GHG emissions reduction.

## Project Wolverine, Allegheny Technologies Inc.

United States

As a supplier of specialty metal products, Allegheny Technologies Inc. (ATI) is currently transforming their business to focus on lower-volume, higher-value products. Project Wolverine is a critical project for ATI, which will optimize and reshape its future business by consolidating numerous processing lines from various facilities to a single location in Vandergrift, Pennsylvania, United States. We have been retained to perform detailed engineering around new, modified, and relocated strip processing lines. The project includes installation of the largest and most capable bright-annealing furnace, in addition to various equipment relocations and upgrades to existing equipment to streamline and optimize ATI's future product flow.

## 6 Mtpa Expansion Prefeasibility Study, Companhia Siderúrgica do Pecém

Brazil

Companhia Siderúrgica do Pecém (CSP) owns and operates a 3.0 Mtpa integrated steel plant located near the port of Pecém in the state of Ceará, Brazil. CSP wishes to expand capacity of the integrated steel plant from 3.0 Mtpa to 6.0 Mtpa of steel slabs. CSP Sretained Hatch-CISDI International (HCI) to perform a pre-feasibility study (PFS) of the capacity expansion project. The capacity expansion involves all areas of the plant: raw materials handling, sinter plant, coke plant, blast furnace, BOF steelmaking, continuous slab casting, power plant, and auxiliary areas. The scope of the project includes FEL-2 level engineering for the capacity expansion, including AACE Class 4 CAPEX estimate.

## Hot Strip Mill Upgrade, NLMK La Louvière S.A.

Belgium

NLMK La Louvière, one of the leading producers of flat steel coils in Belgium, has embarked on a 150-million-euro project to revamp its hot strip mill, expanding production of thinner, stronger, and more sustainable steel. The project will enable the mill to expand production of high-strength thin hot-rolled coil (down to 1.2 mm), increase the range of high-strength products beyond 1000 MPa yield strength, and provide our clients with best-in-class surface and dimensional tolerances. Our role was to modernize the steel hot strip mill in Belgium. We were responsible for developing the final scope of work, providing technical specification and equipment tendering for the main process equipment (MPE), developing a project schedule, the project WBS, and Capital Cost Estimate (CAPEX), and the major inputs into the Operational Cost (OPEX) calculation.

## Transformation Project, Whyalla Steelworks, Liberty OneSteel

Australia

Whyalla Steelworks is owned by LIBERTY OneSteel and located in Whyalla, approximately 400 km northwest of Adelaide. As part of the schedule of work, several projects were identified between July 2018 and June 2019. These projects included a feasibility study to replace the existing heavy structural mill with a modern mill at the existing site, development of options for layout and technology of a new structural rolling mill, and a steelmaking capacity expansion simulation study to increase Basic Oxygen Steelmaking (BOS) throughput from 1.2 Mtpa capacity to 2.0 Mtpa and to verify the new equipment layout.

## DRI Material Handling Basic Engineering, Ternium

Mexico

Ternium Mexico retained Hatch to perform basic engineering of an improved direct reduced iron (DRI) materials handling system for their integrated steel plant located in Monterrey, Mexico. This project was of strategic importance to Ternium as it addressed environmental dust emission concerns, which were directly affecting the local community in Monterrey. The scope of the project included new DRI storage silos complete with nitrogen inerting systems, new materials handling equipment, and environmental control systems.

## Mongolian Steelmaking and Mining Expansion Project, Government of Mongolia/IDA (World Bank)

Mongolia

We completed the prefeasibility and feasibility studies to develop an integrated steel plant in the Darkhan-Selenge region of Mongolia. Our scope included design of the wet concentrator, ironmaking, steelmaking, casting, and rolling plants, and all associated infrastructure for raw materials and finished products. To determine plant size, final products to be made, and viability, Hatch completed a market study focusing on the domestic and regional demand and the economic outlook for the supply of semi-finished and finished steel products.

## Cut-to-Length Facility, Charter Steel

United States

We provided engineering, procurement support, and construction management services for the addition of a cut-to-length (CTL) facility to an existing wound products mill. The project scope involved a new CTL bar mill at Charter Steel's existing special bar quality (SBQ) facility in Cleveland, Ohio. The new mill enables the production of cut-to-length SBQ bars to meet the ever-increasing demands of Charter's customers. The new mill ties into the existing wire mill and will include new pinch rolls, troughs, water boxes, a Kocks reducing and sizing block, shears, a cooling bed, abrasive saws, and bar handling and bundling equipment. This engagement was a challenging brownfield project that also included installation of new mill buildings, tie-ins to existing buildings, new/expanded water treatment facilities, and expansion of existing plant facilities and utility systems.

# Essential services, sound strategies

From designing and delivering major capital programs, to optimizing processes and integrating new technologies, our objectives are always the same: to partner with you to address your most serious challenges and solve your toughest problems.

## Process consulting, project conceptualization, and process optimization

Effective deployment of limited capital on the right projects is important for owners. From early process consulting through project development and design, our team of iron and steel process experts know the steel industry. From raw materials and steelmaking through to rolling and finishing, we provide expert advice in the early stages to ensure that conceptual ideas are transformed into optimized actionable scopes, schedules, and budgets, and ultimately, that the right projects get built. Our engineering and project execution specialists help clients with projects ranging from small brownfield improvements to major greenfield steel plants.

Beyond project execution, you need process implementation and optimization methods that make the most of innovative processes in your operating facility. Through a structured process optimization approach, you will benefit from increased flexibility in feed materials; reduction in waste streams and valorization of by-products; improved recovery; improved process stability; availability and utilization improvements; and reductions in operating expenses and greenhouse gas emissions. We can evaluate your operation and find opportunities for improvement, seeing things that others miss. We use modern project development and execution methods adapted to your operation.

## Project development, implementation, and operational readiness services

Project development and delivery is a core strength at Hatch and is the foundation upon which all our other services rely. Great ideas poorly executed will never reach their full potential. As a full service EPCM provider, we can combine process and business management understanding and expertise with world-class project delivery systems and tools to ensure that as projects are developed, risks are identified and addressed. We continue to develop and implement the latest tools in modern project delivery to maximize the delivered value to the client. One way we do this is through digital project delivery tools that tie all project information back to a cloud-based common data environment. This system provides a “managed source of truth” for all project documents, 3D models, and information attributes. The structured information inherent in the design then provides a future framework for the efficient commissioning, ramp-up, operation, and maintenance of assets.

## Business improvement

There are many operational challenges in business today, and each plant has its own unique challenges. They need significant capital investment and steady funding to remain viable and meet ongoing operational and maintenance requirements.

We work with you, developing strategic operational-performance programs that can boost your bottom line. We find smarter, more efficient solutions for terminal operations. Then we follow up with support across the full business life cycle, from concept to closure. Across the full value chain, from exploration to market.

## Advisory consulting

It is essential that capital projects and asset portfolios achieve their objectives, deliver on expectations, and help you realize your long-term vision. Whether you're looking to capitalize on the full transformative power of digitalization, recapture eroding margins, take advantage of shifting market conditions, manage risks more holistically, conduct a successful transaction, or ensure your operations reach nameplate capacity faster, your ultimate goal is to create and secure value for your organization.

We work closely with you from project conception to full implementation of solutions to help you bring your vision to life and deliver sustainable results. We aspire to unleash the full potential of your assets and organization by assisting you in completing the right financial transactions and business transitions, developing winning strategies to achieve a competitive advantage in your markets, improving your core processes and systems, and driving the right behaviors throughout your organization.

## Digitalization

Digitalization is a game changer for the industry—an enabler to step changes in safety, productivity, cost efficiency, and overall performance. But, given the large number of solutions on offer, selecting and rolling-out the best blend of technologies can be daunting.

Iron and steel companies collect an astonishing amount of data and use less than one per cent of it to make decisions. Modern data-analysis tools can unlock hidden potential in areas such as equipment utilization and plant throughput. Two example areas where digitalization can improve the bottom line are in dynamic simulation and digital twin modeling. A rigorous analysis of liquid steel ladle handling logistics within a steel plant using dynamic simulation can identify critical system bottlenecks and reduce equipment downtime by ten per cent. Our state-of-the-art Blast Furnace 4.0 platform provides a customizable suite of applications designed to deliver stable blast furnace performance through digital twin modeling that will drive down operational costs.

Our team can provide concrete operational experience and judgment—the kind that can provide a robust, practical direction to your digitalization roadmap.

## Decarbonization

We are committed to working with you to develop your decarbonization strategy and road map, and to identify, design, and build practical solutions that meet your greenhouse gas (GHG) emission reduction and sustainability goals. Our clients benefit from a multi-disciplinary team of subject matter experts in the entire steelmaking value chain, as well as low carbon and renewable energy, resilient infrastructure, and climate change policy. We also offer decarbonization technology solutions, including high power electric iron melting and steelmaking furnaces, leveraging our 60+ years in iron/ferro-nickel smelting. By integrating our technology, GHG, and iron and steel subject matter expertise, we are uniquely positioned to address your specific sustainability challenges.

Our teams are working together to deliver technical solutions that will allow all steelmakers to achieve their stated targets while leveraging their existing assets, and the years of experience that goes along with them to the greatest degree.

## Technology and automation

To succeed in today's environment, it is imperative that iron and steel companies fully leverage best available technology and automation to get more out of their existing assets. With solutions ranging from improvements in blast furnace performance to improvements in strip mass coating—we stand ready to support our clients and solve their toughest challenges.

Our portfolio of technologies provides proven solutions for downstream processing of steel, including the Coilbox™, MacroEtcher, best-in-class steel strip coating control systems, and advanced rolling automation engineering. We also provide specialized technologies for iron and steelmaking, including wear resistant staves and finger coolers for blast furnaces, the Acousto Ultrasonic-Echo (AU-E) inspection and monitoring system for measuring the remaining refractory and accretion in blast furnaces, the PyroLiBS online composition sensor, dry slag granulation, hinged ladle lids, and electric furnace technology for low carbon and alternative iron and steelmaking. Our team of technology developers collaborates with clients to implement the next generation of game-changing technologies.

# About Hatch

Whatever our clients envision, our engineers can design and build. With over six decades of business and technical experience in the metals and 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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