# Thermal

HATCH

# Flexible power generation for today's changing needs

Thermal power continues to be the backbone of the world's electricity supply. It's fill-in-the-gaps support that addresses the intermittency of renewables, providing accessible, affordable, and reliable electricity in many markets across the globe.

Energy is a key operating cost in virtually every industry. Disrupting the power supply can be costly, interrupting production and driving down revenue. With the right combination of the best technology and an optimal fuel source, you can have reliable, economical electricity for your business—an edge that can give you a clear competitive advantage.

Today's thermal power plants are facing some tough challenges. New, more stringent regulations and economic requirements highlight the need for state-of-the-art technologies that use energy resources economically and responsibly. And with a rising focus on renewables, a new kind of thermal power facility is needed. One that can fill in the gaps and be more responsive to the needs of a changing market.

You need a partner who understands your needs and your industry. One who can bring innovative and optimized solutions that align with your business objectives.

We work with developers, utilities, operators, process plants, and industrial facilities to provide life-cycle solutions. We listen carefully to your needs and deliver solutions that bring your project from concept to reality… and on through to operations.

# Expertise that serves your needs

Cookie-cutter solutions that use a one-size-fits-all approach can be a trap. Don't get caught. Each project has its own set of challenges and difficulties.

## Thermal power plant development

You need a partner with experience, one who has been through this process many times. Who will properly consider each important aspect of your project: financing, environmental requirements and social engagement, insurance, design, and technology. We work with you, making your projects successful by providing engineering, procurement, and construction management services to minimize project risks and maximize profitability.

## Owner's engineer

The moment a project is launched, we become part of your organization to provide your team with the necessary thermal power expertise to move your concepts from ideas to reality. We work with you to understand the business objectives. Then we can translate the requirements into an EPC tender package that fits your thermal facility's needs. We can help evaluate turnkey bids from technical and economic perspectives, too.

Turnkey contracts require proper oversight and control to be successful in terms of quality, cost, and schedule. That means having a strong team with the technical breadth and management expertise to make your project requirements reality. We form cohesive teams with owners to monitor the design, construction, commissioning, and turnover of contractors' projects to operations. We draw on our proven project delivery procedures, managing turnkey contractors to deliver projects that meet your contractual, technical, and schedule performance commitments. On time. Within budget.

## Refurbishments and retrofits

Many thermal power facilities are shifting to new modes of operation never intended when they were built. This, along with evolving regulations, sometimes requires these facilities to refurbish their equipment or retrofit new technology to maintain profitability. Working in a brownfield environment is challenging. Doing it successfully requires an agile partner who can adapt and provide innovative solutions to address any challenges that may arise.

## Regulatory support, permitting, and approvals

We can help you navigate the often-difficult laws, regulations, and permitting processes in almost any jurisdiction. We're experienced with a wide range of regulatory requirements in many regions around the world. We go where our clients are, and where they need us to be. We work with trusted local partners to offer you world-class yet local services, where they matter most.

## Management consulting services

You need a partner with agile, adaptable skills that go beyond engineering to help you with your investments and business planning. We combine our technical toolbox with an understanding of your business case and how thermal power generation facilities are developed, operated, and made profitable. We can help you evaluate investment opportunities and determine how thermal power facilities fit within your business plans.

## Thermal power expertise

- gas turbine/combined cycle
- coal
- biomass
- steam generation
- cogeneration
- reciprocating engines

## Operational performance

Thermal power generation facilities must be reliable and dependable. They need to respond quickly to their market or end-users' needs, because failing to do so can mean significant penalties or lost revenue. All this requires significant capital investment and a regular stream of sustaining funding to ensure the facility is maintained and able to be reliably dispatched, economically and safely.

We work with you, on the ground in your facilities. We develop strategic operational performance programs that can boost reliability and efficiency, increasing the profitability of your thermal assets. Then, we follow up and support you across the full business life cycle, continually improving your operational performance.

## Emission reduction systems

Air pollution standards are becoming increasingly stringent. So generating facilities are constantly searching for more cost-effective methods to reduce stack emissions to achieve compliance. Whether they are new greenfield or older brownfield retrofit projects, we recognize the strategic importance of top-notch environmental engineering services.

We maintain a technology-neutral position, facilitating independent review and unbiased advice regarding system selection. We can help with flue gas desulfurization (FGD), NOx selective catalytic reduction (SCR), particulate matter, acid mist reduction, mercury control and carbon capture, and sequestration (CCS).

## Bulk material handling services

Coal-fired power plants rely heavily on coal conveying equipment. They place high demands on the equipment's reliability, performance, and productivity. Whether you're developing a new power plant or reviewing an existing operation, we partner with you to develop customized, innovative, and optimized solutions that can drive your power plant to world-class performance.

Today's marketplace is changing how coal power plants must operate. Innovative technology, progressive computer-aided designs, and process tools for your coal handling facilities are key to maintaining your competitive edge.

## Outage Management

Outages can be driven by legislative inspections requirements or maintenance schedules. We can work closely with you as part of an integrated project team, executing planned plant-maintenance outages with full commitments to safety, your schedule, and your budget constraints. Combining our technical capabilities with proven project management and controls, safety, and quality management systems, we have the capability to engineer, schedule, plan, and effectively manage outage activities.

# Global presence, local focus

● Hatch offices

● Selected thermal projects


**1 Shepard Energy Centre—Enmax**
Canada—Gas

This 800 MW natural-gas-combined-cycle-power plant was the first combined-cycle power plant in Canada to employ G-class gas turbine technology, this facility uses reclaimed tertiary-treated effluent used for cooling tower make-up. We provided early stage conceptual design and preliminary engineering services.

**2 Granite City powerhouse—U.S Steel**
United States of America— Blast Furnace Gas/ Natural Gas

Engineering, procurement, and construction services for a new 80 MW powerhouse that was completed under an aggressive schedule. The boiler is fired by 5 percent natural gas and 95 percent blast furnace gas, routed through a 96-inch duct from the adjacent blast furnace.

**3 South Shore waste heat recovery—Suncoke**
United States of America—Waste heat recovery

See page 11

## 4 Industrial power generation project—ArcelorMittal Dofasco
Canada—Coke oven and blast furnace gas

See page 10

## 5 Iquitos reciprocating engine power plant—Genrent del Peru
Peru—HFO/LFO

We completed a lender's engineer evaluation for this 80-MW reciprocating engine power plant, including a review of the EPC design documentation, a site assessment, and a review of project agreements.

## 6 Kelar combined cycle power plant—KOSPO & Samsung C&T
Chile—Gas

We were retained by Korea Southern Power Company (KOSPO) and Samsung C&T for a greenfield 520 MW combined cycle power plant (2x2x1) for their preparation of their IPP bid for the Kelar Power Plant.

## 7 Gold mine processing captive power plant—Tasiast
Mauritania—HFO/LFO

See page 10

## 8 Ghana1000 project—GE Power & Water
Ghana—Gas

Our site selection study recommended the optimal location for a 1,000-MW combined cycle power plant, considering space requirements, water resources, accessibility, climatic conditions, site development effort, performance, and environmental conditions. A high-level combined-cycle-configuration study and a grid analysis study were also conducted to assess transmission requirements.

## 9 600 MW Hwange expansion—Zimbabwe Power Company
Zimbabwe—Coal

See page 9

## 10 Cogeneration project—SAB Miller
South Africa—Natural gas

We conducted an engineering study for a natural gas fired combined heat and power plant for the South African Breweries Rosslyn Brewery. The plant needed to provide electrical power security as well as heat for the brewery process. It is expected to generate approximately 4.2 MW of electricity and 2 MW of thermal energy as well as maximum steam generation.

## 11 Specialized technical support for coal boilers—Sasol Synfuels Secunda
South Africa—Coal

Specialized technical and operational support to evaluate the upgrade of 17 existing coal fired boilers to low NOx burners and comply with new local legislative requirements for air emissions.

## 12 Karibiga ultra-supercritical coal-fired power plant—CENAL Elektrik Üretim
Turkey—Coal

As owner's engineers, we were overseeing the design of an important new 1,320 MW ultra-supercritical coal-fired power plant in Turkey. We were tasked to make sure the project was successfully delivered and achieved the design agreement commitments including plant reliability, operability, safety, quality, performance and schedule.

## 13 Jordan IPP3 project — Bank Tokyo Mitsubishi UFJ
Jordan—Gas, HFO/LFO

Hatch was retained as the lenders' technical advisor for this 573-MW, the world's largest diesel-reciprocating-engine power plant to meet the unique project requirements with tri-fuel capabilities to fire HFO, LFO, and natural gas.

## 14 Al Taweelah alumina power and steam integration—Emirates Global Aluminium
United Arab Emirates—Gas

See page 8

## 15 Tanjung Bin power coal fired power plant—Malakoff Corporation Berhad
Malaysia—Coal

See page 11

## 16 Pocheon combined cycle power plant—Daewoo Engineering & Construction
South Korea—Gas

See page 8

## 17 Shimizu combined cycle power plant—JXTG Holdings
Japan—Gas

To build a 1,100 MW combined cycle plant in Japan, this Independent Power Producer needed help to prepare a minimum functional specifications for an EPC contract and a long term service agreement terms of reference. We also helped estimate the project CAPEX and evaluate the long term service agreement proposals they had received.

## 18 Pinjarra cogeneration plant—Alinta
Australia—Gas

Project management, procurement, and construction management were provided for two 140 MW gas turbine generator units, a heat recovery steam generator on the Alcoa World Alumina Pinjarra refinery, and various interconnections. Waste heat produces high-pressure steam to generate electricity at the Pinjarra powerhouse, and then heat in the alumina refining process.

## 19 Coal-fired power station maintenance outage—Confidential client
Australia—Coal

See page 11

## 20 Koniambo Ferronickel captive power plant—Xstrata
New Caledonia—Gas, coal

See page 9

# Project experience

## Pocheon combined cycle power plant

South Korea

This project will compete with other IPP projects in the power market operated by the Korean Power Exchange, where the merit order of dispatch is based on the lowest operating costs and highest fuel efficiency. Clearly, deploying the most efficient gas turbine technology was vital to its success.

We're providing owner engineer services for front-end engineering, including the selection of gas turbine technology and configuration, and the optimization of the steam cycle, design criteria, and minimum functional specifications. The project is expected to be the most efficient to date with plant efficiency in combined cycle exceeding 60 percent.

## Al Taweelah alumina power and steam integration

United Arab Emirates

The refinery that Emirates Global Aluminium is building at the Al Taweelah site requires its existing 3,000 MW, combined-cycle power plant to be expanded and able to provide steam and power for the new facility. Hatch was selected to provide engineering, procurement, and construction management services for the expansion.

The project required a new heat-recovery steam generator to be installed on an existing open cycle gas turbine on-site, as well as a cogeneration power block and interconnections of the power and steam systems with the alumina refinery. The expansions will add approximately 230 MW and 430 tonnes per hour of steam production.

Hatch worked closely with the client team to optimize the lifecycle costs of the Pocheon IPP project

## Koniambo Ferronickel captive power plant

New Caledonia

The engineering, procurement, and construction management services we provided for the Koniambo Ferronickel power plant included two 135 MW coal-fired power plants and a two 56 MW combustion turbines. To address the many issues that arose due to power consumption variability from the arc furnace, we developed and successfully commissioned the Hatch Grid Management System (HGMS) in 2013.

This intelligent control solution actively and continuously coordinates the power supply and consumption for on-site power generation with challenging electrical loads, under all plant operating scenarios, and on a near-instantaneous basis. With HGMS, KNS can maintain consistent operation with minimal interruptions.

## Tasiast gold mine processing captive power plant

Mauritania

This gold mine and processing facility is located in an extreme desert climate in West Africa. A 22-MW reciprocating engine power plant comprised of four genset units powers the site's operations. We provided detailed engineering, procurement, construction management, and commissioning for the plant, which features exhaust gas recovery boilers, steam distribution, and condensate systems for heavy fuel-oil handling.

Hatch provided EPCM services for a 22 MW power plant for the Tasiast Gold Mine located in a remote area in the Western Sahara Desert in Mauritania

Hatch is the owner's engineer for the Karabiga thermal power project, a 1,320 MW ultra-supercritical coal-fired power plant in Turkey

## 600 MW Hwange expansion

Zimbabwe

This, the largest coal-fired power plant in Zimbabwe, has an installed capacity of 920 MW. It is being expanded to fill the demand gap in the country's power supply and will add a much-needed 600 MW to the national grid. As the owner's engineer, we are providing design review and construction supervision services.

## ArcelorMittal Dofasco industrial power generation project

Canada

The latest advanced engineering tools, such as 3D modeling and laser scanning, are being used to minimize rework in a challenging brownfield environment at AMD's Hamilton steelmaking site, where we are replacing two existing boilers and adding a third. The boilers operate on a variety of gases: burning blast-furnace, coke oven, mixed natural (synthetic coke oven gas), and occasionally heavy fuel oil. A new 20 MW topping turbine will also be installed to utilize the steam generated from the boilers to produce electricity for the steelmaking plant.

## Coal-fired power station maintenance outage

Australia

Every four years, this client in Victoria conducts a mandatory maintenance outage at its brownfield 163 MW coal-fired power station. As well as meeting legislative and maintenance requirements, the outage provides an opportunity to conduct modifications and repairs that require the plant to be offline for an extended period.

Hatch was contracted to plan and manage this outage as part of an integrated project team using the delivery model developed with the client and executed on an earlier major outage. Major items included the removal of the boiler crossover hoppers, cleaning and repair/ replacement of the boiler and pressure parts, and an overhaul of the steam turbine.

## SunCoke South Shore waste heat recovery

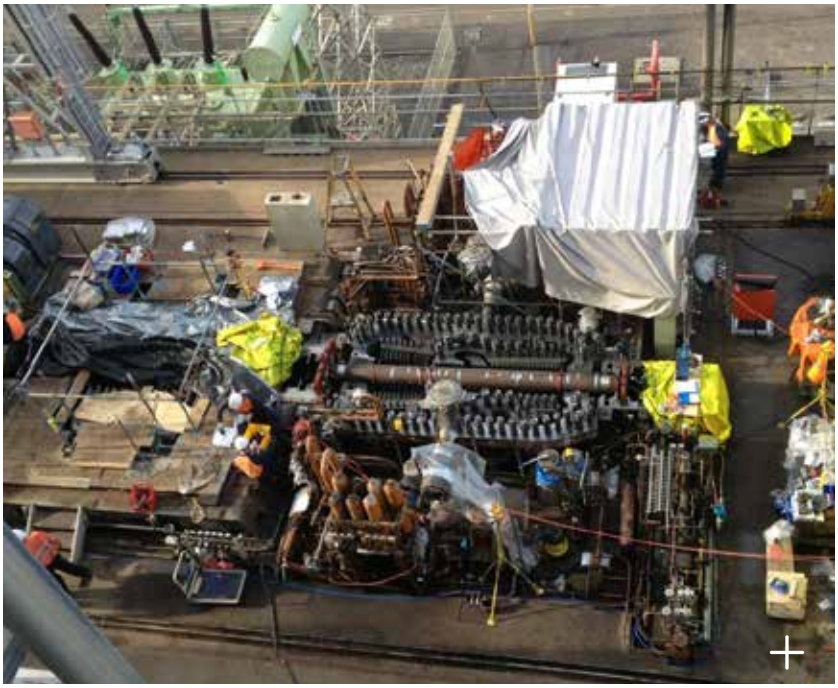
United States of America

The goal was to maximize production of its main saleable product while generating a consistent revenue stream from electricity generation. In the early project phases, we worked closely with Suncoke to develop an integrated greenfield metallurgical coke plant complete with an 82 MW power island. Strict environmental regulations were met while maximizing coke production and improving economics through the generation of electricity from waste heat.

## Tanjung Bin power coal fired power plant

Malaysia

Hatch provided consultancy services to install a new third coal-conveyor line, upgrade two existing conveyor lines, and modify three unloaders for Tanjung Bin's three 700 MW and one 1,000 MW supercritical coal-fired power plants in Johor, Malaysia. Scope of work included the review of an existing assessment report, preparation of technical part of RFP documents for EPC tendering (design criteria, specifications, scope of works), technical support during the EPC tendering process, provision of an option study, and risk assessment.



160 MW steam turbine shaft and rotor assembly was removed for inspection and cleaning

Tanjung Bin coal fired power plant

# About Hatch

Whatever our clients envision, our engineers 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 9,000 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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