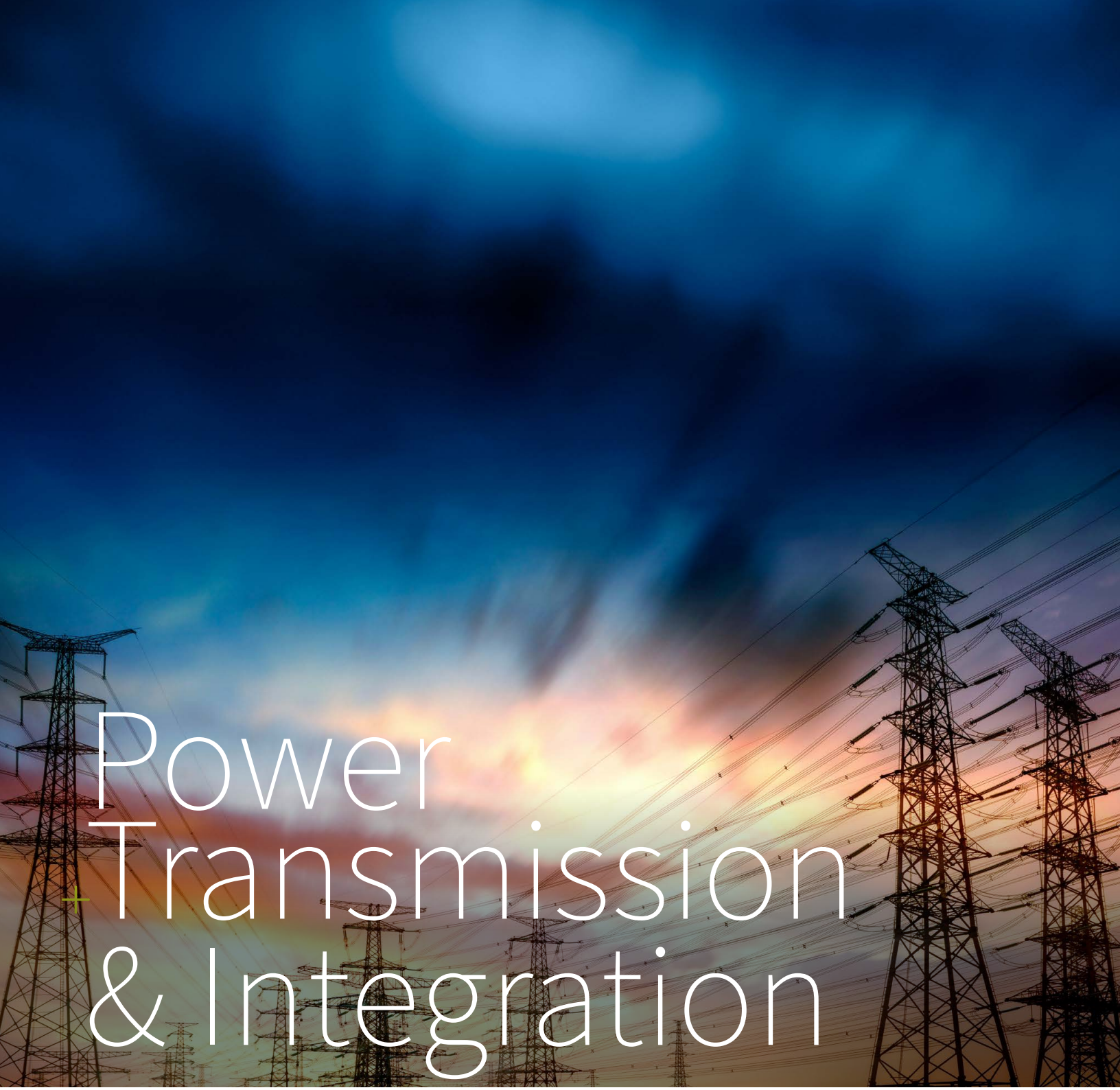

Power + Transmission & Integration

HATCH

Connecting the circuits

Power transmission and integration challenges in a changing energy landscape

The world's need for power transmission and distribution infrastructure continues to change and evolve. Climate-change-related events pose significant challenges to grid resilience and can lead to widespread power outages. Integrating renewable energy sources from remote locations often requires significant investment, which can face regulatory and environmental hurdles; and regulatory frameworks often need to evolve to accommodate new technologies and business models.

Many regions are investing in grid reliability and resilience projects to upgrade aging infrastructure, enhance reliability, and accommodate the integration of renewable energy resources like solar and wind, and a high penetration of inverter-based resources. High-voltage direct current (HVDC) transmission technology is increasingly being used for transmission due to its efficiency, flexibility, and ability to connect remote renewable energy sources to urban centers. The integration of energy storage systems into the modern power grid is also increasing, helping to balance supply and demand, improve grid stability, and support renewable energy integration.

Obtaining and maintaining social licenses for infrastructure projects is becoming more difficult, and power transmission projects are uniquely challenged. New and innovative approaches are needed to complete the required environmental and socio-economic assessments; and continuous, open communication are crucial to ensure public acceptance. Inevitably, more power delivery infrastructure will need to be built out of sight, and possibly underground, requiring a partner who can rise to these challenges.

In an environment of intense regulatory and political scrutiny, the power delivery project developers require world-class engineering, as well as highly professional project management and risk management for their power delivery projects.

It's time to transform the way you generate, transmit, and integrate power.

We can help.

Essential services, sound strategies

Whether it's system upgrades, or planning and implementing major integrated works and developments, our objective is always the same: partnering to solve your toughest challenges.

HVDC and flexible AC transmission systems development

We are responsible for HVDC and flexible AC transmission systems (FACTS) development involving multiple projects on several continents.

We provide complete planning and engineering services for HVDC systems using both line commutated converter (LCC) technology, voltage source converter (VSC) technology, and for FACTS utilizing all forms of static conversion systems. Our experience has included AC and DC system studies; all phases of design of overhead, underground, and submarine transmission facilities; development of functional specifications for LCC and VSC converters, and FACTS devices; and commissioning, operational readiness, and operations and maintenance support. We utilize modern techniques and the most advanced software tools. We are also able to take on the role of an integrator of HVDC projects, by combining our deep subject matter expertise with our leading project delivery services.

We are experts in the design and development of HVDC transmission systems and FACTS devices, and the management of project implementation to drive the results you want.

High-voltage and extra-high-voltage system development

Critical values of safety, quality, and environmental compliance are baked into project delivery from the concept stage. State-of-the-art 3D modeling, design techniques, and the most advanced software tools minimize project risk and maximize profitability. You need experienced experts, like us, in transmission line and substation design, and in project and construction management for transmission and distribution projects, to ensure the success of your power delivery projects.

We have extensive expertise in substation design for all voltage levels and technologies. Whether you are looking for a new greenfield installation, expanding an existing station, or just looking to extend the life of your current station, we can help!

Energy storage

The demand for renewable energy is on the rise. The integration of energy storage systems, such as lithium-ion batteries, into power grids is growing. These systems help balance supply and demand, improve grid stability and power quality, defer grid upgrades, and support renewable energy integration.

Wind and solar energy are intermittent in nature and as a result, require other technologies as part of a complete energy solution, including Energy Storage Systems, to provide reliable, dispatchable electricity. Presently, lithium-ion battery deployments are rapidly increasing while other technologies are developing as potential options for longer duration storage.

Batteries are currently positioned as key enablers to achieving a future where electricity is predominantly derived from low-carbon technologies. While utility grid-scale solutions are highly impactful, energy storage systems can also enable the drive to reduce fossil fuel consumption, use local resources, increase resiliency, and improve lives through reliable electricity generation at smaller, more remote sites and communities.

Transmission lines

We also have expertise from distribution to extra-high voltage (HVAC and HVDC) transmission, and our services cover both overhead and underground technologies. Our team can support every aspect of your project from establishing the design criteria to the final commissioning. We support not only new builds, but refurbishments and upgrades of the systems as well.

Grid modernization

The impact of aging infrastructure, climate change, electrification, and the rise of prosumers are among the leading factors of uncertainty and risks that are driving the requirements of grid modernization and the grid's digital transformation. We're helping utilities drive risk-based asset management and achieve optimal system reliability through automation and grid hardening, and by leveraging data collected from intelligent field devices.

Power system planning and system design studies

With decades of experience analyzing power systems performance and optimizing power system development, we have leading-edge analytical tools and expertise that save you time and money. We have tackled some of the most complex systems imaginable, from isolated power systems in remote/islanded areas to large integrated grid systems. We are experts in developing long-range master plans for these systems, preparing prefeasibility and feasibility studies for development projects, and in conducting interconnection studies, advanced system design, and operational performance studies for clients worldwide. We are also supporting clients globally looking at grid-forming inverters and the impact of inverter-based resources on the ever-changing power system.

We are also experts in forensic simulations, investigating any issues that may arise in your system.

Some of the key studies we perform:

- EMT Analysis
- Load flow
- Dynamic simulations
- Interconnection studies
- Generator deliverability studies
- Power quality/harmonics

Our team utilizes PSCAD, PSSE, PSLF, PowerFactory, TARA, and a host of internally developed tools and other third-party tools to carry out our work.

Route and site selection studies; environmental planning, risk, and permitting expertise

We are experienced in producing and coordinating all the associated project pieces. We offer a unique combination of environmental, socioeconomic, engineering, and project management expertise under one roof, managing your constructability and social license risks at the same time.

Due diligence, independent engineer, and lender's engineer services

Our power industry experts have worked with organizations like yours all over the world, in every type of climate and environment. With proven results, we can offer a full range of assistance to buyers, sellers, and financiers of power delivery assets.

Asset management and operational performance

Our experts manage and assist with asset management process reviews; audits and improvement plans; asset condition assessments, process developments, and studies; asset risk-assessment studies; and risk-based investment plans. We're experienced at developing operations and management (O&M) process reviews and improvement plans, and feasibility studies for investments in facilities, systems, and processes.

In operational risk management, we're your experienced and trusted partner.

Selected project experience

With our global presence and local focus, our professionals contribute experience and industry intelligence to power integration technologies. Optimizing transmission and distribution systems. Making processes more efficient. Partnering with you to build new facilities, renew and repurpose existing ones, and support your operations in every way possible.

Transforming energy reliability with innovative battery storage

Saskatchewan Power Corporation, Canada

SaskPower is enhancing grid reliability and power quality with an advanced 20 MW/20 MWh Battery Energy Storage System. This project will reduce unscheduled flows on the Manitoba Hydro intertie, provide blackstart services, and improve power quality by minimizing voltage and frequency excursions. We are proud to support this initiative with services ranging from performance optimization to construction support, ensuring a resilient and sustainable energy future.

Harnessing solar energy in Australia's Northern Territory

SunCable, Australia & SIngapore

SunCable set out to develop the world's largest and most complex integrated transmission, renewable energy and battery storage facility. They needed a partner to help implement state-of-the-art HVDC technology over vast distances (Australia to Singapore) and assist in overcoming technical hurdles. We assisted in the design and delivery strategy for the end-to-end high-voltage transmission system. Leveraged our extensive regulatory expertise to advise on regulatory approvals within three major jurisdictions. Utilized +/-525 kV HVDC voltage sourced converter system for efficient power transmission. Developed preliminary design for a new high voltage submarine cable manufacturing facility in Australia and supported the project with our global environment and sustainability team's expertise.

Powering Botswana's energy future

Botswana Power Corporation, Botswana

The Isang's Ranch Substations Project is a groundbreaking effort to integrate the Moropule "B" Power Station into Botswana's power grid. This ambitious initiative features a 400/220-kV substation with four 400-kV bus connections, eight 220-kV bus connections, three 315-MVA transformers, and advanced compensation facilities. It aims to electrify hundreds of villages and significantly improve power reliability for many others. Hatch provided comprehensive services, including feasibility studies, design, specification, procurement support, and construction oversight, ensuring a seamless and robust power solution for Botswana.

Connecting remote communities with reliable and affordable power

Wataynikaneyap Power LP, Canada

The Wataynikaneyap Power Transmission project, led by 24 First Nations in partnership with Hatch, is a groundbreaking initiative to connect 17 remote communities in Northwestern Ontario to the provincial power grid. This transformative project spans 1,800 kilometers of transmission lines, promising reliable, affordable electricity and unlocking economic opportunities for over 18,000 people in the Anishiniiniiwug and Anishnabeg communities.

Revolutionizing a power landscape

Zimbabwe Power Company, Africa

The Hwange and Kariba power stations are set for a transformative upgrade, adding 900 MW of generation capacity and significantly expanding the 400 kV and 330 kV transmission infrastructure. We are at the helm of this ambitious project, managing everything from optimal network expansion and route selection to overseeing a Chinese EPC contractor. With over 360 kilometers of new extra-high-voltage (EHV) power lines and enhanced substations at Hwange, Insukamini, and Sherwood, this project promises to deliver reliable electricity to end users, revolutionizing the region's power landscape.

Pioneering a greener future with 2,000 miles of renewable energy, transforming the Midwest

Confidential Client, USA

This ambitious project aims to enhance the reliability and efficiency of a transmission system, integrating 56 GW of renewable energy across the Midwest. With 18 projects spanning three US states this project will lay 2,000 miles of new transmission lines, supporting the operator's goal of increasing renewable energy penetration from 26% to 50% over the next 20 years. We will provide critical system studies and technology advice to ensure the success of this transformative initiative.

Long-range transmission planning for enhanced resilience

Confidential Client, USA

This project will ensure reliability and efficiency with the retirement of 80 GW and the addition of 170 GW of resources to the operator's footprint. We have been asked to model a hypothetical map in the operator's provided base long range transmission planning power flow case and perform an analysis to identify project origination opportunities. Additionally, we will provide support on system studies, interconnection studies, reactive power assessments, and technically advise on integration, optimization, and AC substations.

Expert onshore substation design and engineering services

Linxon Inc., USA

Linxon issued an engineering service request to develop the engineering design for the 230/275 kV Atlantic Shore Onshore substation. We have been assigned the physical electrical, protection and control, civil and structural, permitting support and off-site engineering support through construction, commissioning, and ramp-up. We will prepare a basis of design to establish the engineering standards and design practices to be followed in the execution of the substation design.

About Hatch

Hatch is a global engineering, project management and construction, and professional services firm. Whatever our clients envision, our professionals can design and build. With over six decades of business and technical experience in the energy, infrastructure, and mining 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 rely 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.

hatch.com

Scan the QR code to learn more about what we can do!

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