



**Manitoba**  
HYDRO INTERNATIONAL

A brighter  
future for  
generations  
to come



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Energy  
without  
limits



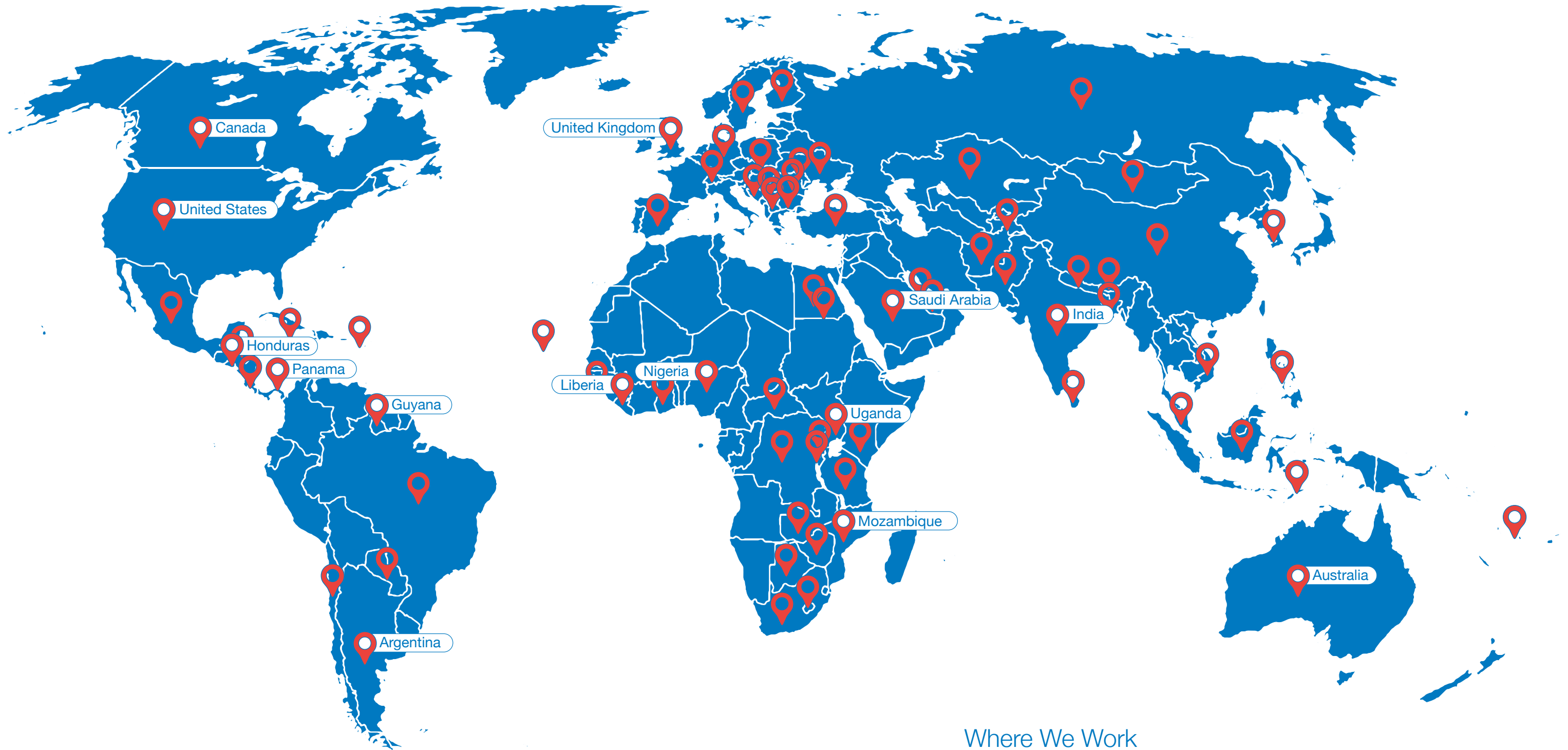
## Who We Are

Manitoba Hydro International Ltd. (MHI) provides innovative solutions to help customers in the energy and telecommunications sectors. We are a subsidiary of one of Canada's most highly regarded energy utilities, Manitoba Hydro. We proudly bring over a century's worth of utility best practice experience and our global expertise to every customer we serve.

As a strong and diversified centre of innovation, we operate right across the electricity market — from generation, through transmission and distribution, to the end user. For over 30 years, we have provided leading-edge services and products to our clients in over 120 countries around the world.

Our clients turn to us to overcome even the most complex challenges, and trust us to deliver results on time and on budget, from start to finish, and in some of the world's most remote locations. Dedicated to providing the right solutions for all your energy and telecommunications needs, we recognize that working together is key for a project's long-term success.

For more information, visit [mhi.ca](http://mhi.ca)  
To sign up for our newsletter, email [news@mhi.ca](mailto:news@mhi.ca)



## Where We Work

For over 30 years, we have provided leading-edge services and products to our clients in over 120 countries around the world.

For more information about our projects, visit [mhi.ca](http://mhi.ca)

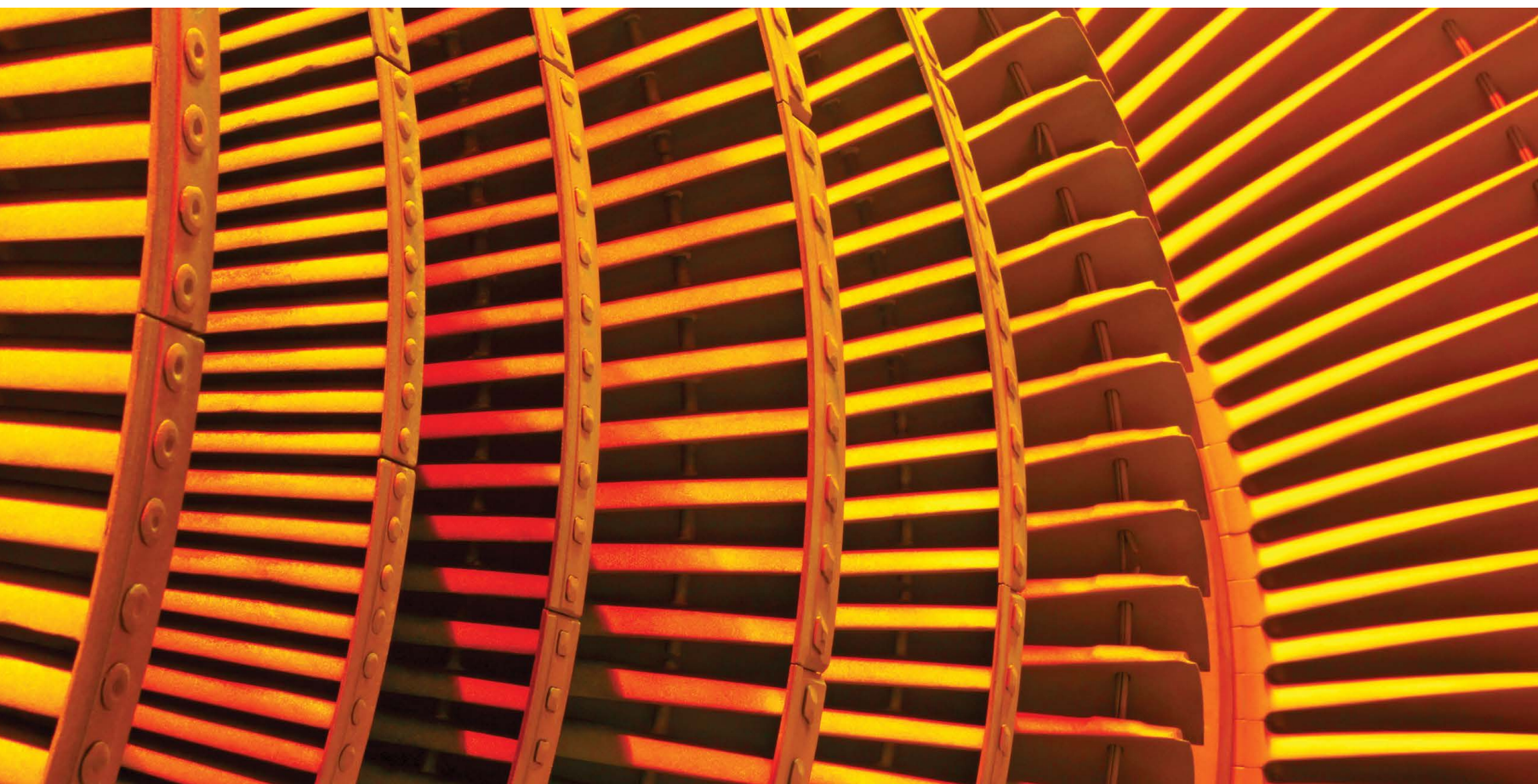


## Engineering Services

We support projects through the entire life cycle from system expansion planning to in-service for transmission; distribution; generation; and substation engineering, procurement, and construction (EPC). As owner's engineer, we provide project management, engineering studies, procurement services, training, and construction supervision. Our staff consists of professional engineers, technologists, and project managers with extensive utility expertise.

Our civil engineering team assists asset owners with design services, vegetation management, line modelling, upgrade engineering, and thermal rating analysis of transmission and distribution lines and assets. Our electrical engineering team provides power system studies; engineering equipment procurement services; operations, maintenance, and commissioning services; asset management; environmental monitoring; and equipment failure analysis.

Our team works with regulators, utilities, consultants, manufacturers, research institutes, academic institutions, and international financial institutions and banks. We provide power system planning and operational studies, Electromagnetic Transient (EMT) studies, and HVDC and renewable energy systems. We offer our clients a variety of software packages, such as PSCAD™/EMTDC™, and other third-party tools required for detailed analysis.



## Utility Management Services

As trusted utility experts, we work in all areas of the energy sector from generation, transmission, and distribution through to commercial operations and the end user. Our specialized knowledge of utility system management and operations has allowed us to deliver energy utility services around the world. We have completed comprehensive, cross-functional, utility management contracts in Africa, Latin America, and Asia.

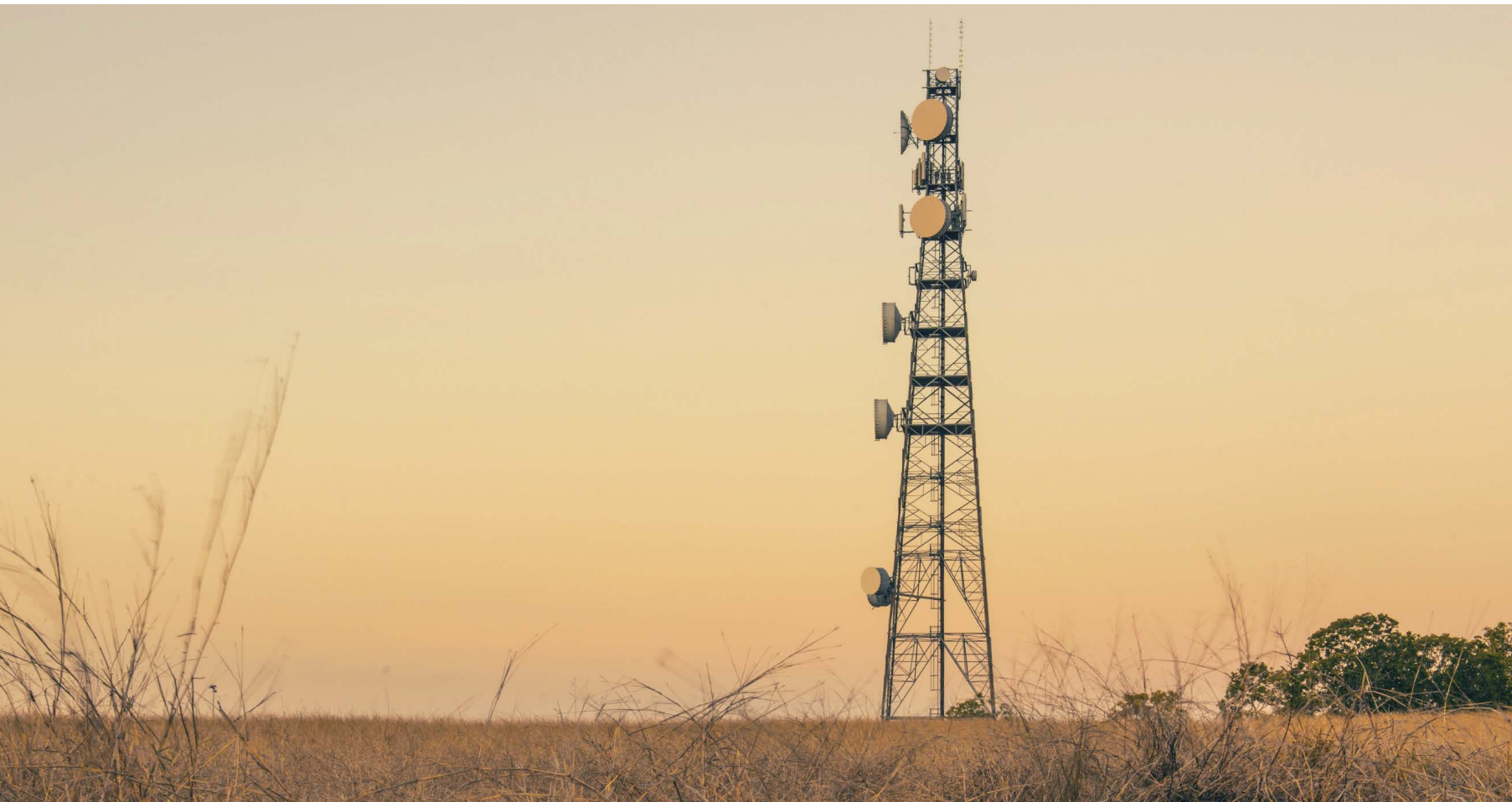
With extensive hydraulic generation experience, we support hydropower developers, owners, and operators in all aspects of the project development life cycle. For over 30 years, we have helped our clients improve their utility operations, asset management, and network performance and reliability. We provide power systems planning, environmental mitigation, economic studies and financial management, construction supervision, and owner's engineering services. We are dedicated to building the capacity of local personnel to create positive and sustainable outcomes for our clients.



## High Voltage Services

We provide safe, efficient, and cost-effective high voltage electrical services within Manitoba and throughout North America. Our services include high voltage maintenance, engineering, project design, project and contract management, and material procurement. In addition, we promote High Voltage Padmount Transformer (HVPT™) Substations, a unique alternative to traditional substations.

In partnership with Manitoba Hydro's High Voltage Test Facility, we provide commercial testing services for a wide variety of high voltage electrical equipment. All testing is performed at Manitoba Hydro's leading-edge facility, where services are tailored to meet each customer's specialized needs in accordance with IEEE, ANSI, IEC, and CSA standards.



## Telecommunications Services

Manitoba Hydro Telecom (MHT) strives to improve the lives of Manitobans through data connectivity. Connection means economic growth, new opportunities for underserved areas of the province, and brings us closer to the things that matter most. We accomplish these connections with a Manitoba-wide, fibre-optic network. Over our network, we deliver services to enterprise, Internet service providers, other carriers, school divisions, and any organization with significant IT and network needs.

Whether through Internet access, Ethernet/wavelength solutions, tower collocation, or datacentre collocation, we provide network solutions that are capable of meeting any organization's needs.

# Committed to innovation excellence



Our flagship product, PSCAD™/EMTDC™, is the industry standard for power system electromagnetic transient simulations. PSCAD™/EMTDC™ has earned the trust of power system leaders around the world in over 80 countries for more than four decades. The software provides unparalleled reliability, speed, and accuracy for a range of applications.



### dcLFL™

The dcLFL™ (Online Line Fault Locator) pinpoints all faults on a transmission line to within a kilometre, including end-of-the-line faults. Initially developed for use on Manitoba Hydro's Nelson River HVDC transmission lines, the dcLFL™ has now been successfully installed in countries around the world to monitor power lines. Our current installations include Canada, Malaysia, Thailand, Australia, New Zealand, India, and China.



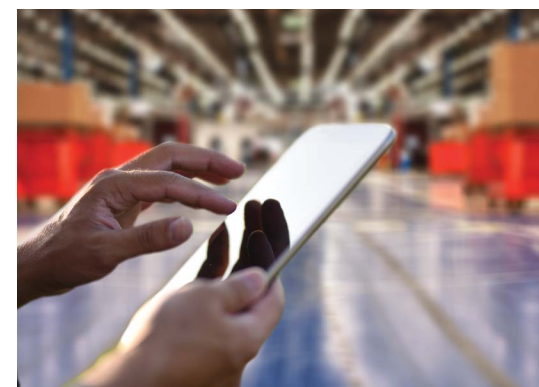
### Ice Vision

Ice Vision is an image-based ice detection system that uses digital images of your overhead transmission lines to identify problem ice build-up. Our real-time system automatically measures ice profiles – directly on overhead transmission lines – and will alert you when it's necessary to take action.



### HVPT™ Substation

A viable alternative to a traditional substation, our modular High Voltage Padmount Transformer (HVPT™) Substation is capable of accepting utility connections from 44 kV to 138 kV for loads up to 20 MVA. With our ability to reduce a traditional substation's footprint by up to 75 per cent and eliminate the need for external overhead conductors and fencing, our transformer is ideal for a wide range of applications.



### Energy Edge

Energy Edge Monitoring software provides customized energy monitoring programs that deliver valuable insight into an organization's operations. Through data monitoring and analysis, Energy Edge identifies new ways to increase efficiency – ultimately saving energy and money.

## VisualSpection

VisualSpection is the most comprehensive augmented reality platform for today's utility industry. Through wearable technology, our award-winning product helps utilities with remote assistance, data collection, 3D modelling, enterprise integration, field inspections, situational awareness, and knowledge transfer. VisualSpection creates a safer, more productive, and efficient work environment.





## Mozambique

### Cahora Bassa Technical Assistance & Monitoring Services

In November 2007, the Government of Mozambique took out a commercial loan to purchase Hidroeléctrica de Cahora Bassa (HCB) and appointed MHI as its Technical Services Partner. In January 2008, MHI began its contract with HCB and the lenders, providing technical assistance and monitoring services.

Due to HCB's effective operation and management of the facility, the original commercial loan was repaid 18 months ahead of schedule. As part of its new contract, MHI is providing both technical and financial services to HCB to help them adjust to their independent role.

During the first nine years, MHI focused on helping HCB keep the equipment running to generate revenue and repay the loan. Following the repayment of the loan, HCB created a longer-term strategy to develop its institutional and financial capacity, as a major player in Mozambique's economy.

HCB decided to continue its partnership with MHI and renewed the contract. In addition to the ongoing technical support, MHI has also been providing financial services and plans to help HCB deliver a new Internal Processes Strengthening Project.

“MHI's relationship with HCB is quite special, as we are more like a trusted friend rather than a consultant,” says **Mike Hart** (Project Manager). “Having that relationship motivates us to do the best that we can to help HCB achieve their goals.”



## Australia

### Wind Interconnection

MHI worked with Lloyd's Register's (LR) power systems team in Australia to find solutions for a wind interconnection project. MHI performed both RMS and EMT-based interconnection studies, using PSCAD™/EMTDC™ as the electromagnetic transient tools (EMT) simulation platform.

Systematic testing, via simulations and a thorough evaluation of the control diagrams, revealed the need for a revised reactive power control strategy at the turbine level. The final solution included a revised reactive power control strategy, new tuning parameters for the wind turbines phase-locked loops, and new tuning parameters for the wind park controller.

“Both parties benefitted greatly from this project, as the manufacturer's development team learned strategies on how to take advantage of a simulation platform like PSCAD™/EMTDC™ in troubleshooting underperforming controls,” says **Juan Carlos Garcia** (Senior Power System Simulation & Studies Engineer).



## Panama

### Electrical Studies on Transmission Lines

MHI is working with Empresa de Transmisión Eléctrica, S.A. (ETESA) in Panama to assess the performance of their existing transmission lines. This project involves using topographic information collected by LiDAR (Light Detection and Ranging) technology and computer modelling of the transmission lines.

MHI has forged a long-lasting relationship with ETESA, completing several projects together. This partnership is based on ETESA's trust in MHI's capabilities including transmission line modelling, data collection, and studies.

To date, MHI has completed the aerial LiDAR collection of the transmission lines. The next stages of the project include data processing, thermal rating and structural analysis, plan and profile drawings, structural modelling and analysis, updating PLS-CADD models, and training.

“The project will provide valuable information on the performances of ETESA's existing transmission lines,” says **Jason Wowryk**, (Project Engineering Manager). “With this data, ETESA can make informed decisions to improve reliability and increase capacity on their transmission system.”



## Social Responsibility

Whether working with a utility in Africa to deliver reliable energy for homes and schools or helping a business in Australia optimize their power usage, we strive to improve people's lives around the world. We work closely with our clients to provide sustainable results, enhance local economic and social benefits, and deliver better outcomes for the lives we touch every day.

The international communities that we are fortunate enough to work with are as vibrant and diverse as the people who live in them. In an effort to give back to these communities, MHI focuses on initiatives that are representative of the countries that we are currently working in.

In our pursuit for a brighter world, we are dedicated to forging lasting partnerships to move our communities and society forward. Working together, we can achieve a much greater impact that any of us can accomplish alone.



### MHI Employees Raise Funds for Nepal Red Cross Society

In 2018, MHI employees donated to the Nepal Red Cross Society (NRCS). The NRCS is the largest humanitarian organization in Nepal. The society aides in war and disaster relief, health services, and community development.



## Join Us

Whether developing your career or hoping to share a lifetime of knowledge, we are always looking for individuals interested in joining our ambitious and diverse team.

Our motivating and balanced work culture offers you an opportunity to travel and explore exotic locations while making a significant difference in the world.

We offer several types of employment opportunities including permanent full-time positions, term positions, and international project positions.



**“It is rewarding knowing we are, in a small way, helping developing countries improve their access to energy — and ultimately increasing their standard of living.”**

**Robyn Eaglesham (Project Manager)**



**“I love coming to work! The drive and passion everyone has is so empowering that you can't help but be inspired to do your best.”**

**Mark Kulchycki (Development Manager)**



Manitoba Hydro International Ltd.

211 Commerce Drive | Winnipeg, MB, Canada, R3P 1A3  
1-204-480-5200 | [info@mhi.ca](mailto:info@mhi.ca) | [mhi.ca](http://mhi.ca)

To sign up for our newsletter, email [news@mhi.ca](mailto:news@mhi.ca)