

Welcome to  
**POWERTECH LABS**



**Powertech**  
The Power of Trust. The Future of Energy.



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# ABOUT POWERTECH

## Expertise to Meet Industry Needs and Bring Changes to the Marketplace.

Powertech Labs is one of the largest and most diverse testing and research labs in North America.

At Powertech, our people are the heart of the company. Our team consists of talented and experienced scientists, technologists, professional engineers, researchers, and specialists who combine their efforts and expertise to meet the needs of the future in a variety of market segments, including electric utilities (power generation, transmission and distribution, substations, grid modernization, and power systems), original equipment manufacturers, industrial, clean technologies, transportation, mining, oil and gas, telecom, and other industries.

Powertech offers expert technical consultation to assist customers with the most demanding needs in designing tests, navigating international certification or regulatory requirements, interpreting test results, and conducting failure analyses.

These services provide value to our customers, measured in avoided costs, productivity gains, adoption of clean technologies, extension of service life of assets, enhanced performance, optimized maintenance, and energy efficiency.

Powertech also develops advanced, innovative solutions that address emerging technical problems as they arise, extend the boundaries of technology, and change the market landscape.

## THE POWERTECH ADVANTAGE

### Trusted and Multi-Disciplinary Knowledge

**In-depth experience** — more than 30 years' experience, and deep knowledge of industries to meet the latest standards and solve complex problems.

**State-of-the-art facilities** — 32 primary labs, with the latest test equipment and staff expertise in high voltage and power, mechanical technology, applied chemistry and materials, high-pressure hydrogen and compressed natural gas, civil engineering, software technology, and power systems.

**Cross-disciplinary analysis** — close collaboration between technical disciplines enables across-the-board, end-to-end testing of products, components, and materials.

**Pioneering innovations** — groundbreaking firsts that have been adopted by industries around the globe, and that have changed the ways companies operate.

**Global customer base** — almost 1,000 clients on six continents, including some of the largest and most technologically advanced utilities, grid operators, and electric equipment and automotive OEMs in the world.

### Our Approach

Conduct our activities in a safe manner, in accordance with international accreditation standards, and with respect toward our environment and communities.

### Vision

Trusted provider of knowledge and innovative solutions supporting the electric utility sector and other technology-oriented industries.





## COMPANY VALUES

**Safety** — Safety tops everything. We do our work safely or we don't do it at all.

**Diverse Team** — We are strongest when we work together and capitalize on our varied attributes — together we are more than the sum of our parts.

**Excellence** — Striving for excellence, acting with integrity, and having the highest standards in quality are core to what we do.

**Our Customers** — Customers fuel this company and we constantly work with them to earn and retain their trust and loyalty. We expect that our customers hold us accountable to our commitments.

**Challenges** — We ready ourselves for the hardest challenges — through obtaining accreditations, developing industry-leading innovative products & services, investing in our labs and hiring great people and making them better.





## BUSINESS SEGMENTS

### Long-Term Relationships Across a Range of Industries

Powertech's independent commercial testing and research facilities offer testing, R&D, and consulting expertise for a broad spectrum of industries under one roof.

We are among the few organizations that have a concentration of multidisciplinary expertise—including chemical, mechanical, civil, materials, electrical, high-pressure, and instrumentation. We collaborate with utilities, vendors, and OEMs in test planning and execution, results interpretation, product development, interoperability testing, pre-deployment validation, and failure analysis.

Our teams help ensure customers receive the most comprehensive and reliable results to support their business decisions. These services optimally design tests to meet customer needs at minimal costs and reduce the risk of bringing advanced technologies to the industry.

## MARKET SECTORS



### Clean Technologies

Renewable Energy, Electrified Transportation, Energy Storage, IPPs, Non-Integrated Micro-Grids.



### Electrical OEMs

Equipment Manufacturers, Component Vendors.



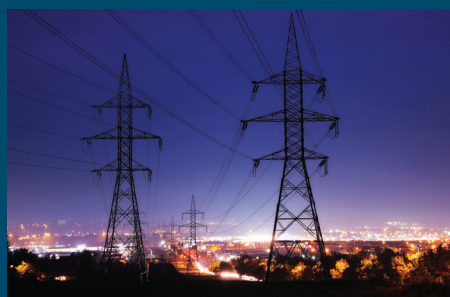
### Industrial

Aerospace/Defense, Airports/Ports, Mining, Oil & Gas, Building Products, Chemical, Forestry.



### Transportation

Hydrogen Fuel Cell Vehicle Components and Systems, Hydrogen Fueling Infrastructure, EV Charging Infrastructure Deployment, Batteries, High Pressure Components and Systems and Stations, High-Pressure Gas Components and Systems, Electric Vehicles.



### Electric Utilities

Power Generation, Transmission & Distribution Services, Substation Services, Grid Modernization, Power System Services.



### Other Markets

Collaborative Research Organizations, Municipalities & Government Agencies, University & Research Institutions.

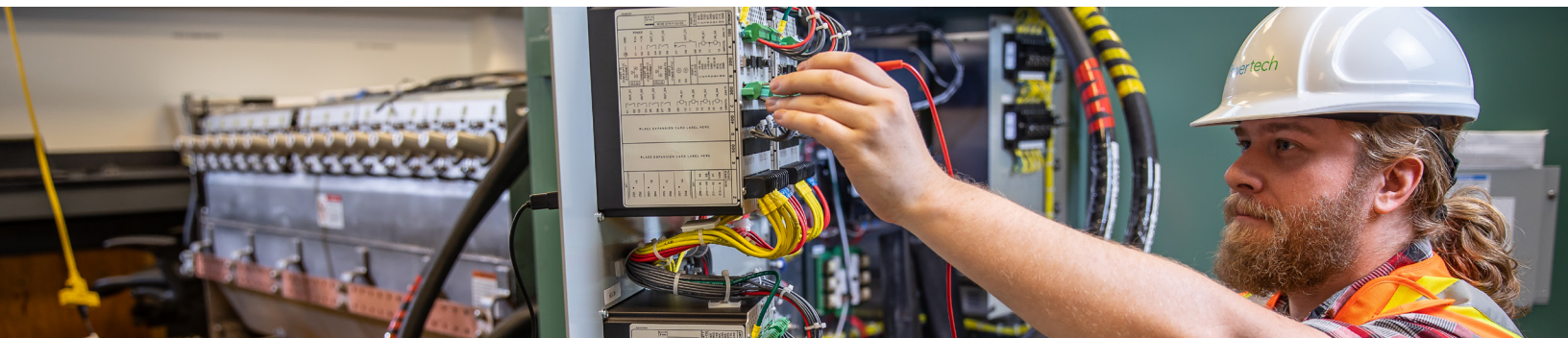




## CLEAN TECHNOLOGIES

Powertech has a long history of developing new clean technologies that assist the global utility industry to avoid environmental impacts, increase energy efficiency, and support the use of renewable energy. Technologies include:

- Sulphur hexafluoride (SF<sub>6</sub>) leak detection from power transformers and other electrical equipment
- Destruction and removal of polychlorinated biphenyls (PCBs)
- Software for grid optimization and integration of intermittent renewable resources
- Communication systems to enable implementation of micro-grids and control automation
- Energy storage devices
- Energy management and demand-side management solutions
- Development of fueling technologies for hydrogen vehicles and evaluation and installation of charger technologies for battery electric vehicles
- Testing of transformer rectifier units and other power equipment for use in electric transport applications



## ELECTRICAL OEMS

Original Equipment Manufacturers (OEMs) to the electric power industry need to ensure their products operate reliably, safely, and according to design specifications and government and industry standards.

Powertech engineers provide a wide range of electrical, mechanical, chemical, and material testing to satisfy the needs of OEMs:

- Cross-disciplinary testing and analysis are supported by detailed documentation for each test performed.
- In addition to standard industry compliance and type tests for equipment, assemblies, and components, we offer customized testing and evaluation procedures that minimize the costs of prototype development by identifying the critical performance tests to ensure products successfully pass compliance requirements.





## INDUSTRIAL

Powertech has 30+ years of industrial experience and the in-house capability to conduct structural safety and reliability analysis to quantify probability of failure of a structure or component. We also offer a full range of mechanical testing services, including vibration and shock, environmental, and tensile testing.

Powertech specialists serve the industrial sector by designing, specifying, and engineering products and components to optimize their performance.

Powertech's independent experts can assist with:

- Designing to prevent failure
- Aging and life prediction (accelerated environmental testing)
- Failure diagnosis and resolution
- Expert witness
- Product testing to international standards
- Material testing and chemical analysis



## TRANSPORTATION

Powertech supports technology to decarbonize transportation vehicles, including hydrogen fuel cell electric, battery electric, and compressed natural gas.

- The company has designed and constructed hydrogen fueling stations across North America, and has installed more than 100 direct-current fast charging electric vehicle stations throughout British Columbia.
- Powertech is also a global leader in testing high-pressure components used in alternate fuel vehicles, and is responsible for innovations, including the world's first 700 bar hydrogen fast fill station, one of the first retail-style dispensers, and the first high-speed test device for hydrogen refueling stations.



# UTILITIES

SEGMENTS	EXAMPLES
Power Generation Services	<ul style="list-style-type: none"> <li>➤ Generator condition assessment</li> <li>➤ Hydroelectric asset life extension</li> <li>➤ Generator grid compliance, model validation, and AVR/PSS tuning</li> <li>➤ Failure analysis and repair &amp; prevention strategies</li> <li>➤ Embankment dam material testing</li> <li>➤ Advanced non-destructive testing</li> <li>➤ Corrosion assessment, protective coating specification and inspection</li> </ul>
Transmission & Distribution Services	<ul style="list-style-type: none"> <li>➤ Electrical and mechanical type/qualification testing of T&amp;D components, equipment, and hardware</li> <li>➤ Overhead conductor type/qualification testing</li> <li>➤ Underground cable type/qualification testing</li> <li>➤ On-site field inspections and testing</li> <li>➤ Asset lifecycle management services</li> <li>➤ Condition assessment of components and equipment</li> <li>➤ Structural integrity and reliability assessment of towers and poles</li> <li>➤ Coatings and corrosion assessment and design</li> <li>➤ Failure investigation and root cause analysis</li> <li>➤ Cable inspection service including maintenance hole condition assessment</li> <li>➤ Wildfire characterization, mitigation, and failure analysis</li> </ul>
Substation Services	<ul style="list-style-type: none"> <li>➤ Engineering application studies of electromagnetic transients, inductions, point-on-wave, arc-flash, grounding induction, harmonics, and short circuits</li> <li>➤ Failure investigation and root cause analysis</li> <li>➤ Transformer health assessment, risk mitigation</li> <li>➤ Transformer oil purification and analysis</li> <li>➤ Equipment transients and disturbance analysis</li> </ul>
Grid Modernization	<ul style="list-style-type: none"> <li>➤ Distribution automation and congestion management</li> <li>➤ Smart metering</li> <li>➤ Distributed energy resources (DER) for residential, commercial, and industrial applications</li> <li>➤ Renewables energy storage</li> </ul>



SEGMENTS	EXAMPLES
Grid Modernization	<ul style="list-style-type: none"> <li>➤ Demand response and electric vehicle grid impact management</li> <li>➤ Electric vehicle deployment and fleet electrification</li> <li>➤ North American Electric Reliability Corporation Critical Infrastructure Protection (NERC CIP) assessment and sustainment services</li> <li>➤ Grid Modernization roadmap development</li> <li>➤ Smartgrid product validation and certification</li> <li>➤ Sensor technologies for wild-fire mitigation and risk characterization</li> </ul>
Power System Services	<ul style="list-style-type: none"> <li>➤ Development of Dynamic Security Assessment Tools (DSATools™) software suite and specialized modules</li> <li>➤ World leading provider of On-line DSA solutions</li> <li>➤ Power system planning and operation studies</li> <li>➤ Power system data/model management and database development</li> <li>➤ Comprehensive stability assessment for transient, small-signal, voltage, and frequency</li> <li>➤ Evaluation of transfer capability and security limits</li> <li>➤ TSA/EMT model development and validation for renewables</li> <li>➤ White (open-box) and black (closed-box) user-defined model development for OEM products, or support for internal model development</li> <li>➤ Provider of hybrid simulation platforms to perform TSA-EMT hybrid studies with TSAT &amp; PSCAD™ or TSAT &amp; RTDS™</li> <li>➤ Customized technical training courses</li> <li>➤ Generation and load interconnection studies</li> <li>➤ Development and assessment of remedial action scheme (RAS)</li> <li>➤ Electromagnetic transient switching studies</li> <li>➤ Hardware-in-loop (HIL) testing</li> </ul>

## OTHER MARKETS

Powertech conducts product testing, advanced R&D, and consulting services for nonprofit organizations, municipalities and government agencies, and university and research institutions.

We meet the specific needs of these markets through equipment testing, condition assessment, failure analysis, and advanced chemical analysis.



# INNOVATIONS

## Catalogue of “Firsts”



### HyStEP—Hydrogen Station Equipment Performance

First test device of its kind in North America that ensures safety and performance of new hydrogen fueling stations, reducing commissioning time from an average of several months to a couple weeks.



### First 70 MPa Hydrogen Fueling Station

World's first 70 MPa hydrogen fueling station capable of fast-filling vehicles, offering range up to 500 km (300 miles) with under 4 minutes fueling time.



### AeroMACS

Only AeroMACS Designated Certification Laboratory in world, capable of testing and certifying equipment using new digital airport communications system— Aeronautical Mobile Airport Communications System.



### Testing of Self-Lubricating Bearings

Only lab in world to conduct life testing of self-lubricating bearings for hydroelectric plants operated by U.S. Army Corps of Engineers.





### PCB Online Decontamination

One of a kind system for online extraction of PCB compounds from transformer oil.



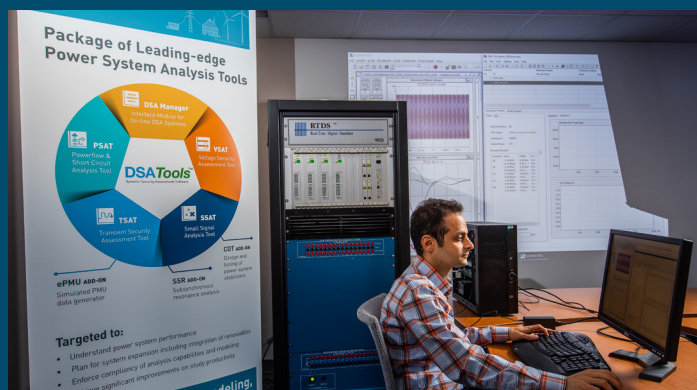
### Equipment Health Rating (EHR) of Transformers

Unique software to diagnose and assess condition and life stage of power transformers.



### On-line Dynamic Security Assessment (DSA)

Pioneering technologies for on-line DSA, including tools for voltage and transient security assessment and small signal analysis.



### TSAT - RTDS™ Interface (TRI)

Cutting-edge platform allowing analysis of large interconnected power systems through synchronized real-time cosimulations of electromechanical and electromagnetic transients.



# QUALITY AND INDUSTRY STANDARDS

## Adhering to the Highest Industry Standards

Powertech is accredited according to international standards for quality management, environmental management and technical competence of testing laboratories.

The foundation of our success is delivering quality-focused services and products that exceed our customers' expectations. Considering stakeholder feedback and listening to the voice of customers through customer satisfaction surveys ensure we constantly improve business practices for those we serve.

Quality management underpins our ability to maintain our business financially, socially, and environmentally, and provides a consistent framework towards a sustainable path. We maintain our competitive advantage in the market by expansion of new services, year over year, often in accordance with nationally recognized standards under our ISO quality registration/ accreditation.



### Occupational Health and Safety

ISO 45001 Occupational Health and Safety management system.



### Quality Management

ISO 9001 Quality management systems, since 1997.



### Environmental Management

ISO 14001 Environmental management systems, since 2002.



### ISO/IEC 17025 Accreditation

General requirements for the competency of testing and calibration laboratories. Accredited by the Standards Council of Canada (SCC).

### UL TPTDP

An active participant in Underwriters Laboratories (UL) Third Party Test Data Program (TPTDP). This participation allows Powertech to perform testing for UL without UL staff having to witness. Our accreditation in this program complements our ISO/IEC17025 accreditation with the SCC.





## GLOBAL REACH

Powertech Labs serves almost 1,000 clients in ten regions, encompassing and some of the largest and most technologically advanced companies in the world.



## THE FUTURE OF POWERTECH

Powertech evaluates market needs on a regular basis and adds new services to align with these needs. In the future, our focus will be on advancing innovation in support of electric utilities, expanding the company's global presence, conducting leading-edge research and development, investing in state-of-the-art technology, and growing without compromising our quality, environment and safety performance or vision.



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