

POWERTECH LABS: BRAZIL-CANADA TRADE MISSION



Powertech
The Power of Trust. The Future of Energy.

ABOUT POWERTECH

- Founded in 1979
- Subsidiary of BC Hydro
- Large multidisciplinary laboratory, 11-acre site (200,000 sqft.) with 15 primary labs
- Over 30 years of specialized engineering experience
- 220 employees, technologists, professional engineers and PhDs
- We offer quality services for testing, consulting and products

POWERTECH STRUCTURE

ADVANCED TRANSPORTATION

High Pressure Gas Testing

High Pressure Hydraulic
Testing & Operations

H2 Infrastructure Engineering

H2 Infrastructure Production

EV Infrastructure

SUBSTATIONS

Chemistry

High Power Labs

Substations R&D

Substations Studies

Substations Field Services

POWER SYSTEMS

Power System Studies

Engineering Applications

Application Delivery

Network Applications

Customer Support

TRANSMISSION & DISTRIBUTION

T&D Electrical Services

T&D Mechanical Services

T&D Asset Management

T&D Field Services

GENERATION

Generation Materials Solution

Generation NDT & Field Inspections

Generation Electrical Services

Generation Civil Services

GRID MODERNIZATION

Smart Labs

Distribution Grid Management

QUALITY POLICY

Our Quality Policy is to continually improve all products and services to satisfy customer needs and to do so efficiently while meeting or exceeding the requirements of good laboratory practice, sound engineering principles, applicable standards, statutes and regulations.

As employees, we are collectively responsible for implementing our policies and procedures while maintaining impartiality, confidentiality and proficiency in delivering our products and services.



ISO/IEC 17025



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THE POWERTECH ADVANTAGE

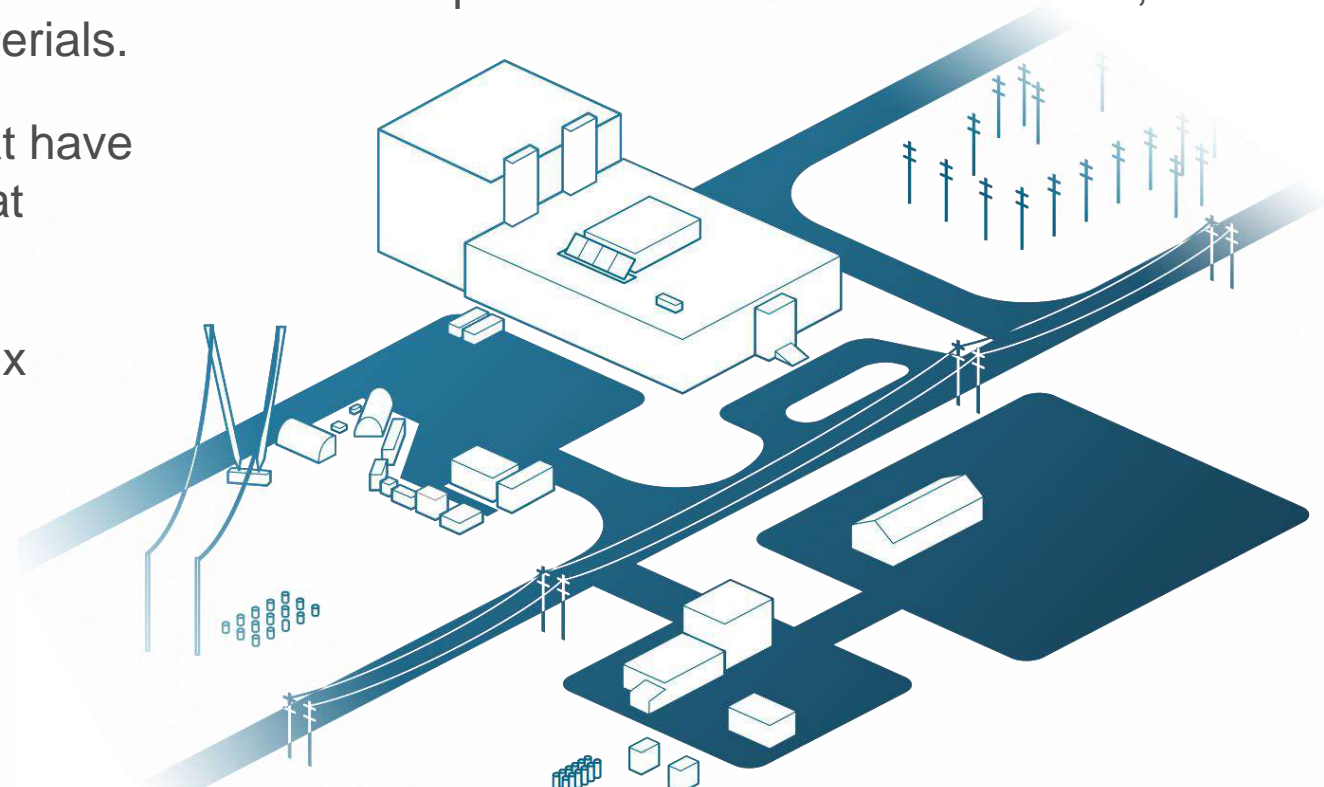
In-depth experience – more than 30 years of experience, and deep knowledge of industries to meet the latest standards and solve complex problems.

State-of-the-art facilities – 15 primary labs, with the latest test equipment and staff expertise in high voltage and power, mechanical technology, applied chemistry and materials, gas systems engineering, 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 – ground-breaking firsts that have been adopted by industries around the globe, and that have changed the ways companies operate.

Global customer base – more than 300 clients on six continents, including some of the largest and most technologically advanced utilities, grid operators, and OEMs in the world.



MARKETS SERVED

Utilities

Electric Generation
Transmission & Distribution
Substations
Power Systems
Grid Operations

Transportation

Hydrogen-Fueled Vehicles and Stations
High-Pressure Gas Components and Systems
Electric Vehicles

Industrial

Aerospace and Defence
Building Products
Automotive
Chemical
Electronics
Industrial

Telecom

Network Systems
Data Transmission
Satellite
Communication

Clean Technologies

Renewable Energy
Non-Fossil-Fuel Vehicles
Energy Storage
IPPs
Non-Integrated Micro-Grids

Electrical OEMs

Equipment Manufacturers
Component Vendors

CLIENTS

Utility Customers



Application Partners



OEM Partners



Research Partners



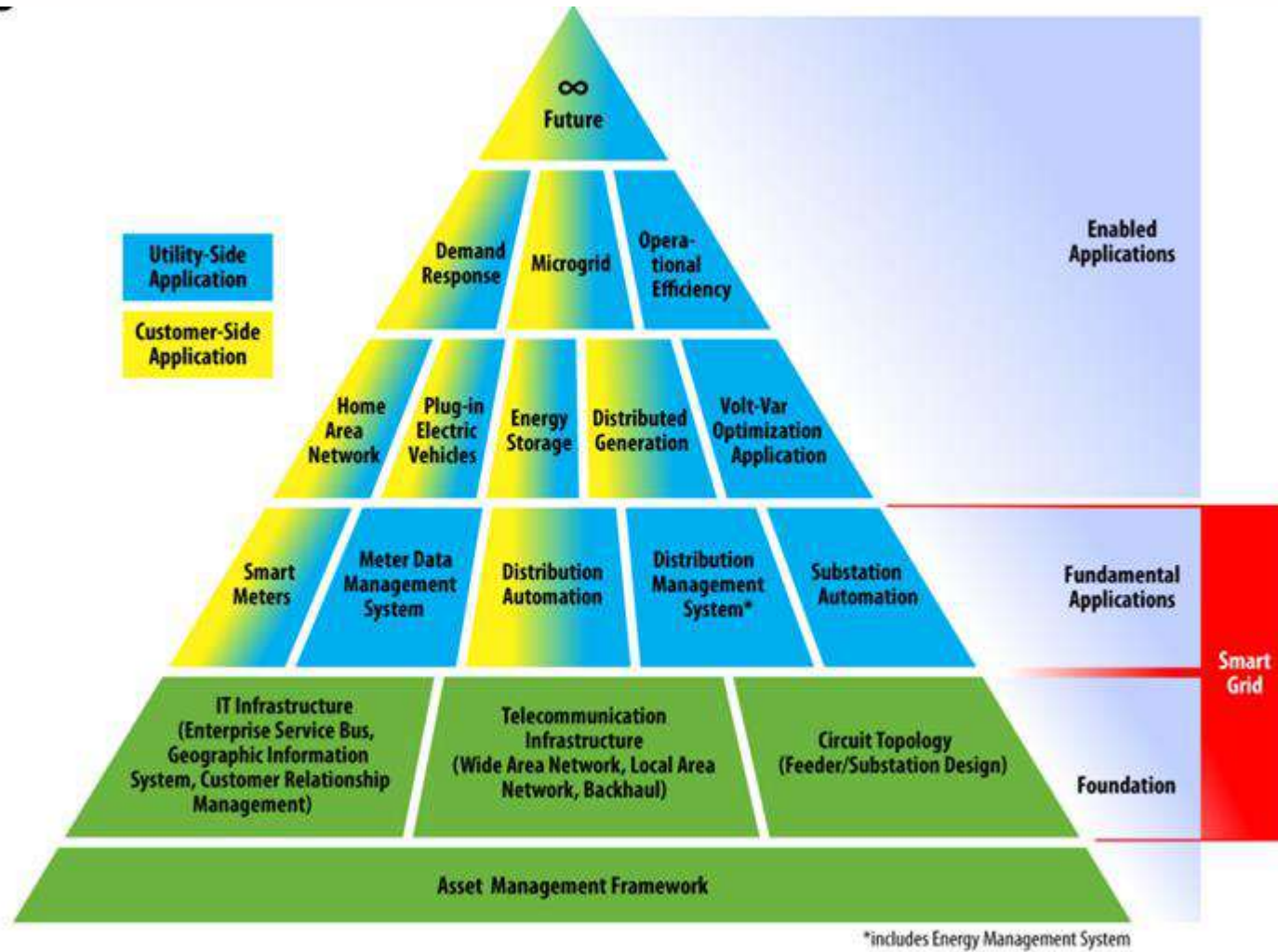
GRID MODERNIZATION: POWERTECH LABS EXPERIENCE

Vidya Vankayala
Director, Grid Modernization

Mazana Armstrong
Manager, High Power Lab

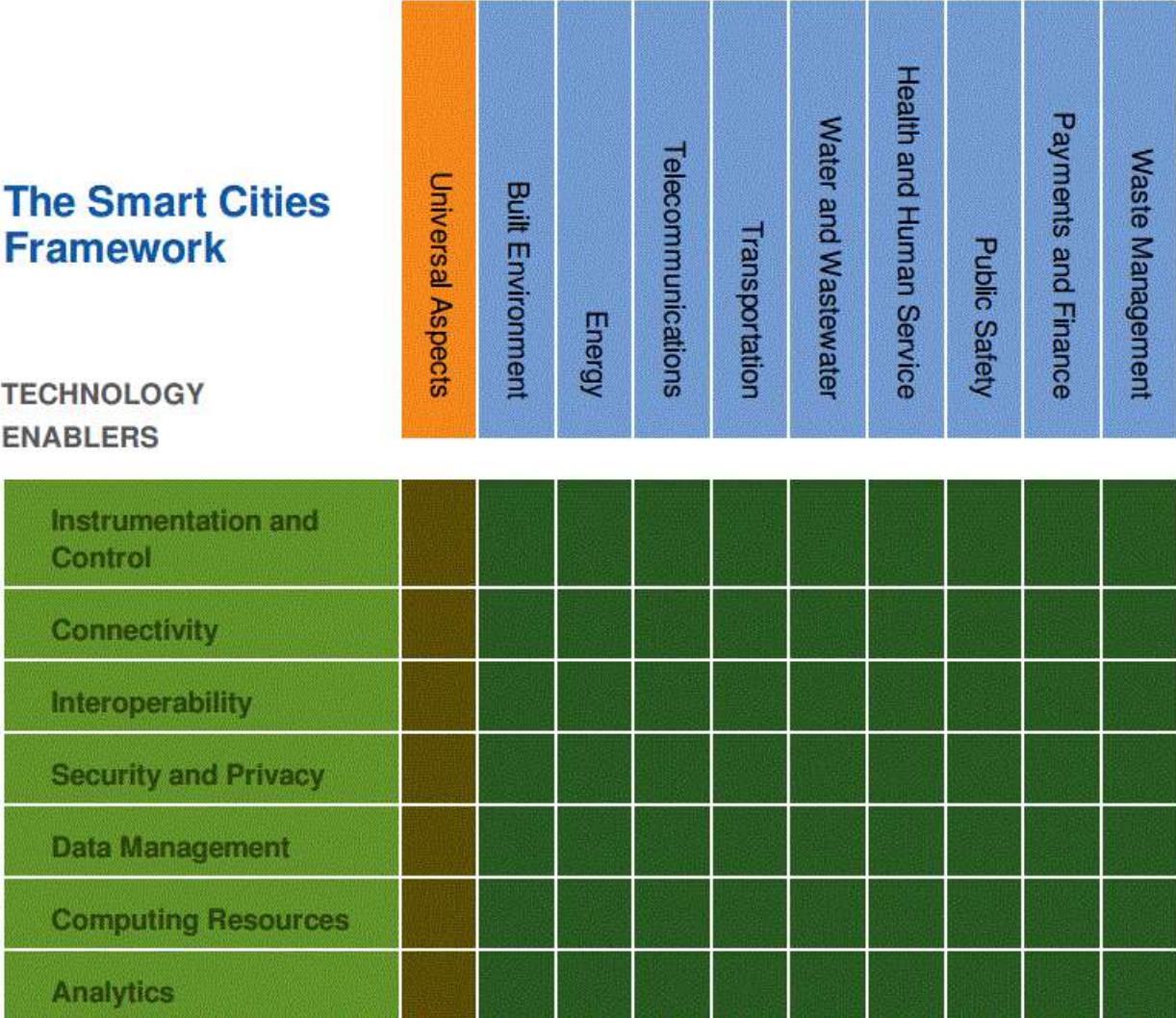
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Canada Grid Modernization Overview

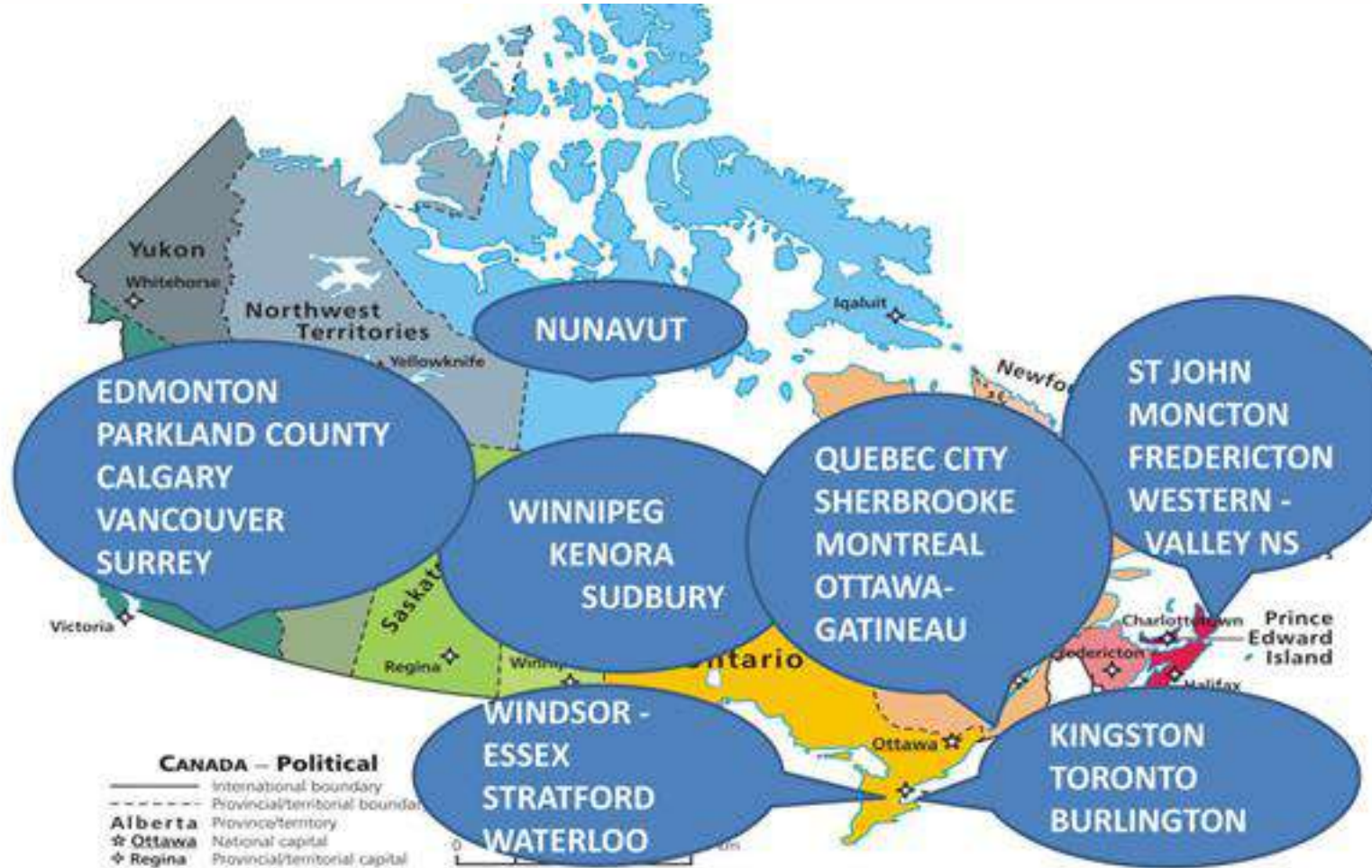


Source: BC Hydro, NRCAN

“SMARTNESS” IN A CITY/COMMUNITY



CANADA'S INTELLIGENT COMMUNITIES



WHY



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WE ALL HAVE GOOD REASONS

- **Utilities:** modernize aging infrastructure, maintain reliability, increase safety, reduce cost, fight competition, DER, increased weather events, wildfires
- **Policy makers:** protect energy access, regulate rates, provide societal benefits, standardize
- **Communities:** resilient energy, economic development, reduce costs
- **Prosumers:** flexibility, reduce costs
- **Suppliers:** create and sell products, fight competition, stay relevant

HOW TO MODERNIZE?



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POLICY ELEMENTS

- Business models for a viable utility and viable prosumer
- Security and reliability
- Cost recovery for ancillary services, stranded assets and last mile
- Tariff support for load classes, time of use and value-add
- Affordability and societal responsibility
- Environment and community support

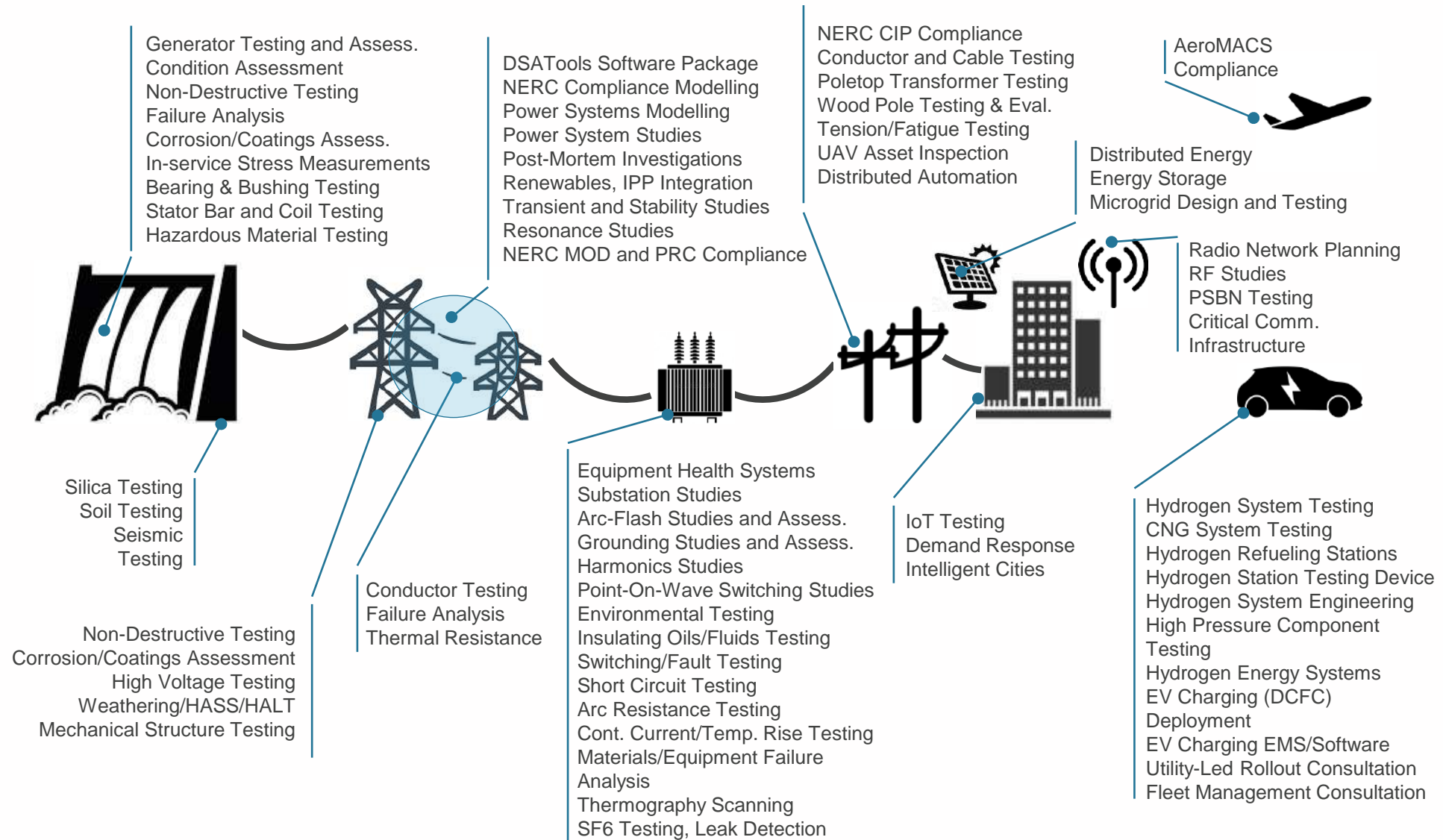
ECONOMICS

- Declining DER costs
- Electrification and load growth (e.g., EV, smart port, smart airports)
- Automation and cost efficiency/affordability
- Compliance costs and penalties
- Geographically dispersed VPPs become viable
- Increased need for climate change resiliency
- Who pays for what and who owns that
- BOO/BOT
- DSO, CCA, disruptions from new entrants

Powertech Grid Modernization Technology Projects

- Distribution automation
 - Ubiquitous communication network
 - Demand response and grid impact management
 - VPP and microgrid
 - Block chain for settlements and billing
-
- Sensors to gather real time data
 - AI, drones and geo-mapping
 - System visibility and control
 - Wearable safety
 - Accurate maps and data
 - Wild-fire characterization and mitigation

MODERNIZE ASSETS AND SERVICES ACROSS THE VALUE CHAIN



GRID MODERNIZATION AT POWERTECH

CRITICAL INFRASTRUCTURE COMMUNICATIONS
Utility telecom
WiMax certification
AeroMACS certification
Public safety networks

MOBILE APPS FOR FIELD
Asset inspection
Telecom/DA site assessment
Meter troubleshooting
New area for growth

DISTRIBUTION AUTOMATION
Line devices
Switchgear
SCADA
Device Management
NERC-CIP

GRID IMPACT
Demand response of EV
Industrial and commercial energy management
Load shaping

HIGH POWER LAB



VIRTUAL POWERPLANT TEST BED

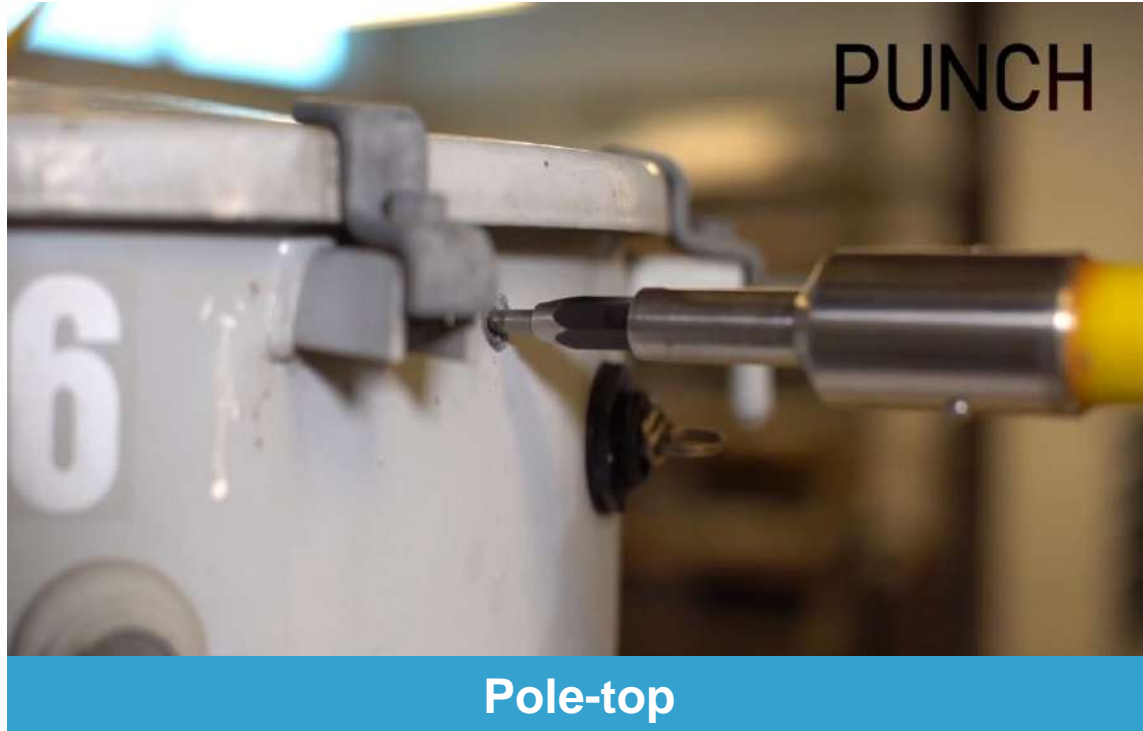


TRANSFORMER OIL SAMPLING FOR PCBS: POLE-TOP AND UNDERGROUND (PADMOUNT)



Ben Skillings
Manager, Mechanical Technology & Testing

THE DISTRIBUTION TRANSFORMER SAMPLING CHALLENGE



How do you get an oil sample from a device not designed for easy oil sampling?

- Do it energized
- Thousands and thousands of times
- Ensure not to decrease life of transformer

WHY SAMPLE DISTRIBUTION TRANSFORMERS?

Brazil and Canada Regulations

- > 50ppm of PCB must be removed/replaced
- December 31, 2025 deadline

Affects everything other than cables

- Transformers – pole-top and underground
- Reclosers, sectionalizers, capacitors
- Light ballasts
- Metering transformers
- Customer vaults

Transformers

- Which ones? Where are they?
- Replace? Replace only affected ones?



OTHER SOLUTIONS?



POWERTECH SOLUTION

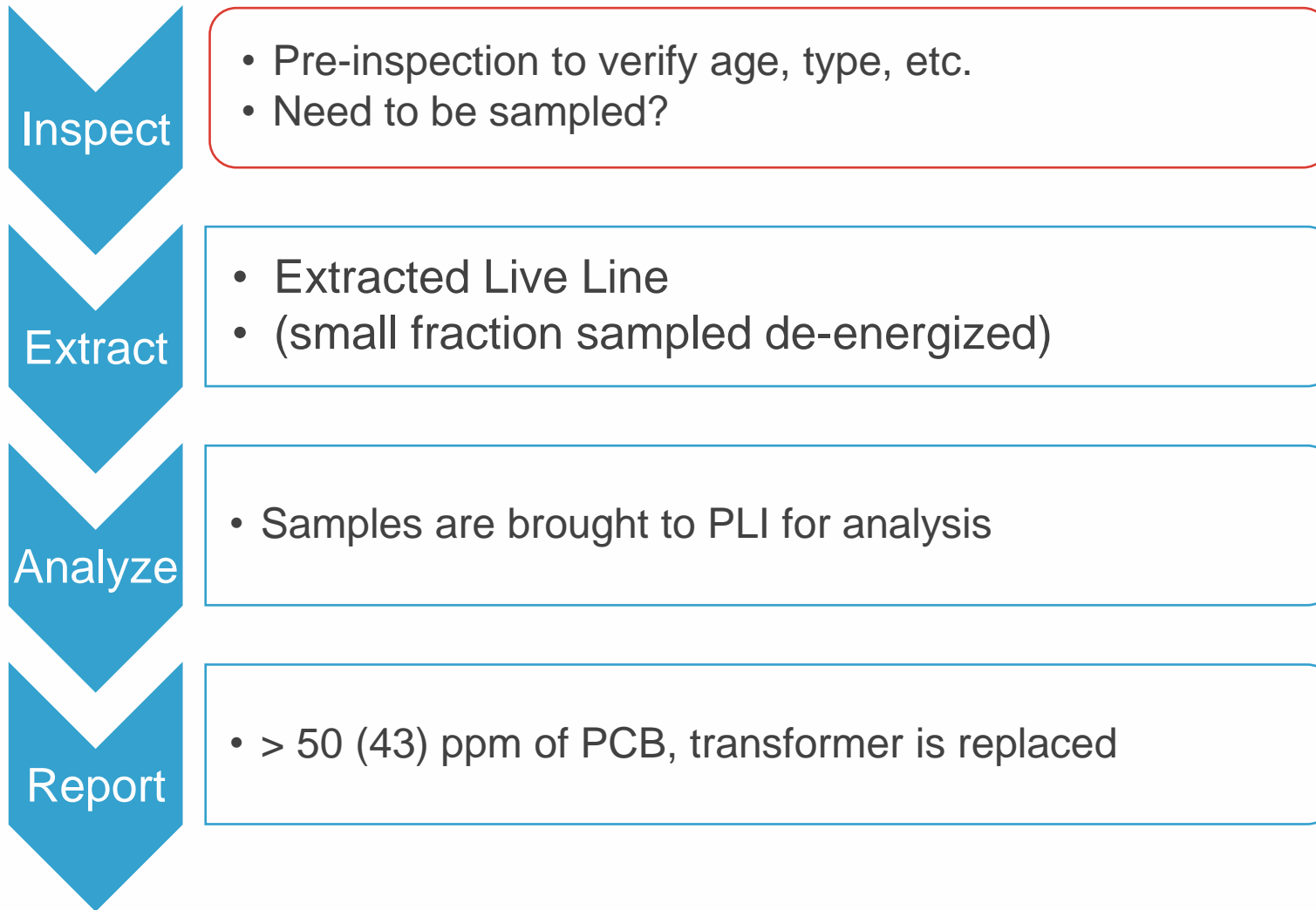
Drill → Punch → Sample → Seal → Paint



POWERTECH SOLUTION



BC HYDRO PROGRAM REVIEW



THE BC HYDRO 2025 CHALLENGE

Pole-tops	Approx. Number
Remaining Typ. About 70% are sampled	70,000
Sampled to Date With Powertech System	30,000

Underground	Approx. Number
Remaining Typ. About 70% are sampled	5,500
Sampled to Date With Powertech System	Just started this Month



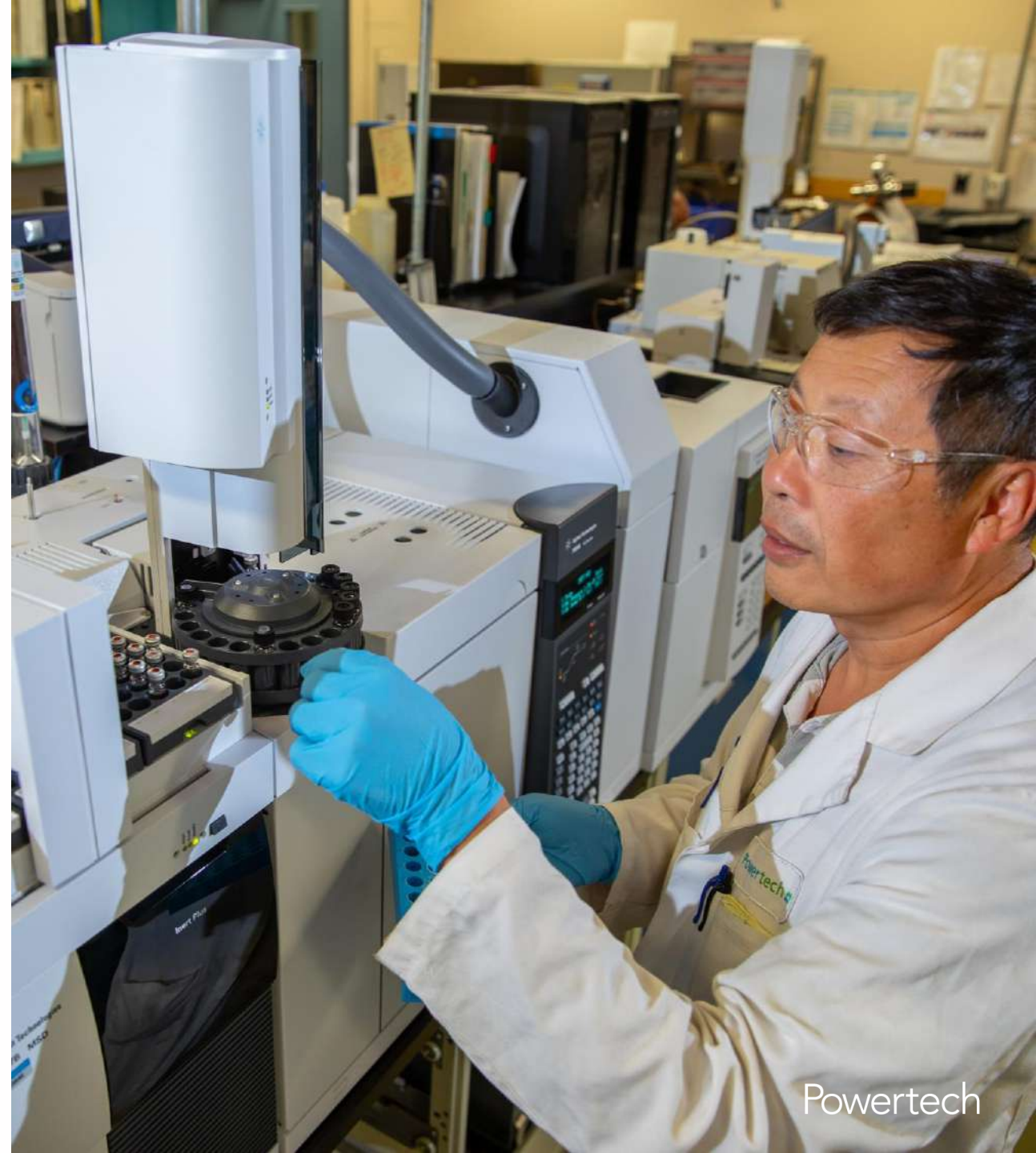
System is also used by several utilities in Canada

CONTINUED DIAGNOSTICS

Collecting a sample from sealed systems is challenging.

Get the most out of the collected sample:

- Metal analysis
- Furan screen
- Volatiles analysis
- Oil and paper health screen



THANK YOU!

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