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SCC's Innovation Initiative

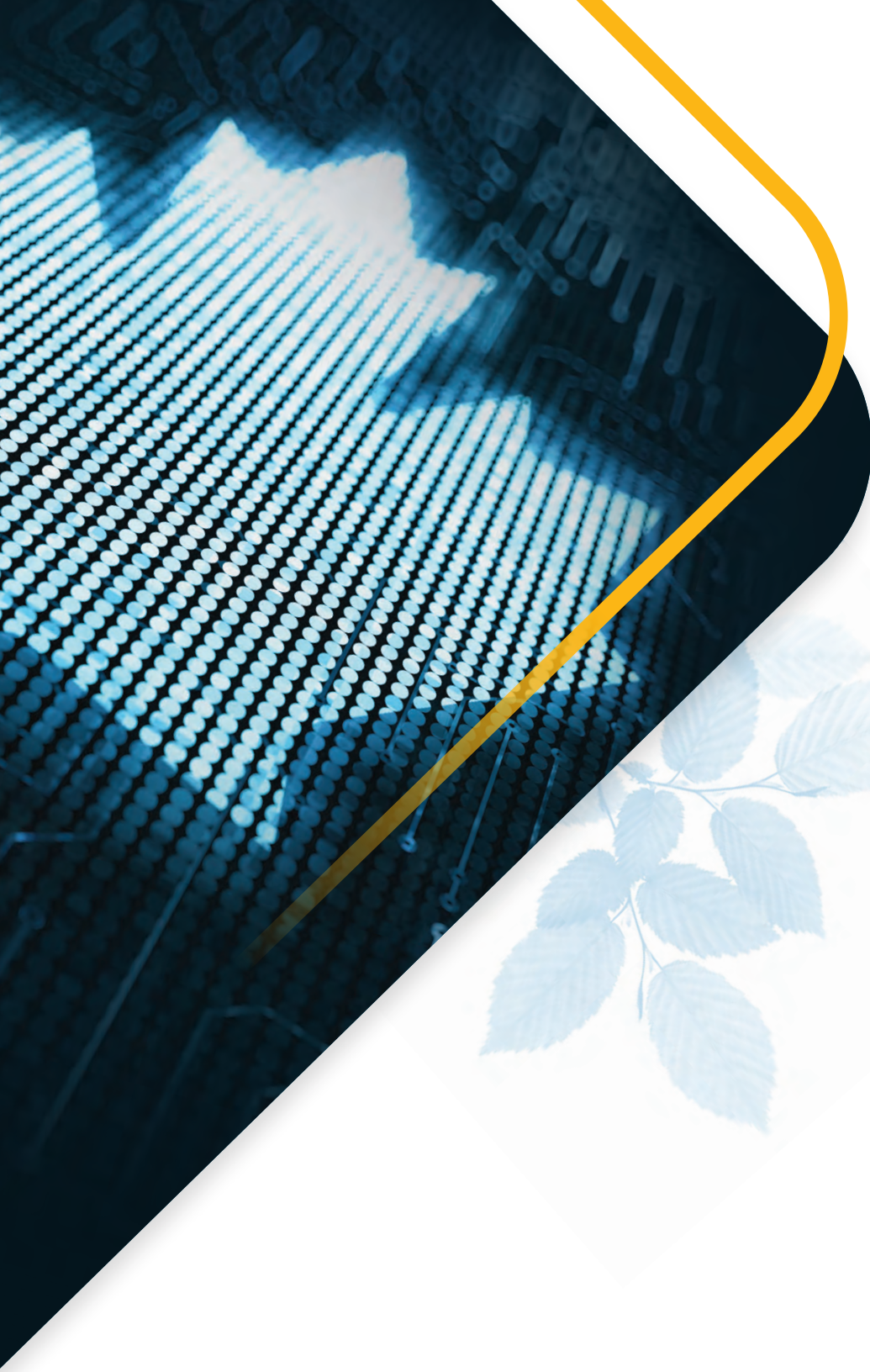
Case Studies
Compendium



Standards
Council
of Canada

Open a world of possibilities.

Canada 




SCC created its Innovation Initiative in 2017 so Canadian innovators from coast to coast could reap the benefits that standardization offers. We engaged with more than 250 from small and medium-sized enterprises (SMEs) to help them successfully navigate the standardization system here and at the international level. We also directly supported 130 Canadian companies by providing invaluable customized standardization advice.

The following sample case studies demonstrate how SCC's Innovation Initiative has helped to build a stronger innovation ecosystem by providing standardization solutions to help Canadian innovators:

- protect health and safety
- support sustainability
- ensure compatibility
- enhance consumer confidence
- ensure market access
- boost competitiveness

No matter what the challenge facing these Canadian innovators, these cases show that SCC's Innovation Initiative has made a difference over the past five years.



Enabling and securing the use of data

Ensuring the collection of quality data

AML Oceanographic: Developing marine sensing technology that users can rely on

AML Oceanographic is an innovative company based in British Columbia that designs and manufactures instrumentation and deployment systems for marine sensing, environmental monitoring, and other subsea applications.

Marine sensors are used for a growing number of applications such as mapping the ocean floor and waterways, aquaculture subsea construction and understanding the effects of climate change on the world's oceans, lakes and rivers. To make full use of the information these sensors collect, they must provide accurate, reliable and consistent data. However, no international standard existed to ensure device accuracy in measurement for marine sensors.

SCC's strategic advice and expertise helped AML lead the development of an ISO standard for marine sensors. The standard sets out universal device specifications to ensure consistent results and a standardized approach for performance tests of these devices as well as a consistent method to report on those tests. This means customers can truly compare technologies when purchasing marine sensors. For AML Oceanographic, it means they can better demonstrate their equipment's capabilities and compete internationally.

Participating in international standards development has allowed AML to gain invaluable access to potential customers, particularly in China. It will also help AML influence the very market rules that affect its operations and ultimate success, as well as demonstrate Canadian leadership in this field to the world.

NRC: Developing a standardized method for nanoscale measurements for tomography

Nanotechnology companies need to be able to certify their products at nearly atomic resolution (at around ~1 nm). They also need a fast tool for performing diagnostic tests and troubleshooting production processes. Having these tools is key to ensuring companies have a competitive advantage and facilitating the flow of goods between countries.

3-D – or electron – tomography in a transmission electron microscope (TEM) can respond to this need. Electron tomography provides a detailed image that can separate and recognize the distance between nanoparticles and measure their size and even their roughness. But no standardized method existed to ensure the images and measurements produced by electron tomography in a TEM are reproducible and accurate.

SCC worked with researchers at the National Research Centre's Nanotechnology Research Centre in Edmonton to help them develop an ISO Technical Specification (TS) that would provide a documented, reproducible way to quantitatively measure the shape and volume of nanoparticles in three dimensions (with single digit nanometer spatial resolution in all three dimensions).

This TS benefits a broad range of stakeholders – from companies that manufacture products with nanocomponents to protection agencies that want to evaluate the safety of nano-enabled products for our health and the environment.

MappedIn: Making the indoors more “discoverable”

MappedIn is an innovative company based in Waterloo, Ontario, with a mission to make the indoors discoverable – whether a mall, hospital, retail store, campus, warehouse, or airport.

It developed an indoor geographical information system (GIS) to allow property owners and managers to maintain accurate maps of indoor spaces by delivering a dataset of what's indoors, providing a better digital experiences for their visitors. MappedIn's main customers are major real estate investment trusts from around the globe, but the platform can be used for other spaces as well, such as commercial office space at healthcare locations.

However, there was inconsistency between mapping tools and digital maps offered by service providers and property owner maps. This lack of consistency and interoperability was creating inefficiencies across the industry. SCC provided the company with the support it needed to lead an international industry consortium of major mall facility owners and digital device providers that developed an international standard for the indoor mapping industry to address this issue.



Protecting and safeguarding data

ISARA: Making data “quantum-safe” – today and in the future

ISARA is a cybersecurity company based in Waterloo, ON, with offices in California and the UK. Its goal is to create a world where the possibilities and benefits offered by quantum computing can be tapped into – without giving up digital trust and privacy. ISARA specializes in creating quantum-safe cryptography solutions that can be embedded into commercial products to secure and protect data.

To achieve this, ISARA uses algorithms that are resistant to hacker attacks using both traditional computers of today, as well as quantum computers. Currently, encrypted data stored for future use will be vulnerable to eventual decryption by a quantum computer. Without appropriate quantum-safe cryptographic schemes, it will be impossible to guarantee the integrity and authenticity of transmitted information, as data tampering will go undetected. In addition, the lack of secure data encryption could violate current regulatory requirements for data privacy and security.

SCC provided strategic advice to help ISARA develop new global standards for quantum-safe solutions that address current gaps. ISARA began leading the development of quantum-safe cryptography standards at the European Telecommunications Standards Institute (ETSI), which is internationally recognized for developing standards for information and communications technologies. The company will also facilitate the adoption of quantum-safe standards developed at ETSI by other standards organizations, such as the United Nation’s International Telecommunication Union (ITU-T).

By helping ISARA participate in standards development at ETSI and ITU-T, SCC has enabled the company to expand its network and collaborate with international experts in the quantum field. It has also given ISARA global market exposure and positioned the company, and Canada, as a data protection leader on the world stage at a time when keeping our data safe is increasingly critical to governments, companies, and citizens around the world.

Delvinia: Securing automated market research and its assets through certification

Delvinia is a Toronto-based company that offers a suite of technology platforms that organizations use to collect consumer data to enable them to make quicker, better and more cost-effective business decisions. Delvinia’s longterm goal is to lead the way in the automation and virtualization of the entire market research process through data collection technologies and artificial intelligence.

With the increasing importance of faster decision making and “big data” in modern economies, all types of industries are turning to data collection companies like Delvinia to provide accurate, relevant, reliable, and current market information. But to gain a competitive advantage globally, Delvinia needed to be able to demonstrate an understanding of the threats to data privacy and protection, and country-or state-specific compliance requirements.

SCC provided the company with the strategic advice and support it needed to obtain ISO 27001 certification. ISO 27001 is an international standard used around the world to manage the security of information. Certification to ISO 27001 has allowed Delvinia to prove to its customers that information security is a top priority. It is also enabling Delvinia to compete in the global marketplace because it can now demonstrate to clients around the world that it is following best practices in data security and to easily meet procurement requirements when responding to RFPs. In the process, it has helped positioned Canada as an innovator and global leader in the transformation of market research.

Canadian Data Governance Collaborative: Supporting data governance through standardization

The role of data governance is to ensure that data is used properly, both to avoid introducing data errors into systems and to prevent the misuse of personal data. Data governance is also important for Canadian companies that need to comply with regulatory compliance initiatives, such as the European Union's General Data Protection Regulation (see section below).

Although other countries have been quick to support initiatives such as data trusts, Canada has been slower to move into this sector. But in 2019, SCC established the [Canadian Data Governance Standardization Collaborative](#) to accelerate the development of industry-wide data governance standardization strategies. Made up of 220 Canadians from across government, industry, civil society, Indigenous organizations, academia, and standards development organizations, it is identifying the standards, specifications and conformity assessment solutions needed to support Canada's data governance capabilities.

During the first two years of its existence, the collaborative worked to build the [Canadian Data Governance Standardization Roadmap](#), to tackle the challenging standardization and data governance questions facing our country. The roadmap provides an overview of the current and desired Canadian standardization landscape and makes 35 recommendations to address gaps and identify new areas where standards and conformity assessment are needed. The solutions identified in the roadmap will help build a safer and more secure digital infrastructure founded on quality, trust and ethics.

Not only will this work help to protect data in the future, but it will also provide social and economic value by securing Canada's place as a leader in data innovation. It will also enhance Canadians' security by supporting increased interoperability, reduced uncertainty, and updated ethical use and protection of data. Standards can help play a role in building that trust so that Canadians can participate in the digital economy knowing that their information is being protected.

GDPR: Helping Canadian companies comply with the EU's data regulations

Increasingly, governments around the world are looking for ways to protect their citizens' personal data from corruption, compromise, and loss. In 2018, the European Union (EU) implemented the General Data Protection Regulation (GDPR) as a step toward protecting the privacy of EU citizens.

THE GDPR fundamentally changed how EU data needed to be managed across all sectors, from banking to health care. It applies to any organization in the world which has collected EU data as a course of daily business.

This regulation had worldwide impact and significant implications for Canadian organizations. Since it can be difficult for a company to know whether an individual is an EU citizen or resident, this regulation posed new challenges for Canadian organizations. Companies that fail to abide by this regulation can face fines of up \$20 million euros or four percent of their annual global revenue. For this reason, it was critical for Canadian companies to understand it so that they could meet the new EU regulatory obligations.

SCC supported Canadian companies by establishing the *Canadian Advisory Committee on GDPR* (CAC-GDPR) as part of its Innovation Initiative. The committee acted as a national forum to influence the development of standards and conformity assessment schemes related to GDPR, data protection and privacy in general.

SCC worked alongside the CAC-GDPR to facilitate the development of a [guidance document](#) to introduce Canadian organizations to the GDPR and to recommend standardization strategies that could support compliance to this new regulation. Although these standards are not directly referenced in the GDPR, they provide a strong foundation for Canadian organizations to show compliance with GDPR.

Using data to enhance Canadians' quality of life

WCCD: Leading the world in standardized city data

The World Council on City Data (WCCD), is a not-for-profit organization, headquartered in Toronto. It is the global leader in standardized city data – creating smart, sustainable, resilient, and prosperous cities around the world. WCCD hosts a network of 100 cities across 39 countries building the highest calibre globally comparable and independently verified city data.

Standardization is at the core of the work that WCCD does. In 2014, the organization implemented the first international standard on city data: ISO 37120. This demand-led standard defines and establishes definitions and methods for a suite of fully numeric Key Performance Indicators to steer and measure the performance of city services and quality of life. Most recently, WCCD has led the development of two new standards that are now being implemented in cities worldwide – *ISO 37122 (Indicators for Smart Cities)* & *ISO 37123 (Indicators for Resilient Cities)*.

Before the development of these standards, cities worldwide struggled to build solid data sets because there were no clear definitions of what was being measured or the methodologies used to compile these measurements. As a result, cities could not speak to each other – or learn from each other.

With relatively little experience in navigating the world of standards development, SCC's advice and guidance were invaluable to WCCD. Our support has also helped to solidify WCCD's global reputation as the "go-to" organization to help cities embrace standardized city data to build smarter, more prosperous, resilient, and sustainable future for residents of cities in Canada and worldwide.

GA4GH: Enabling the responsible sharing of genomic and related health data

As the cost of genomic sequencing decreases, we are seeing increasing amounts of genomic data becoming available. But to effectively use that data, research and healthcare communities need to agree on common methods for collecting, storing, analyzing, and transferring it. For example, most existing formats for describing genotype information do not include a means to share corresponding phenotypic information and those that do exist are not uniform. The lack of uniformity in genomic databases hinders communication and limits the ability to perform analyses across clinical and research systems.

The Global Alliance for Genomics and Health (GA4GH) was established to create standards and policies for the responsible sharing of genomic and related health data. Headquartered in Toronto, this global alliance has developed Phenopackets, a standard file format for sharing phenotypic information, such as clinical diagnosis, age of onset, results from lab tests, and disease severity. The Phenopackets standard facilitates communication by creating an ecosystem of interoperable tools and resources that can use phenotypic data with fewer barriers.

In 2020, GA4GH began working with SCC to navigate the international standardization network and have the Phenopackets standard recognized by the ISO. SCC played a critical role in helping GA4GH to have their standard accepted as a new work item by providing guidance, supporting strategies and plans, and reaching out to national member bodies to raise awareness and generate support.

ISO/DIS 4454 Genomics informatics – Phenopackets: A format for phenotypic data exchange is now a published standard ensuring genomic data is more accessible here in Canada and around the world.

Propelling Canada forward in Artificial Intelligence

Helping AI innovators succeed

AIMS: Developing industry assurance in AI through standardization

Organizations are increasingly developing and using products and services based on AI. But there are a variety of concerns regarding the use of these technologies – from their safety and security to their implications for privacy and the protection of personal information. Because there is no regulatory framework guiding the use of AI technologies, it has been left to the industry to create their own. A new standard to manage these systems would ensure the product quality and safety of AI applications across companies and industries.

Starting in 2019, SCC worked with other National Standards Bodies on a proposal for a new Artificial Intelligent Management System Standard (AIMS), ISO/IEC 42001. This standard will enable organizations that provide or use AI products and services to manage issues related to these technologies and show they have implemented and are continually improving processes unique to the development or use of AI. For example, AIMS will address things such as identifying and treating bias of machine learning data, or more general issues such as fairness, inclusiveness, safety, security, privacy, accountability, and transparency.

AIMS will help to increase interoperability, harmonize requirements, and build trust in AI systems. It will also give industry a consistent metric to strive for, building credibility for those who become certified. With increased demand, it may also influence statutory and regulatory requirements.

Commercializing Canada-made clean technologies

Moov AI: Making artificial intelligence more reliable, useful, and accessible

Moov AI is a data valorization and artificial intelligence consulting firm that trains clients, helps them find the best opportunities to apply AI and develops useful solutions that generate concrete results. Some of the use cases it focuses on are demand forecasting, commodity price forecasting, predictive maintenance, natural language processing and operationalization of machine learning solutions.

Although Canada is a leader in AI research, it falls behind other countries in terms of its business adoption of the technology. Moov AI is trying to bridge this gap by developing a tool that measures the usefulness and quality of AI systems. The tool, called Snitch AI, provides quality assurance for machine learning by allowing organizations to validate the usefulness of their AI systems. It also offers AI system validation services. Ultimately, Moov AI's goal is to democratize the use of AI by making it more accessible and valuable to a broader group.

SCC worked with Moov AI to help them develop a technical specification at ISO/IEC SC 42. The company led the development of a document called *Guidance for quality evaluation of AI systems*. It provides a list of concrete guidelines that align with Snitch AI and with ML model validation framework. Having these specifications will enable companies who are interested in making use of AI to have confidence in it because they will have concrete guidelines for implementing AI in their organization.



Helping innovators turn waste into power

Terragon Environmental: Accessing new markets for an innovative green technology

Terragon Environmental Technologies is a Montreal-based clean technology company that developed the Micro Auto Gasification System (MAGS). MAGS generates energy fuelled by waste such as plastics, paper, food, used oils and wood. That waste is then converted into inert carbon products. The thermal energy it produces can be used to heat water or for heating, ventilation, and air conditioning units. Although MAGS is currently used in such settings as cruise ships, overseas resorts, and by the military, Terragon's aim is to expand their market to businesses and households in Canada.

However, Terragon faced regulatory barriers in achieving this. Even though MAGS' level of emissions is less than those of a boiler, regulators regarded the system as an incinerator because it thermally treats waste. This means that it must conform to standards and testing for large-scale and environmentally degrading products. This was costing more than the MAGS products itself.

Terragon needed to find a way to demonstrate to regulators that MAGS is a safe energy appliance. SCC identified the simplest and speediest way to get over this hurdle was to facilitate the development of an Other Recognized Document, or ORD. Certification to this document allows the company to demonstrate the product's safety and relevance as a clean technology to break into Canada's land-based markets.

HARVEST Systems: Fuelling the food service industry with waste energy

HARVEST Systems Inc. is a start-up company based in Hamilton, Ontario focused on the integrating waste heat recovery systems for the full-service restaurant industry. The company grew out of the Thermal Management Research Laboratory at McMaster University. HARVEST is committed to the commercialization of the Pizza Oven Waste Energy Recovery (POWER) system within the food service industry.

The POWER system uses a PVR-sized thermoelectric generator that captures heat and converts it to electricity. That stored energy can be used to power lights, heat hot water and other uses. This saves businesses money by improving energy use and reducing greenhouse gas emissions.

The wide-scale adoption of the POWER system, and other waste heat recovery systems, within the restaurant market was being inadvertently hampered by current safety standards. As the practice of waste heat recovery is not uniformly defined across Canada, or North America, HARVEST faced varying entrance strategies for provinces and states.

SCC provided HARVEST with the support the company needed to navigate the standards development process. HARVEST was able to develop a standard to market their waste heat recovery system more effectively to restaurants across North America.



Fueling innovation in the energy sector

CISMaRT: Leading the way in the application of hydrogen fuel in ships

The Canadian Network for Innovative Shipbuilding, Marine Research and Training (CISMaRT) is based out of the Department of Ocean and Naval Architectural Engineering at Memorial University, in St. John's, Newfoundland. The network undertakes innovative and collaborative research and development in marine technology with the goal of improving education and training for Canada's shipbuilding and marine industries.

One of CISMaRT's recent areas of research is the application of hydrogen fuel in ships – a relatively new field, especially in Canada. Currently, there are no Canadian-specific standards for marine applications of hydrogen. Such standards are critical for training and use in the marine industry, especially to ensure safety.

With SCC's assistance, CISMaRT worked with a group of national and international partners through the international classification society known as DNV GL to address changes in maritime hydrogen safety issues by developing a handbook on the storage and use of hydrogen fuel cell technology in marine environments.

This standardization solution will enable CISMaRT to develop technologies for marine vessels using hydrogen in Canadian waters where international marine companies operate. These technologies can also be exported and will attract further collaborations with international partners. Working with international partners is helpful in understanding the global issues in the hydrogen field so that we can develop better solutions for Canada and its unique environments.

Supporting innovation in the combined heat and power sector

iGEN Technologies: Generating electricity with self-powered home heating

iGEN Technologies Inc. focuses on residential heating, ventilation and air conditioning (*HVAC*). The company's first product, the i2, is a self-powered home heating system that uses intuitive algorithms to autonomously switch between natural gas and electricity as its primary fuel source. This not only saves homeowners money and provides environmental benefits by being more efficient than traditional home heating equipment, but during a blackout or natural disaster, the i2 can generate enough electricity to run itself and provide 400 Watts extra power.

As the first self-powered heating system on the North America market, iGEN is uniquely positioned to compete with more traditional heating systems. But for the company's new type of combined heat and power appliance to enter the market, it needed to be approved by regulators and certified for safety. However, no relevant standard existed.

SCC worked with the company to provide the technical knowledge, advocacy and support it needed to lead the development of a Canadian standard that addressed product safety aspects by building on an existing European standard. Having a standard for the i2 is now enabling iGEN to compete with the traditional HVAC industry – and to develop better, more efficient and smarter products for consumers.



Creating a more
sustainable
future through
standardization

Addressing standardization gaps in the biomass sector

Ecostrat Inc.: Supporting Canada's biomass sector

Ecostrat Inc. is a Toronto-based company that assesses, develops, optimizes and manages biomass supply chains. It both aggregates and supplies various types of biomass for a range of markets, as well as assessing, validating and optimizing bio-based feedstock supply chains for project developers, power utilities, financial institutions, investment funds, engineering companies, US national labs, governments and First Nations communities.

In the past, it was difficult for bio-projects to obtain financing because there was no standardized biomass feedstock risk evaluation protocol. This was a major barrier to industry growth. In 2016, Ecostrat started developing the *Biomass Supply Chain Risk Standards*. It is a standardized biomass feedstock risk assessment protocol designed to enable capital markets to more accurately quantify bio-feedstock risk and reduce the level of uncertainty that is currently a significant driver of low bio-project credit ratings and high capital costs.

SCC worked with Ecostrat to support the development of a National Standard of Canada on Biomass Supply Chain Risk and create a validated method to price feedstock risk and accelerate bio-project financing. CSA W209:2 provides a means for developers and investors to quantify and qualify biomass feedstock risk, helping to drive lender confidence and de-risk investment in biomass-based projects across Canada.

By creating a validated method and standardized solution with SCC to price feedstock risk and accelerate bio-project financing, Ecostrat has solidified its position as an innovative leader in the Canadian bioeconomy.

Supporting innovative technologies that capture carbon

CarbonCure: Capturing CO₂ for “greener” concrete worldwide

CarbonCure is a company that is reducing the carbon footprint of the built environment by using recycled CO₂ to improve the manufacturing of concrete.

CarbonCure’s technology is installed in concrete plants across the world to permanently sequester or “lock in” carbon dioxide by injecting it into concrete as it is mixed. This CO₂ mineralization improves concrete’s compressive strength, resulting in concrete products that meet or exceed quality benchmarks, while at the same time decreasing both greenhouse gas emissions and manufacturing costs.

To expand its operations, CarbonCure needed the relevant standard for manufacturing concrete to include its patented technology as one of the acceptable methods of producing concrete. SCC helped CarbonCure get the current standard updated with the addition of a new annex. We also provided advice on how to get this annex integrated into the National Model Construction Codes (and into provincial and territorial adoptions of the codes).

SCC is helping CarbonCure to take part in international standardization activities by facilitating its participation as an observer on relevant European standardization technical committees for concrete specifications. This will enable CarbonCure’s entry and expansion into European markets.

Questor Technology: Using clean tech to reduce greenhouse gas emissions

Questor Technology Inc. is a Calgary-based clean tech company that provides high efficiency waste gas combustion systems. Their mission is to change the way the world handles waste gas combustion systems.

The company specializes in the design, sale and rental of high efficiency, solar-powered waste gas incinerators. Questor’s patented technology can take any waste gas stream and ensure it is combusted at 99.99 per cent efficiency. All that is produced is CO₂ and water that can then be used to generate power or treat water. Used primarily in the oil and gas sector, these combustors are one “end-of-pipe” method used to limit air pollutants and greenhouse gas emissions.

With energy producers, regulators and investors around the world looking to reduce emissions, there is increased demand for combustion systems such as Questor’s. However, although standards existed for the design of flares, there was no similar standard for the design and performance of incinerators. This made it difficult for Questor to compete with companies offering alternative technologies.

SCC determined the best strategy to support customer needs and the advancement of global greenhouse gas reductions was for Questor to verify the performance of its Clean Combustion Thermal Oxidizers to the ISO 14034 Environmental Technology Verification (ETV) standard. Testing to this international standard verifies Questor’s 99.99% combustion efficiency and supports efforts toward achieving further greenhouse gas reduction, particularly by incorporating precise quantification and determination into regulation.

Questor’s clean product line was the first environmental technology to be verified by an ANSI National Accreditation Board (ANAB) accredited verifier to the ISO ETV standard.

Enabling cutting-edge technologies

WindTrans: Finding a path to certification for a breakthrough product

WindTrans is an innovative company based in Seaforth, Ontario, that designs and manufactures energy efficient products. The company created a new and revolutionary high-volume, low-speed pump that would change how efficiently the world moves fluids and harnesses kinetic energy. This versatile new energy efficient and portable pump could be operated by hand, kinetic power or motor.

The pump transfers fluids quickly with little effort, with or without an engine or motor. It is the first high-flow rate pump operating efficiently at low rotational speeds in either pump or turbine mode. It can also be used as a turbine to produce electricity when connected to a generator.

The pump is ideal for situations when there is no power or grid assistance, such as remote areas and during power outages. It is perfectly suited for use in firefighting, flood control, spill recovery, and any time when connecting to power is impossible. It can also pump high and low viscosity fluids, from sludge to fresh water.

Although WindTrans was ready to go to market with the pump, the company faced challenges certifying it since no standard applied to their innovative technology. Customer demand and concerns over liability drove their need for certification, especially since the pump is intended for a range of fluids, including heavier ones like oil.

SCC provided WindTrans with the help they needed to have an amendment made to an existing standard to address their innovative product. Achieving certification under this amended standard has enabled WindTrans to access new markets and stay competitive.

Nature Fibres: Bio-based material for more sustainable construction

Nature Fibres was the first company in North America to manufacture bio-based construction material at an industrial scale, providing a more environmental alternative to existing products. In particular, the Quebec company focuses on producing hemp-based insulation material that can be used for everything from constructing new buildings to transporting food and pharmaceuticals.

When Nature Fibres began production, the company realized there were no existing standards in North America for bio-based construction materials. They turned to SCC to help them develop a technical guide that would allow them to obtain certification from the Canadian Construction Materials Centre.

With SCC's help, Nature Fibres is also adapting an existing ISO standard (ISO/TC 163/SC 3) to fit the needs of the North American market. Developing this new technical guide and standard will make Nature Fibres' materials more accessible to construction companies and will lead the way for other Canadian companies to produce innovative ecological construction material.





Capitalizing on opportunities in emerging technologies

Providing Canada with a leg up in Lignin

FPIInnovations: Helping Canadian lignin producers gain a competitive advantage

FPIInnovations is a private, not-for-profit organization headquartered in Pointe Claire, Quebec, that specializes in scientific solutions for the forestry sector. One of their innovations is a proprietary process that recovers lignin – a highly versatile and renewable bioproduct – from waste products in the pulp industry. Lignin can be used as a replacement for fossil-based raw materials in products such as carbon fibre, adhesives, thermoplastics, resins, composites, and various chemicals.

However, commercialization efforts for lignin have exposed a lack of reliable and market-accepted methods for characterizing their chemical composition, structure, and properties. Such standards are essential to accelerate the development and commercialization of lignin-based products, and to differentiate lignin from various producers.

With SCC's support, FPIInnovations worked with the ISO Technical Committee on Paper, Board and Pulp (ISO/TC 6) to include lignin within the scope of the committee's work, and they also led the development of four new international standards under a newly established working group.

The resulting standards will help promote commercialization of Canadian lignin and lignin production processes (LignoForce) by opening new markets and facilitating trade. They will also ensure emerging lignin producers will be well-positioned to gain a competitive advantage as the standards consider their capabilities.

Taking a leading role in the cannabis industry

Aurora Cannabis: Giving Canada's cannabis sector a competitive advantage

Aurora Cannabis Inc. is an Edmonton-based company focused on producing and distributing cannabis and cannabis-related products in Canada and around the world. It produces approximately 150,000 kilograms of cannabis biomass annually for the global medical and recreational cannabis markets as well as global hemp-derived cannabidiol (CBD) markets.

As new cannabis products enter the market – such as edibles, oils, extracts, flowers, topicals, devices, appliances – there is a critical need to establish clear best practices to ensure that consumers can trust the products that they are buying. Standards are a way to offer this assurance.

SCC began working with Aurora to develop a framework of standards to support the emerging cannabis industry. This collaboration has resulted in eight published standards at two ASTM sub-committees: *ASTM D37.08 Cannabis Devices & Appliances* and *ASTM D37.04 Processing & Handling*. Aurora has also contributed to the development of other standards in areas such as terminology, training, universal symbology, labelling, and packaging.

These standards help businesses control risk by ensuring that cannabis and cannabis products are safe.

Being involved in the standards development process at this early stage in the cannabis industry's development has provided significant market advantages to the Canadian industry. By ensuring emerging international standards meet the needs and protect the interests of the Canadian industry, SCC helped to support Canada's export growth and competitiveness in this rapidly growing sector.

extractX: Developing a mobile lab to serve the cannabis industry

extractX Inc. is a biotech company based in Welland, Ontario. It has developed an innovative mobile biomass extraction lab to serve the rapidly growing cannabis industry. The labs are provided on a fee-for-service basis to companies around the world looking to take hemp biomass and extract it into distillate and can process up to 2160 pounds of input biomass a day.

extractX's lab is one of the first fully automated, mobile extraction labs in the world built to GPP, GMP, and EU GMP (pharma grade) standards. SCC worked with the company to integrate standardization into the front end of their product development process. This has allowed extractX to build a self-contained turnkey unit that meets or exceeds the highest standards within the pharmaceutical industry.

As additional countries around the world legalize cannabis products, there is a growing need to have policies and practices in place to be able to create a consistent, safe product. Standards provide this assurance. By ensuring extractX's mobile lab meets the highest standards possible, the company has been able to quickly roll out a polished finished product that answers a growing need within the cannabis industry.



Going beyond with breakthrough technology

TESCO Automation: Improving Efficiency and Effectiveness in the Global Power Utility Sector

TESCO Automation is a Saskatchewan-based company that delivers consulting, design, configuration, testing support services and training to the global power system sector.

Power stations operate by using various systems and software, including Human Machine Interface software applications (HMIs). HMIs present information to human operators through status indicators, alarms and updates that allow them to interact and control equipment and processes as needed. Unfortunately, there is no consistency in the way this type of information is currently displayed. This means that each of these unique systems runs independently – lacking interoperability and requiring significant reconfiguring – which results in inefficiencies and costly delays for the utilities sector.

TESCO Automation recognized that an opportunity existed to improve how operators work with HMIs that control power stations. Standardizing the software and images used to run these systems would allow for enhanced interoperability and fewer reconfiguration requirements, all of which save significant time and money, and reduce risk.

As the sponsor of Canada's National Committee to the International Electrotechnical Commission, SCC was instrumental in facilitating TESCO's leadership in the IEC committee responsible for developing an international standard to fill this industry gap. SCC provided support and advice to TESCO Automation as the project lead for the IEC 61850 based HMI New Work Item Proposal. In addition to the development of this important work, by participating in international standards development, TESCO has gained additional insight and exposure, as well as access to new customers, resulting in an increase in its global sales.

Beyond 5G Initiative: Getting ahead of the competition

As the world makes the leap from fourth generation (4G) to fifth generation (5G) wireless technology, new opportunities are opening in the telecommunication industry. Unfortunately, Canadian companies didn't get their foot in the door early enough to capitalize on opportunities associated with this transition. But it is still unclear what this next generation of wireless will bring – and what the subsequent generations will look like.

SCC has worked with Innovation, Science and Economic Development Canada (ISED) and the National Research Council of Canada Industrial Research Assistance Program (NRC-IRAP) to develop a roadmap for how to ensure Canadian companies remain competitive in this mobile infrastructure market – now and in the future. SCC also reached out to Canadian companies to get them to participate in a Beyond 5G Workshop. The goal of the workshop was to explore how SMEs can overcome any challenges they face entering and competing in the global wireless technologies market – and how standards can assist with this.

As the result of the workshop, SCC helped draft a series of recommendations that point to the policy, research and standards initiatives needed to help Canadian companies become more globally competitive in the wireless technologies sector.

Ensuring the health and well-being of Canadians

Digital Twin Initiative: Providing new opportunities for Canadian Innovators

In today's connected world, we need tools to meet the new realities of software-driven products. The digital twin is one emerging technology that has the potential to fill this need and offer new opportunities for Canadian companies.

A digital twin is an exact virtual representation, or twin, of an object or system. It can be anything from a car to a building or bridge. Sensors in this physical object or system collect data that can be seen in the virtual model, or digital twin in real time. This enables the user to control the physical unit remotely and get critical information about how it is performing in the real world.

This technology has applications across industries such as transportation, oil and gas, and construction. For example, a digital twin could provide real-time information about what is happening on an oil rig in the middle of the ocean to troubleshoot from afar or used to monitor fire sensors in a building to identify potential problems without ever actually stepping foot in the building's electrical room.

While the concept of a digital twin has been around since 2002, the Internet of Things (IoT) is making this technology much more cost-effective to implement. SCC is working at getting the different players in the industry and academia to come together on issues and challenges that can be addressed through standardization. For example, ensuring that there is a common terminology that all digital twin creators use to communicate.

By coming up with standardized terminology and software for this technology, we can alleviate challenges that might arise in the future – and provide Canadian companies with the opportunity to become leaders in this sector. Through the Initiative, SCC held a standardization workshop to make recommendations for steps the industry should take to address the challenges facing the commercialization of digital twin technologies.



Responding to the challenges of the COVID-19 pandemic

Providing reliable access to quality PPE during pandemics

The beginning of the COVID-19 pandemic brought a severe shortage of personal protective equipment (PPE) and there was no Canadian standard in place at that time to ensure its certification in this country. To provide a reliable and quality supply of PPE for Canada in the future, SCC supported [CSA Group](#) to develop and publish a new standard. *CSA Z94.4.1:21 Performance of Filtering Respirators* addresses some of the specific needs and requirements identified during the pandemic, such as ensuring masks fit, that they are comfortable and easy to breathe through, and that they have an extended shelf life. The first edition of CSA Z94.4.1:21 covers filtering respirators for particulate matter only, addressing the urgent needs of Canadian health care and essential workers.

SCC is also working with CSA to bring about a Canadian certification program that would replace the current Health Canada guidance for filtering facepiece respirators. The current guidance was created to resolve critical supply issues early on the pandemic. The goal is to have this certification program align with the United States National Institute for Occupational Safety and Health's (NIOSH's) requirements for filtering facepiece respirators. This would ensure that respirators manufactured and approved in Canada will also meet US standards so that they can be sold on both sides of the border.

Getting Canadians back to work safely during a pandemic

The COVID-19 pandemic forced Canadians and people around the world to quickly change how and where they worked, as many of us shifted from the office to our homes. Although workplaces are potential sites for transmitting infectious diseases like COVID-19, most employers were ill prepared for dealing with this health crisis. Finding ways to get Canadians back to work safely after the pandemic has been critical to our health and well-being, as well as our economy.

One of the challenges has been the lack of available guidance regarding occupational health and safety considerations for operating during a pandemic or safely reopening after one. To support employers as they reopened workplaces, SCC collaborated with CSA Group to hold both a webinar and workshop in the spring of 2021.

The workshop brought together leaders from Canada's superclusters, government, industry, and academia to provide input on the guidance needed for workplaces to remain open and to operate during an infectious disease pandemic. The discussions also helped identify standardization needs and solutions to respond to the pandemic and resulted in a published report that will help us to plan and prepare for any others.

Creating an agri-food index to increase competitiveness

Protein Industries Canada: Shining a light on sustainability in Canada's agri-food sector

To ensure the sustainability of our global food systems – for both people and our planet – we need to transform how we grow food. Although Canada is one of the most sustainable, safest, and reliable food producers in the world, we need to find concrete ways to demonstrate this.

While considerable data exists on Canada's agri-food sector, there is currently no consolidated set of metrics of how it is doing on issues such as environmental sustainability, supply reliability, food safety, and food nutrition. To demonstrate Canada's record in these areas when it comes to agri-food production and supply, we need to develop common definitions, standards and verifiability as well as comparable data and data-sharing.

SCC partnered with Protein Industries Canada, Pulse Canada, the Global Institute for Food Security at the University of Saskatchewan, and more than 75 organizations spanning the food system to develop an integrated picture of Canada's agri-food sector's sustainability – from food production to retail. This coalition is using science-based metrics based on four sustainability priorities – the environment, economics, health and food safety, and societal well-being – to create a National Index on Agri-Food Performance.

Creating a food index will provide a means to concretely demonstrate that Canada's agri-food production and supply is economically, environmentally, and socially sustainable. This will build trust and enable Canada to credibly show its track record and leadership in this area. It will also help increase Canada's competitiveness in the global market by shining a spotlight on the sustainable practices being used in the industry, while also helping pinpoint where improvements can be made.

Supporting innovative technologies in the health sector

KA Imaging: Providing a better way to conduct diagnostic imaging

KA Imaging, based in Waterloo, Ontario, designs and develops X-ray and micro-CT imaging products for medical and veterinary industries. The company is taking cutting-edge research out of Canadian universities, and elsewhere, and converting it into products that will meet the needs of these sectors.

The company's product called "Reveal" offers X-ray technology that allows users to differentiate between soft tissue and bone in patients. This enables us to better understand diseases such as lung cancer, pneumonia and even coronavirus.

Using KA Imaging's patented technology, the detector provides advanced bone and tissue differentiation in the diagnostic image while maintaining low exposure to harmful radiation. It is also portable and retrofittable, capable of simultaneously capturing dual energy images and very high detective quantum efficiency (DQE) digital radiography images.

SCC helped the company navigate the complexities of standards creation – everything from providing advice on standards development strategies to planning and stakeholder engagement throughout the process. With SCC's support, the company has led this work from the initial proposal throughout the development of the International Electrotechnical Commission (IEC) Standard applicable to their innovative product (IEC 62220-2-1 ED1 Medical electrical equipment – Characteristics of digital X-ray imaging devices – Part 2-1: Determination of dual-energy subtraction efficiency – Detectors used for dual-energy radiographic imaging).

As a relatively small and young company, KA Imaging has also taken a proactive approach to standardization, integrating it into the product development process. This standards development leadership has helped to increase visibility for their technology and accelerate product adoption.

Filling standardization gaps

Genomadix (formerly Spartan Bioscience): Bringing Legionella testing out of the lab

Genomadix, previously known as Spartan Bioscience, is an Ottawa-based company that developed an innovative way to conduct polymerase chain reaction (PCR) DNA testing on site using a small portable kit for Legionella, or Legionnaires' disease.

Legionella is a very aggressive and deadly form of pneumonia that is contracted by inhaling droplets of water that contain Legionella bacteria. The bacteria can be found almost everywhere there is stagnant water – from commercial cooling towers to hot tubs to showerheads that aren't used frequently.

To test for Legionella, samples are traditionally sent to a laboratory. But Legionella bacteria can degrade when it is transported, resulting in false negatives. It also takes up to two weeks to get results. But the company's PCR technology allows building owners and operators to test for the bacteria and get results within 45-minutes, giving an almost instantaneous snapshot of the levels of Legionella bacteria in the water supply.

One of the problems the company faced was that their technology is so innovative it was not recognized in existing standards. But there is an existing international standard for traditional laboratory testing: ISO/TS 12869 Water quality – Detection and quantification of Legionella spp. and/or Legionella pneumophila by concentration and genic amplification by quantitative polymerase chain reaction (qPCR). They worked with SCC to use the technical specifications of the current ISO standard to draft a standard that the company's system can conform to. This new standard would ensure their manufacturing process follows the processes set out in ISO/TS1 2869 and that the user follows a set protocol to successfully perform the on-site test with reproducible results.



Addressing business challenges with standardization

CHTA: Promoting the Canadian hemp industry through standardization

The Canadian Hemp Trade Alliance (CHTA) represents Canadian farmers, processors, manufacturers, researchers, entrepreneurs, and marketers involved in Canada's hemp industry as well as some international members. Its goal is to share information and promote the use of nutritional and industrial hemp products as well as to coordinate research.

Although hemp is the same plant as cannabis, it contains more CBD and less tetrahydrocannabinol (THC) in its flowering heads and leaves. THC is the compound that causes the "high" that people associate with cannabis. One of the challenges the hemp industry has faced is that all cannabinoids in the cannabis plant, including CBD and THC, have been regulated the same way. This means that any CBD-containing products may only be accessed the same way as cannabis products. This has created more cost, encumbering the competitiveness of this agricultural crop.

SCC worked with CHTA to develop industry-wide grading standards so that Canadian hemp products could be recognized globally for their quality and consistency. SCC also worked with CHTA to request that ASTM's D37 cannabis committee and its subcommittees clearly respect differences between hemp and high-THC cannabis by facilitating the development of hemp-specific terminology, standards, guides, and hemp-specific test methods.

To date, CHTA has worked with ASTM to develop standards for assessing spoilage and sampling of hemp seed intended for human consumption. It is also developing standards for hemp seed intended for dehulling or oil extraction for food purposes and guides for issues such as storing whole hemp seed, growing hemp intended for fibre production, and storing hemp chaff intended for cannabinoid extraction.

Northern Cables: Bringing a Canadian innovation to the global wire cable industry

Northern Cables Inc. manufactures low voltage commercial and industrial power cables. The company, based in Brockville, Ontario, produces four million metres of armoured cable monthly for markets in Canada and the United States.

One of the products Northern Cables produces is the Teck90, a low voltage, armoured power cable tailored to light commercial or industrial applications. It can be used in industries such as the petrol-chemical sector, mining, and even to supply power to electric vehicle chargers. Although this Canadian innovation has been around for many years, the company has faced barriers selling the product internationally as interlocking armoured cables are not recognized by IEC standards. To ensure they remain competitive, Northern Cables needed to find a way to break into the international market.

SCC worked with Northern Cables to amend an IEC standard that would ensure their CSA Teck90 cable is accepted internationally. We helped guide the company through the international standards development process and enabled Northern Cables to demonstrate that an IEC standard would have applications beyond North America. Ensuring the Teck90 cable meets international standards will be critical in opening up new markets for Northern Cables. In the long term, developing an international standard could have tremendous impact on the future of the wire cable industry in general.

We are proud to have worked with each of these organizations on their standardization journey. We encourage all micro and small and medium-sized enterprises to contact us to learn more about participating in the standardization system and leveraging it for continued growth.





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