



SCC's Innovation Initiative

Empowering Canadian
innovation where it sparks

Standards
Council
of Canada



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Message from the CEO

At the Standards Council of Canada (SCC) we know that although innovation may ignite from a creative idea, it only succeeds when the idea for a new product, service or way of doing something finds a market. Standards and conformity assessment make this possible by serving as a “passport” to trade in today’s global economy.

Standardization sets the conditions to help innovation thrive. It enables compatibility across global markets by establishing a common language for new concepts and technologies. It supports faster commercialization of innovative products or services by providing credibility, attracting investment and stimulating research and development. And, since standards reflect the views and best practices of those who develop them, it helps innovators shape their industries by participating in standardization activities. But to capitalize on the benefits standardization offers, we need to embed it more extensively into Canada’s innovation ecosystem. This notion has rung especially true during the COVID-19 pandemic. The combined need for innovation and safety has skyrocketed, and reliance on standardization and certification has been pivotal to support the health and economic recovery of Canadians.

SCC created its Innovation Initiative so Canadian innovators from coast to coast can reap the benefits that standardization offers. When we started this initiative just a few years ago, our goal was to deliver 63 standardization strategies to Canadian companies by 2022. We are well on track to meeting this target, with 36 strategies already delivered to help Canadian innovators on the road to success. To date, 59% of the companies that we have worked

with have reported an increase in either exports, jobs, or revenue as a direct result of their engagement with SCC. We have also dedicated more than \$1.9 million in funding to implement standardization strategies for Canadian companies and facilitated the participation of 49 Canadian innovators on international technical committees to ensure our nation’s interests are represented in developing new standards.

Perhaps just as importantly, SCC has been able to use the program to leverage the standardization network to accomplish these successes and beyond. In union with Canada’s Plan to Mobilize Industry to Fight COVID-19, we have worked closely with our standardization, government, and industry partners to aid companies in developing technologies, solutions, and products to help battle the pandemic. These efforts range from providing easier access to standards for personal protective equipment (PPE) production to facilitating the development of standards to better share health data for future research.

We know that by providing Canadian creators with the support they need to influence and lead the development of the standards of tomorrow, we are ensuring that Canada will be a “global standards setter” rather than a follower. Through standardization we are helping Canadian companies drive innovation in new and emerging sectors, such as the ever-advancing artificial intelligence or ground-breaking clean energy solutions, so our nation can be a leader in these fields. We have achieved a 91% satisfaction rating from the innovators we supported, and we look forward to continuing our work and expanding our efforts to identify ways that standardization can facilitate innovation in new sectors. We remain committed to helping innovators move their ideas and products forward, and to opening a world of possibilities.

A handwritten signature in blue ink that reads "Chantal Guay". The signature is fluid and cursive.

Ms. Chantal Guay, ing, P.Eng., FCAE
CEO, Standards Council of Canada



Introduction

In 2018, Canada ranked second in the Organisation for Economic Co-operation and Development (OECD) for early-stage entrepreneurial activity and seventh for entrepreneurial spirit. Several of Canada's biggest cities also ranked among the top 20 most high-tech cities globally¹. Canada has what it takes to be a global innovation leader.



Despite this strong foundation, Canada still faces tough competition in the global innovation race. Other countries such as China, France, Japan, the United Kingdom and the United States are making significant investments in innovation, and all rank higher than Canada in the latest Global Innovation Index.² If we want to create jobs, drive growth and improve quality of life for all Canadians, we need to stay at the cutting edge of this innovation race.

The federal government announced an ambitious strategy in 2017 to establish Canada as one of the most innovative countries in the world through its [Innovation and Skills Plan](#). The plan aims to foster Canadian leadership in potential high-growth areas such as advanced manufacturing, agri-food, clean technology, digital industries, health/bio-sciences and clean resources. SCC's Innovation Initiative supports this plan by putting standards-setting front and center.

Standardization plays a pivotal role in Canada's economic health. It contributes to GDP growth (17%) and labour productivity growth (38%).³ It is also essential for trade. Standards affect 93% of global trade, given that both regulatory and market acceptance are dependent on speaking the same technical language.⁴ This "standardized" language ensures the reduction of trade barriers and promotes compatibility of technologies within the market. The importance of standardization cannot be underestimated, especially when one considers that 65% of Canada's GDP is attributed to international trade.⁵ Simply put: standardization is key to advancing Canada's economic interests and growing globally successful companies.

1. "Building a Nation of Innovators," Innovation, Science and Economic Development Canada, 2019, https://www.ic.gc.ca/eic/site/062.nsf/eng/h_00105.html

2. "Global Innovation Index 2019 rankings," <https://www.globalinnovationindex.org/gii-2019-report>

3. Liao, D. Every Standard Counts – How Standardization Boosts the Canadian Economy. Ottawa: Standards Council of Canada, 2021

4. Jeff Okun-Kozlowicki. Standards and Regulations: Measuring the Link to Goods Trade. Office of Standards and Investment Policy Industry & Analysis, International Trade Administration, U.S. Department of Commerce. June 2016

5. The Conference Board of Canada. Getting Aligned. How Adopting Standards Affects Canada's Productivity and Growth, 2015

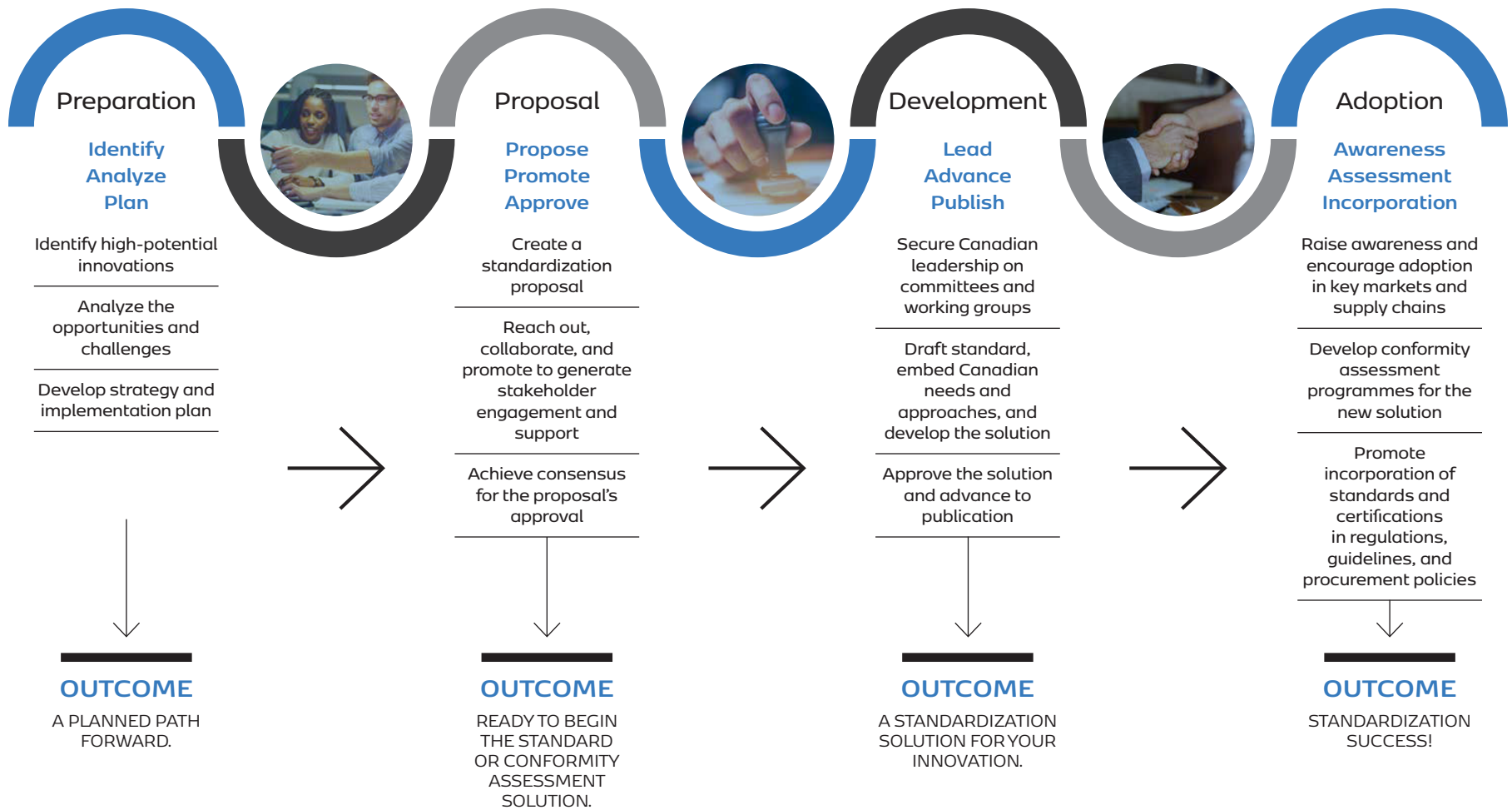
A top-down view of a meeting table. Several hands are visible, some resting on notebooks and others holding pens. A grey mug is on the table. There are architectural drawings and papers spread out. The scene is brightly lit, suggesting an indoor office or meeting room.

SCC's Innovation Initiative

In 2017, we launched our Innovation Initiative to work directly with Canadian innovators to help them leverage the standardization system for the maximum benefit of their company's growth. We do this in several ways.

Standardization Pathway

Every path has milestones





Government Entity

Accelerated
Growth Service

Canadian Federation
of Municipalities

Clean Growth Hub

Innovation, Science
and Economic
Development Canada

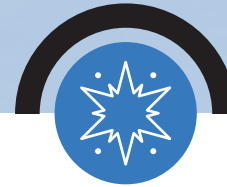
National Research
Council

Provincial and Territorial
governments

Regional Economic
Development Agencies

Strategic Innovation Fund

Sustainable Development
Technology Canada



Industry Entity

Canada Council of Innovators

Industry Associations
(e.g. Canadian Manufacturers
and Exporters)

Superclusters



Standardization Entity

SCC Advisory Committees
(i.e. SDOAC and PTAC)

SCC Membership Program

SCC Staff (e.g. executive
engagement, or staff
introduction at event)

We have begun to build awareness of standardization benefits within the innovation ecosystem, and to make links with ecosystem partners in expanding our reach to Canadian innovators. By building relationships with important programs and hubs such as the National Research Council of Canada Industrial Research Assistance Program (NRC IRAP), the Clean Growth Hub, Sustainable Development Technology Canada (SDTC), the Accelerated Growth Service (AGS), the Canadian Intellectual Property Office (CIPO), and Innovation Canada, for example, we have also built champions for standardization. Nearly half of the innovators engaged by our program have been referred to us by our partners.

Our sector specialists within the Innovation Initiative understand the markets and the technologies and consult with innovators to identify market barriers and develop strategies to overcome them. To date, SCC has spoken with more than 250 Canadian businesses to discuss their issues. In many cases, the solution may be to use existing standards or connect them with other partners in the standardization network—such as regulators, standardization development organizations, and certification bodies—to address their needs.

SCC is well-embedded within the standardization network, with strong partnerships to benefit our clients. We work directly with standards development organizations within Canada and around the world, and act as secretariat to the Standards Development Organization Advisory Committee (SDOAC). We are Canada's member body to the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC), and represent Canada's voice on standards-related matters at an international level. With government, we are the secretariat for the Provincial-Territorial Advisory Committee, the National Public Safety Advisory Committee, and Regulatory Authority Advisory Bodies and participate on many intergovernmental committees and working groups. These types of relationships provide insight and links that we are able to pass on to Canadian innovators and bring issues forward as needed. In fact, 87% of the companies involved in our Innovation Initiative have reported that working with SCC led to other strategic partnerships.

SCC drives Canadian innovators to take a leading role in standards development to influence the standards that will help protect their interests, better leverage their intellectual property and enable them to remain competitive in the global marketplace. We are fostering partnerships with governments, research institutions, businesses and key industries to identify where Canadians have unique expertise—so we can encourage the development of relevant standards and conformity assessment solutions to ensure we are global leaders in those areas. For example, through our Innovation Initiative we have already facilitated the participation of nearly 50 Canadian experts on international technical committees in key growth areas such as Artificial Intelligence, Data Management, and Cannabis.



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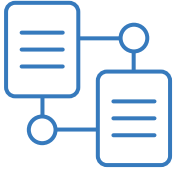
Furthermore, we deliver tailor-made standardization strategies that recognize the diverse and often unique needs of innovators in a rapidly changing and competitive marketplace. These strategies include:

 <p>developing a new national or international standard, or new edition</p>	 <p>amending, revising or adding a new part to an existing standard</p>
 <p>developing a technical specification or other normative document</p>	 <p>ensuring compliance with existing standards and conformity assessment programs and/or schemes</p>
 <p>developing or expanding a new conformity assessment program and/or scheme</p>	 <p>creating a consortium, committee or working group to advance standardization activity, including any of the above-mentioned proposals</p>

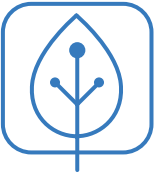
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Cannabis



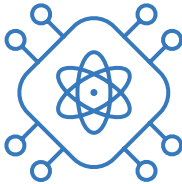
Data Management



Clean Technologies



Cybersecurity



Quantum Computer

Of the more than 250 Canadian innovators whom SCC has helped navigate the standardization system and provide information and linkages, we have directly supported more than 130 Canadian companies by providing invaluable customized standardization advice specific to their market barriers. These solutions are allowing innovators to get their products or services to market so they can compete nationally and globally—and even become world leaders in their field. These standardization strategies have helped them address some of the most critical business challenges facing them, such as the need to: protect health and safety; ensure compatibility; enhance consumer confidence; ensure market access; and, boost competitiveness.

SCC's Innovation Initiative case studies

The following case studies provide a sample of our Innovation Initiative's success—highlighting the pivotal role standards and conformity assessment are playing in fostering Canadian innovation. They demonstrate how participating in standardization—and working with SCC—is helping Canadian innovators overcome market challenges and paving their way to success. For more examples of how SCC is supporting Canadian innovation, see the Appendix at the end of this report.

PROTECT HEALTH AND SAFETY

ENSURE COMPATIBILITY

ENHANCE CONSUMER CONFIDENCE

ENSURE MARKET ACCESS

BOOST COMPETITIVENESS

HEALTH AND SAFETY

Spartan Bioscience: Fast, efficient onsite medical testing made possible

Spartan Bioscience manufactures DNA testing kits. The company developed an innovative way to conduct polymerase chain reaction (PCR) DNA testing on site within a small, portable kit for a competitive price.

This system is used in a wide variety of industries, including precision medicine and environmental testing. For instance, the company has successfully applied this technology to on-site water-quality testing for Legionella and is adapting it to test for COVID-19. In the past, the test for Legionella would have entailed sending samples for in-lab testing, a process that usually lasted approximately 10 days.

The biggest challenge Spartan faced was that its technology was so innovative it was not recognized in existing standards. The company turned to SCC to help develop a standard for on-site, on-demand testing. To do this, SCC helped Spartan gain membership to two main international standards bodies: ASHRAE and ISO. Conforming to international consensus standards has enabled Spartan to not only demonstrate the quality and reliability of its products, but also compete in the global marketplace.

COMPATIBILITY

The World Council on City Data: Comparable, consistent and independently verified city data to improve quality of life

The World Council on City Data (WCCD) is a not-for-profit organization and the global leader in standardized city data. WCCD offers a unique database that hosts the highest calibre of globally comparable and independently verified city data inputted by a network of 100 cities in 39 countries.

With SCC's assistance, the Council implemented the first international standard on city data, ISO 37120 and have participated on the development of two additional standards for the suite. This series defines and establishes definitions and methodologies for a set of indicators to steer and measure the performance of city services and quality of life.

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

Participating in standardization has helped to solidify WCCD's global reputation as the "go-to" organization in enabling cities to embrace standardized city data to build a smarter, more resilient and sustainable future for cities in Canada and around the world.

CONSUMER CONFIDENCE

WindTrans: An energy-efficient pump to respond to natural disasters

WindTrans has created a revolutionary high-volume, low-speed (HVLS) pump to efficiently harness kinetic energy to move fluids in order to respond safely and rapidly to human-made and natural disasters. The Zelda pump is ideal for situations when there is no power or grid assistance, such as in remote areas or during power outages. This versatile, energy-efficient, portable pump can be operated by hand, kinetic power or motor, and can extract 90 percent of oil from spills, douse remote fires, and assist in flood control. Not only that, but it can also be used as a turbine to produce electricity when connected to a generator.

But WindTrans faced certification challenges since no existing standard applied to its innovative technology. SCC provided WindTrans with the help it needed to get an existing standard amended to address its innovative product, enabling WindTrans to get Zelda certified. This provided customers with an assurance that the product is safe and effective, allowing WindTrans to finally enter the market.

MARKET ACCESS

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 American 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 it with 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.

COMPETITIVE ADVANTAGE

CarbonCure: Capturing CO₂ for “greener” concrete worldwide

CarbonCure is an innovative 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.

In order 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 and 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 also 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 be valuable because it will support CarbonCure's entry and expansion into European markets.

New Opportunities: Leveraging standards to prepare for the future

We are currently focusing on several emerging areas where a great deal of innovation—and consequently, standardization—is happening. We have launched several initiatives to identify ways standardization can give Canadian innovators a leg-up in these sectors, and ensure Canada plays a leading role in the years to come.



Supporting Canada's Innovation Superclusters Initiative

As part of its Innovation and Skills Plan, the Government of Canada is spending \$950 million over five years to support business-led superclusters that have the greatest potential to build world-leading, collaborative, sector-based innovation ecosystems. Five superclusters have been chosen, representing industries across the country:





These world-leading superclusters are translating Canada's technology strengths into commercial opportunities. SCC is helping these superclusters and their members to strategically develop and deploy national and international standards and benefit from conformity assessment. We are ensuring that companies in the superclusters know from the beginning what standardization can do for them and what support SCC can provide to help them shape marketplace rules to their advantage.

We have engaged with each of the superclusters from their onset and have worked collaboratively to develop standardization strategies specific to each to accelerate commercialization and remove barriers to the adoption of new Canadian technologies. Our strategies outline four categories of activities, including (1) education and awareness; (2) participation and leadership; (3) roadmapping and guidance and, (4) standards setting.

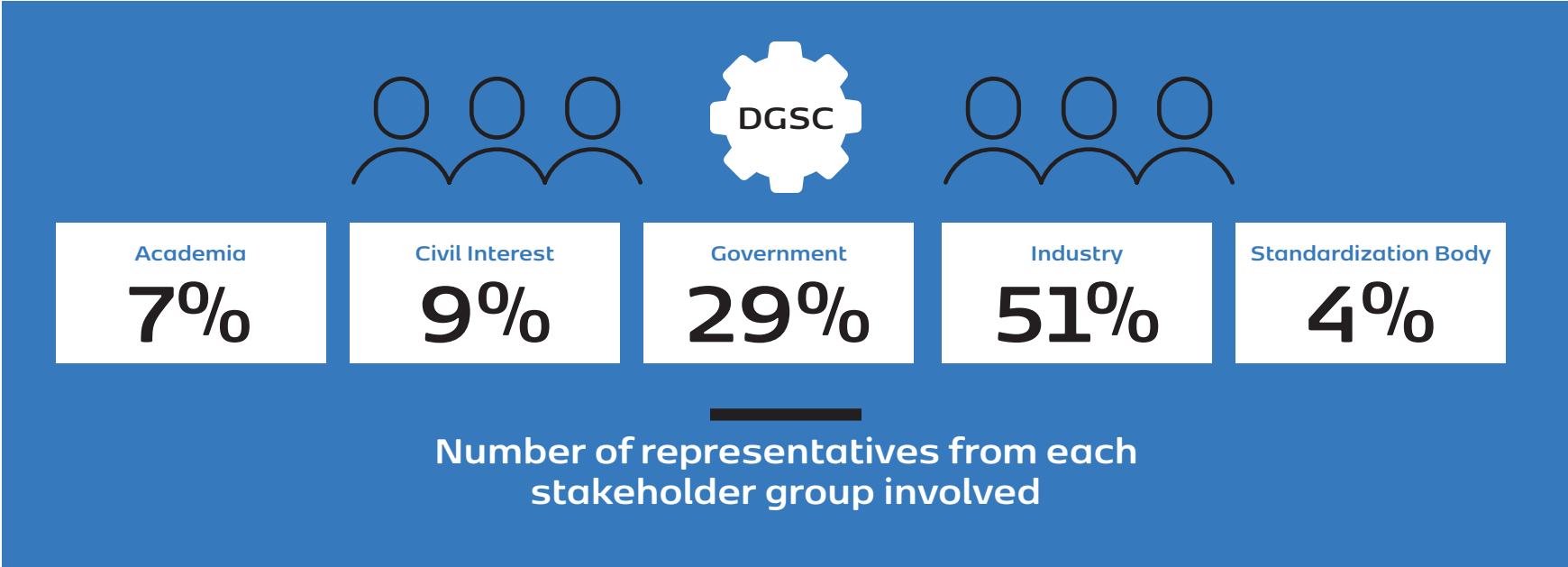
Now in implementation, we have worked directly with the superclusters and individual members to deliver on these activities. Examples include development of standardization criteria for project selection, development, presentation and distribution of educational information on standardization, participation in collaboration events, and support to members on project proposals regarding standardization opportunities, including one focused on facilitating agricultural blockchain use with links to the Protein Industries Canada (PIC) supercluster. We have also engaged with the superclusters, such as Canada's Digital Technologies Supercluster (CDTS), on standardization initiatives for key areas like data governance.

As well, SCC has established direct relationships with Government of Canada program areas with direct links to the five superclusters and is participating in related partner-led initiatives, such as the Canadian Forum for Maritime Autonomous Surface Ships and its working groups, which have links to both Ocean Supercluster Canada (OSC) and Scale AI. In supporting Canada's COVID-19 response, SCC is also working with the Next Generation Manufacturing (NGEN) supercluster and ecosystem partners to develop a national safe return to workplace guidance document for industry to aid recovery.

Data Governance Standardization Collaborative

In today’s digital world, we are producing massive amounts of data. As technologies that collect, retain, share and bundle these data gain more traction, governments and businesses are increasingly competing to gain access to the data. This is creating a critical need to develop and adopt standards to address how we structure, secure and govern data. SCC is playing a leading role in making this happen by directly supporting [Innovation, Science and Economic Development Canada’s Digital Charter](#).⁶ The Charter includes 10 principles to ensure Canadian innovators are leading the way in harnessing the power of digital and data transformation.

In May 2019, SCC established the Canadian Data Governance Standardization Collaborative (DGSC), a cross-sector coordinating body to accelerate the development of data governance standards and specifications. Overseen by a 32-member steering committee, the DGSC currently consists of over 200 members representing academia, civil society, government, industry, and standards development organizations. Through its four working groups, the DGSC is identifying the standards, specifications and conformity assessment solutions that will meet stakeholder needs and support the growth of Canada’s data governance capabilities.



6. Innovation, Science and Economic Development Canada’s Digital Charter, https://www.ic.gc.ca/eic/site/062.nsf/eng/h_00108.html

As part of the DGSC, SCC is building a comprehensive roadmap to be published in late 2020 of needed data governance standardization solutions that will enable industry and citizens to benefit from the exploding supply of data—as well as manage security and privacy risks. This roadmap will:

- **identify existing standardization solutions as well as those in development,**
- **assess gaps and make recommendations to fill them,**
- **establish priorities for action, and**
- **suggest organizations to lead the work.**

Not only will this protect data in the future—it will 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. The DGSC's work will set the stage for future standards development in other emerging areas, such as AI and big data.

Artificial Intelligence: Driving opportunities for growth through standardization

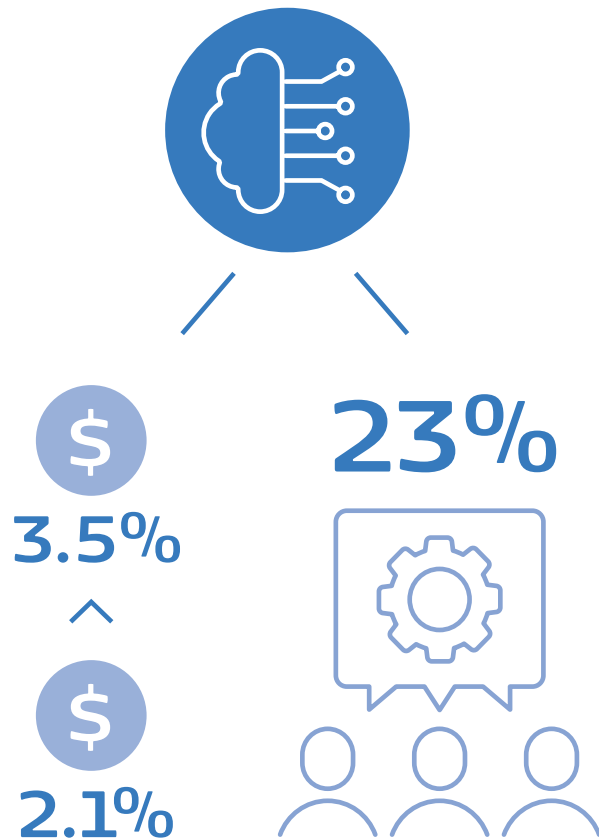
Like ground-breaking technologies before it, AI is changing the way we do business and influencing many other facets of our everyday lives. Forward-looking countries such as Canada recognize the potential AI offers and have developed strategies to foster AI through investment, education and research and development. These countries understand that if they don't get in on the ground floor, they risk missing out on the benefits this technology will offer in the years ahead.

Canada is already a global leader in AI and machine learning and has some of the top-ranked educational institutions and market-leading technology companies working in the field. To maintain its position, the Government of Canada released a national AI strategy in 2017. And with good reason: industry forecasts estimate that by 2035, AI will increase Canada's annual gross value-added growth rate from 2.1% to 3.5% and boost labour productivity by 23%.

As a relatively new technology, AI regulations are still being developed. This has created a critical need to develop and adopt standards that will provide ethical and operational guidance on AI use and security. It has also created an opportunity for countries like Canada to cement their positions by spearheading the development of AI standards.

SCC is working hard to respond to the growing demand for foundational standards and performance assessment specifications to manage the societal impacts of AI and integrate international best practices in AI. As part of the Innovation Initiative, we have been able to create a stakeholder network to launch the Canadian Mirror Committee for ISO/IEC JTC 1/SC 42 Artificial Intelligence. This committee has grown to over 40 members. Canada has the convenorship of an international working group for Sub-Committee 42 and we are identifying strategic opportunities in the validation of machine learning models, AI lifecycle definitions, data quality, and AI trustworthiness.

AI will increase Canada's annual gross value-added growth rate from 2.1% to 3.5% and boost labour productivity by 23%.



EU General Data Protection Regulation: Helping SMEs comply with international data protection requirements

In today's interconnected world, protecting our personal information from corruption, compromise or loss is essential. The EU's newly implemented General Data Protection Regulation (GDPR) is a big step toward safeguarding data across Europe. This new regulation fundamentally changes how data are handled in every sector, from banking to health care.

The goal of the EU's GDPR is simple: to harmonize data protection laws across Europe to ensure the privacy of all EU citizens' information. It came into effect on May 25, 2018 and applies to data controllers and processors based in Europe as well as to companies offering goods or services to people living within the EU. This includes Canadian companies working in the EU, or those that "offer goods or services" to or "monitor the behaviour" of individuals there. Since the GDPR can significantly increase the risk for Canadian organizations doing business in Europe, there is a need to raise awareness in Canada about this critical topic and provide guidance to involved organizations, including small- and medium-sized enterprises (SMEs).

Under its Innovation Initiative, SCC established the *Canadian Advisory Committee on GDPR* (CAC-GDPR) to help Canadian organizations better understand this regulation and meet their obligations. The committee has served as a national forum to develop and relay consensus positions to influence the development of national, regional and international standards and conformity assessment schemes related to GDPR as well as data protection and privacy in general. The CAC-GDPR has identified compliance challenges that Canadian organizations may face and proposes helpful solutions so they can compete in European markets. The CAC-GDPR work has received over 1500 unique pageviews on the SCC website and the group is now in the process of producing a guidance document to help Canadian organizations more easily identify standardization solutions to support their compliance to GDPR principles and specifications.

Cannabis: Capitalizing on an emerging industry through standardization

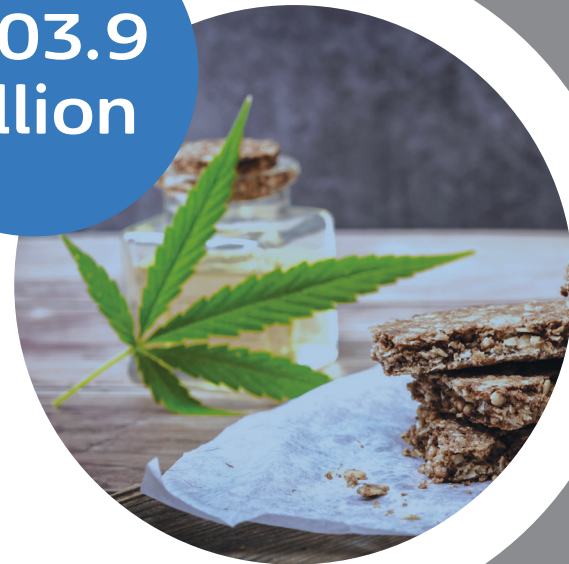
Canadians consistently rank among the most active users of cannabis in the world. While its use is not new, the legalization of cannabis is—and that is opening up tremendous opportunities. This sector has significant long-term economic potential for both domestic and international markets given that by 2024, the global cannabis industry is set to be worth USD \$103.9 billion.⁷

Concerns about cannabis safety and quality control will also undoubtedly open the door to important standardization and accreditation opportunities—and Canada needs to be ready to capitalize on these. As the first OECD country to legalize cannabis, Canada is in a unique position to get ahead of the game by leading the development of globally recognized industry standards. This would allow Canada not only to protect consumers at home and around the world, but to promote its own economic interests.

Last year alone, SCC helped innovators to advance 13 globally recognized cannabis standards at ASTM. These efforts are enabling Canadian innovators to participate in this emerging industry, so that Canada can become a leader in setting globally recognized standards in cannabis and related products and services.

By 2024, the global cannabis industry is set to be worth

\$103.9 billion



7. *Global Cannabis Report: 2019 Industry Outlook*, New Frontier Data, 2019, p.36



Looking Ahead: The next steps in driving innovation

SCC's Innovation Initiative has achieved a lot in a short period of time. Through this initiative we are directly helping Canadian innovators to succeed in today's competitive global marketplace. In fact, nearly 60% of the companies that we have worked with so far have reported an increase in either exports, jobs, or revenue.

Since the launch of the Innovation Initiative, we have refined the program to broaden our approach so that Canada—and Canadian innovators—can capitalize on opportunities in a rapidly-changing world. Rather than merely focusing on delivering standardization solutions to individual creators or companies, we are expanding our efforts to identify how standardization can multiply its impact in and across entire sectors.

This effort was amplified with the sudden strike of COVID-19 across the globe. SCC responded to Canadians' needs in union with Canada's Plan to Mobilize Industry to Fight COVID-19 through the Innovation Program to support innovative Canadian companies in developing technologies, solutions, and products that can address a variety of COVID-19 issues. We worked swiftly with our standardization, government, and industry stakeholders to develop an online resource of standards and conformity assessment solutions to help Canadian industry respond to COVID-19. The list includes standardization solutions for personal protective equipment, medical devices, crisis management, and business continuity to help industry retool and adapt to the pandemic and respond to government and healthcare needs.

SCC responded to Canadians' needs to Fight COVID-19 through the Innovation Program to support innovative Canadian companies in developing technologies, solutions, and products that can address a variety of COVID-19 issues.



SCC has partnered with our accredited SDOs to address areas of concern illuminated by COVID-19. With HSO and CSA we will work to provide a holistic solution for long-term care homes by using updated and complementary standards and assessments, including the development of two National Standards of Canada. We are also supporting CSA in developing a National Standard of Canada for Medical Grade Personal Protective Equipment (PPE). These will incorporate re-use, enhanced design and performance requirements to ensure proper user protection and support manufacturer certification.

We have been working with Canada's Superclusters to develop standardization strategies for these new solutions; provide Canadians guidance on safe workplace environments; and, help reboot Canadian supply chains, manufacturing capabilities, and the economy. NGEN and SCC have collaborated to ensure wide distribution of necessary information to industry, including COVID-19 standardization online resources for personal protective equipment (PPE) and medical device manufacturing; industry re-tooling certification webinars; Made in Canada PPE supply chains discussions; and, Safe Return to Workplace workshop and guidance. Bringing together CDTS with an industry partner, SCC is advancing a standardization strategy for an ISO standard related to data exchange for collaborative genomic research and clinical work intended to enable medical response, such as for COVID-19, in the future.

Additionally, SCC leveraged its Data Governance Standardization Collaborative to develop use cases on how standards can address current and future healthcare needs due to COVID-19, such as improving tracing and surveillance models, identifying early outbreak signs, and providing decision makers timely and reliable information (jointly with Statistics Canada and the Public Health Agency of Canada).

To foster a thriving innovation ecosystem, we will continue to recruit Canadian experts from all sectors—industry, government, academia, and civil society—to participate in standardization activities. We are also attracting more

diverse minds to be part of Canada's standardization network, including women, young professionals, and person's with disability, so that they have a voice in developing the standards that shape our world. For example, we are working hard to have balanced representation on our various committees and working groups. 41% of DGSC members are female and we plan to increase this number through more outreach. We have also formalized the incorporation of broader inclusion within our program by considering both UN Sustainable Development Goals⁸ and Gender-Based Analysis Plus⁹ criteria in project evaluations to better assess projects' social, economic and environmental impacts.

We will also continue to reach out to emerging sectors to build awareness of the need to consider standardization at the front end of the innovation process—right from an idea's inception. We want to explore new technologies and identify where standardization can generate the greatest value to Canada through innovation, commercialization, and leadership opportunities. To this end, we will continue to work closely with key ecosystem players, such as the superclusters and their members, to help them realize economic and commercial success through participation in standardization activities. From leveraging standardization for agricultural blockchain technology to providing guidance to companies as they make the shift to advanced manufacturing, we will be there to support them.

Although we cannot predict what new technologies or ideas lay around the corner, we can ensure that we have the structures, people and systems in place to enable Canada, and Canadian innovators, to take advantage of the opportunities they will offer. That is what SCC's Innovation Initiative is all about.

As we look to the future, we remain committed to finding ways for Canadian innovators to take the lead in the development of standards, so that we can ensure Canadian values and voices contribute to the betterment of our world today, and in the years to come.

8 United Nations Sustainable Development Goals, <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

9 Gender-based Analysis Plus, Government of Canada, <https://cfc-swc.gc.ca/gba-acis/index-en.html>

Appendix A

Additional Innovation Initiative case studies

The following case studies demonstrate how SCC's Innovation Initiative is building a stronger innovation ecosystem and helping Canadian companies succeed by providing standardization solution that meet their need to:

PROTECT HEALTH AND SAFETY

ENSURE COMPATIBILITY

ENHANCE CONSUMER CONFIDENCE

ENSURE MARKET ACCESS

BOOST COMPETITIVENESS

Whether Canadian innovators face one challenge, or several, these case studies provide the proof that standardization paves the way to success and growth.

COMPETITIVE ADVANTAGE

AML Oceanographic: Ensuring accuracy for marine sensors

AML Oceanographic specializes in designing and manufacturing instrumentation and deployment systems for marine sensing, environmental monitoring and other subsea applications. Marine sensors are used in 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 marine sensors collect, they must provide accurate, reliable and consistent data. However, before AML Oceanographic began its work, no international standard existed to ensure measurement accuracy in marine sensors.

SCC's strategic advice and expertise helped AML lead the development of an international standard for marine sensors through ISO. The standard sets out universal device specifications to ensure consistent results and a standardized approach for performance tests of these devices and determine a consistent method to report on those tests. This means customers who purchase marine sensors can now compare technologies. It also means AML Oceanographic will be able to demonstrate its product's performance capabilities, gain access to new customers and increase its exports.

COMPATIBILITY

TESCO Automation: Improving efficiency and effectiveness in the utility sector

Power stations operate by using various systems and software applications, including Human Machine Interface (HMI) software applications. Unfortunately, there is no consistency in the way this type of information is displayed. This has resulted in a lack of interoperability, which in turn results in inefficiencies and costly delays for the utilities sector.

TESCO Automation, which delivers consulting, design, configuration and testing support services and training to the global power system sector, recognized a need to standardize how operators work with HMIs that control power stations. As the sponsor of Canada's National Committee to the International Electrotechnical Commission (IEC), SCC was instrumental in facilitating TESCO's participation in the IEC committee responsible for developing an international standard to fill this industry gap. SCC provided the support and advice that TESCO Automation needed to be the project lead for the IEC 61850-based HMI new work item proposal.

Participating in international standards development has provided TESCO with additional insight and exposure as well as access to new customers, resulting in an increase in its global sales.

HEALTH AND SAFETY

NRC: Standardizing methods for nanoscale measurements for electron tomography

Nanotechnology companies need to be able to certify their products at nearly atomic resolution (around ~1 nm). They also need fast tools for performing diagnostic tests and troubleshooting production processes. 3D (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 standard exists to ensure the images and measurements produced by electron tomography in a TEM are reproducible and accurate.

SCC has been working with researchers at the NRC's Nanotechnology Research Centre to develop a proposal for a technical specification to provide a documented and reproducible way to quantitatively measure the shape and volume of nanoparticles in three dimensions. From companies that manufacture products with nano components to protection agencies that want to evaluate the safety of nano-enabled products for our health and the environment, this standard will benefit a broad range of stakeholders.

MARKET ACCESS

HARVEST Systems: Fuelling the food service industry through waste energy

HARVEST Systems Inc. is a start-up that emerged from the Thermal Management Research Laboratory at McMaster University and focuses on integrating waste heat recovery systems in the restaurant industry. Its Pizza Oven Waste Energy Recovery (POWER) system uses a thermoelectric generator to capture heat and convert it to electricity. The stored energy can be used to power lights or heat hot water and save the business money by improving energy use and reducing greenhouse gas emissions.

However, the wide-scale adoption of the POWER system (and other waste heat recovery systems) was hampered by varying safety standards and regulations since the practice of waste heat recovery is not uniformly defined across Canada (or North America).

With SCC's help, HARVEST is on track to integrate the necessary provisions within the applicable safety standard(s) to allow for a standardized approach for installing and operating waste heat recovery systems in the restaurant industry. This standardization solution will allow HARVEST to develop and market its POWER system across North America more quickly and effectively.

MARKET ACCESS

Terragon Environmental Technologies: Generating energy from waste

Terragon Environmental Technologies is a clean technology company that has developed a Micro Auto Gasification System (MAGS) which generates energy fuelled by waste—such as plastics, paper, food, used oils and wood—that is converted into inert carbon products. The thermal energy it produces can be used to heat water, or in HVAC units.

Terragon has faced regulatory barriers to expanding the market for its innovative technology. Even though its system's emissions level is less than that of a boiler, regulators regarded MAGS as an incinerator because it burns waste. This made it subject to strict requirements, standards and testing applied to large-scale, environmentally degrading products.

Terragon needed to find a way to demonstrate to regulators that MAGS is a safe energy appliance. SCC identified the simplest, speediest way to clear this hurdle by facilitating the development of an Other Recognized Document, or ORD. Certification to this document allows the company to demonstrate its product's safety and relevance as a clean technology to obtain regulatory approval, enabling access to new markets.

COMPETITIVE ADVANTAGE

Questor Technology: Using clean tech to change how the world handles waste gas

Questor Technology Inc. is a clean technology company that provides high-efficiency waste gas combustion systems. Its patented technology can take any waste gas stream and ensure it is combusted at 99.99 percent efficiency, producing only CO₂ and water which can be used to generate power or treat water.

As energy producers, regulators and investors around the world look to reduce greenhouse gas emissions, there is increased demand for combustion systems such as Questor's. However, there is no standard for the design and performance of incinerators, making it difficult for Questor to compete with companies offering technology alternatives.

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 ISO 14034:2016 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 is the first environmental technology to be verified by an ANSI National Accreditation Board (ANAB) accredited verifier to the ISO 14034:2016 Environmental Technology Verification (ETV) standard.

COMPETITIVE ADVANTAGE

KA Imaging: "Seeing" more through X-ray technology

KA Imaging designs and develops X-ray and micro-CT imaging products for the medical, non-destructive testing (NDT) and veterinary industries. Its newest product, the "Reveal," offers X-ray technology that allows users to differentiate between soft tissue and bone in patients to better understand diseases such as lung cancer, pneumonia and even coronaviruses or COVID-19.

KA Imaging has taken a proactive approach to standardization by integrating it into the product development process to increase visibility for its innovative technology and accelerate adoption. Standardization of the performance metrics offers a means to compare performance of dual-energy capable digital X-ray detectors to ensure development of safer, better quality products and allow health care providers and regulators a way to assess that quality.

SCC has helped the company navigate the complexities of the standard creation process—from providing advice on whether to create a brand-new standard (versus modifying an existing one) to building a strategy to generate international awareness and support for the proposal. With SCC's support, the company is currently leading a new work item proposal to create a new standard that will build on an existing series of standards that is more suited to this innovative product.

Having an IEC standard that provides metrics to help differentiate the product will help the Reveal gain acceptance in the market by demonstrating its quality—particularly helpful for a relatively small and young company.

MARKET ACCESS

FPInnovations: Helping Canadian lignin producers gain a competitive advantage

FPInnovations is a not-for-profit organization that specializes in scientific solutions for the forestry sector. One of its innovations is a proprietary process that recovers lignin—a highly versatile and renewable bio-product—from waste products in the pulp industry. Lignin can be used to replace fossil-based raw materials in products such as carbon fibre, adhesives, thermoplastics, resins, composites and various chemicals.

Efforts to commercialize lignin have exposed a lack of reliable, market-accepted methods for characterizing their chemical composition, structure and properties. Such standards are an essential part of accelerating the development and commercialization of lignin-based products.

With SCC's support, FPInnovations 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. A newly established working group is currently developing two new international standards that will describe methods for determining the lignin content and carbohydrate composition of industrially produced lignin. The resulting standards will promote the commercialization of Canadian lignin and lignin production processes by opening new markets and facilitating trade.

CONSUMER CONFIDENCE

Delvinia: Making automated market research more secure

Delvinia offers a suite of technology platforms that organizations use to collect consumer data. This data enables them to make quicker, better, more cost-effective business decisions. With the increasing importance of faster decision-making and "big data," 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 needs to be able to demonstrate that it understands 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 that helps ensure the safety of consumer data by providing a set of standardized requirements for an information security management system. This certification helps Delvinia compete in the global marketplace by demonstrating to clients worldwide that it is following best practices in data security. It is also enabling them to meet procurement requirements easily when responding to requests for proposals globally—and in the process, positioning Canada as an innovator and global leader in the transformation of market research.

COMPETITIVE ADVANTAGE

extractX: Developing cutting-edge technology for mobile biomass extraction

extractX Inc. is a biotech company that specializes in the oil extraction and compound separation of biomass and has developed an automated mobile biomass extraction lab that is not only transportable, but self-contained and scalable.

In an industry where shutting down operations for a single day can equal hundreds of thousands of dollars in losses, being able to get products to market quickly is critical. extractX's mobile lab avoids shutdowns by providing cultivators and producers with a full range of manufacturing capabilities that are normally only found in large brick-and-mortar facilities.

With SCC's assistance, extractX is leading the way in developing the standards that will be used within this rapidly changing industry. By integrating standardization into the front end of the product development process, extractX has been able to build a self-contained turnkey unit that meets or exceeds standards. This has allowed the company to be one of the first to market and to quickly roll out a product that answers a big need within the industry.

MARKET ACCESS

Northern Cables: Bringing Canadian interlocking armoured cables to the world

Northern Cables Inc. manufactures low-voltage commercial and industrial power cables. With three manufacturing plants, it produces four million metres of armoured cable monthly for markets in Canada and the United States. However, it faced barriers in selling products in jurisdictions that have IEC standards, since these international standards do not recognize interlocking armoured cables.

Northern Cables is working with SCC to develop an IEC standard to enable its CSA Teck90 cable (a low-voltage, armoured power cable tailored to light commercial or industrial applications) to be accepted internationally. SCC guided the company through the international standards development process, helping it to create a roadmap based on the IEC standards development framework. Finding a way to have its products accepted by the international community will enhance Northern Cables' ability to grow and compete in the global marketplace.

COMPATIBILITY

MappedIn: Making the indoors more “discoverable”

MappedIn has a mission to make the indoors “discoverable”—whether that means a mall, hospital, retail store, campus, office space, warehouse or airport. Its indoor geographical information system enables property owners and managers to maintain accurate maps of indoor spaces by delivering a dataset of what’s indoors.

MappedIn is building the leading platform to allow businesses to enable their customers to search and discover the indoors. However, there is no consistency and interoperability between the mapping tools or digital maps offered by service providers.

SCC is facilitating MappedIn’s participation in an industry consortium of major mall facility owners and digital device providers from around the world. The group is collaborating to develop solutions to address common challenges and create a mutually beneficial standard for the indoor mapping industry. This standard would ensure the production of consistent and accurate indoor maps, allowing consumers to navigate any indoor space more easily.

CONSUMER CONFIDENCE

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

ISARA Corporation is a cybersecurity company that creates quantum-safe cryptography solutions to embed into commercial products to secure and protect data. To achieve this, ISARA uses algorithms that are resistant to hacker attacks using both today’s traditional computers and quantum computers. Currently encrypted data stored for future use will eventually be vulnerable to decryption by a quantum computer. Without appropriate quantum-safe cryptographic schemes, it is impossible to guarantee the integrity and authenticity of transmitted information, as data tampering will go undetected.

SCC provided strategic advice to help ISARA develop new international standards for quantum-safe solutions that address and fill current gaps. ISARA is leading the development of quantum-safe cryptography standards at the European Telecommunications Standards Institute (ETSI). ISARA will also facilitate the adoption of quantum-safe standards developed at ETSI by other standards organizations, such as the United Nations International Telecommunication Union (ITU-T).

CONSUMER CONFIDENCE

Vector Institute: Propelling Canada to the head of the pack in artificial intelligence

The Vector Institute is an independent, not-for-profit corporation that works with universities, industry, start-ups, incubators and accelerators to advance research that drives the application, adoption and commercialization of artificial intelligence (AI) and machine learning. Organizations face a lack of cohesion and uniformity when discussing machine learning, as there is no standardized approach to use when describing machine capability. As more industries make use of AI and machine learning, a standard is critical to ensure public confidence and safety.

SCC has been working with experts at the Vector Institute to help them spearhead the development of an ISO standard that would standardize certain aspects of machine learning. The standard will allow companies, academic institutions, individuals and governments to ensure that the performance data provided in academic papers and industrial materials have met certain evaluation criteria. Participating in the development of an international standard will also help ensure our nation's leadership in this field in the years to come.

COMPETITIVE ADVANTAGE

Ecostrat: Helping Canada's biomass sector secure the financing it needs

Ecostrat Inc. both aggregates and supplies various types of biomass for a range of markets. It also assesses, validates and optimizes bio-based feedstock supply chains for project developers, power utilities, financial institutions, investment funds, engineering companies, US national labs, governments and Indigenous communities.

In the past, it was difficult for bio-projects to obtain financing because there was no standardized method for evaluating biomass feedstock risk—a major barrier to industry growth. Ecostrat developed a *Biomass Supply Chain Risk Standard* to provide a standardized risk assessment protocol to enable capital markets to quantify bio-feedstock risk more accurately and reduce the level of uncertainty that is a significant driver of low bio-project credit ratings and high capital costs.

SCC worked with Ecostrat to support accreditation of the *Biomass Supply Chain Risk Standards* as a National Standard of Canada. This standardization solution will help address the limited investor capacity to assess biomass supply chain risk, particularly in fast-paced capital finance markets. By creating a validated method and standardized solution to price feedstock risk and accelerate bio-project financing, Ecostrat has also been able to solidify its position as an innovative leader in the Canadian bio-economy.

HEALTH AND SAFETY

The Canadian Network for Innovative Shipbuilding, Marine Research and Training: 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 of Newfoundland. CISMaRT is investigating 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, although similar standards exist for land—and to a limited extent, air—environments. Standards are critical for training and use in the marine industry, especially to ensure safety. With SCC's assistance, CISMaRT is working 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 innovative technologies for marine vessels using hydrogen in Canadian and international waters. These technologies can also be exported and will attract further collaborations with international partners.

Appendix B

Innovation program deliverables

Projects Initiated

#	Innovation Proponent	Standardization Solution	Objective	Sector
1	AML Oceanographic	New International Standard	Competitive Advantage	Clean Technology
2	NRC	New International Standard	Health and Safety	Advanced Manufacturing
3	Tesco	New International Standard	Compatibility	Digital Technologies
4	ISARA Corporation	New International Technical Specification	Consumer Confidence	Digital Technologies
5	ISARA Corporation	New International Technical Specification	Consumer Confidence	Digital Technologies
6	Carbon Cure	National Amendment, Revision or New Part to an Existing Standard	Competitive Advantage	Clean Technology
7	MappedIn	New International Standard	Compatibility	Digital Technology
8	Canadian Centre for Product Validation	Compliance to an Existing Standard or Conformity Assessment Scheme	Health and Safety	Advanced Manufacturing
9	WindTrans	Compliance to an Existing Standard or Conformity Assessment Scheme	Consumer Confidence	Clean Technology
10	Canadian Advisory Committee on GDPR	Consortia, Committee or Working Group to Advance Standardization Activity	Compatibility	Digital Technology
11	National Cannabis Standardization Advisory Committee	Consortia, Committee or Working Group to Advance Standardization Activity	Health and Safety	Cannabis
12	Terragon	New National Other Recognized Document	Market Access	Clean Technology
13	Delvinia	Compliance to an Existing Standard or Conformity Assessment Scheme	Consumer Confidence	Digital Technologies
14	FP Innovations	New International Expansion of Technical Work Program Scope	Market Access	Clean Technology

15	FP Innovations	New International Standard	Market Access	Clean Technology
16	FP Innovations	New International Standard	Market Access	Clean Technology
17	CIO Strategy Council	Consortia, Committee or Working Group to Advance Standardization Activity	Compatibility	Digital Technologies
18	Spartan Bioscience	New International Standard	Health and Safety	Health/Bio-sciences
19	Canadian Delegation to ISO/TC 279 - ISO 56002	New International Standard	Competitive Advantage	General Innovation
20	Questor	Compliance to an Existing Standard or Conformity Assessment Scheme	Competitive Advantage	Clean Technology
21	KA Imaging	International Amendment, Revision or New Part to an Existing Standard	Competitive Advantage	Health/Bio-sciences
22	Harvest	National Amendment, Revision or New Part to an Existing Standard	Market Access	Advanced Manufacturing
23	Canadian Network for Hydrogen Fuel Ships	Consortia, Committee or Working Group to Advance Standardization Activity	Health and Safety	Clean Technology
24	Northern Cables	New National Standard	Market Access	Advanced Manufacturing
25	World Council on City Data	Development of a Conformity Assessment Program and/or Scheme	Compatibility	Digital Technologies
26	Data Governance	Standardization Collaborative	Compatibility	Digital Technologies
27	Canadian Hemp Trade Alliance	New International Standard	Health and Safety	Cannabis
28	Canadian Hemp Trade Alliance	New International Standard	Health and Safety	Cannabis
29	Canadian Hemp Trade Alliance	New International Standard	Health and Safety	Cannabis
30	Canadian Hemp Trade Alliance	New International Standard	Health and Safety	Cannabis
31	Canadian Hemp Trade Alliance	New International Standard	Health and Safety	Cannabis
32	iGen	New National Other Recognized Document	Market Access	Consumer Products
33	Vector / Winterlight	New International Standard	Consumer Confidence	Artificial Intelligence
34	ExtractX	New International Standard	Health and Safety	Cannabis
35	EcoStrat	New International Standard	Competitive Advantage	Clean Technology
36	Aurora	New National Standard	Health and Safety	Cannabis

Projects Planned

#	Innovation Proponent	Standardization Solution	Objective	Sector
37	COVID-19 Safe Return to Workplace	National Workshop Agreement	Health and Safety	Advanced Manufacturing
38	Spartan Bioscience	International Amendment, Revision or New Part to an Existing Standard	Health and Safety	Health/Bio-sciences
39	Artificial Intelligence Management System	New International Standard	Compatibility	Artificial Intelligence
40	CTA	New National Standard	Compatibility	Digital Technologies
41	BNQ Hydrogen Code	New National Standard	Health and Safety	Clean Technology
42	BNQ Hydrogen	New National Standard	Health and Safety	Clean Technology
43	CSA Combined Heat	New National Standard	Health and Safety	Clean Technology
44	CSA eDNA	New National Standard	Health and Safety	Health/Bio-sciences
45	CSA Flaring	New National Standard	Health and Safety	Clean Technology
46	CSA Lignin	New National Standard	Health and Safety	Clean Technology
47	CSA Modular Buildings	New National Standard	Health and Safety	Public Safety/ Construction
48	CSA Vent Gas	New National Standard	Health and Safety	Advanced Manufacturing
49	HSO Cannabis	New National Standard	Health and Safety	Cannabis
50	ExtractX	Compliance to an Existing Standard or Conformity Assessment Scheme	Health and Safety	Cannabis
51	Global Alliance for Genomics and Health	New International Standard	Health and Safety	Health/Bio-sciences
52	Monachus	International Technical Specification	Health and Safety	Cannabis
53	Moov AI	International Technical Specification	Consumer Confidence	Artificial Intelligence
54	Northern Cables	New International Standard	Market Access	Advanced Manufacturing



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