



Clean Technology Innovation Initiative

22 September 2021 Online Workshop Report

VerifiGlobal Newsletter Special Edition September 2021



1. Workshop Introduction

The Clean Technology Innovative Initiative Online Workshop was moderated by Starlene Buchanan, Program Manager for Canadian Innovation, with the Standards Council of Canada.

Starlene welcomed Workshop participants, noting that the Clean Technology Innovation Initiative is a joint project between the Standards Council of Canada and VerifiGlobal. She explained that the Workshop was organized as an information session, with a very full agenda and three participant polls built into the program. It was therefore suggested that participant questions should be put into the Workshop "chat" for follow-up after the Workshop.

Starlene concluded her introductory remarks by thanking participants for joining the Workshop to learn about

- The ISO Technical Committee on the Environment (TC-207) and the ypes of environmental standards already available.
- How 'Community Sourced Guidance' and relationship mapping can be used to create tools that support environmental business decisions, whether as a regulator, technology developer, manufacturer, investor, or procurement officer, and
- How participants can have their voices heard in the creation of these tools.

The Standards Council of Canada (SCC) is a federal Crown corporation and part of the Innovation, Science and Economic Development portfolio.



VerifiGlobal helps clients communicate the benefits of innovative solutions and demonstrate effective performance of innovative solutions through independent performance benchmarking and verification. This helps advance viable, eco-efficient solutions that create value and reduce risk.



The ISO/TC 207 Technical Committee on Environment has been

a leader in the development of standards in the field of environmental management systems and tools in support of sustainable development around the world since 1993. Canada has held the leadership position for this Committee since its inception. SCC oversees Canada's national standardization network and facilitates the development and use of national and international standards and accreditation services to enhance Canada's competitiveness and wellbeing. Standards help to ensure better, safer and more efficient methods and products, and are an essential element of technology, innovation and trade.

VerifiGlobal conducts environmental technology performance verification through qualified technical organizations that are members of the VerifiGlobal Alliance, an international platform of qualified performance testing and verification organizations. Currently, there are 12 Alliance members in 7 different countries. These organizations have the personnel, equipment and facilities to conduct independent performance testing of technologies within their respective areas of expertise, as well as environmental technology verifications in accordance with the ISO 14034 ETV Standard.

TC 207 develops standards and tools in the field of environmental management, through a team of five subcommittees and various working groups shored up by international Member Bodies. These subcommittees focus on various areas of standards development that relate to environmental management systems, lifecycle assessment, greenhouse gas management, environmental labelling, environmental performance evaluations and environmental auditing. The TC currently has membership from 83 participating member bodies and 38 observing member bodies.

2. Clean Technology Innovation Initiative Objectives – John Neate, VerifiGlobal

UN SDGs

In 2018, VerifiGlobal conducted a review of the United Nations sustainable development goals (i.e., the UN SDGs), to better understand the effective translation of sustainable development commitments into tangible outcomes.

The review re-affirmed the importance of international trade as an engine for development and sustained economic growth, as well as the need for an equitable rules-based, multilateral trading system that uses standards to assess, evaluate, and verify the performance of technologies and products. VerifiGlobal and the Standards Council of Canada launched the Clean Technology Innovation Initiative to advance global sustainability.

Innovative technologies are essential for achieving sustainability goals. There is a need to strengthen capacity to assess the benefits and the risks of these technologies, to enable the selection and deployment of effective solutions with sustainable outcomes. The new initiative aims to improve understanding and mobilize knowledge directed at the development and deployment of innovative clean technologies and the effective use of standardization.

Public and private organizations are challenged when considering environmental issues and new international agreements in the context of their activities and their business operations.

Often, they are not fully aware of the benefits and pivotal role of standards in assessing environmental performance, and there's limited or no knowledge about the way products or firms are certified, or how innovative technologies are verified or certified. With growing demand for green technologies, businesses, products, and services need to be better understood and positioned effectively to support the achievement of sustainable development goals. Ensuring market relevance of these products, technologies and services requires mutual understanding and trust among stakeholders through effective engagement and the articulation of shared performance objectives, with the focus on evidencebased outcomes. The Clean Technology Innovation Part one aims to reach consensus on the principle Initiative has two parts process elements and relationships that enable the development and deployment of innovative environmentally sound solutions, AND the corresponding linkages to existing and proposed standards. These key relationships will be represented in the form of a generic relationship map. Part two involves the assessment and analysis of key issues and opportunities in selected sectors where the relationship map 'TOOL' could effectively be applied. Initial examples will be used to illustrate solution pathways, exemplifying how relationship mapping and performance benchmarking could be applied to untangle complex issues and add value. What is a relationship map? A relationship map, or diagram, is a visual tool that shows the relationships between individual items, presenting the logical links between the different elements. It is important to bear in mind that relations in complex situations don't necessarily fit into familiar structures. such as hierarchies. A relationship map is used to understand and organize any type of logical relationship between ideas, factors, or issues. Links can be in any direction and between any number of items. A relationship map can also be used to identify communication patterns, indirect influence patterns, and the frequency and importance of interactions.

This is a simple example of how TC 207 processes and relationships could be mapped.



Clean Technology Innovation Initiative Workplan





The Clean Technology Innovation Initiative was initiated in June of this year. The CTII introductory workshop was the first major project milestone. As we move forward, we are hoping to capture your imagination and gain your commitment to collaborate and participate with us in the development of a clean technology innovation ecosystem relationship map that can serve as a tool across a wide range of sectors.

Innovative clean technologies are essential for achieving sustainability goals. We are proposing to establish a number of engagement and development teams to help build consensus on the principal process elements and relationships that enable the development and deployment of innovative environmental solutions.

This work will continue through 2022, aligning with other initiatives in defining solution pathways that add value and optimize the essential linkages to existing and proposed standards.

Anticipated outcomes

The anticipated outcomes from the Clean Technology Innovation Initiative are:

- Increased awareness and understanding regarding the role of standardization in supporting global sustainability.
- An interactive visual tool for the global innovation system to demonstrate how the crosscutting family of ISO TC 207 standards are relevant to global and national challenges and opportunities.
- A web based integrative relationship map to visualize how global sustainability objectives and international standards interact and relate to each other in a systematic way.
- Effective application of existing and proposed environmental standards in support of technology innovation and the realization of global sustainability objectives.

The Clean technology innovation relationship map will be publicly accessible on the VerifiGlobal website.

Community Sourced Guidance – Jesse Arndt, SCC

Jesse Arndt outlined how the Clean Technology Innovation Initiative aligns with the 'Community Sourced Guidance' strategy of the Standards Council of Canada.



https://www.scc.ca/en/about-scc/publications/general/national-community-sourced-guidance

Community Sourced Guidance is a standards ecosystem tool offered freely by SCC to the world to promote standards and consensus building. The architecture provided is in-line with standards development principals, and provides participants with assurance of the deliverable, and its expected lifecycle.

What it is: A Community-Sourced deliverable (CS) is developed as a result of the collection of information using online platforms and allows for the continuous renewal of content to ensure relevant, and current information for the lifecycle of the CS.

What it can do: This process aims to offer a publicly accessible online collaborative mechanism to capture current practice, state-of-the-art knowledge and stakeholder understanding on an emerging/existing area and is suitable for global collaboration.

Why it is used: Following the CS guidelines gives the process credibility by ensuring that basic principles of standards development (transparency, collaboration, and fairness) are applied. Additionally, using a structured process to bring interested stakeholders together should result in a deliverable that addresses the objectives.

3. ISO TC 207 and ISO 14000 Standards – Sheila Leggett, Chair ISO TC 207

Roots

ISO was created in 1947 to "promote the development of standardization and related activities...with a view to facilitating international exchange of goods and services and to develop cooperation in the spheres of intellectual scientific, technological and economic activity."

TC 207 was established in 1993 as an outcome of the Rio Earth Summit. The initial focus was to develop 14000 series to "level the playing field" for trade agreements and avoid protectionist barriers.

ISO TC 207 Today

The purpose of TC 207 today is to provide frameworks for organizing and applying environmental management best practices. There are six subcommittees responsible for over 50 published standards, with 83 Member Countries, 42 Observing Members, and 32 Liaison Groups. A driving principle is to produce standards, either alone or in collaboration with others, that support global sustainable development.

Types of Standards

TC 207 standards include 14001 and others that address environmental auditing, environmental labelling and performance evaluation, life cycle assessment and greenhouse gas measurement, adaptation, and mitigation.

- TC 207 standards are adopted by many countries as national standards particularly in the areas of environmental labelling and environmental technology verification.
- There are over 300,000 14001 certificates recorded in ~200 countries.
- The LCA standard is used as the basis for all LCA studies (with an estimated 1500 LCA publications/year).
- GHG management standards provide an internationally agreed upon framework for measuring GHG emissions, quantifying carbon footprint, verifying claims and accreditation.
- Framework for auditing environmental management systems included in a joint ISO guideline for auditing management systems.

UN SDGs and TC 207 standards - TC 207 standards support 16 of the 17 UN SDGs and many of the SDG's are supported across subcommittees.

Challenges - There remain many challenges, including:

- Standards proliferation
- Relevance in differing regulatory frameworks
- Time sensitivity + consensus
- Developing and developed countries
- Cost effective standards and processes especially for SMEs
- Quantification of TC 207 standards usage
- Feedback loop for improvement and emerging needs
- Coordination, collaboration, and communication.

Way Forward - TC 207 recently updated its Strategic Business Plan:

Vision – TC 207 delivers timely solutions for the management of the world's environmental challenges. TC 207 standards contribute to the achievement of the UN SDGs and to the ISO vision of making lives easier, safer, and better.

Mission – TC 207 provides environmental management standards which address environmental and climate impacts, including related social and economic aspects, in support of a sustainable future.

Goal 1 - TC 207 Standards Used Everywhere to Meet Global Needs:

- Compatible and complementary with other ISO standards
- Framework for more sector specific standards developed by other standards setting bodies
- Integrated within regulatory frameworks at all levels of government
- Supporting organizations to improve environmental outcomes.

Goal 2 - All Voices Heard:

• Focus is to increase and broaden the participation of government representatives within TC 207, including ENGOs, the UN, industry and academics.

ISO TC 207 - A Well Kept Secret

TC 207 is open for business and for input as to how its standards can better meet market needs. TC 207 standards offer organizations a solid framework to measure and improve environmental performance. ISO's brand and long-standing reputation is important for emerging sectors. There is no need to reinvent the wheel.

4. ISO 14034 and Clean Technology Innovation – Thomas Bruun, VerifiGlobal

ETV is a quality-assured process that provides independent confirmation of the performance of environmental technologies based on objective evidence:

- Supports informed decision-making;
- Enhances the effective demonstration, deployment and market acceptance of innovative technology-based solutions.

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3 key principles help ensure that verifications are performed and reported accurately in a manner useful to stakeholders:

- Flexibility in specifying relevant performance parameters and test methods
- Credibility in generating reliable performance data using robust, quality-assured test procedures
- Transparency in assessing the evidence and verification results in reports that are clear, complete, and objective.



Innovative environmental technologies provide solutions that address specific environmental challenges



ETV provides a credible, impartial account of technology performance which contributes to environmental objectives



The ISO 14034 ETV process is particularly effective in verifying the performance of technologies with innovative features or technical and/or environmental benefits are not fully reflected in existing product standards.

Innovative environmental technologies provide solutions that address specific environmental challenges such as:

- Pollution prevention, control and remediation
- Efficient use of resources, including their recovery and recycling
- Climate change resiliency, adaptation and mitigation
- Environmental monitoring and surveillance.

Environmental technology verification (ETV) provides a credible, impartial account of the performance of technologies which contribute to the attainment of environmental objectives through:

- Specific, quantifiable environmental benefits (e.g., technologies with more beneficial or less adverse environmental impacts); or
- Superior measurement of environmental impacts (e.g., environmental monitoring and surveillance technologies).

The ISO 14034 ETV process is particularly effective for verifying the performance of technologies with innovative features or technical and/or environmental benefits are not fully reflected in existing product standards.

The figure below is a snapshot of the key ingredients for a Clean Technology Innovation Ecosystem.



1. Value-based procurement and early adoption of clean technology solutions - Benchmarking and verification provide evidence of technology performance, thereby strengthening the procurement process and making it easier to build the case for adopting innovative solutions.

2. Evidence based regulations and policies to support technology innovation – This means the use of technology performance verification in addressing environmental regulatory requirements and approvals.

3. Transformative financing to accelerate technology deployment - Technology performance benchmarking and verification can be used to support decisions on the financing and market deployment of innovative, sustainable technology solutions.

4. Workforce training and capacity building – The idea here is to establish "living laboratory" networks to develop and demonstrate innovative technology solutions and build the essential workforce and capacity to successfully deploy these technologies.

5. Effective international collaboration – This means continued outreach, collaboration and integration of efforts to accelerate market acceptance and deployment of innovative technologies.

There are three important enablers for accelerating eco-innovation and investment in clean technology

Leadership and co-operation - To a large extent, institutional infrastructure is already in place to facilitate leadership and cooperation through various existing governmental platforms and mechanisms.

Effective engagement - For the most part, standards encompass specifications, regulations, and protocols that ensure things work properly, interactively, and responsibly. However, achieving global environmental sustainability goals, such as the United Nations Sustainable Development Goals (UN SDGs), requires placing greater emphasis on integrated approaches and innovative solutions, coupled with enhanced efforts to engage with key stakeholders and interested parties.

Benchmarking and Verification - Performance benchmarking and verification are decision support tools that can be applied within an integrated framework to encourage mutual understanding and build trust among stakeholders.



As we move forward with this important project, we must ensure that our collective efforts focus on the essential linkages and relationships that encompass:

- National Standards and Standards Development Organizations (SDOs), such as the Canadian Standards Association (CSA)
- The United Nations Sustainable Development Goals (SDGs)
- United Nations Framework Convention on Climate Change (UNFCCC), International Financial Reporting Standards (IFRS), and others
- Other International Organization for Standardization (ISO) Technical Committees
- Industry Associations and Innovation Clusters
- Government Departments and Agencies.

5. Environmental, Social, and Corporate Governance (ESG) – Chantal Guay, CEO, Standards Council of Canada

What is ESG?

The role of business in society is undergoing a paradigm shift. Around the world, businesses, their owners and their stakeholders are realizing the need for and benefits to be gained from socially responsible behaviour and its contribution to sustainable development. From giving back, reputation management, and regulatory compliance in the 1990s to the transformation that is underway today, leading companies are charting a new path to a sustainable future for themselves and society.



As stated in ISO 26000, "The perception and reality of an organization's performance on social responsibility can influence:

- its competitive advantage;

- its reputation;
- its ability to attract and retain workers or members, customers, clients or users;
- the maintenance of employees' morale, commitment and productivity;
- the view of investors, owners, donors, sponsors and the financial community; and

- its relationship with companies, governments, the media, suppliers, peers, customers and the community in which it operates."

ESG defined - There has been a dramatic acceleration of interest in Environmental Social Governance or ESG in the past two years, driven by factors such as climate change, social inequality, and the impact of COVID-19 ... and it has been amplified through social media platforms.

ESG is about the ability to create and sustain long-term value in a rapidly changing world, and managing the risks and opportunities associated with these changes. This has led to organizations scrambling to find ways to demonstrate their commitment to ESG. The use of standards and frameworks to help organizations demonstrate their compliance with ESG indicators has been growing. In 2018, 86% of the S&P 500 companies reported on ESG issues and \$31 trillion in assets around the world were managed using ESG strategies.

Challenges in ESG reporting - This has brought to light a variety of challenges when it comes to ESG reporting. First, there is a lack of harmonization and consensus in proposed ESG frameworks. There is no universal categorization for ESG issues, and some can be defined in different ways depending on the industry, company characteristics, and the business model. This lack of harmonization leads to difficulty in reporting, and depending on which frameworks companies chose, some have over 500 indicators.

Second, there is a lack of guidance on the best ways to transform existing processes and operations to meet the indicators of various ESG frameworks. Companies are struggling to identify and implement what the best practices are to implement various ESG indicators.

And finally, there is a lack of trust and stakeholder confidence in the ranking results from the various frameworks and indices. The same company can rank very differently depending on the criteria used.

As evidenced by the IPCC report, at least in terms of environmental benefits, we have not been reaching the results that we are hoping for even though we are reporting against indicators.

Opportunities to address challenges

Standardization offers opportunities to address these challenges. International standards are broadly recognized as one of the tools to establish common ground across frameworks, and which can be applied to ESG. There are multiple technical committees at ISO that develop standards in each space of ESG, yet most of those standards are currently not reflected in the proposals put forward by various ESG frameworks developers.

Mapping ISO standards to ESG frameworks could help users identify the tools needed to reach their ESG goals. Conformity assessment and inspection to verify, demonstrate, and certify results will increase trust in reporting and disclosure.

ISO standards have been delivering results for decades in many sectors of the economy – they are tools used by organizations to meet their objectives of quality, health, safety, interoperability and so on and so forth

Role of SCC

SCC supports and facilitates standards solutions, like those needed in this space, with the VeriGlobal initiative being one of them. SCC works within the standardization network, with its standardization partners, to offer flexible standards-based strategies and solutions to meet the needs of the market.

Community Sourced Guidance is one such tool that draws on the collective knowledge and experience of the community to create a rich body of information, particularly useful in evolving areas like ESG.

SCC consistently works with Authorities Having Jurisdiction to incorporate standards solutions to meet internal objectives and promote interoperability and consistency of products, processes, and systems.

Given the vast and overlapping areas under ESG, ongoing collaboration with these bodies to implement solutions is essential to creating clarity and harmonization and reducing duplication.

Collaboration

A tangible way forward is to participate in this mapping exercise is to identify existing ISO Technical Committee 207 environmental management standards and their real-world use in relation to environmental, social, and governance issues.

This activity will showcase symbiotic relationships and applications that may have otherwise not been evident. It should then not only prove to be a useful tool to industry and Authorities Having Jurisdiction but will add efficiency to existing standards.

Please continue to be part of the conversation and the standardization system as we navigate the area of ESG



Agenda Item 6

CSA Standards at-a-glance – Holding the future to a higher standard for Social Good

Connecting CSA Standards to the SDGs

Michael Leering Director Environment & Business Excellence CSA Group



CSA is a Standards Development Organization

- Standards Development
- Education
- Research
- Advocacy

CSA also has Commercial Subsidiaries

- Testing
- Inspection
- Certification

Environment & Business Excellence: Two major programs of activity:

1. Environment & Climate Change, which includes:

- Environmental & GHG standards
- Energy Efficiency & the Circular Economy
- Sustainable Finance
- Innovation & Risk Management
- Quality management standards

2. Natural Resources, which includes:

- Water (incl. flood resilience)
- Carbon Capture & Storage
- Mining, Rare Earths & Lithium
- Northern (Arctic) standards
- Forestry (management standards, bioeconomy, lignin)

Background: The 2030 Agenda for Sustainable Development	 Adopted in September 2015 by Canada and 192 other UN member states, the 2030 Agenda for Sustainable Development is a 15-year global framework for achieving a secure world free of poverty and hunger: With full and productive employment, Access to quality education and universal health coverage, The achievement of gender equality and the empowerment of women and girls, and An end to environmental degradation. 	
	2030 Agenda for Sustainable Development is centered around 17 Sustainable Development Goals, 169 targets, and 232 indicators.	
SDG Trends and Opportunities	Governments are directly charged with SDG strategy development, monitoring, and reporting progress. SDGs articulate outcomes to be achieved but are silent on the modalities.	
	Sustainable Development is increasingly being prioritized by industry, shareholders, investors, and consumers.	
Role of Standards	Organizations and governments need tools and guidance on how to implement, measure and demonstrate their actions to achieve the SDGs, and standards are a natural choice.	
	If organizations and governments are able to link their standards activities to the SDGs, progress on achieving the SDGs could become more consistent and comparable	
	Standards:	
	 Provide a solution to SDG "greenwashing" –complete, concise, measurable 	
	 Address the needs of organizations looking to support the SDGs - detailed methods of operationalization 	
	 Are ideally suited for achievement of SDGs –structured, transparent, consensus-based, multi-stakeholder 	
	• Are referenced in regulations (58% of homegrown CSA standards).	
	Laws and standards were not explicitly developed with the SDGs in mind –therefore the connection is not self-evident.	
The SDG Path for the CSA Group	1. Map all 'homegrown' CSA Standards: Determine defensible linkage between each CSA 'homegrown' standard and the 17 SDGs.	
	2. CSA Research Grant through ESDC: Develop consistent mapping methodology, validate mapping results, develop case studies, and develop recommendations for increasing alignment between CSA standards and the SDGs.	
	3. CSA Group Communications: Sharing the value that standards bring to SDGs.	
	4. (Phase II) Develop Guidance for Staff & Standard Developers: Encourage and enable TCs to embed SDG priorities into future standards, and map future publications to the SDGs.	

CSA preliminary Standards mapping	SDG mapping was conducted for 1105 CSA 'homegrown', bi-national or tri-national standards (excluding adoptions). This Identified a strong link between CSA standards and the SDGs - 889/1105 (80%) of standards mapped support the SDGs. It also identified standards that offer strong support for one or multiple SDGs
	The mapping process confirmed need for a clear, rigorous, and repeatable, mapping methodology for consistency in results.
Future CSA SDG activities	Moving forward the key objective is to elevate societal good mission and priorities within CSA Group by aligning standard development processes and methods with the UN SDGs.
	Phase 2 objectives include:
	 Educate Communicate SDG initiative goals and value to all staff and SSC members, TC members, and showcase alignment to strategic
	initiatives and cross-sectorial priorities.
	 Improve & Implement Establish/update internal procedures and tools to identify and maximize alignment between standards and the SDGs, including training for standards staff and members
	Monitor
	 Map all standards deliverables to the SDGs using the consistent methodology developed.
CSA GROUP [®]	Communicate
	 Present, publish, and showcase the value of CSA standards in supporting the SDGs,
	 Collaborate and connect with federal government departments, Connect SDG value with ESG reporting, and other priorities.
	You can learn more about CSA Group efforts to map Canadian Standards to the SDGs by viewing the recordings of two webinars that CSA Group hosted in September 2021. The webinar recordings are available at thew following links:
	CSA Group Webinar 1: https://csagroup.webex.com/recordingservice/sites/csagroup/recording /57b7bfe1fc6a1039b7770050568f0a79/playback
	CSA Group Webinar 2: https://csagroup.webex.com/csagroup/lsr.php?RCID=c15fe23187dfdd3 ebf39d1406179fec9

Agenda Item 7

The Value Proposition in Relationship Mapping

Lynn Johannson President, E2M and Catalyst for 'The Collaboration' and 'Are You Climate Ready?'



Working together in a system is critical in today's rapidly changing environment. 'Are You Climate Ready?' is a systems approach to harness the synergy between elements such as ISO 14001, the UN SDGs, and Project Drawdown to accelerate climate action, and give the market confidence.

The Collaboration

The Collaboration is a stakeholder engagement process created and led by E2M's President, Lynn Johannson. Members of The Collaboration are focused on leveraging the value proposition that investigates opportunities based on two questions:

- What is your EMS doing for you?
- What are you doing with your EMS?

The Collaboration evolved from an earlier process involving organizations from 16 different business sectors, including the public sector. This initiative was undertaken so that Canadian organizations with an investment in ISO 14001 could offer their insight during the third revision of the standard and bring greater understanding of the consequences of the proposed changes to the market.

Their collective wisdom brought forward practical recommendations by the user community, which were taken into account in the development of the Canadian positions and used to negotiate the standard. Once the standard was published in 2015, the group evolved to become 'The Collaboration', with a mandate to assist members with their transition to ISO 14001:2015.

The team supporting The Collaboration expanded to include Canadian and US negotiators of the international standard. By September 2018, Collaboration members had completed their transition. Interest turned towards opportunities to improve their EMS and address issues such as the financial consequences of climate risk and highlighted by the Task Force on Climate-related Financial Disclosures (TCFD). This prompted the development of "Are You Climate Ready?"

Climate change, while not the most critical or urgent issue identified by the Stockholm Resilience Centre, was skyrocketing into being the most critical for the financial community.

While The Collaboration continues to monitor issues affecting ISO 14001, it is researching and inspiring complementary projects to address opportunities to improve environmental performance for any issue, mindful that accelerating climate action is critical.

There is no silver bullet

To thrive, organizations need to take decisive action supported by excellent management control. Organizations that have a robust, credible, and reliable environmental management system are better positioned to provide internal and external stakeholders with greater confidence based on objective evidence. For there is no Planet B, no renegotiation of ecological debt, and no silver bullet. "Increasing transparency makes markets more efficient, and economies more stable and resilient." - Michael R. Bloomberg, Chair, TCFD

"There will be industries, sectors and firms that do very well during this process because they will be part of the solution" ... "But there will also be ones that lag behind and they will be punished." ...

"Companies that don't adapt will go bankrupt without question." - Mark Carney, former Governor of the Bank of England.

Task Force on Climate-related Financial Disclosures (TCFD)

The Collaboration reviewed the Task Force on Climate-related Financial Disclosures shortly after its publication. Members supported the development of a systems approach to address the **11** recommendations of the TCFD, as well as inputs from the accounting and legal community.

The TCFD recognizes both the physical and transformative risk.



'Are You Climate Ready?' (AYCR)

'Are You Climate Ready?' offers a management systems approach to address transitional and physical risks associated with climate change. It enables subscribers to identify and choose opportunities for innovative solutions aligned to their business and environmental objectives. It was designed to help leverage objective evidence, build confidence, and enhance trust in the marketplace.

AYCR is comprised of four elements that are interdependent:

- AYCR 1 addresses personal climate readiness and the positive spillover that can occur.
- AYCR 2 maps the objective evidence enabled by ISO 14001 to granular questions from the TCFD, and other sources.
- AYCR 3 leverages the knowledge from AYCR 2 to address the SDGs is at the target level and links them to Project Drawdown.
- AYCR 4 is a feedback mechanism, which identifies patterns and trends from shared data to accelerate improvement through collaboration.

AYCR leverages the power of relationship mapping to examine interdependencies and opportunities to work together to accelerate climate action. Subscribers value the "improved identification of opportunity and the fact it enables better external reporting."

Now is the time to do something really great !





Agenda Item 8 – Sector Overviews

Agenda Item 8.1

Carbon Capture, Utilization & Storage

Tim Hansen 350Solutions





A Sustainable Low-Carbon Future is Coming

Clean technology innovation is critical to solving global environmental challenges, such as those associated with climate change. As a result of global compacts, corporate commitments, and other initiatives to address climate change, significant growth in climate friendly, lowcarbon technology development has occurred in the past five years. Efforts to ensure that new technologies perform as claimed and impacts are measurable and verifiable are needed.

Why?

Multiple new (& existing) carbon offset and removal credit markets have developed to address targets and commitments:

- 23% of Fortune 500 companies have committed to carbon neutrality by 2030
- Carbon negative commitments will be the next phase
- 10 gigatons/yr. Carbon removal needed by 2050
- All business sectors impacted
- ESG achievements becoming critical to investment & financial performance

Rapidly developing standards, protocols, guidelines for C Removal (Microsoft, Stripe, Shopify), as well as existing and changing C offset accounting protocols.

Global competitions (\$20M NRG COSIA Carbon XPRIZE, \$100M Musk C Removal XPRIZE) are driving tech development and markets.

Hundreds of new technologies rapidly developing, gaining investment, seeking credits:

- New innovations needed to achieve all targets
- Tech & Carbon offsets will not meet need
- As Carbon becomes valued \$, technology impacts need to be verifiable.

Consensus approaches needed to evaluate and verify impacts, performance, and credits. Verification valuable because it's a risky bet

- >\$0.5B in CCUS technology investment in 2019 & 2020
- >\$25B invested in cleantech 2006-2011: 50% lost 3
- Hype, overcommitment, poor performance = C reduction targets not achieved.

Carbontech Development & Deployment: Relationship to Standards & Protocols When developing new technology innovations, such as carbontech, various standards and protocols may come into play throughout the technology development lifecycle. In theory, these standards and protocols should provide useful information to stakeholders (investors, purchasers, regulators, the tech developer) about the technology through the development and deployment processes. And, there could also be common approaches, requirements, or references to standards and guidelines among these.

The simplified development and implementation timeline below provides insight into stages of development and deployment with comment on examples of processes and standards that might apply at each stage of development. For Carbontech innovations, several standards and guidelines exist that may be utilized for different purposes at different stages, whether it is verifying a technology performance at near commercial stage to gain investment, or validating performance in a commercial project, to ensure green financing targets are met.



The carbontech sector becomes complicated quickly because stakeholders may want standards and guidelines to be implemented for a variety of potentially related reasons, for example:

- Does the technology work? What are its potential impacts? Is it worth investing in?
- When implemented, how much carbon is it actually removing or offsetting – in a real-world, large-scale project?
- Does the environmental performance meet requirements dictated in its sustainability linked loan?

Carbontech can also get complicated because of the rapid growth in the sector, which causes development of new guidelines and protocols at a rapid pace, out of necessity, but which sometimes reduces the development of consensus, and leads to multiple standards or guidelines existing in the same space.

The preliminary relationship map shows this readily, with many items identified and relationships detailed in the map. It is easy to see that four primary groups of documents exist:

- Carbon accounting standards and programs,
- Technology evaluation focused standards and protocols,
- Green (carbon-related) finance standards or protocols, and
- Some carbon removal and offset credit markets that might fit in the middle.

The relationship map also includes dotted lines of potential relationships that don't exist right now. Improving the relationships among the standards, protocols, and programs in the carbontech sector and moving toward consensus approaches could significantly improve outcomes related to reducing carbon levels in the atmosphere – by providing consistent, high quality, 3rd party verified outputs and data for the market to use in making investment, purchase, and policy decisions. But we also need to act quickly as the carbontech sector is developing rapidly.



Agenda Item 8.2

Stormwater Management

Greg Williams StormTrap











Toronto and Region Conservation Authority (TRCA)

Like carbon capture, stormwater management is essential to sustainability. Managing the quality and quantity of stormwater as it flows off man-made surfaces is essential to avoiding floods, droughts and harmful algae blooms.

- Stormwater management is an integral part of water resiliency and sustainability.
- It includes addressing water quantity especially flooding and water quality.
- The industry has been developing standard since 2000.

Stormwater quality control using manufactured devices is important for water resiliency which ties in with the broader theme of the value of standardization.

The stormwater industry has been developing its own standards since Y2K, and there have been lessons learned.

Key Initiatives

These three programs three programs are the three most active today. Together they govern almost every kind of manufactured treatment device:

The New Jersey Department of Environmental Protection, NJDEP.

The Washington (State) Technology Assessment Protocol, Ecology (TAPE), protocol.

The Toronto and Region Conservation Authority (TRCA) developed the "Procedure for Laboratory Testing of Oil-Grit Separators".

The primary things these programs got right was insisting on independent testing and verification and creating demand.

In order for manufacturers to sell a device in New Jersey or Washington State, stormwater devices must go through their respective programs and demonstrate performance that meets or exceeds state requirements.

This is a critical lesson for ETV more broadly: If you create demand supply will surely follow, if you create supply demand may or may not come.

"Regionality", has caused programs to be adopted by other jurisdictions in a piecemeal fashion. There is no consistency.



The STEPP (Stormwater Testing and Evaluation for Products and Practices) initiative, currently operating under the NMSA umbrella, aims to provide national level guidance and practices to improve consistency.





At the testing level, STEPP is working with ASTM through its newly formed E64 Stormwater Control Measures Committee to develop standardized test methods.

Moving forward, the intent is address this inconsistency with STEPP - the Stormwater Testing and Evaluation for Products and Practices initiative, which will provide national scale guidance and standardized protocols.

At the protocol level STEPP is working with ASTM to develop a number of standards. At the program level STEPP will be incorporating the principles of ISO 14034, although the details are still being worked out.

Relationship Map

Development of this relationship map was useful and could be incorporated into STEPP.



Agenda item 8.3

Onsite Wastewater Treatment

Jennifer Andersen CAWT/Fleming









The Centre for Advancement of Water and Wastewater Technologies (CAWT) is located at Fleming College's Frost campus in Lindsay, Ontario.

The CAWT focuses on wastewater technology advancements. While many people think of wastewater as simply sewage, it is actually a wide range of effluents. This includes effluent from any industry that generates wasted water, such as abattoirs, mines, the food and beverage sector, just to name a few. The CAWT specializes in understanding these various wastewaters, the environmental concerns related to them, and the types of technologies used to treat them.

The CAWT's goal is to help companies get their products closer to market by working with them on solving the challenges they face. To do this the CAWT has facilities both on campus and off that can host a number of full-scale technologies, including the CAWT's validation and certification facility located in Minden, Ontario. The validation and certification facility can hold up to 6 full-scale onsite wastewater treatment technologies and test them under cold climate conditions.

The CAWT's areas of expertise include, but are not limited to: biological treatment (including biofilms and anaerobic biofilters); membranes and filtration; advanced oxidation technologies; low energy, cold climate and remote systems; and innovative technologies that target nutrients, heavy metals, and emerging contaminants of concern like pharmaceuticals.

This relationship map outlines the importance of on-site residential wastewater treatment standards and the role of the CAWT in assisting companies in getting to market, while also meeting the important requirements set out by certification standards.



As a research centre, the CAWT is supported through various federal and provincial funds. Working with the private sector on research and development, the CAWT is also supported through fee for service contracts. All of these funding sources help to support the CAWT's staffing, resources, and infrastructure.

On collaborative projects, the CAWT works closely with academic partners, including other colleges, universities, and Technology Access Centres (TACs). TACs are federally supported college research centres, located across Canada.

With regards to on-site wastewater technologies, the CAWT works with industry and private partners on a range of validation, performance verification, and certification projects. The CAWT also works closely with commercial labs on specialized regulatory testing.

CAWT services range from proof-of-concept testing to full scale demonstration, validation, and certification. For its validation work, the CAWT often tests technologies to a specific standard. To do this the CAWT follows standard methods and the required sampling and dosing schedules to target specific nutrients, organics or contaminants for percent removal or reduction. As a certification testing facility through the US-based NSF International, the CAWT is able to provide both NSF and Bureau de normalisation du Québec (BNQ) certifications for residential wastewater and greywater treatment systems. Residential wastewater is domestic wastewater generated from a household. Greywater is the relatively cleaner portion of wastewater from a household that includes wastewater from showers, sinks, and washing machines. NSF certification is required for many US states, so if your company wants to enter the US market, depending on the state, you may require NSF certification. The CAWT is the only NSF certification provider for residential wastewater and greywater treatment in Canada.

BNQ certification is required in the Province of Ontario for on-site residential wastewater treatment systems. Again, these are systems that are designed to treat domestic or household wastewater. A major difference between NSF and BNQ is that BNQ requires an additional 6 months of testing in a cold climate to meet Canadian standards. The CAWT is one of two providers in Canada who offer BNQ certification.

In addition, the CAWT has completed the VerifiGlobal peer assessment process, demonstrating that it meets the requirements of ISO 17020 when conducting verifications of environmental technologies in accordance with the ISO 14034 standard. The ISO 14034 ETV process is particularly effective for verifying the performance of technologies with innovative features or technical and/or environmental benefits are not fully reflected in existing product standards. To make sure the data the CAWT provides are of the highest caliber and meet the stringent requirements of regulations, standards, and certifications, the CAWT lab is ISO 17025 accredited to analyze over 20 parameters in wastewater. Many of these parameters are regulated in the wastewater industry, including biochemical oxygen demand, *E. coli.* and total suspended solids.

The CAWT follows standard methods in all of its work. The CAWT also works closely with private commercial labs on analyses that the Centre's lab does not have the capacity to analyze in house. Following standard methods and being accredited ensures that the CAWT's analyses are performed safely and consistent with other laboratories in Ontario, Canada and globally. Validating, verifying and certifying technologies in the on-site wastewater sector is critical for a number of reasons. Not only does it provide industry partners with a marketable product, but it ensures we are all achieving common goals and treatment requirements; meaning technologies across the globe can be trusted and relied upon.

Results of this include:

- Increasing recycling, safe water reuse, and wateruse efficiency across all sectors
- Implementing integrated water resources management at all levels, thereby protecting and restoring water-related ecosystems
- Expanding cooperation and water capacitybuilding

Agenda Item 8.4

Nitrogen Sensor Challenge

Gail DeRuzzo Battelle





The United States Environmental Protection Agency (US EPA) initiated the Advanced Septic System Nitrogen Sensor Challenge to advance the development of low-cost sensors to measure nitrogen levels discharged from advanced residential septic systems.

Battelle, MASSTC and VerifiGlobal provided technology performance testing and verification services to support the Challenge from 2017 to 2020.

Following this, during 2020-21, a nitrogen sensor developed by Stony Brook University completed additional field testing, leading to performance verification of the sensor technology in accordance with the globally-recognized International Organization for Standardization (ISO) Environmental Technology Verification (ETV) 14034 standard.

The Problem

Residential septic system effluents can be a major source of excess nitrogen load, with dangerous levels of nitrate and other contaminants which may seep into coastal areas and groundwater, often affecting drinking water quality. This problem prevalent across the northeastern United States and may other regions.

To protect public health and ecosystems, local and state regulators are considering the effectiveness of innovative and alternative onsite wastewater treatment systems (I/A OWTS). The long-term performance of these systems requires low cost and remote sensing capabilities. Clean Technology Innovation Initiative September 2021 Online Workshop Report



Test/Quality Assurance Plan (T/QAP)

Battelle and US EPA developed a Test/Quality Assurance Plan (T/QAP) which included performance goals for the sensor challenge and the subsequent six-month field performance testing. The T/QAP was developed with input from stakeholders, including The Nature Conversancy, state regulators, USGS, and experts in the field.

The T/QAPP included details on the test design – i.e., test fluids concentrations, statistical number of spike standards, schedules for exposure of fluids to the sensor.

Assessment of sampling methods and analytical laboratory methods, together with data validation were incorporated into the T/QAP to confirm data quality.



Project Steps

The Challenge and subsequent sensor performance testing and verification progressed in six phases, which included webinars, developer applications, screening of candidate sensor technologies, preliminary testing, six-month field testing and ISO 14034 verification.

Step 1	Hold Webinars to inform/attract Sensor Developers
Step 2	Develop Challenge Application for Preliminary Testing
	J. J
Step 3	Screen Candidate Technologies
Step 4	Run One-Week Preliminary Tests – 4 tests with 5 developers
Step 5	Run One-Month Preliminary Test – 1 test with 3 developers
	·
Step 6	Run Six-Month Field Performance Test/ISO 14034 Verification Process

Several one-week tests were conducted to see if sensors were technically capable of meeting the T/QAP requirements. Only sensors that met the performance goals proceeded to the one-month test.

On-site audits were conducted for all tests to ensure conformance to the T/QAP protocols. Only one sensor passed the one-month test to go to the six-month test and ISO 14034 verification.

Key players and aspects of ISO standards in the sensor challenge were:

- MASSTC and the Barnstable County Department of Health and Environment (BCDHE) Laboratory were the Test Bodies which had to meet requirements of ISO 17025 for testing and calibration.
- Battelle was the Verifier which had to meet ISO 17020 for performing the inspection.
- VerifiGlobal was the Verification Bodywhich completed a peer assessment of Battelle per ISO 17040 prior to the start of the challenge.
- ISO 14034 Environmental Technology Verification was used to guide the sensor verification.

Test bodies meet ISO 17025 requirements	Validation of performance testing based on T/QAP and Verification Plan
Verifiers meet ISO 17020 requirements	Verification of test results against the sensor Performance Claim
ISO 17040 guidance on peer assessment to assess competence of organizations	Verification Protocol used in verification process

Roles and Responsibilities

Relationship Map

The following relationship map shows these ISO standards linked to the players and stakeholders in the Nitrogen Sensor Challenge and subsequent technology performance verification, The standards are in green, key players in light blue, and regulators in dark blue.



Lessons Learned

Technology development not fast	The Nitrogen Sensor Challenge and subsequent performance testing and verification took several years. Finding technologies that will make it through the test design was harder than anticipated.
Collaboration and communication	Keeping experts on the team throughout the process was valuable. They were a part of each T/QAP revision and report review.
Flexibility	Multiple stages were necessary to get through sensor design hurdles. Be willing to revise plans.
ISO 14034 ETV	Successful ETV through ISO 14034 ETV Standard. One successful sensor developer completed the ISO 14034 ETV process.

Agenda Item 9

Next steps Getting Involved

John Neate VerifiGlobal







Following the workshop, the generic relationship map will be refined, and work will begin on the practical application of relationship mapping and other tools to additional sectors.

The additional sectors will be identified in conjunction with the Standards Council Canada and ISO TC207 leadership.

Detailed assessment and analysis of these additional sectors will be undertaken to further elaborate and operationalize the primary relationship map.

The intent is to engage sector-specific stakeholders and interested parties in order to identify specific concerns and needs when addressing critical issues. Each sector specific relationship diagram will serve as a roadmap for that particular sector or subsector.

Examples developed through this initiative will be used to illustrate how relationship mapping and performance benchmarking tools can be applied by stakeholders to untangle complex issues and add value across multiple sectors.

Issues and opportunities include:

- Clean technology and green infrastructure,
- Climate change mitigation and adaptation,
- Water air soil pollution control and remediation,
- Waste minimization resource efficiency and the circular economy,
- Advanced monitoring and control and surveillance systems,
- Ecosystems diversity and preservation,
- Green finance and procurement.

Issues and opportunities

Current targeted sectors include:

- Water for example, Stormwater management and on-site systems,
- Energy for example, energy storage renewables carbon capture and utilization,
- Sustainable building and construction in the context of the circular economy,
- Transportation, including electric vehicles hydrogen and green mobility,
- Agriculture for example, nutrient management bio technology and integrated pest management.

The relationship map and related tools will be publicly accessible on the VerifiGlobal website so please join us. Visit the VerifiGlobal homepage to find out more about performance benchmarking and verification, and the Clean Technology Innovation initiative.

Under current initiatives on the right side of the VerifiGlobal homepage, you will see links to the online workshop agenda and panelist profiles. There is also information on Community Sourced Guidance and flexible standards-based strategies. There's also an opportunity for you to register to participate and collaborate with us on the Clean Technology Innovation Initiative.

So let's collaborate:

- To improve understanding of standardization and its relevance to global challenges and opportunities,
- To create a web based integrative relationship map to visualize how sustainability goals and international standards interact in a systemic in a systematic way,
- To enable effective application of existing and proposed environmental standards in support of technology innovation and global sustainability objectives.





Current targeted

sectors

Next Step: Collaboration



Clean Technology Innovation Initiative Online Workshop - 22 September 2021 10:00 – 11:30 Eastern Time

AGENDA

- **1. Introduction Moderator**
- Starlene Buchanan, Standards Council of Canada

2. Clean Technology Innovation Initiative Objectives

- John Neate, Managing Director, VerifiGlobal
- Jesse Arndt, Standards Council of Canada

3. SCC: Environmental, Social, and Corporate Governance

- Chantal Guay, CEO, Standards Council of Canada

4. ISO TC207 and ISO 14000 Standards

- Sheila Leggett, Chair, ISO/TC 207

5. ISO 14034 ETV and Clean Technology Innovation

- Thomas Bruun Managing Director, VerifiGlobal

6. Connecting the Use of Standards to the UN SDGs

- Michael Leering, Director, Environment and Business Excellence, Canadian Standards Association

7. The Value Proposition in Relationship Mapping

- Lynn Johannson, President, E2M and Catalyst for 'The Collaboration' and 'Are you Climate Ready?'

8. Sector Overviews (illustrative examples)

- Carbon Capture, Utilization and Storage - Tim Hansen, 350Solutions
- Stormwater
 Greg Williams, StormTrap
- Onsite Wastewater Treatment
 - Jennifer Andersen, CAWT
- Nitrogen Sensor Challenge - Gail DeRuzzo, Battelle

9. Next steps – Getting Involved - John Neate, Managing Director, VerifiGlobal

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