

DELIVERING ON OUR COMMITMENTS

2021 | RESPONSIBLE CARE® REPORT



Responsible Care®
Our commitment to sustainability.



CONTENTS

- 03** Introduction
- 04** Outcomes for 2020* at a glance
- 06** Advancing equity, diversity and inclusion
- 09** Supporting Canada's recovery from the COVID-19 pandemic
- 13** Engaging our communities to minimize adverse health and environmental impacts
- 16** Reducing emissions of harmful chemicals
- 23** Investing in innovative climate change solutions
- 32** Advancing product stewardship and sustainable practices
- 35** Increasing natural resource use efficiency
- 42** Promoting safe and secure working environments
- 49** Supporting sustainable and resilient transportation infrastructure
- 53** Closing

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INTRODUCTION

About Responsible Care®

For nearly 40 years, Canada's chemistry sector has led the journey towards safe, responsible, and sustainable chemical manufacturing through its United Nations (UN)-recognized environmental, societal and governance (ESG) initiative, Responsible Care. Founded in Canada in 1985, Responsible Care is now practiced in 73 countries and by 96 of the 100 largest chemical producers in the world.

Through Responsible Care, CIAC members strive to the ethic to ***“do the right thing and be seen to do the right thing.”*** They innovate for safer and greener products and processes, and work to continuously improve their environmental, health, and safety performance.

Responsible Care covers all aspects of a company's business, their employees, the communities, and the environment, over the entire life cycle of its products. Through TRANSCAER®, our members engage with communities along transportation corridors, emergency responders, governments, and other stakeholders to ensure they are aware of the dangerous goods travelling through their community and prepared should there be an incident.

All CIAC member companies commit to the Responsible Care Ethic and Principles for Sustainability and the Responsible Care Codes, covering all aspects of the company's business and product lifecycle. This leads to safer and more sustainable products and processes – improving the environmental and safety performance of our members.

Responsible Care Verification

Companies must be transparent about their activities and allow independent experts and members of the public to verify that they are living up to the standards set by Responsible Care. Read more about Responsible Care verification and see past reports here.



United Nations Sustainable Development Goals

As leaders in Responsible Care, CIAC members have committed to transparency and an improvement process in which each company measures its performance against that of the best-in-class companies. Since 1992, on behalf of members, CIAC has been collecting performance data on emissions, waste, transportation, process safety, and health and safety. Much of our existing data is aligned with the United Nations (UN) Sustainable Development Goals (SDGs) which are becoming global reporting standards across all sectors. Additionally, through our membership on the International Council of Chemical Associations (ICCA), CIAC is committed to accelerating progress towards the 17 UN SDGs. The UN SDGs that are most material to the chemistry sector are listed below and are also identified throughout the report.



LEARN MORE



OUTCOMES FOR 2020* AT A GLANCE

The federal government has set ambitious targets to reduce greenhouse gas emissions from 2005 levels, driven by the Paris Agreement. CIAC members are making progress towards these goals while also increasing the safety of their operations.

Since 2005, CIAC members have...



Reduced carbon dioxide equivalent emission intensity from greenhouse gases by **25%**



Reduced their total recordable incident rate by **75%**



Reduced criteria air contaminant emission intensity, including oxides of nitrogen, ozone, sulphur dioxide, total particulate matter, and volatile organic compounds, by **28%**



Worked with supply chains, from supplier to consumer, to minimize risks through the entire lifecycle of their products, including during product transportation (**100% third-party verified**)



Reduced emission intensity of substances requiring risk management, excluding greenhouse gases and criteria air contaminants, by **90%** as part of requirements under the Canadian Environmental Protection Act, 1999 (CEPA)



Worked with communities living close to our members' facilities to ensure the public understands the risks and benefits of operations and products (**100% third-party verified**)



Virtually eliminated **large-scale** incidents



Prepared emergency plans, ensuring communities are ready to respond to chemical-related incidents (**100% third-party verified**)

In 2012, CIAC launched the Resource Conservation Measurement (RCM) survey of waste and water metrics.

Since 2012, CIAC members have...



26%

Reduced **routine hazardous** waste for disposal



9%

Reduced **non-hazardous** waste for disposal



69%

Reduced **total waste** (routine and non-routine) for disposal



21%

Reduced **net water** consumption

*CIAC collects member performance data on a yearly basis once data from the previous year is available. CIAC collected 2020 performance data in 2021 and will collect 2021 performance data throughout 2022. As a result, the data presented in this report will primarily identify progress up until 2020.

Recognizing our members' commitment to Responsible Care®

Verifications completed in 2021:



2020 SHARE AWARDS:

Excellence in Safety – *Dupont Canada, Imperial*
Improvement in Safety – *H. L. Blachford*

New Responsible Care Awards Launching Soon!

This year, CIAC will be launching seven new Responsible Care awards to recognize companies that exemplify leadership and outstanding performance based on the implementation and execution of Responsible Care over the past year.

This new awards program includes four code-based awards – the **Operations Award**, **Stewardship Award**, **Accountability Award**, and **Company of the Year** – which are meant to recognize a company (or companies) that have exemplified each code, as well as the codes as a whole. The program also includes three awards that align with the Responsible Care ethic and principles – including the **Jean Bélanger Award**, meant

to honour individual(s) who reflect Responsible Care in all aspects of their life, the **Women in Chemistry Award**, meant to honour and recognize women who are seen as leaders in the field of chemistry, and the **Excellence in Partnership Award**, meant to honour implementation partner(s) who provided significant value to Responsible Care.

We invite all CIAC Members, CIAC Plastics Division Members, and other stakeholders to nominate and/or apply for one or more of these awards once the awards are launched later in 2022. For more information, please contact a member of the CIAC Responsible Care team.

ADVANCING EQUITY, DIVERSITY AND INCLUSION

It is increasingly a societal expectation that companies in Canada be responsive to concerns related to equity, diversity, and inclusion, ensuring greater access to opportunities for individuals of all backgrounds and orientations. In line with UN SDG 8 (Decent Work and Economic Growth) and UN SDG 10 (Reduced Inequalities), CIAC and its members are working to advance the following targets:



8.5 – By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.



10.2 – By 2030, empower and promote the social, economic, and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status.

10.3 – Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies, and action in this regard.

10.4 – Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality.

Developing Equity, Diversity, and Inclusion Codes within Responsible Care®

Since its inception in 1985, Responsible Care has evolved to continually meet expectations for social responsibility. Following the development and implementation of the Indigenous code elements, CIAC members have committed to further meet society's expectations by embedding equity, diversity, and inclusion (EDI) into their RC code handbook.

Leading CIAC members, experts and other stakeholders are working to developing updated principles, code elements, benchmarks and guidance documents that will continue to advance equity, diversity, and inclusion across the industry.

Measuring our commitment to Equity, Diversity, and Inclusion

CIAC has been collecting performance data on emissions, wastes, transportation, process safety, and health and safety for 20 years now. Much of our existing data is aligned with the UN SDGs, which are becoming global reporting standards across all sectors. However, there is a gap in CIAC's performance data related to SDG 10, "Reduced Inequalities". To address this gap, CIAC will begin developing and collecting EDI metrics once the Responsible Care EDI codes are finalized to report member progress towards achieving these new commitments, consistent with the UN SDG 10 targets.

Women Building Futures



In 2021, inspired by the legacy of John Philip Vincett – a prominent champion of Responsible Care – CIAC and Women Building Futures (WBF) announced the John Vincett Responsible Care Award. WBF is an organization that embodies John’s values and principles in its goal to empower women, and Indigenous communities through support of training and apprenticeships in the skilled trades. The John Vincett Responsible Care Award was created to provide financial relief to Indigenous women who attend WBF programs. Now, a year after its creation, we are pleased to see the positive impact this award has made on individuals who truly deserve and will benefit from WBF programs:

“The Impact the (CIAC) donation in honour of John Vincett, not only helped me get where I want to be in life but can and will help someone else in need of a little assistance when wanting to better their future. I am truly at a loss of words. The emotions I felt (the day I received the award) were pure happiness and love. All the tears I shed were not from sadness but from being overjoyed. Being an Indigenous woman myself, I never thought I would be fortunate enough to be accepted into such an amazing program but to also receive financial aid in the process. A true huge thank you to the CIAC in honour of John Vincett. Thank you so very much, I hope you keep helping others reach their life goals! I wouldn’t have been able to see such a bright future without you.”

What members are doing to advance equity, diversity, and inclusion

BASF expands efforts to create a safe and inclusive culture

Diversity, Equity and Inclusion (DEI) has been a long part of BASF’s strategy. However, major global societal shifts, coupled with more recent tragic events and discoveries related to Canada’s troubled history of marginalization, caused profound reflection for the organization and a need for acceleration. As a result, BASF created a framework to ensure ongoing dedicated focus and impactful action and accountability while expanding efforts across the country in early 2021.

The organization launched a DEI Council that represents all operating divisions and support groups, as well as contributors across the country at each of its facilities. The role of the DEI Council is to serve as a critical strategic sounding board and champion for DEI and ensure relevance and coordination across their organization. The BASF Canada Leadership Team is committed to ensuring that the company’s strong safety culture also means that employees feel safe to bring their authentic selves to work, and have committed to creating an inclusive culture, where everyone is heard and seen, where everyone feels respected, where opportunities for advancement are transparent and the decision process

for advancement is fair. This will be achieved through a robust 3-year DEI strategy which includes engagement of passionate employees at all levels of the organization as a key cornerstone of execution.

DuPont: community outreach for a better future

An important part of DuPont’s mission is to build a strong culture of employee volunteerism by connecting with people and making a meaningful difference in the communities they serve. In line with this commitment, the DuPont Kingston Technology Centre (KTC) continues to make a strong social and economic impact in the local community through various outreach activities.

In 2021, DuPont once again collaborated with Queen’s University and the Chemical Institute of Canada (CIC) Kingston Chapter on the “Bonds for Success” virtual mentorship program that aims to help students in Kingston and surrounding areas secure professional and technical development opportunities. Seven KTC employees participated as mentors in the program providing opportunities for chemistry students to learn through the knowledge and experience of later career professionals. KTC and DuPont Canada also partnered with the “See it Be it STEM it” organization to attract young women to pursue education and careers in STEM (Science, Technology, Engineering and Mathematics).

ADVANCING EQUITY, DIVERSITY AND INCLUSION

The “See it Be it STEM it” initiative is focused on sharing stories of successful women with careers in STEM fields to empower young girls to pursue their interest in STEM. The organization also provides access to resources and tools that are critical for their success. Extraordinary young women who have education or careers in STEM are featured as role models on the “See It Be it STEM it” website. Through these collaborations and support of other STEM initiatives, DuPont strives to inspire and cultivate the next generation of cutting-edge problem solvers.



Methanex: laying a strong foundation for diversity and inclusion

At Methanex, the goal is to provide a workplace where diversity is valued and sought after, and all global team members are encouraged and supported to reach their full potential. In early 2021, Methanex established a Global Diversity and Inclusion Council made up of internal senior

leaders from around the world to lead the development and implementation of their Diversity and Inclusion Strategy. A new role was also created at the company to lead this renewed focus: Director, Diversity and Inclusion.

Together, the Director and Council oversaw an in-depth, third-party assessment of Methanex’s current state of Diversity and Inclusion, consisting of interviews, focus groups, a systemic analysis and a global Diversity and Inclusion survey, which had a 93 per cent participation rate. The assessment reinforced that Methanex has a motivated, engaged, and hardworking team with clear values and a positive and collaborative culture. It also revealed opportunity for improvement to ensure all team members feel a sense of belonging and that their people practices are fair and transparent. Following the Diversity and Inclusion assessment, Methanex finalized a Diversity and Inclusion Strategy and a three year roadmap to drive progress in this important area.

WEBINAR

Responsible Care: A Cultural Transformation

A webinar slide titled "Responsible Care Today" is displayed. The slide features a background image of a hand holding a green plant branch. The text on the slide includes a title, a list of four bullet points, and a play button icon. The bullet points are: "UN Recognized Best Practices in Corporate Responsibility.", "Now practiced in over 70 countries and by 95% of largest 150 chemical companies globally.", "Condition of CIAC membership", and "Requires third-party verification of many practices and performance." The play button is a green square with a black triangle pointing to the right.



Click to watch the webinar!

On November 9, 2021, CIAC hosted a webinar on Responsible Care culture, led by CIAC President and CEO, **Bob Masterson**. This webinar explored the history and evolution of Responsible Care, including how it came about and what it means to CIAC members and staff. Given that the Responsible Care ethic, principles, and codes influence the decisions that CIAC members make every day—decisions that are key to creating more sustainable products and processes while keeping their employees and communities safe – it will be critical to integrate the EDI codes into the culture of Responsible Care to further contribute to its transformation, evolution, and spirit of continuous improvement.

SUPPORTING CANADA'S RECOVERY FROM THE COVID-19 PANDEMIC

Chemistry products like disinfectant and hand sanitizer and personal protective gear like plastic masks, shields and gloves help keep frontline workers safe. In line with UN SDG 3 (Good Health and Well-Being), CIAC and its members are contributing to the following SDG targets:



3.3 – By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases.

3.d – Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.

A year of recovery and resilience for the chemistry industry

In 2021, the chemistry sector saw impacts from the pandemic along with the greater economy; however, this year's statistics not only reflect these impacts, but also our resilience. As economies shutdown, demand for chemistry products rebounded. The chemistry sector was called upon almost immediately to supply the goods Canadians demanded – safe and sterile food packaging, cleaning products, hand sanitizer and water treatment chemicals just to name a few. With chemistry impacting 95 per cent of all manufactured products, our sector responded to economic re-opening efforts, providing the essential building blocks to nearly all manufactured goods, while supporting our local communities along the way.

What CIAC members are doing to support Canada's recovery and their local communities

Sarnia area members sponsor local vaccination clinic

In March 2021, as Canada was just ramping up its vaccination effort, Sarnia-Lambton Community Awareness and Emergency Response (CAER), an association to which many Sarnia-area CIAC members belong – along with a number of other local groups, supported a high-output vaccination model at Lambton Public Health's fixed immunization clinic in Point

Edward. The model is an ideal solution for a large-scale immunization rollout and was made possible by tremendous contributions from CAER, the Industrial Educational Cooperative (IEC), the Sarnia-Lambton Environmental Association (SLEA), Bruce Power, and Enbridge Pipelines Inc.

The local petrochemical industry donated \$60,000 in support of Lambton County's vaccine deployment. As lead sponsor, the funds provided by CAER, IEC, and SLEA were used to convert the Point Edward Arena ice pad into a mass vaccination hub. Through the support of the organization and its members, the Arena was outfitted with vaccination pods, stanchions, and signage to guide elevated numbers of individuals through the clinic each day.

Imperial's special partnership with neighbouring long-term care facilities

Long-term care residents in Ontario were perhaps the most heavily affected group with respect to being physically isolated during the COVID-19 pandemic. Recognizing the impact isolation has on physical and emotional well-being, Imperial partnered with Marshall Gowland Manor, a nearby long-term care facility run by the County of Lambton and purchased iPad's so residents could keep in touch with loved ones. To celebrate Valentine's Day 2021, residents and staff were also treated to a special lunch delivered by Imperial employees, and that summer,

SUPPORTING CANADA'S RECOVERY FROM THE COVID-19 PANDEMIC



Imperial representatives at Marshall Gowland Manor. Photos courtesy of Imperial.

“The staff and residents are our neighbours, and we wanted to help bring some joy to their lives during a particularly difficult time,” says Kim Haas, Vice President of Imperial Oil Chemicals and Sarnia Chemical Plant Manager. “Later in the year, myself along with other employees visited the Residence on the St. Clair and shared a special holiday dinner organized by Imperial. I really enjoyed getting to know the residents and staff there.”

Imperial was thrilled to donate a trishaw bike to the Manor. After months of lockdowns, residents were able to enjoy the outdoors and the bike helped to enhance their experience.



Methanex rises to the challenge for the community

Methanex Medicine Hat and Methanex Vancouver employees have long been enthusiastic supporters of their local community, but COVID-19 presented a unique opportunity to support the community through a challenging time.

Both locations have annual United Way Workplace campaigns where employees raise funds through creative and fun initiatives – and Methanex matches every dollar they raise. That money is donated to the local United Way chapter in each location, a trusted partner that distributes the funds across the community where the need is highest. The total for the two campaigns, with the Methanex match, was \$562,020 CAD for 2021. Along with these very successful United Way campaigns, Methanex in Vancouver organized funding to support a winter break program with The Kidsafe Project, a local charity that provides a safe space for vulnerable children when school is out, which has been in high demand during COVID.

As well, in direct response to the pandemic, Methanex in Medicine Hat prioritized mental health for their 2021 community investments. These include a \$20,000 commitment to the Medicine Hat and District Health Foundation to support developing mental health resources through the Foundation, including outpatient support groups and a pediatric mental health room. They also supported the placement of five Google Assistants in palliative care units through the Canadian Mental Health Association Alberta Southeast Region. These Google assistants provide residents with a friendly voice and connection to their friends and family.

DuPont's external giving campaigns



DuPont Canada employees continue to show their generosity by supporting community events and raising money for worthwhile causes. DuPont is proud of their successful external giving campaigns that support local volunteer agencies such as the United Way, Habitat for Humanity, Operations Xmas Child, Angel Tree Program and the Partners in Mission Foodbank. In these challenging times, DuPont cares about making a meaningful impact in the lives of people in their local communities for a better future.

■ BASF BASF donates essential supplies to support local communities

In 2021, BASF Canada donated approximately 30 cases of their Windsor produced hand sanitizer, and Personal Protective Equipment to Project Northern Lights (PNL),

a Canadian national non-profit focused on providing sustainable relief to communities that have been particularly affected and endangered by COVID-19. BASF also facilitated several charitable donation initiatives to support communities where they work and live, such as a food drive which included more than \$60,000 worth of funding and non-perishable food items.

WEBINAR

Navigating the legal implications of COVID-19 vaccination mandates in the workplace



With millions of COVID vaccines flooding into Canada in the Spring of 2021, it seemed as though the end of the pandemic was finally in sight. However, the question quickly then became, “Can employers mandate vaccinations in their workplace?”. The fact is our courts, tribunals and arbitrators had not been required to answer this question in modern times. The last global pandemic of COVID-19 proportions happened over 100 years ago with the Spanish Flu. As a result, employers were left to wonder how the legal decisionmakers would rule on this issue in the early days of vaccination.

Jim Anstey, lawyer in the Employment Law group at Nelligan Law, helped answer important questions related to human rights and legal implications of COVID-19 vaccination mandates in the workplace through CIAC’s webinar series. This allowed the CIAC membership to take a proactive and educated approach to addressing the issue of vaccination mandates.

WEBINAR

Crisis Communications Best Practices: Preparing to respond in 15 minutes



Shawna Bruce presents: Crisis Communications Best Practices Preparing to respond in 15 minutes

Crisis Communications Best Practices: Preparing to respond in 15 minutes

Shawna Bruce CD, MA (DEM)



Click to watch the webinar!

In September 2021, CIAC hosted a webinar with seasoned communicator and facilitator to CIAC's National Advisory Panel, **Shawna Bruce**. Shawna shared her expertise and experience in risk and crisis communications, emergency public information, effective use of public notification systems, and a number of other relevant topics with CIAC members. As the public health crisis persisted, members were able to use this webinar to build on their skill sets for responding to a crisis and understanding public information needs.

THE FIRST 15 MINUTES...

<p>1</p> <p>Issue a holding statement</p> <p>Use a generic legally approved holding statement to buy time to gather and verify facts. Post across all of your communications platforms.</p>	<p>2</p> <p>Activate your plan</p> <p>Gather your communications team. Start gathering the Who, What, Where, Why, When, and How (if possible) – as many details as you can. Validate the facts. Review the response approach with leadership and begin preparing key messages.</p>	<p>3</p> <p>Identify your audiences</p> <p>Identify who needs to be informed. Consider employees, leadership, community, customers, Board of Directors, and especially, anyone impacted by the event.</p>	<p>4</p> <p>Identify a spokesperson</p> <p>Identify who needs to be informed. Consider employees, leadership, community, customers, Board of Directors, and especially, anyone impacted by the event.</p>	<p>5</p> <p>Communicate</p> <p>Begin communicating with your internal audiences – send them what you're sending externally. Update with an Initial Statement. Use all available channels. Set up your website as an information hub and pre-load a microsite or cloud for emergency use.</p>	<p>✓</p> <p>Monitor and listen</p> <p>Make sure you're monitoring your media channels and that your information is getting to those who need it. Respond accordingly to questions and correct misinformation.</p>	<p>✓</p> <p>Review and adjust</p> <p>Constantly review your communications approach. Review and adjust as needed to ensure the right information is getting to the right people at the right time through the right platforms.</p>
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ENGAGING OUR COMMUNITIES TO MINIMIZE ADVERSE HEALTH AND ENVIRONMENTAL IMPACTS

Through Responsible Care, CIAC members make the commitment to engage with operating site communities, neighbours, consumers, the general public, and other potential stakeholders that members have identified. Through this Responsible Care commitment, CIAC and its members are making progress on UN SDG 12 (Responsible Consumption and Production) and the following targets:



12.4 – By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.

12.6 – Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.

12.8 – By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.

CIAC's National Advisory Panel

Responsible Care is guided by input from CIAC's National Advisory Panel—a group of academics, environmental leaders, and community members who provide an external, critical perspective on all matters related to the Canadian chemistry industry. The panel meets three times a year, allowing for continuous dialogue between CIAC, its members, and these key thought leaders and opinion shapers.

Through the panel's advice and input, CIAC can better understand Canadians' expectations of the chemistry industry. The panel also performs an important, challenge function: alerting CIAC to emerging issues, encouraging it to focus its efforts in particular areas, or to rethink its policy and advocacy positions.



2018 Challenge Letter

In 2018, the National Advisory Panel issued a Challenge Letter to CIAC's Board of Directors in response to concerning news reports in the Sarnia area, calling on CIAC to engage with members in Sarnia and encourage

them to release information to the public on leaks and spills when they occur, enhance community advisory panel processes, and renew efforts to involve the Aamjiwnaang First Nation community in their advisory panel.

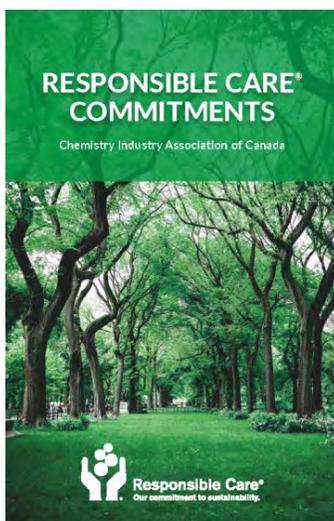
In response to this letter, CIAC surveyed members' progress on these recommendations in 2021 and was able to highlight the work of the broader Sarnia industrial community to the National Advisory Panel, as well as the work of the Bluewater Association for Safety, Environment, and Sustainability (BASES). BASES provides a home for an interactive exchange of information in Sarnia-Lambton related to the protection of workers, the public and the environment. BASES is supported by the members of the Sarnia-Lambton Community Awareness and Emergency Response (CAER), Sarnia-Lambton Industrial Educational Cooperative (IEC), and the Sarnia Lambton Environmental Association.

CIAC's Sarnia members are actively engaged in BASES, a platform that uses modern technologies to allow industry to share emergency notifications with the community and emergency response teams with respect to events

ENGAGING OUR COMMUNITIES TO MINIMIZE ADVERSE HEALTH AND ENVIRONMENTAL IMPACTS

and response. The platform allows the local community associations, working with industry, to be transparent with residents, building confidence and fostering trust.

Additionally, to support its members in their community engagement initiatives, CIAC has a series of community engagement tools, guides, and best practices. However, CIAC does not currently have a process to effectively share these best practices and some of the existing resources require updates to address new technologies and the latest trends in community engagement. To fill this gap, CIAC is initiating a Community Engagement Project to improve sharing of best practices, reinvigorate its tools and guides and identify and fill knowledge gaps.



Indigenous engagement

Many of our members have facilities near Indigenous communities and their input is important to the responsible operation of these facilities. In 2020, CIAC updated its United Nations-recognized Responsible Care Codes to include new commitments to engage Indigenous communities through proactive and formal processes. While

developing the codes, the CIAC engaged with Indigenous communities and their leaders.



ARLANXEO Anishinaabe Cultural Awareness Event

As part of their commitment to the Responsible Care Indigenous Codes, on Friday, May 28th, 2021, CIAC member ARLANXEO held an Anishinaabe Cultural Awareness Session led by an elder and teacher from the Aamjiwnaang First Nation. The remote session involved storytelling about the spirituality of nibi (water) and was attended by ARLANXEO staff, members of their Community Advisory Panel (CAP) and industry partners including Diamond Petrochemicals, CIAC staff, CIAC members Cabot and INEOS Styrolution and the Sarnia-Lambton Environmental Association.



NOVA Chemicals

NOVA Chemicals' Near Neighbour Engagement

In 2018, NOVA Chemicals announced a capital investment of approximately \$2 billion for two new significant projects in its St. Clair Township operations: a new polyethylene facility and the next phase in the expansion of its Corunna Site cracker. As part of its construction effort, NOVA has been working closely with the Aamjiwnaang First Nation through its Near Neighbour Engagement to identify and move culturally sensitive plants and artifacts.



Imperial

Imperial's focus on Indigenous business development

Imperial fosters the development of Indigenous businesses in ways that benefit the company and the community by:

- Developing Indigenous content plans that address employment and business opportunities for Indigenous Peoples and including this content as a factor in evaluating and awarding contracts.
- Supporting the growth and development of Indigenous business through capacity building and shared learning.
- Using Indigenous suppliers of goods and services that are competitive and meet Imperial's safety, technical and quality standards, and timing needs.
- Providing information and training on Imperial's procurement processes, safety standards and expectations of business conduct.

Imperial's Consultation and Capacity Building Agreement with the Aamjiwnaang First Nation in Sarnia became effective in January 2021.



Methanex aims to educate on Indigenous rights and cultural heritage

In 2021, Methanex developed an internal Indigenous Reconciliation Action Plan to align their internal policies and standards more closely with the Canadian Truth and Reconciliation Commission's recommendations to promote meaningful reconciliation with Indigenous People in Canada and the Responsible Care Indigenous Communities Code. The 2021 actions focused on: providing Indigenous awareness training for leaders, modifying the membership requirements for their Medicine Hat Community Advisory Panel to include at least one person who identifies as Indigenous, and committing to support or partner with at least one Indigenous community, event, or initiative on an annual basis as part of their social responsibility program.

ENGAGING OUR COMMUNITIES TO MINIMIZE ADVERSE HEALTH AND ENVIRONMENTAL IMPACTS

Other community engagement efforts by CIAC members

MEGlobal named “Small But Mighty Award” winner by United Way Alberta Capital Region

MEGlobal Fort Saskatchewan received the “Small but Mighty Award” for its 2021 Employee Charities Campaign during the United Way of the Alberta Capital Region’s Small Business Awards of Distinction ceremony on March 10, 2022. It is the first year that MEGlobal Fort Saskatchewan has received the award.

The campaign raised nearly \$61,000 including \$27,022 in employee contributions, \$27,022 in matching funds from MEGlobal and \$6,898 raised in special events for a total of \$60,942.



“I want to congratulate everyone at MEGlobal Fort Saskatchewan for this great recognition from the United Way of the Alberta Capital Region,” said Rocco Schurink, VP of Manufacturing. “The funds raised are important but what is even more important is that Fort employees showed our communities that they care about them and that they want to make a difference for those who are in need.”

Shell Scotford signs emergency services agreement with Heartland Petrochemical Complex

In 2021 Shell Scotford and Heartland Petrochemical Complex (HPC) signed a service agreement that provides Emergency Response services. This agreement is the first in the area, and it provides emergency response services from Scotford to HPC which is approximately 5 km away. This includes things such as fire, high angle and confined space rescue, and medical support. Utilizing resources in this way is mutually beneficial as it provides a high level of service to both sites and provides more efficient use of emergency response resources in the region.



REDUCING EMISSIONS OF HARMFUL CHEMICALS

Under Responsible Care[®], CIAC members are committed to awareness and public communication of all emissions to the environment and a program to reduce those of health and environmental concern. Through this commitment, CIAC and its members are making progress on the following targets under UN SDG 3 (Good Health and Well-Being), UN SDG 6 (Clean Water and Sanitation), UN SDG 12 (Responsible Consumption and Production) and UN SDG 13 (Climate Action):



3.9 – By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water, and soil pollution and contamination.



6.3 – By 2030, improve water quality by reducing pollution, eliminating dumping, and minimizing the release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.



12.4 – By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.



13.2 – Integrate climate change measures into national policies, strategies, and planning.

Through Responsible Care and our commitment to sustainability and continuous improvement, CIAC members continue to invest in pollution prevention, energy efficiency, and resource conservation. CIAC tracks our members' reductions of greenhouse gas (GHG) and criteria air contaminant emissions through the National Emissions Reduction Masterplan (NERM).

Since 1992, CIAC has and continues to collect data through its NERM survey on chemical emissions by members including air, water, land, underground injection, and the offsite transfers of those substances in waste or recoverable materials. As can be seen in **Figure 1**, in 2020, 185 substances were reported out of more than 900 substances on the NERM substance list, and only 24 substances had emissions over 100 tonnes.

REDUCING EMISSIONS OF HARMFUL CHEMICALS

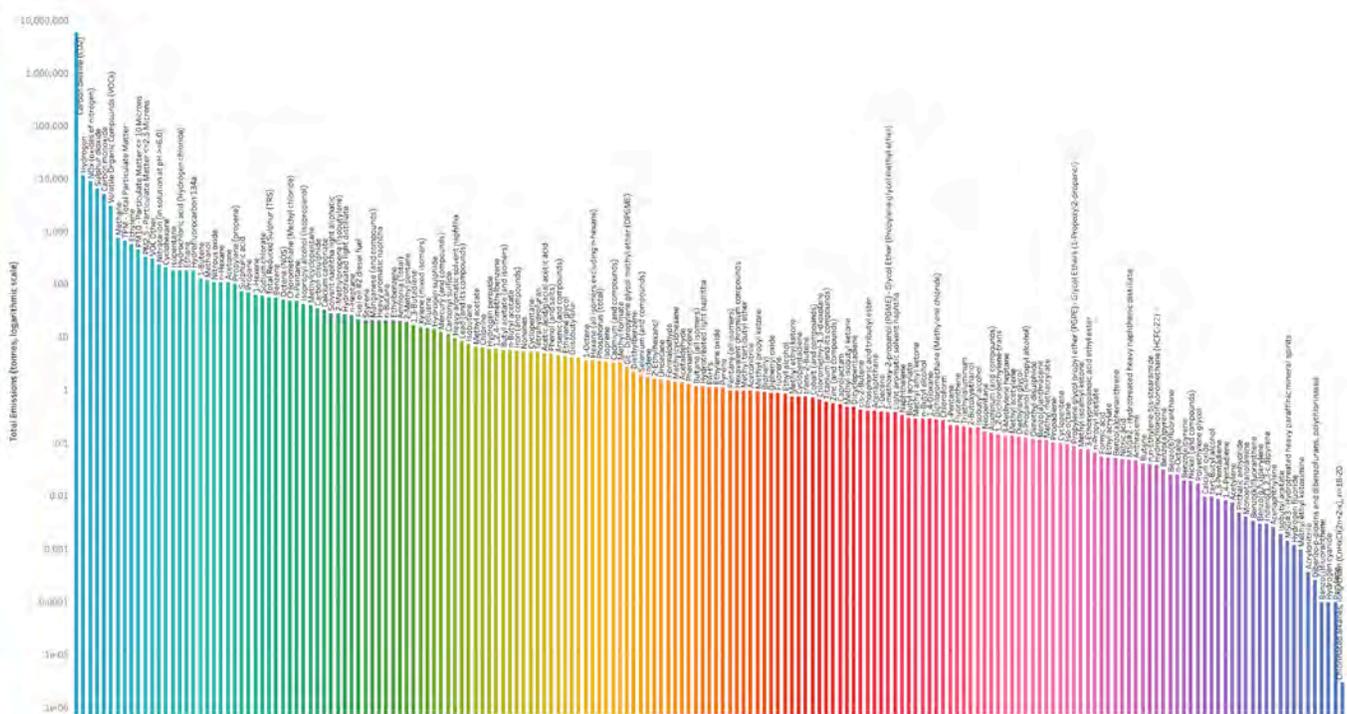


Figure 1. Total emissions of NERM substances by CIAC members in 2020, on a logarithmic scale from highest emissions to lowest emissions.

Figure 2 shows that the top ten chemicals emitted by CIAC member companies in 2020 were: carbon dioxide (CO₂), hydrogen, oxides of nitrogen, sulphur dioxide, carbon monoxide, volatile organic compounds, methane, total particulate matter, ethylene, and other particulate matter <= 10 micrometres (PM10). Since NERM’s inception, CO₂ has been consistently ranked the highest

emitted substance. It is important to note that despite the abundance of greenhouse gases and criteria air contaminants on this list, there are also less concerning chemicals, such as hydrogen. To see how CIAC members are making use of these hydrogen emissions, please see the next page covering climate change solutions.

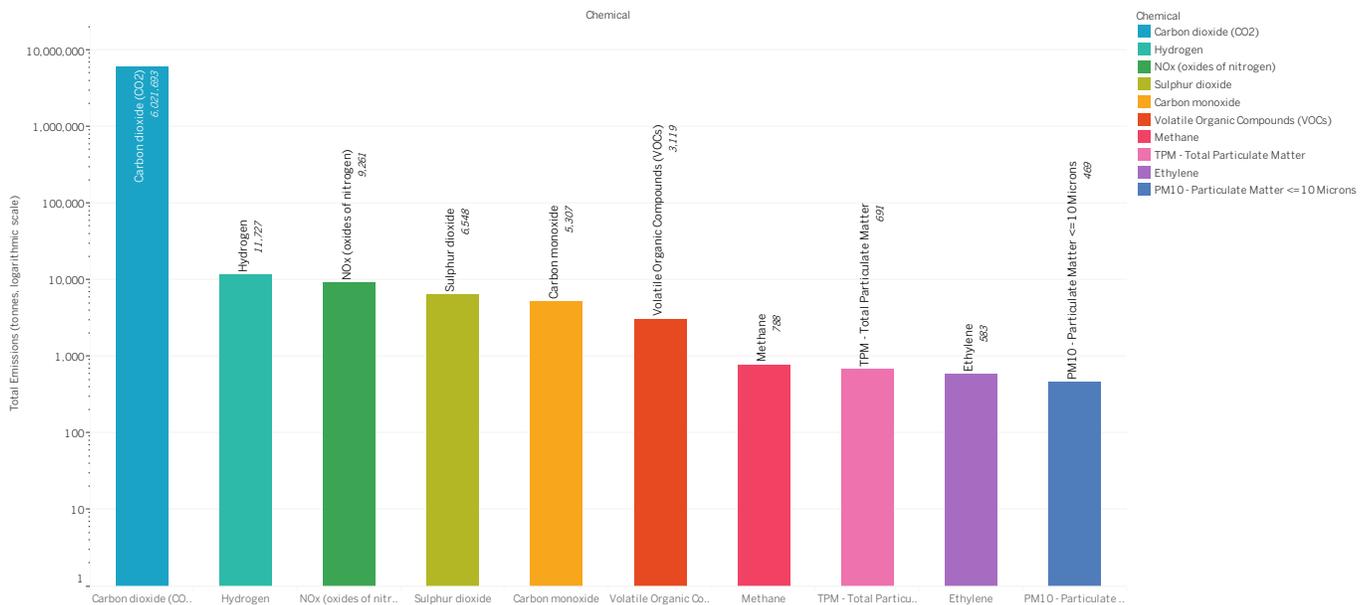


Figure 2. Total emissions of the top 10 NERM substances by CIAC members in 2020, on a logarithmic scale from highest emissions to lowest emissions.

REDUCING EMISSIONS OF HARMFUL CHEMICALS

Supporting chemicals management

The safe manufacturing of chemistry is at the centre of all the items that ensure our modern way of life. Canadians need to be confident that their health, safety, and environment are protected at all times. CIAC and our members are proud to support Canada as a global leader in the risk-based approach to chemicals management. Since 2005, CIAC members have reduced their emissions of Canadian Environment Protection Act (CEPA) Schedule 1 substances (excluding greenhouse gases and criteria air contaminants, which are analyzed separately) by 25 per cent on an absolute basis and 90 per cent based on emission intensity.

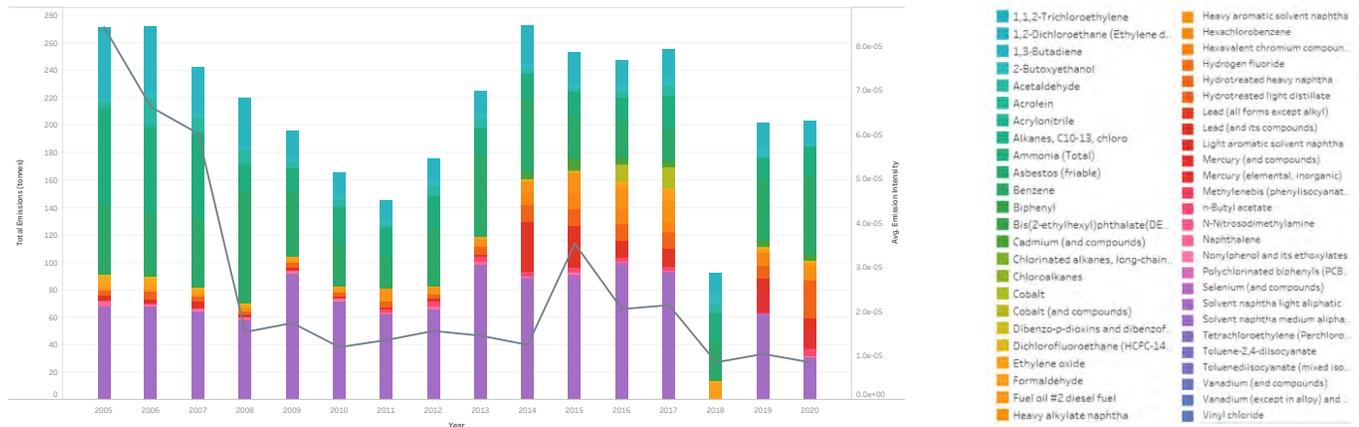


Figure 3. Total emissions (coloured bars) and average emission intensity (grey line) of CEPA Schedule 1 substances (excluding GHGs and CACs), 2005-2020. Note: the list of Schedule 1 substances is up to date as of May 2021.

The following figures explore trends for other sub-groups of chemicals that fall under CEPA Schedule 1

BTEX

Often, people choose to measure a group of VOCs, collectively known as BTEX, comprising benzene, toluene, ethylbenzene, and xylenes (mixed isomers – ortho, meta, para). The BTEX suite is more commonly measured, as they are straightforward to monitor together, and provide a well-rounded picture of aromatic VOCs and are present in most urban areas. Since 2005, CIAC members have reduced their emissions of BTEX by 25 per cent on an absolute basis and 46 per cent based on emission intensity.

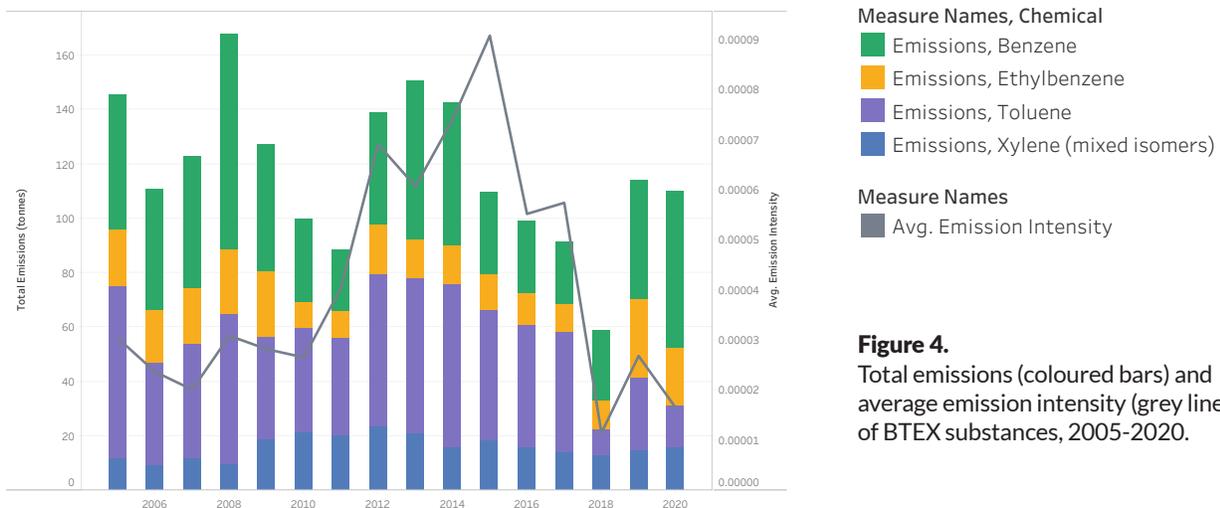


Figure 4. Total emissions (coloured bars) and average emission intensity (grey line) of BTEX substances, 2005-2020.

REDUCING EMISSIONS OF HARMFUL CHEMICALS

IARC

The International Agency for Research on Cancer (IARC) classifies substances as Group 1 (carcinogenic to humans), Group 2A (probably carcinogenic to humans), Group 2B (possibly carcinogenic to humans), and Group 3 (not classifiable as to its carcinogenicity to humans). Since 2005, CIAC members have reduced their emissions of IARC Group 1, 2A, and 2B substances by 24 per cent on an absolute basis.

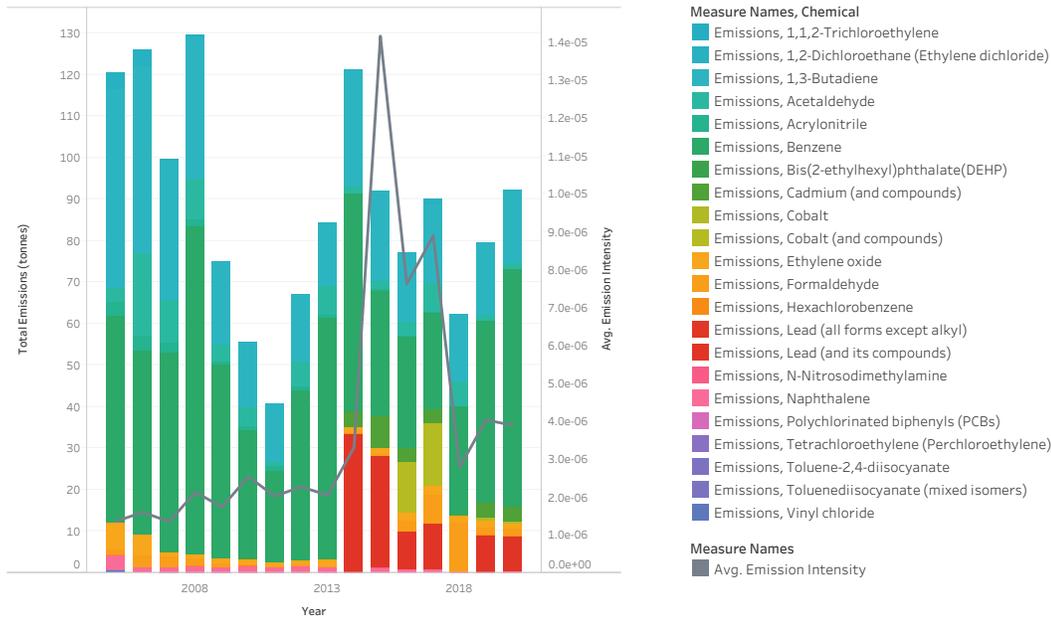


Figure 5. Total emissions (coloured bars) and average emission intensity (grey line) of IARC Group 1, 2A, and 2B substances, 2005-2020.

SAEHP

The Sarnia Area Environmental Health Project (SAEHP) aims to address concerns of Sarnia area communities about air pollution and other environmental stressors from local industries in the area. The Air Exposure Review is a scientific assessment that describes community exposures and associated risks to human health from chemicals in the outdoor air in the Sarnia area. Since 2005, CIAC members have reduced their emissions of SAEHP substances by 86 per cent on both an absolute basis and based on emission intensity.

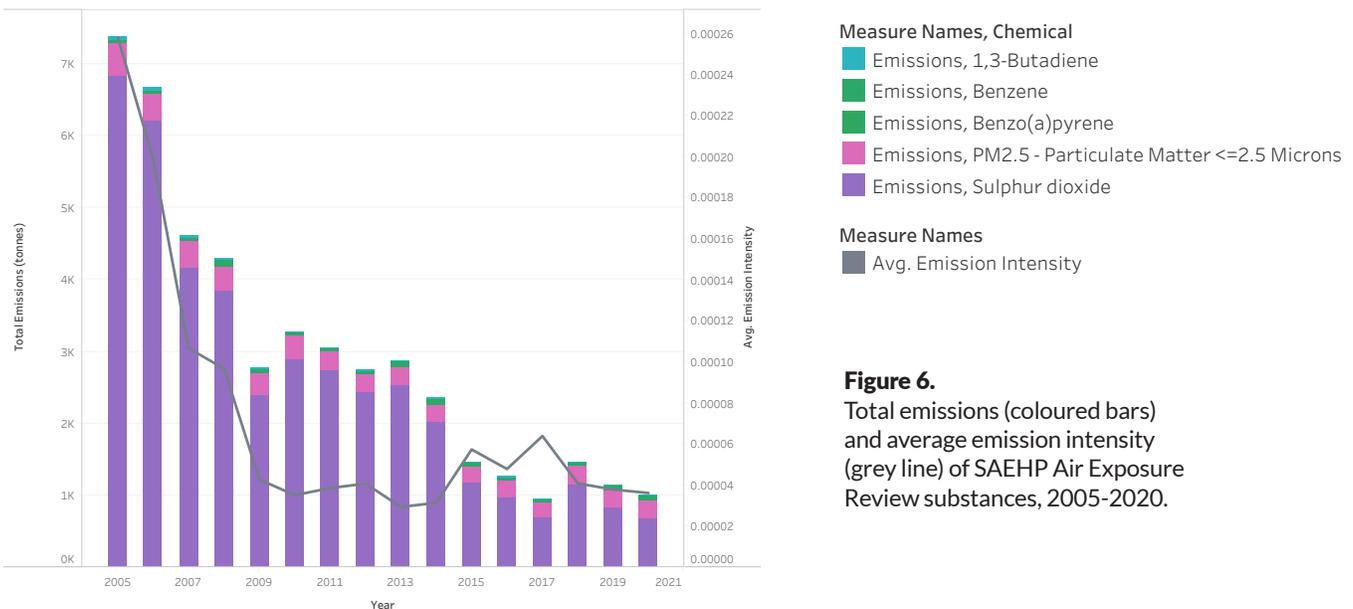


Figure 6. Total emissions (coloured bars) and average emission intensity (grey line) of SAEHP Air Exposure Review substances, 2005-2020.

What CIAC members are doing to support Canada's world-leading chemicals management approach

Replacement of fluorine free foam on Shell Scotford site

The Shell Scotford Emergency Response department made a large step toward ensuring a more environmentally responsible future for the Shell Scotford Site through the removal of fluorinated firefighting foam concentrates from service. They have removed over 6000 gallons of foam concentrate containing per-fluorooctane sulfonate (PFOS) and per-fluorooctanoic acid (PFOA). These chemicals are the subject of increasing regulatory focus due to potential health risks and potential for bioaccumulation within the environment. Scotford is the first Shell site in the Americas to complete the change to non-fluorinated firefighting foams and their learnings will assist other Shell assets with their future plans.

Renewal of the *Canadian Environmental Protection Act, 1999*

In April 2021, the federal government tabled Bill C-28, *Strengthening Environmental Protection for a Healthier*

Canada Act. The proposed amendments in this Bill represented the first major reform to the *Canadian Environmental Protection Act, 1999* (CEPA) since it was updated more than 20 years ago. CIAC welcomed its tabling and found the associated amendments to CEPA to be well-balanced and pragmatic. Unfortunately, Bill C-28 died on the Order Paper following the election call in August and has since been re-introduced in the Senate as Bill S-5 in early 2022.

Modernizing CEPA will ensure that the future of risk-based chemicals management in Canada can be launched as the original Chemicals Management Plan (CMP)—seen as the global gold standard and model for other countries—comes to its natural conclusion. To date, Canada has completed more risk assessments and introduced more risk management instruments than any other jurisdiction. Specifically, the government has categorized 23,000 substances and subsequently assessed almost 4,000 chemistries of the 4,300 identified as having potential exposures of concern since the launch of the CMP.

The balance of risk and precaution is an incredibly important underpinning of the Act. For the remainder of



REDUCING EMISSIONS OF HARMFUL CHEMICALS

2021, as CIAC prepared for re-introduction of a CEPA Modernization Bill, our advocacy remained focused on preserving the risk-based approach at the heart of CEPA and support for the legislative recognition of the Right to a Healthy Environment in the preamble of the Act, in keeping with the ethic and principles of Responsible Care.

Improving air quality

In 2012, in order to better protect human health and the environment, ministers of the environment, with the exception of Québec, agreed to implement a new Air Quality Management System (AQMS) to guide work on air emissions across Canada. The AQMS is a comprehensive and collaborative approach by federal, provincial, and territorial governments to reduce the emissions and

ambient concentrations of various pollutants of concern (i.e., criteria air contaminants or CACs), providing a framework for collaborative action across Canada to further protect human health and the environment from harmful air pollutants through continuous improvement of air quality. This program was built on a foundation of collaboration, accountability, and transparency. Industry, non-governmental and Indigenous organizations, including the CIAC, worked with governments to develop the AQMS, and CIAC, along with other stakeholders, continues to monitor implementation of the AQMS and participate in its ongoing development and improvement.

As seen in the **figure** below, since 2005, CIAC members have seen a 13 per cent decrease in total CAC emissions and 28 per cent decrease in CAC emission intensity.

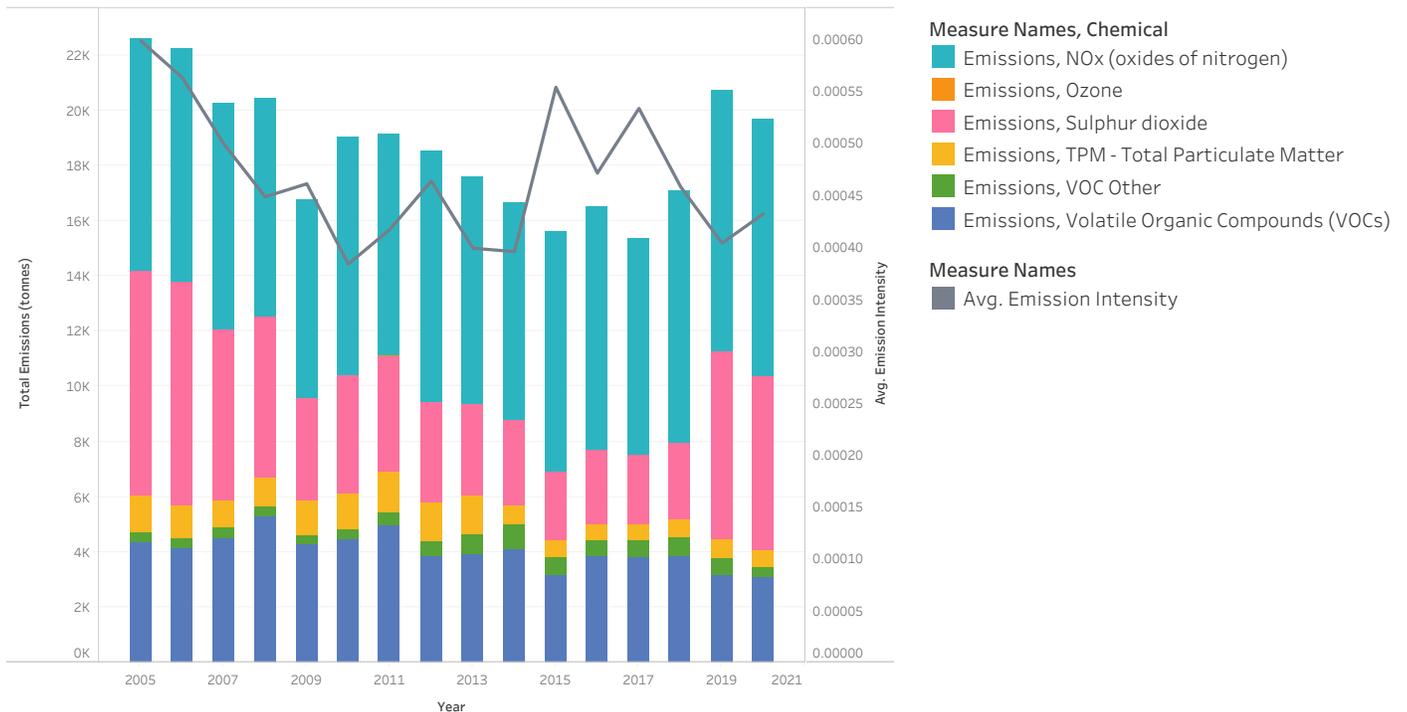


Figure 7. Total criteria air contaminant emissions (coloured bars) and average emission intensity (grey line), 2005-2020.

REDUCING EMISSIONS OF HARMFUL CHEMICALS

Canadian Ambient Air Quality Standards (CAAQS) are developed as a key element of the Air Quality Management System to drive improvement of air quality across Canada. CAAQS have been developed for nitrogen dioxide (NO₂), sulphur dioxide (SO₂), fine particulate matter (PM2.5) and ozone (O₃).

The figure below illustrates member emissions of SO₂, PM2.5, and NO_x geographically according to federal airshed. Based on this figure, it seems that most releases are of NO_x in Prairie and East Central airsheds and SO₂ in the East Central. However, it should be noted though that Methanex conducted major maintenance and re-investment activities at its Medicine Hat site recently, including the installation of low-NO_x burners, which represented a 75 per cent reduction in their facility emissions. The change year over year between 2020 and 2021 from Methanex alone will represent about an 11 per cent reduction in absolute emissions from CIAC members in Alberta and a corresponding improvement in NO_x emission intensity.

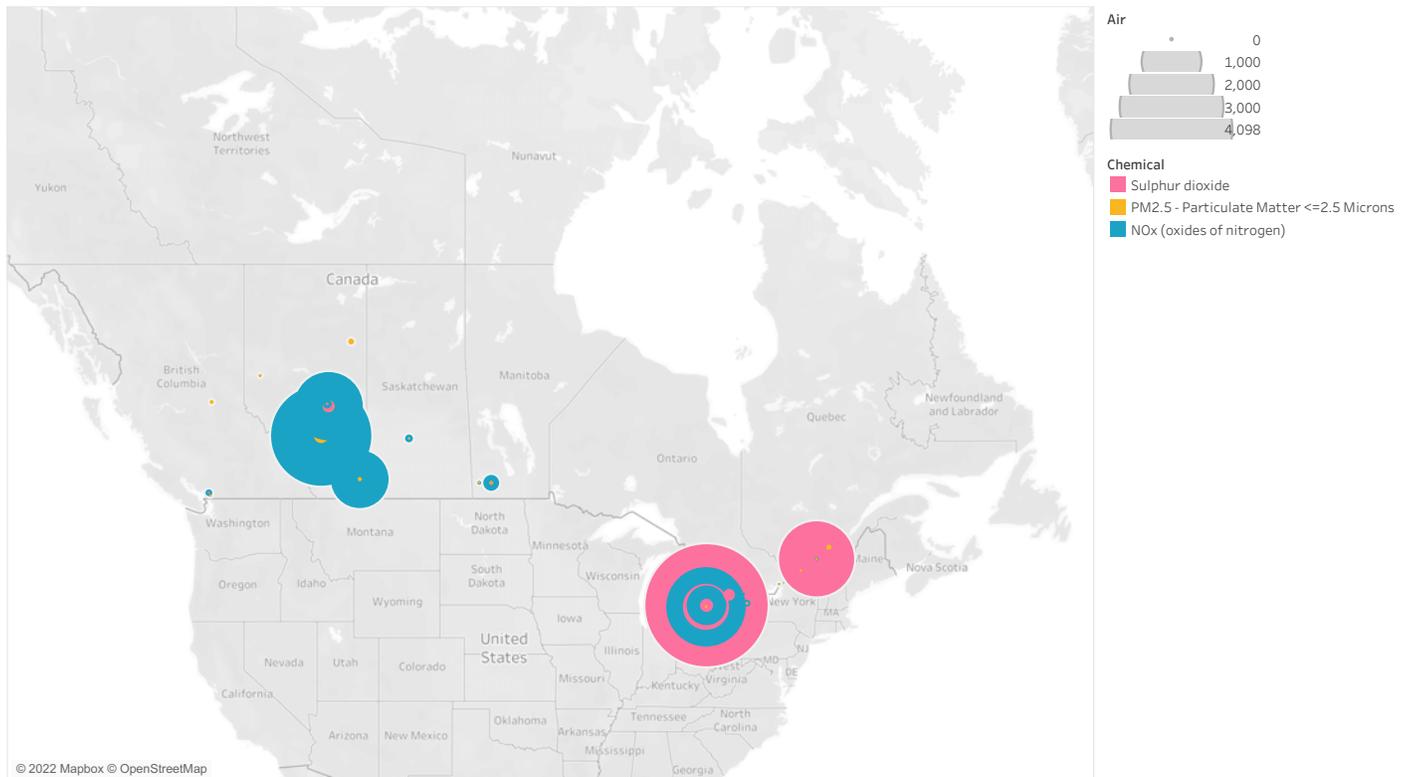


Figure 8. Geographic representation of PM2.5, SO₂, and NO_x air emissions in 2020 by airshed.

INVESTING IN INNOVATIVE CLIMATE CHANGE SOLUTIONS

Achieving net-zero carbon emissions for all of Canada by 2050 will require chemistry- and plastics-based solutions from green buildings, sustainable transportation, and clean energy. For example, chemistry and plastics-based solutions, such as carbon fiber, can reduce a vehicle's weight by an average of 100 kg and cuts its emissions by 10 g CO₂e/km through improved fuel efficiency while innovative insulation, window treatments and reflective roofing can dramatically reduce heating and cooling requirements and the corresponding emissions associated with buildings. Through these solutions, CIAC is supporting progress towards the following targets under UN SDG 7 (Affordable and Clean Energy), UN SDG 8 (Decent Work and Economic Growth), UN SDG 9 (Industry Innovation and Infrastructure) and UN SDG 13 (Climate Action):



7.2 – By 2030, increase substantially the share of renewable energy in the global energy mix.
7.3 – By 2030, double the global rate of improvement in energy efficiency.



8.2 – Achieve higher levels of economic productivity through diversification, technological upgrading, and innovation, including through a focus on high-value added and labour-intensive sectors.
8.4 – Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead.



9.4 – By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.
9.5 – Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending.



13.2 – Integrate climate change measures into national policies, strategies, and planning.

Climate change policy and advocacy

CIAC supports the government's 2050 net-zero ambition and is committed to sustainability through Responsible Care. The transition to the net-zero economy will not be possible without the chemistry and plastics sectors as more than 95 per cent of all manufactured products rely on chemistry. CIAC has responded to both the Net-Zero Advisory Body (NZAB) and federal government on their separate consultations to the 2030 Emissions Reduction Plan (ERP) and net-zero by 2050, noting the importance of chemistry and plastic innovations to enable the net-zero economy. As the federal government continues to engage on the ERP, our advocacy will focus on ensuring that the government works with industry to develop policies and tools beyond regulations that support Canadian industry to transition to net-zero. Additionally, the world's leading chemistry and plastics companies, including members of CIAC, are already exploring innovative new investments and emerging technologies to decarbonize production.



Dow Canada plans to build the world's first Net Carbon Zero Circular Hydrogen Cracker and

CCUS Project at Alberta Industrial Heartland

In October 2021, Dow Canada announced its plan to build the world's first net-zero carbon emissions integrated ethylene cracker and derivatives site with respect to scope 1 and 2 carbon dioxide emissions. The project would more than triple Dow's ethylene and polyethylene capacity from its Fort Saskatchewan, Alberta site, while retrofitting the site's existing assets to net-zero carbon emissions.



Proposed carbon neutral Blue Methanol Facility in Grande Prairie, Alberta

Canada's Nauticol Energy is developing a world-scale, net-zero, blue methanol facility in Alberta, Canada. The project will produce 3.4 million metric tonnes of net-zero methanol annually, made from the abundant regional natural gas supply and incorporating best-in-class 90+ per cent precombustion carbon capture. The blue methanol production is destined for global markets, meeting the increasing demand for low-carbon chemicals and clean energy in Asia and elsewhere.

Federal net-zero actions

CIAC supports the government's 2050 net-zero ambition. As part of the Net-Zero Emissions Accountability Act (the Act), which became law in June 2021, the federal government released a consultation process for Canada's 2030 Emissions Reduction Plan. This law enshrines the 2030 greenhouse gas emissions target as being Canada's Nationally Determined Contribution under the Paris Agreement, which is 40-45 per cent below 2005 levels by 2030.

A Net-Zero Advisory Body, made up of a group of independent experts, was established as part of the Act to consult with the government of Canada and provide advice on the strategic pathways to achieve net-zero emissions by 2050 and their interim targets. The government has also released, and plans to release, consultations in parallel for key initiatives of the ERP. These include transitioning to a net-zero emitting electricity grid by 2035, capping emissions from the oil and gas sector, developing a plan to reduce methane emissions, including reducing oil and gas methane emissions by at least 75 per cent by 2030, and mandating the sale of zero-emission vehicles.

INVESTING IN INNOVATIVE CLIMATE CHANGE SOLUTIONS

Since 2005, CIAC members have seen a **17 per cent decrease** in total CO₂e emissions and **25 per cent decrease** in CO₂e emission intensity.

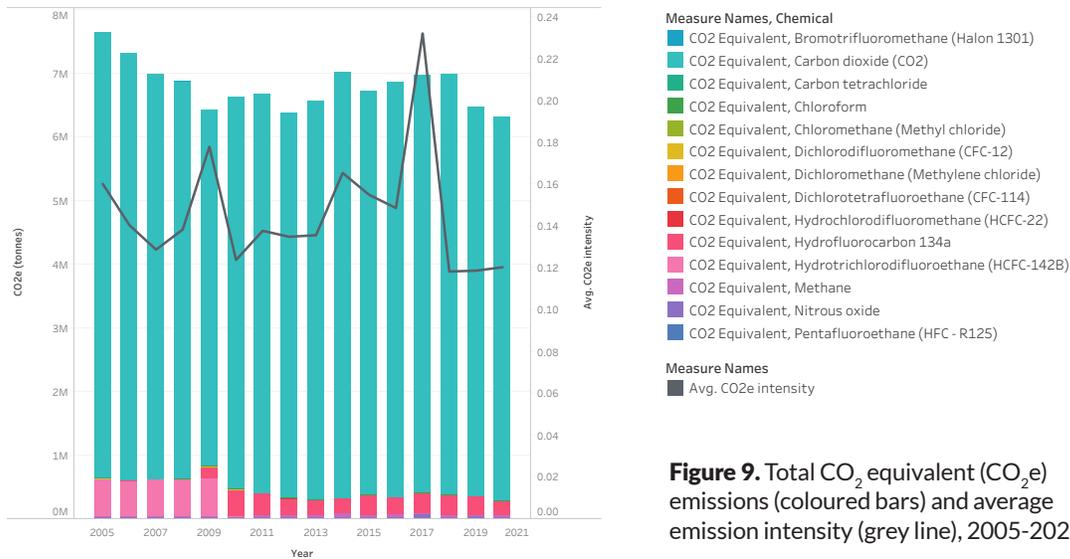


Figure 9. Total CO₂ equivalent (CO₂e) emissions (coloured bars) and average emission intensity (grey line), 2005-2020.

Creating new markets for hydrogen

CIAC members' H₂ emissions (see **Figure 10**) come from various manufacturing processes, including as a by-product of the sodium chlorate manufacturing process and other processes, such as the manufacturing of ethylene from ethane feedstock, which creates what is known as "grey" H₂.

H₂ by-product from these processes is typically captured and used as a feedstock in chemical production, recycled as a fuel, or released to the atmosphere, representing an opportunity to create a new market for CIAC members to sell by-product H₂. Supply of by-product H₂ in the near-term is low-cost relative to dedicated new production,

and members that currently emit H₂ into the atmosphere could become focal points around which near-term deployment hubs are based.

Moving forward, the chemistry industry will play a key role in determining which H₂ production pathways are most economical and should come to fruition in Canada. As lower carbon intensity forms of H₂ may not yet be cost-competitive, it is important that federal and provincial governments work with industry to find ways existing (i.e., grey) H₂ production can affordably reduce carbon intensity using available technologies such as Carbon Capture, Utilization, and Storage.

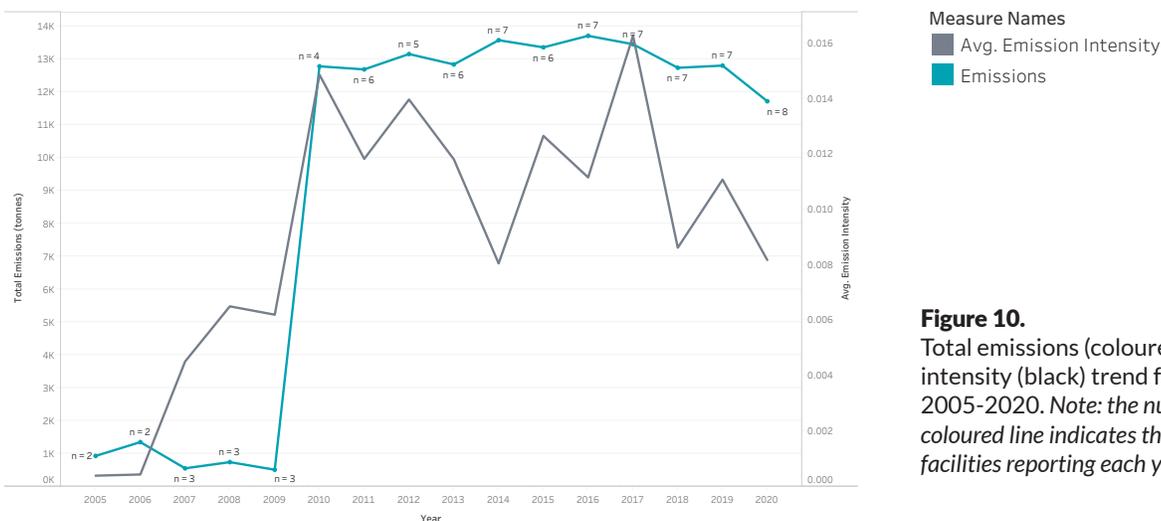


Figure 10. Total emissions (coloured) and emission intensity (black) trend for hydrogen, 2005-2020. Note: the number on the coloured line indicates the number of facilities reporting each year.

Decoupling economic growth from environmental degradation

Despite the COVID-19 pandemic, demand for chemistry products has not slowed down – in fact, the need for our sector’s products have never been greater. By 2050, chemical production will need to triple in volume to address future economic challenges, while also addressing emission reduction targets. Carefully designed, in collaboration with industry, Canada’s net-zero emissions plan has the potential to strengthen Canada’s chemistry sector further and contribute to making Canada’s economy more resilient and competitive.

Historically, the chemistry sector’s CO₂ and other greenhouse gas emissions have followed the same trend as economic sales data. As we work towards net-zero emissions, we have the opportunity to reverse this trend – driving down greenhouse gas emissions while maintaining the competitiveness of our industry and continuing to address the high demand for Canadian chemistry products. We are on our way to achieving this – in fact, as seen in **Figure 11**, since 2007, CIAC members have seen a 12 per cent decrease in total CO₂ emissions per \$1M CAD of value added to the Canadian economy (i.e., GDP) by the chemistry industry.

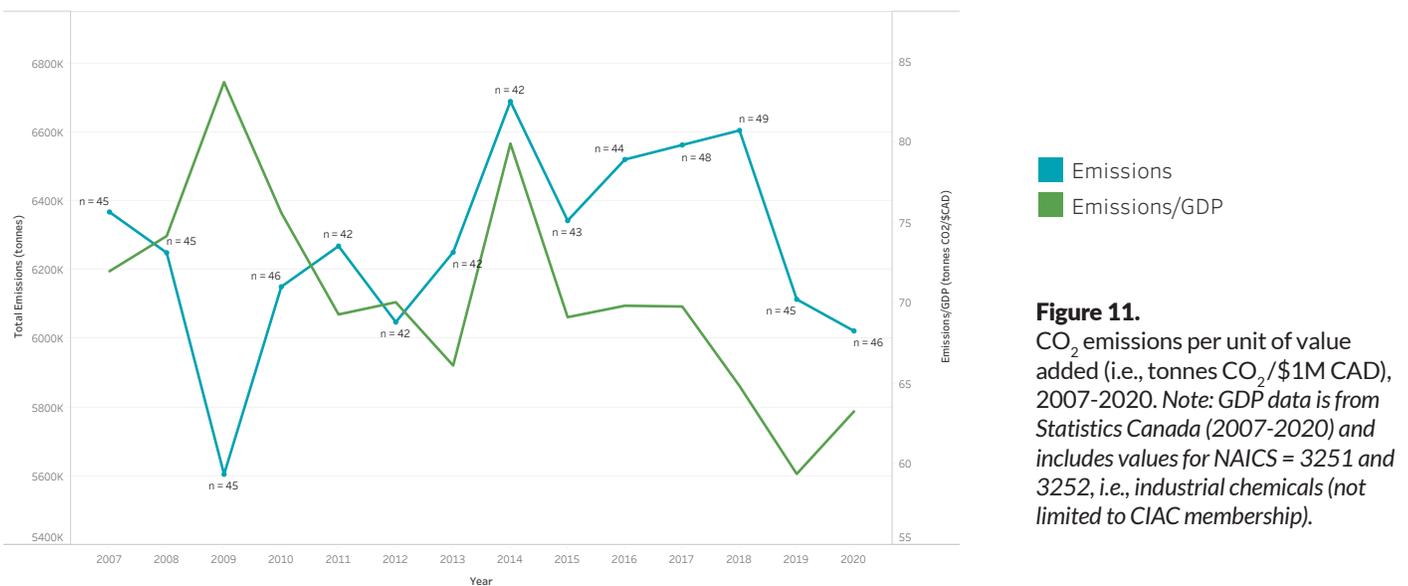


Figure 11. CO₂ emissions per unit of value added (i.e., tonnes CO₂/\$1M CAD), 2007-2020. Note: GDP data is from Statistics Canada (2007-2020) and includes values for NAICS = 3251 and 3252, i.e., industrial chemicals (not limited to CIAC membership).

What members are doing to achieve a low carbon economy



P&G's ambition to net-zero

Accelerating action on climate change is critical to ensuring a healthy planet for generations to come. P&G has set an ambition to achieve net-zero greenhouse gas (GHG) emissions by 2040 across its operations and supply chain, from raw material to retailer. P&G also shared a Climate Transition Action Plan to accelerate climate action across the entire lifecycle emissions of our products and packaging. P&G continues to make progress in reducing their operational emissions, leveraging their brands to help reduce energy use at home, and collaborating with their value chain partners to advance climate change progress.



BASF's transformation towards climate neutrality and a circular economy

In 2021, BASF launched the “Net Zero Accelerator”, a new senior project that focuses on BASF's transformation towards climate neutrality and a circular economy. In the senior project "Net Zero Accelerator", BASF is bundling and accelerating its extensive activities to achieve climate neutrality in 2050. This newly established unit focuses on implementing and accelerating projects relating to low-CO₂ production technologies, circular economy, and renewable energies. It will initiate, develop, implement, and manage projects related to climate protection across BASF. By combining expertise around renewable energies, alternative raw materials and CO₂ reduction technologies, BASF will increase the speed of implementation and achieve scaling effects more quickly, thus making an important contribution to climate protection.



NOVA Chemicals and CNG scale up use of post-consumer resin

According to recent consumer research conducted by NOVA Chemicals, the majority of consumers in all age demographics prefer packaging that contains Post-Consumer Resin (PCR). NOVA Chemicals and Charter Next Generation (CNG) have successfully collaborated to increase the supply of more sustainable films for packaging and advance a circular economy where valuable plastic materials are recycled to be used again and again. NOVA Chemicals' and CNG's work to increase PCR incorporation will help meet the emerging preference of consumers.

NOVA Chemicals' polyethylene PCR (PE-PCR) business is expanding to support customer demand for recyclable film structures with recycled content to meet converter, brand owner and retailer sustainability goals. CNG's purchase of recycled, linear low-density polyethylene (rLLDPE) can be used in a range of non-food film applications including e-commerce packaging, heavy duty sacks, collation shrink and industrial films.



The Methanex approach to a low carbon future

As a global leader in the methanol industry, Methanex recognizes

that the company has an opportunity and is well-positioned to actively participate in the transition to a low carbon economy. By leveraging the company's existing production assets and leading market position and by collaborating with government and industry, Methanex will drive solutions that can meet growing demand for methanol in ways that respect the environmental commitments of the company, its industry and customers.

Two priorities are guiding Methanex's activities to support a transition to a low-carbon economy: producing low-carbon/carbon neutral methanol and growing markets for methanol. The first set of activities are geared towards reducing the carbon footprint of methanol production. Methanex is exploring processes to reduce emissions from its existing facilities through improvements to efficiency and reliability, using lower-carbon or renewable feedstocks, and evaluating and implementing new technologies to produce methanol with a lower-carbon footprint at existing or future sites.



Closed Loop Partners launches multi-million dollar circular plastics fund

The current supply of recycled plastics meets only 6 per cent of demand for the most commonly used plastics in the U.S. and Canada. Systemic bottlenecks, misaligned incentives and policies, technological inefficiencies and outdated equipment across the plastics recovery system contribute to millions of tons of plastic going to waste in landfills and oceans. Increasing the recovery and recirculation of plastics could help meet an addressable market for plastics with potential revenue opportunities of \$120 billion in the U.S. and Canada alone.

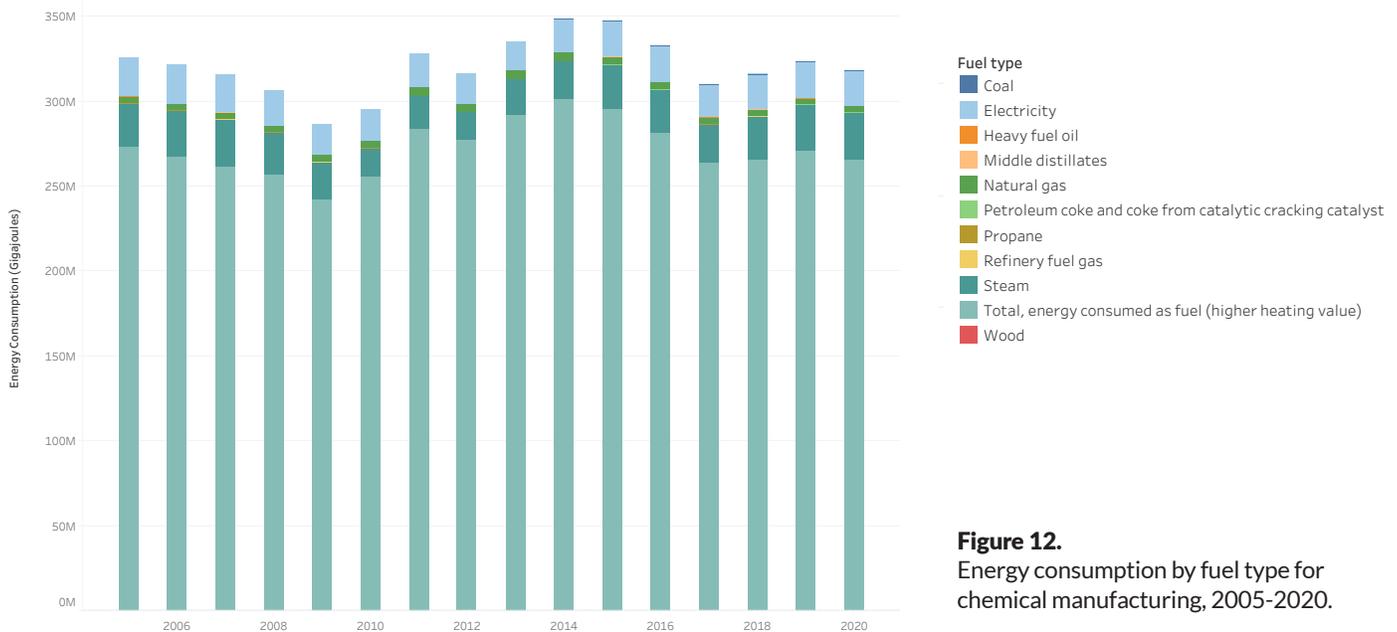
On May 26, 2021, three leading plastics and material science companies—Dow, LyondellBasell and NOVA Chemicals—announced the establishment of the Closed Loop Circular Plastics Fund to invest in scalable recycling technologies, equipment upgrades and infrastructure solutions. At scale, the Fund's investments aim to recycle over 500 million pounds of plastic over the Fund's lifespan.

What members are doing to increase energy efficiency

Throughout 2020, governments across Canada implemented public health measures to reduce the spread of COVID-19. These measures—such as lockdowns, travel restrictions and the closure of non-essential businesses—limited economic activity. In manufacturing, temporary closures and the suspension of operations, as well as disruptions in global supply chains, contributed to changes in demand for products and the reduction of some activities. The decline in manufacturing industry operations resulted in lower energy requirements.

Under the Responsible Care® Stewardship Code, CIAC members should identify opportunities to reduce risk and maximize efficiency of energy. A breakdown of energy consumption by fuel type for the entire chemical manufacturing industry in Canada (not limited to CIAC membership) is shown in **Figure 12**.

According to Statistics Canada, in 2020, energy consumption by the manufacturing sector fell 7.2 per cent to 2,033 petajoules compared with 2019, slightly lower than the amount of energy consumed during the 2009 recession.



What CIAC members are doing to increase energy efficiency.



KRONOS focused on energy efficiency at all production locations

Because titanium dioxide production requires significant energy input, KRONOS is focused on energy efficiency at all production locations. KRONOS recently established the Global Sustainable Energy Team, which is responsible for improving consistency between locations when collecting, comparing, and analyzing energy use data. They maintain a global inventory of historical energy reductions projects, which can be accessed by all locations to facilitate sharing of best practices. This team, consisting of global experts, discusses various ESG concerns and opportunities throughout KRONOS.

KRONOS also supports the purchase of energy-efficient products and services, as well as the principles of design for energy performance improvement. They are working to improve energy performance and to ensure the availability of information and necessary resources to achieve approved objectives and targets. For example, their Varennes, Quebec production facility is sourced with electricity from local power grids, comprised of nearly 100 per cent renewable energy (hydropower).



Shell's energy transition

Shell Scotford is embracing the Energy Transition with the completion of a 5 MW solar farm. The solar farm will displace 3 per cent of the electricity consumption at the Scotford Chemicals plant, reducing scope two greenhouse gas emissions and their site electricity supply costs. The energy generated will be brought back to their chemicals facility to offset grid power demand and reduce their scope two emissions by 5 kt CO₂ equivalents per year.

Some interesting facts related to the solar farm:

- 1,533 screw piles were fabricated locally from recycled drilling pipe and installed to support panel racking;
- 14,600 solar panels installed;
- inverters will be used to convert the DC power generated by the solar panels to AC power for transmission to the Chemicals site; and
- approximately 1,200 m of above ground and 200 m of underground 25kV line connects the Chemicals site.



Methanex pursues best in class plant efficiency

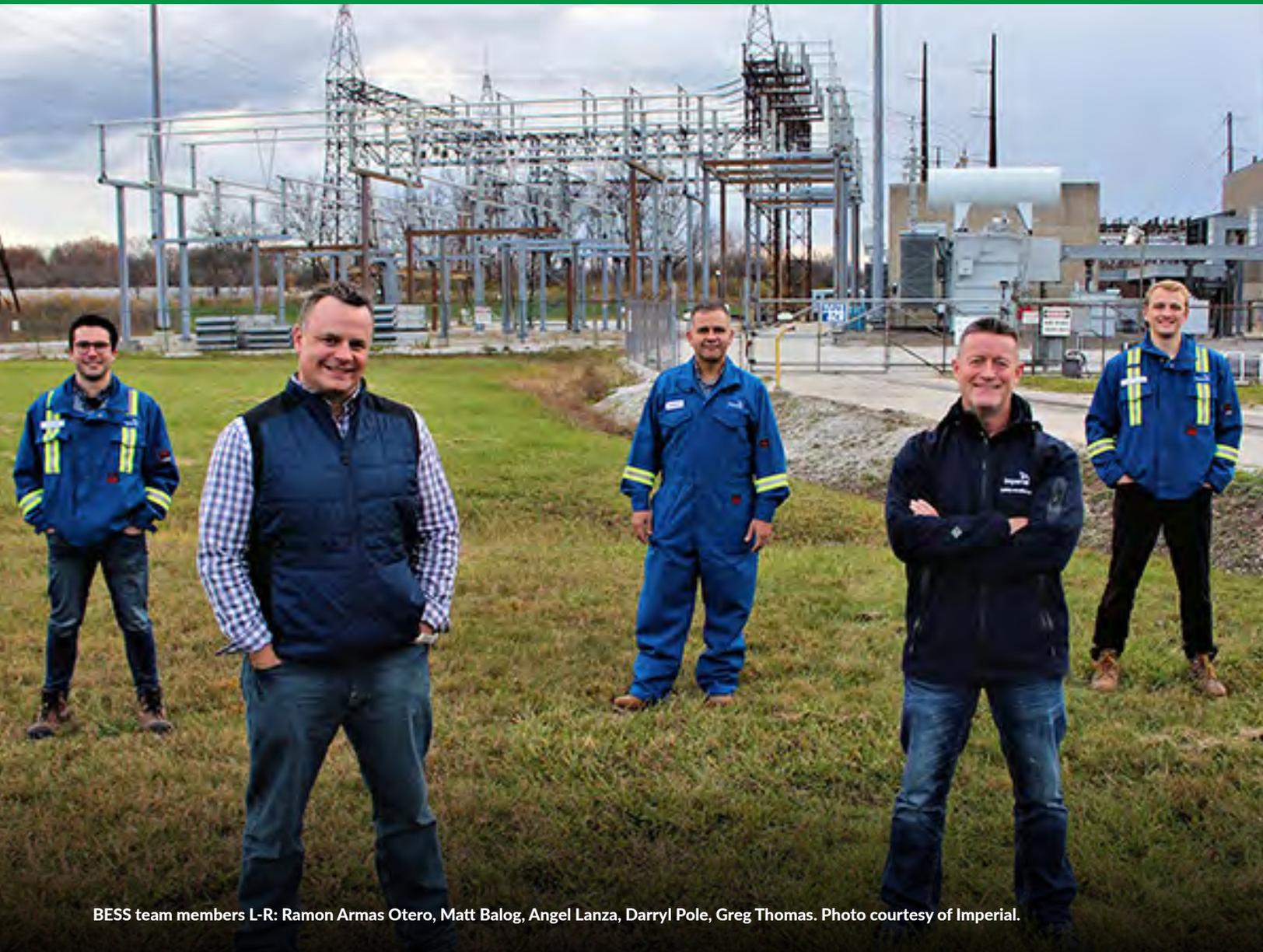
Methanex has always pursued strategies to reduce CO₂ emissions from manufacturing facilities and to use energy efficiently, which reduces the company's emissions intensity and lowers their overall cost structure. From 1994 to 2021, Methanex achieved an approximately 32 per cent reduction in Scope 1 (direct) emissions intensity and approximately three per cent reduction in absolute emissions from the company's manufacturing operations, even with a 42 per cent increase in production.

Methanex understands that as the global methanol leader the company has an opportunity to actively participate in the transition to a low carbon economy, which is why their recently released 2021 Sustainability Report details a commitment to reduce Scope 1 and Scope 2 GHG emission intensity from manufacturing by 10 per cent by 2030 from 2019 levels.



NOVA rewheeled its E2 compressor for environmental improvements

In 2019, NOVA Chemicals completed a project to rewheel a propylene refrigeration compressor at its Joffre, Alberta site, which resulted in many environmental improvements. Rewheeling the compressor significantly improved its efficiency, addressed a demineralized water constraint, reduced overall water consumption, lowered costs and reduced GHG emissions.



BESS team members L-R: Ramon Armas Otero, Matt Balog, Angel Lanza, Darryl Pole, Greg Thomas. Photo courtesy of Imperial.



A sustainable battery storage solution at Imperial Sarnia

The sustainability of Ontario's electrical grid is an important part of the energy transition. Imperial's Sarnia site has partnered with global energy company Enel X to install a 20 MW behind-the-meter energy storage solution (BESS) on the footprint of its polyethylene plant. Site Business Analyst, Greg Thomas says this project will allow Imperial to draw from the grid at night when it's running on nuclear, hydro and wind. "The energy is stored in a large battery and discharged during the day when electricity consumption is at peak demand. This reduces the draw on the province's grid especially during extreme weather, and that's a benefit for everyone," Greg says. Not only will the battery utilize stored energy, but it will also lower operating costs and reduce emissions at the site. The Sarnia BESS will be the largest of its kind in North America.



Dow staff with test utility task vehicles. Photo courtesy of Dow.



Electric vehicle trial underway at Dow Fort Saskatchewan

In October 2021, Dow's Alberta Operations started a one-year trial to test utility task vehicles (UTV), including three electric models, to replace the existing fleet of aging pickup trucks at the Fort Saskatchewan site. This project will support Dow's site goal to build a culture of sustainability and Dow's 2025 Sustainability Goal to maintain world-leading operations performance in natural resource efficiency, environment, health and safety.

A total of 19 vehicles were delivered and assigned across the site to different units, so they can be tested under different requirements. All electric vehicles will be kept at charging stalls at their designated home buildings. Their power consumption will be tracked and compared to traditional internal combustion engine vehicles. Not only will the electric UTVs consume little to no fuel, reducing Dow's greenhouse gas emissions, they will also help lower maintenance costs, travel time, and the trips needed for tradespeople to gather their tools, since the vehicles have more storage.

If the trial proves successful, the electric UTVs could provide a more sustainable option for replacing internal combustion engine vehicles as they reach their end of life. The project team will collect feedback throughout the trial period to assess and optimize vehicle performance.

ADVANCING PRODUCT STEWARDSHIP AND SUSTAINABLE PRACTICES

The Responsible Care® Stewardship Codes describe the expectations of companies to responsibly manage their products beyond their transport to the next entity down the value chain, the supply of raw materials and the sale of services and technologies. Additionally, through Operation Clean Sweep™, our Plastics Division members commit to preventing plastic pellets, powders and flakes from entering the environment. Through these commitments, CIAC members are making progress on the following targets under UN SDG 12 (Responsible Consumption and Production):



12.4 – By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.

12.5 – By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

12.6 – Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.

Stewardship culture

Through Responsible Care, CIAC members are expected to instill a culture of stewardship throughout their organizations. CIAC considers stewardship a shared responsibility on behalf of all parties involved throughout the entire chemistry industry value chain. These parties are to share information to ensure the safe management of products throughout their life cycles. This requires the development of regular, sustained dialogue between member companies and their stakeholders, as well as working relationships between members, suppliers, customers, and any other relevant parties.

A culture of stewardship encourages all parties, regardless of their place along the value chain, to have in place active systems and processes that ensure the safe, environmentally sound, and socially responsible management of products. By taking the necessary steps to ensure that stewardship is exercised along the entire value chain, there is a much greater chance that the chemistry industry as a whole will meet the public's increasing demand for safe, environmentally friendly, and sustainable chemistry products.



Tim Gilroy, Process Operator. Photo courtesy of Imperial.

What CIAC members are doing to promote a culture of stewardship



Operation Clean Sweep progress at Imperial Sarnia

The Imperial Sarnia Polyethylene Plant is making great strides in its Operation Clean Sweep (OCS) stewardship. OCS is an international industry

program focused on preventing plastic resin and pellet loss. Imperial began its participation over two years ago and since then, the site has significantly lowered the possibility of losing pellets to the environment. OCS audits are carried out quarterly, and new procedures have been developed. The program has been integrated into operator training and has become part of surveillance rounds with operators actively looking for pellet loss during every shift.

A key progress area for the program at Imperial has been procuring resources like barrel vacuums and backpack shop vacs which are used when responding to small spills. The motivation around OCS amongst Imperial employees is high particularly since they're able to see the major improvements that have been made in the two short years since the program launched.



NOVA considers biodiversity in its operations

Biodiversity is all around us. It is the variety of life in the world and encompasses eight million plant and animal species, their ecosystems and genetic diversity. Unfortunately, the United Nations (UN) reported that biodiversity is declining at a faster rate than ever before. Resulting impacts include natural disasters like floods and fires, which disrupt supply chains, negatively impacting businesses and the local and national economies.

NOVA Chemicals is taking care to consider biodiversity in its operations. To minimize risk and avoid disruption to biodiversity during construction projects, the Company's Environment Team works with experts to conduct land assessments, surveys, nest sweeps and other activities to identify sensitive species and opportunities for enhancement at our existing sites and the Rokeby site under construction. Then, biodiversity risk mitigations and management plans are implemented to protect, preserve, or enhance the plants, wildlife, and area habitat.

BASF Canada: supporting a circular economy for plastics

Global brand owners have committed to reducing virgin plastic by 50 per cent as early as 2025. The Government of Canada has committed to 50 per cent + recycled content in plastic products by 2030, translating to almost 2.5 million tonnes of plastics that need to be certified as recycled content. To achieve these commitments within the stated deadlines, there are technical, quality, trust, certification, and economic issues to address.

To address these challenges, BASF Canada launched reciChain, an innovative solution to incentivize plastics circularity participation. reciChain enables sorting, traceability, and transparency of recycled plastics throughout the value chain and complies with anticipated certification and extended producer responsibility (EPR) standards. This program is an example of BASF aiming to move toward a more circular economy by increasingly using recycled, and renewable feedstocks.

This past year, BASF Canada also launched a documentary titled, *The Afterlife of Waste*, to build awareness on the opportunities and challenges of implementing a circular economy for plastics in Canada. The documentary, co-produced by BASF Canada and Bullfrog Power, highlights the potential for a circular economy in Canada and reframes how we think about waste and energy. Today, during a pandemic that has increased the use of disposable goods, it is more important than ever to reduce waste and design for reuse in Canada. **Watch The Afterlife of Waste here.**



Methanex – A focus on stewardship and education

Methanex's product stewardship programs cover the entire methanol value chain, starting with product safety programs for employees and customers, and expanding throughout the supply chain to include safe product transportation. Specialized training requirements are in place for all employees that handle methanol, and Methanex also regularly offers free seminars and webinars to share best practices in the safe handling and distribution of methanol and similar products.

These information sessions are offered throughout the year in local languages and are attended by supply chain partners, customers, terminals, surveyors, distributors, carriers and emergency services, as well as local and/or regional authorities in all regions where the company sells methanol. In 2021, Methanex hosted 45 such seminars or webinars, reaching more than 800 participants. The company provides technical and safety information about methanol in multiple languages on their website, including material SDSs as noted above, a methanol safe handling guide and video, and other educational materials.

Plastics research in action with Inter Pipeline, NAIT and Dow Canada

Inter Pipeline partnered with the Northern Alberta Institute of Technology (NAIT) and fellow industry member Dow Canada to undertake the Plastics Research in Action (PRIA) initiative. This multi-disciplinary research program led by industry and research experts focused on exploring opportunities for society to reuse and recycle plastic waste, as well as identifying opportunities for enhanced sustainable operational practices at Inter Pipeline’s Heartland Petrochemical Complex.

The Microplastics Project is one of PRIA’s major research initiatives. It is focused on developing methods to identify and quantify microplastics in freshwater and river sediments. The goal of this project is to optimize protocols that can accurately and efficiently evaluate types of microplastics in the North Saskatchewan River. Other PRIA projects underway involve blending post-consumer plastics into asphalts, producing recyclable luxury flooring and collaborating with Alberta Plastics Recycling Association (APRA) in a plastic waste study.



NAIT’s Dr. Paolo Mussone and his team from NAIT taking samples on the North Saskatchewan River for the microplastics project. Photo courtesy of Inter Pipeline.



A LEADING POLYTECHNIC
COMMITTED TO STUDENT SUCCESS



“It’s important as a society that we get plastics right. When plastic products complete their usefulness, they don’t belong in landfills or the environment. They should be considered a valuable resource that can be recycled and re-used and enter the production cycle again and again, known as a circular economy.”

— Lorraine Royer, Director of Government and Stakeholder Relations with Inter Pipeline

DUPONT™ DuPont: Advancing chemicals management processes

In 2021, DuPont de Nemours Inc. implemented an enhanced corporate chemical management policy that details a framework and specific governance practices for managing substances of concern (SoC) globally. The framework is designed to evaluate scenario by scenario, specific and aggregated potential human health and environmental risks, product deselection risks, and risks to its right to operate associated with current and potential regulatory landscapes. The substance and product-based risk assessment outcomes provide a transparent view that support the governance for making informed decisions for excluding the use of a SoC within the development of new products, for discontinuing the use of a SoC in its existing portfolio, for framing risks assumed when considering acquisitions and for supporting the safe use and disposal

of their products by their customers. DuPont’s enhanced focus on the management and governance of SoC also inherently contributes to its Corporate Sustainability Goals for Safer by Design.



NorFalco’s product stewardship practices seen as “Best Practices”

NorFalco was re-verified at the end of 2020 and their product stewardship practices were highlighted as “Best Practices” in the last re-verification report:

“The verification team notes as a Successful Practice the NorFalco Dislocation Policy related to potential community disruptions during an emergency incident involving NorFalco third party carriers and products.”

INCREASING NATURAL RESOURCE USE EFFICIENCY

Our members provide the essential chemicals to ensure our safe, clean water supply. Additionally, under the Responsible Care® Operations Code, members are committed to resource conservation efforts, including energy, raw materials, water, and other utilizes and supplies. Through these commitments, CIAC members are making progress on the following targets under UN SDG 6 (Clean Water and Sanitation), UN SDG 9 (Industry, innovation and Infrastructure) and UN SDG 12 (Responsible Consumption and Production):



6.3 – By 2030, improve water quality by reducing pollution, eliminating dumping, and minimizing the release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

6.4 – By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.



9.4 – By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.



12.2 – By 2030, achieve the sustainable management and efficient use of natural resources.

12.5 – By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

12.6 – Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.

As part of Responsible Care, members are committed to being responsible stewards of water resources by managing their business to conserve and minimize water use, preventing incidents that would be detrimental to water quality or quantity, and controlling effluent streams to protect water bodies, groundwater, and habitat.

The Responsible Care Codes also govern members actions in relation to the generation, handling, and disposal of hazardous wastes, through all the life cycle stages of research and development, manufacture, transportation, distribution, and the end use and disposal of chemicals and chemical products.

Improving water quality

Through the NERM survey, CIAC is able to track members' releases of NERM substance to water. As can be seen in **Figure 13**, since 2005, CIAC members have reduced total emissions to water by 54 per cent. In 2020 specifically, water emissions represented only 0.005 per cent of the total 2020 emissions to all media (i.e., air, land, and water).

INCREASING NATURAL RESOURCE USE EFFICIENCY

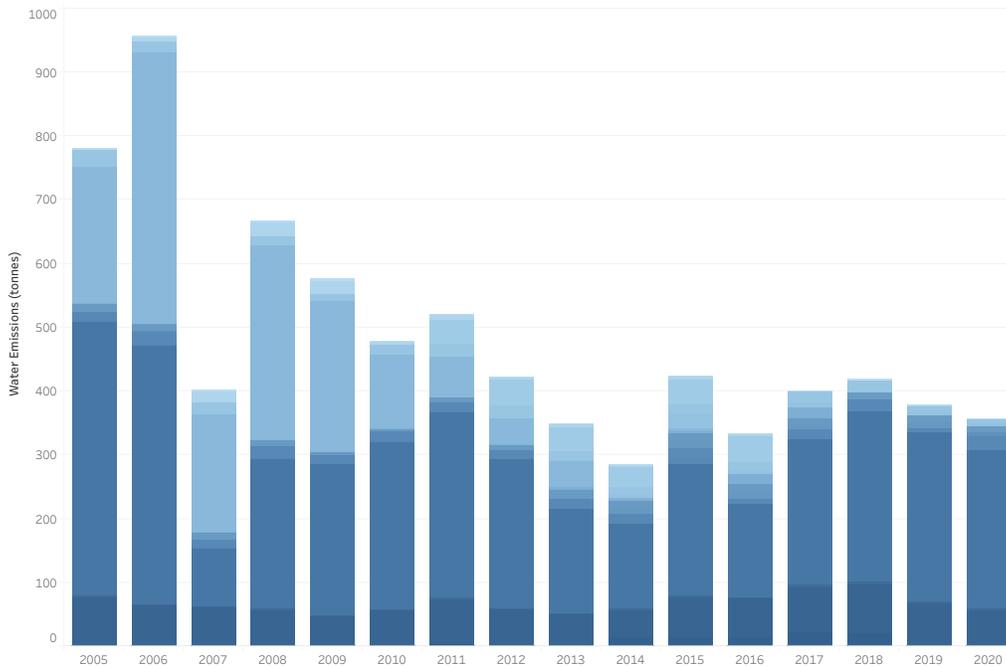


Figure 13. Total emissions to water, 2005-2020. Note: each shade represents a different substance.

Additionally, through the Resource Conservation Metrics survey, which was launched in 2012, CIAC is able to track members' water intake from ground, municipal, and surface water sources. A breakdown of water intake by province and source (i.e., ground water, municipal water, and surface water) can be seen in **Figure 14**, with surface water being the most common source for water for members over the years.

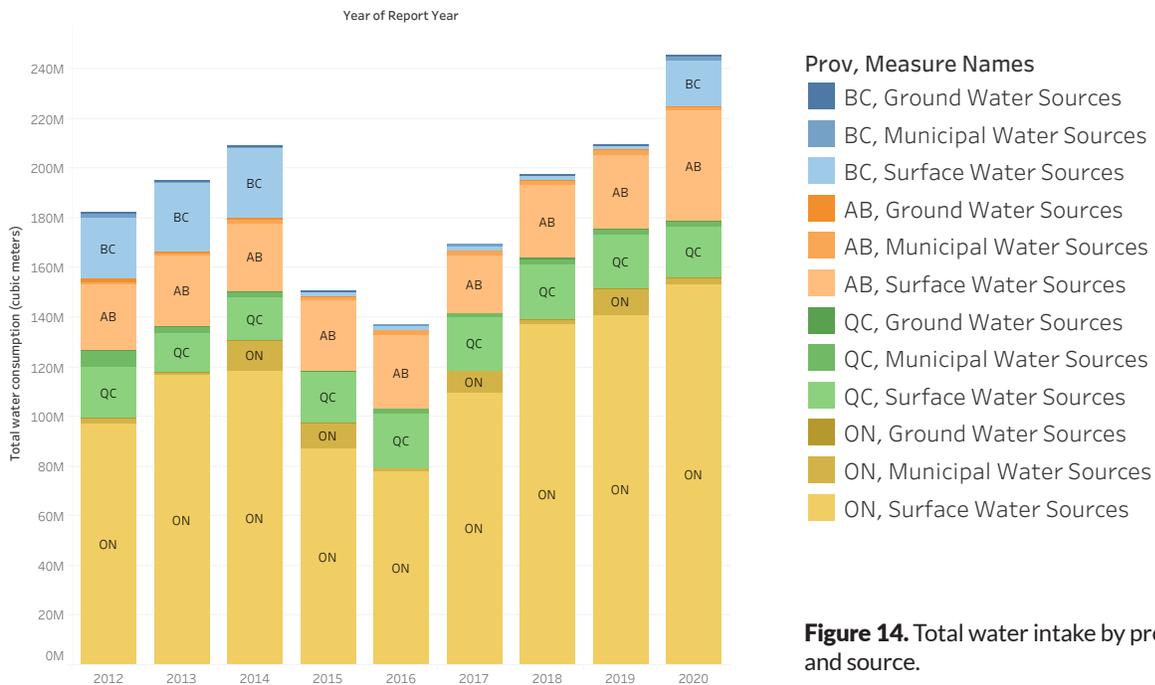


Figure 14. Total water intake by province and source.

INCREASING NATURAL RESOURCE USE EFFICIENCY

The map in **Figure 15** shows where surface water is being taken by our members in 2020. It is quite evident that the majority of water intake is from surface water sources in the Great Lakes region, St. Lawrence River, and in Alberta, aligned with members' facility locations.

Based on analysis by Environment and Climate Change Canada, the greatest threats² to water availability in Canada are in portions of southern Ontario, southern Alberta, southern Saskatchewan, southwestern Manitoba, and the Okanagan Valley in British Columbia. Considering this information, it is critical to ensure that CIAC members

in areas like the Great Lakes keep resource conservation top of mind.

CIAC members are doing just that – through various methods of wastewater treatment, many CIAC members are actually returning water cleaner than when they found it. **Figure 16** below shows both the treatment methods used for wastewater (colour) and volume of effluent released by members (bubble size) in 2020, providing a picture of the water that actually gets returned to its source following extraction and use.

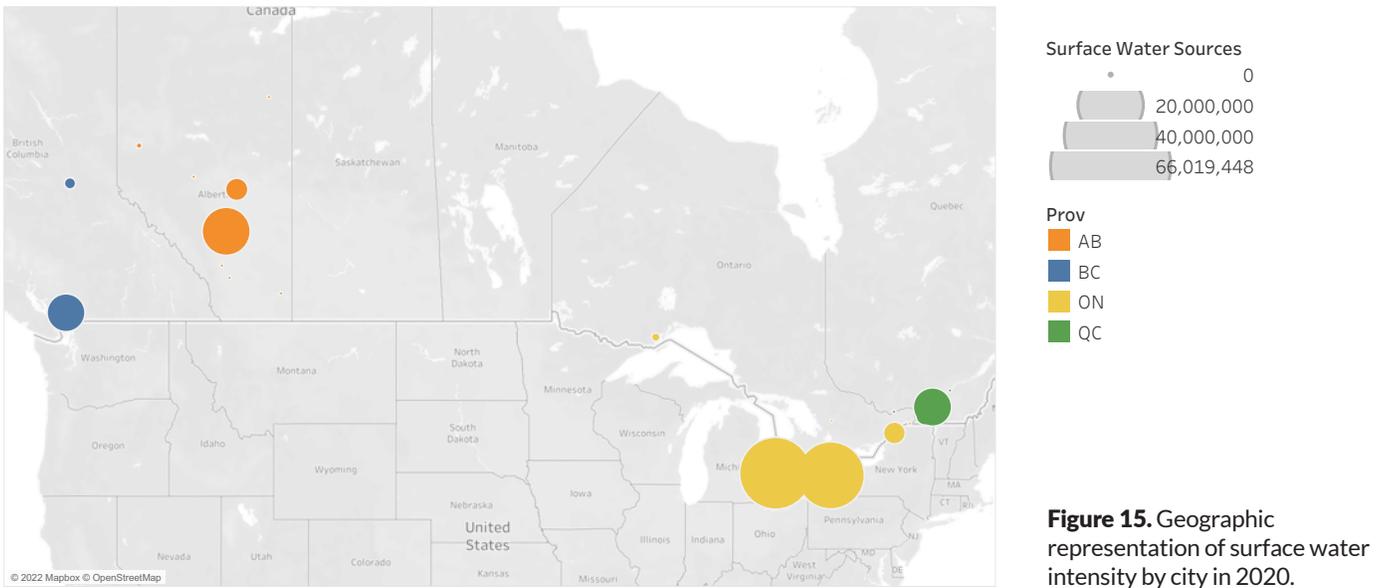


Figure 15. Geographic representation of surface water intensity by city in 2020.

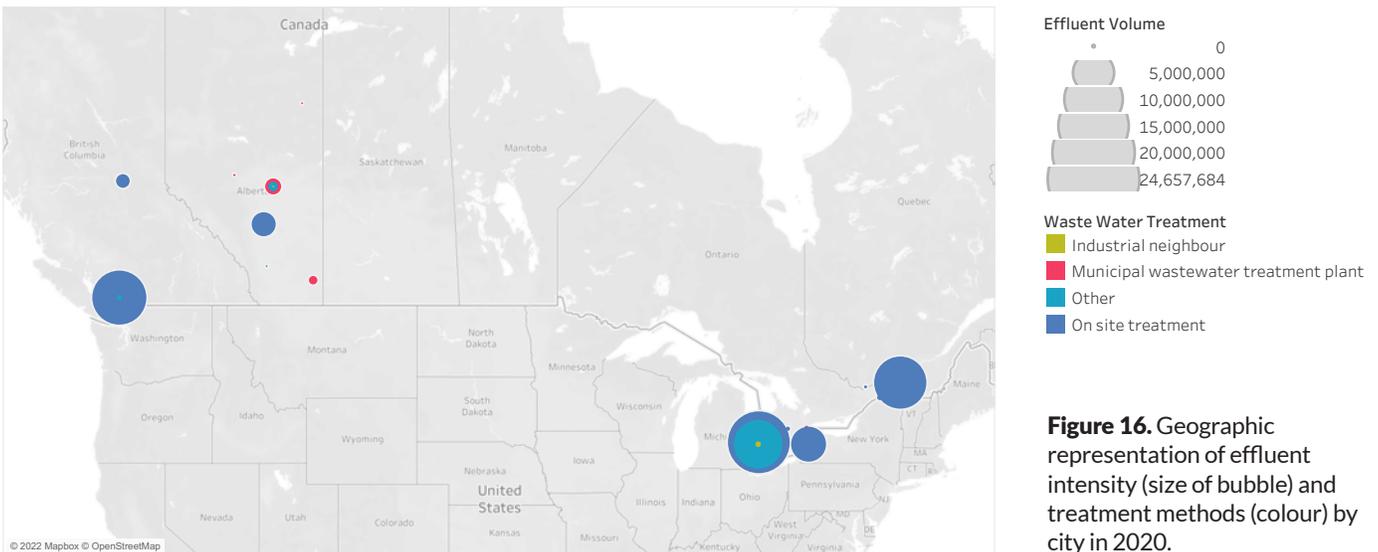


Figure 16. Geographic representation of effluent intensity (size of bubble) and treatment methods (colour) by city in 2020.

²A high threat to water availability means that more than 40 per cent of the water in rivers was withdrawn for human use.

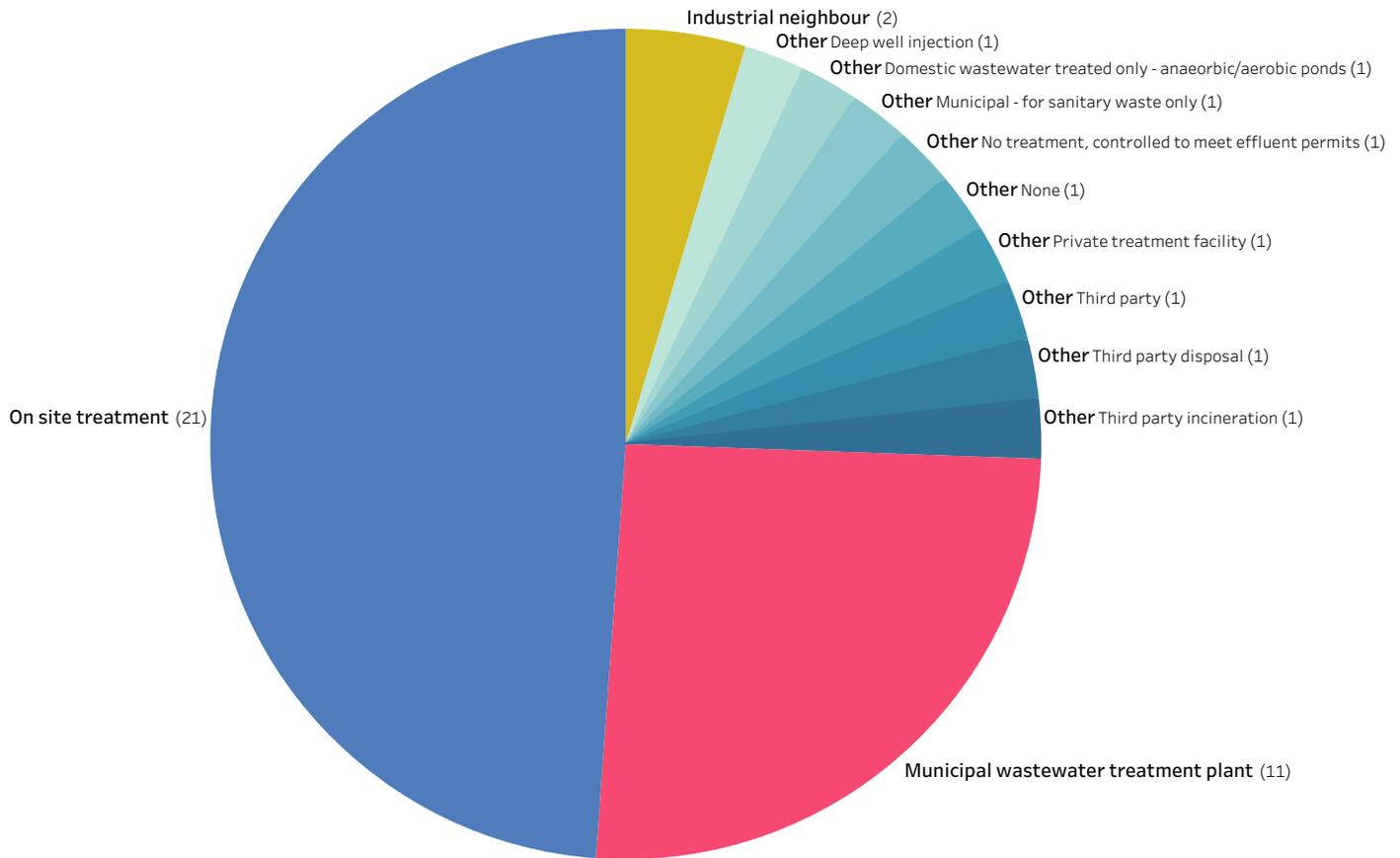


Figure 17. Wastewater treatment methods used by CIAC members in 2020.

What CIAC members are doing to support clean water and sanitation

EVONIK *Leading Beyond Chemistry* **Evonik strives to use water as efficiently as possible**

The availability of water as a resource depends enormously on regional and local conditions. By using water stress analyses at production sites, Evonik aims to pay greater attention, in particular, to the considerable local differences in the availability of water. For them, water stress refers first and foremost to the availability of water for production. Their sustainable water management also takes into account quantitative, qualitative, and social aspects of water use. Evonik identifies potential for improvement at its sites and endeavors to minimize the use of water, especially in water stress areas, in order to respect the needs of their neighbors. They plan to develop a new quantitative water target through a strategic project in 2022.

Jungbunzlauer **Jungbunzlauer uses state-of-the-art wastewater treatment plants**

One of the main water sources affected by Jungbunzlauer's operations is the Welland Canal in Canada. Water is drawn from the canal mainly for cooling purposes and for use in other parts of the production process. While so called non-contact cooling water is directly returned to the Welland Canal, process water is treated first in a state-of-the-art wastewater treatment plant before it is returned to the water source.

Each production site has a wastewater treatment plant to ensure the correct treatment of water effluents. Local regulatory requirements are fulfilled and there is a dedicated employee in each plant responsible for the treatment of wastewater. Additionally, in their wastewater treatment plant, some waste streams are used in anaerobic digesters to produce biogas, which is used on site for the production of steam.

INCREASING NATURAL RESOURCE USE EFFICIENCY



Project Partner LANXESS with their 2nd Annual donation. Photo courtesy of LANXESS.



LANXESS helps deliver safe drinking water in Uganda

In 2020, LANXESS supported Enviro-Stewards by provided funding for their new safe water project being established in Uganda. Enviro-Stewards has created this project to not only provide access to clean drinking water, but also encourage locals to create a sustainable business.

“Being that we are neighbours with the Enviro-Stewards team, we’ve naturally gotten to know each other very well over the years. The more we learned about the life-changing work their team is doing, we realized this was a perfect opportunity to work together with them and support a project that aligns with many of our corporate values. As a global company headquartered in Germany, we are very much in line with and striving to meet the UN’s Sustainable Development Goals – and the biofilter project certainly helps us towards achieving those goals and helping so many people in the process. We’re very thankful for this relationship and the opportunity to support Enviro-Stewards with this project.” - Helder Botelho, LANXESS operations head.



W.R. Grace reduces water consumption intensity within their manufacturing processes

W. R. Grace facilities monitor water discharges through effluent flow meters and sample collection points for common parameters, including temperature and pH,

at intervals specified by their facilities. They also use advanced tools to approximate the level of baseline water stress at each of their facilities around the world. Areas with a baseline water stress score above 3.0 (high to very high) are identified as being within water stressed areas and based on their screening, nine per cent of Graces' total water withdrawals are from water-stressed areas.

W.R. Grace strives towards the decreased consumption of water resources throughout their operations and each of their facilities continues to reduce water consumption intensity within their discrete manufacturing processes. For example, at their Valleyfield, Quebec facility:

- investments in plant instrumentation have optimized wastewater management to protect local river ecosystems; and
- filtration equipment optimization and vacuum pump seal water recovery projects have led to a 23 percent decrease in water consumption over a 10-year period.



Methanex improving water efficiency and protecting water quality

Methanex depends on water for operations and shares this vital resource with the communities where the company operates. Through the water stewardship program, Methanex focuses on minimizing its water use and protecting water quality in their areas of operation. In 2021, the company completed a project to improve the output of their Trinidad desalination facility, which

INCREASING NATURAL RESOURCE USE EFFICIENCY

provides desalinated seawater for their Atlas plant. The project has increased the yearly output of desalinated water by an estimated 43,000 m³, reducing Methanex's reliance on municipal water sources by approximately 6 per cent.

The company also continues to send clean effluent for reuse in community gardens in Egypt where they also have a plant site. In 2021, their Damietta, Egypt, plant pumped 18 per cent of its treated wastewater to irrigate community gardens in New Damietta, with the goal of reaching 80 per cent in the next few years. This innovative project is a partnership between Methanex Egypt and the New Damietta Development Authority to help the community conserve river water from the Nile.

Hazardous waste management

When CIAC began reporting waste metrics through the Resource Conversation Metrics survey in 2012, members produced about 20,000 tonnes of routine hazardous waste for disposal. As seen in **Figure 18**, in only eight years, CIAC members have reduced the routine hazardous waste for disposal to 14,500 tonnes – a reduction of 28 per cent. There are a number of factors to take into account when looking at these trends, including the identification of alternate uses for waste streams, improved equipment reliability requiring less cleaning, soil and asbestos remediation, and COVID-19 disruptions, to name a few. Our members have also established ambitious programs to limit waste disposal to landfills.

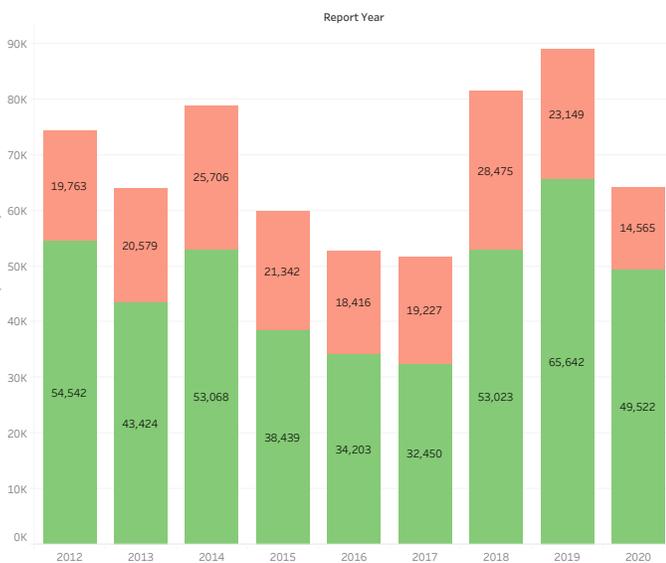


Figure 18. Total routine hazardous waste and routine non-hazardous waste, 2012-2020.

Measure Names
■ Total Routine Hazardous Waste
■ Total Routine Non-Hazardous Waste

What CIAC members are doing to manage their waste



SOLVAY

Solvay reaches industrial waste reduction target

In 2021, Solvay successfully reached its target to reduce non-recoverable industrial waste by 30 per cent, well in advance of its 2030 timeline. Much of this was accomplished from waste valorization, which is the process of reusing, recycling, or composting waste and converting them to more useful products. Some examples include repurposing waste for cement, transforming wastewater sludges into bricks for construction, and better monitoring of the waste management data.



Dow Canada: Pursuing a world without waste

New waste reduction program at Dow's Alberta Operations will divert more recyclable and compostable waste from the landfill. Last year, Dow's Alberta Operations recycled more than 700,000 kilograms of industrial materials used in manufacturing. Now, more personal waste that is generated on Dow's Alberta sites can be diverted.

New indoor eco bins have been installed at the Fort Saskatchewan and Prentiss sites, making it more convenient to collect mixed-stream recycling and compostable materials. The new bins support Dow's efforts to stop waste, advance a circular economy, and help meet its 2025 sustainability goals and global sustainability targets. Based on data from past years, the bins are



Rozanna Steenbergen places a new eco bin in the staff kitchen in Prentiss. Photo courtesy of Dow.

INCREASING NATURAL RESOURCE USE EFFICIENCY

estimated to divert more than 25,000 kilograms of waste from landfills – roughly the weight of 15 cars. In addition to these eco bins, Alberta operations recycle nearly 20 industrial materials including scrap metals, lumber, batteries (lithium, alkaline and Ni-Cad), light bulbs (fluorescent, halide, high-pressure Na), and waste oil.

BASF sets goals to decrease waste generation

In 2021, BASF manufacturing facilities began to focus more on reducing emissions and pollution prevention at their sites through a benchmarking process to identify and quantify waste generation and disposal for each site. The goals for participating facilities were to decrease the amount of waste per tonne of product, and increase waste diversion (recycling, energy-from-waste, alternative markets for discontinued or off-spec product, and others) as a percentage of total wastes disposed.

The benchmarking exercise showed that since 2018, participating BASF production facilities have, through processing efficiencies and Responsible Care programs and practices, maintained or increased their waste diversion efforts, achieving as much as 89 per cent waste diversion at their Cornwall facility in 2021 while maintaining or increasing overall production. Best practices at the sites include common activities such as Walking the Line, visually inspecting production lines to ensure integrity (or find leaks or spills before they become significant), finding alternative means of disposing of used packaging (finding recyclers or even buyers for some types, so these materials no longer go to landfill), and various production improvements and efficiencies to reduce the amount of process waste generated in the first place.

What CIAC members are doing to promote resource conversation and biodiversity

H.L. Blachford's 100th anniversary: for the earth, environment and future generations

Maintaining trees is essential for future survival of all species. Trees help reduce climate change and the effects of it. They also provide a home for birds, animals and insects, and provide fuel for warmth and cooking for those in some of their remote communities. To this end, and to celebrate their 100th anniversary, Blachford is contributing both locally and nationally:

1. In the spring of 2022, a grove of trees will be planted on the east side of the Mississauga office. They will work with a local landscaper to support choosing the type and number of trees for the location. It is expected that this will be accompanied by a ceremonial event.

2. Blachford is also contributing \$25,000 to Forests Ontario in support of a program for forestation or reforestation. This is the only not-for-profit organization in Canada that oversees all the steps from seed to tree, with follow up to track survival.

The donation will cover the planting and nurturing of approximately 6,250 trees. They have requested that a site be chosen on indigenous land in the northern part of Ontario. Once the site is selected, trees will be chosen that are beneficial for the specific area. Trees could include white pine, larch, tamarack, oak, maple, and beech depending on the area. The size of the seedling when planted will vary from 20 to 90 cm depending on the specific species.



Shell Canada's Peregrine Falcon Conservation Project

In April 2021, Shell's Scotford site installed a new Peregrine Falcon Nesting box on the radio tower in the North Hub. This box was designed to support the nesting of their resident pair of endangered Peregrine Falcons which had previously been nesting in the Upgrader North A&V unit. A camera was installed in the box and they posted a number of videos on Yammer throughout the summer showcasing the falcons using the box. Unfortunately, the pair wasn't successful in rearing any chicks, but hopefully this changes in 2022. The video clips have received hundreds of views and comments from the Scotford community which has helped to promote wildlife conservation across the site.

PROMOTING SAFE AND SECURE WORKING ENVIRONMENTS

Through CIAC's Safety, Health, Analysis, Recognition and Exchange (SHARE) Network and Process Safety Network, members are able to provide balanced and accurate information on environment, health and safety issues, while also being responsive to questions and concerns from other parties. These networks allow CIAC members to make progress on the following targets under UN SDG 3 (Good Health and Well-Being) and UN SDG 8 (Decent Work and Economic Growth):



3.9 – By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.



8.8 – Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment.

Protecting worker health and safety

Safety is first and foremost at every Responsible Care® company. For more than 34 years, CIAC members have been creating workplaces which are as healthy and safe as possible through initiatives such as the Safety, Health, Analysis, Recognition and Exchange (SHARE) Network. The SHARE Network brings together CIAC member company health and safety professionals who are committed to measuring, tracking, and continuously improving performance, with the goal of achieving zero workplace injuries and illnesses.

Consistent with CIAC members' roles as leaders in safety and occupational health, CIAC collects the annual Safety and Health Incident Metrics (SHIM) survey. This data measures, tracks, and communicates health and safety trends, and is used by the SHARE committee to drive continuous improvement and provide a forum for members to share information and experience related to occupational health and safety. Trends in the Total Recordable Incident Rate (TRIR) and Day Away from Work Incident Rate (DAWIR) for CIAC member employees and contractors between 2016-2020 are shown in **Figure 19** and **Figure 20** below. Since 2016, employees have seen a positive downward trend for TRIR and DAWIR, while contractors have remained fairly steady.

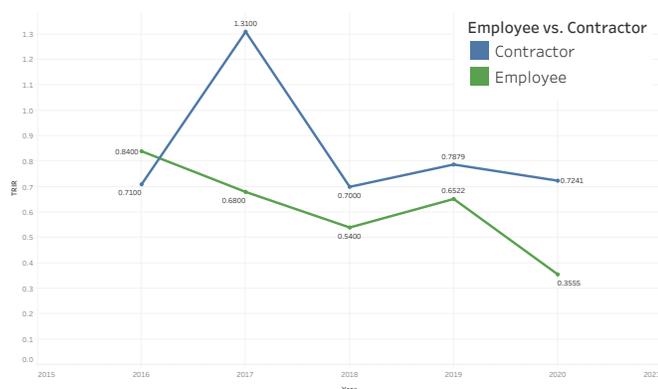


Figure 19. TRIR Employees vs. Contractors (2016-2020)

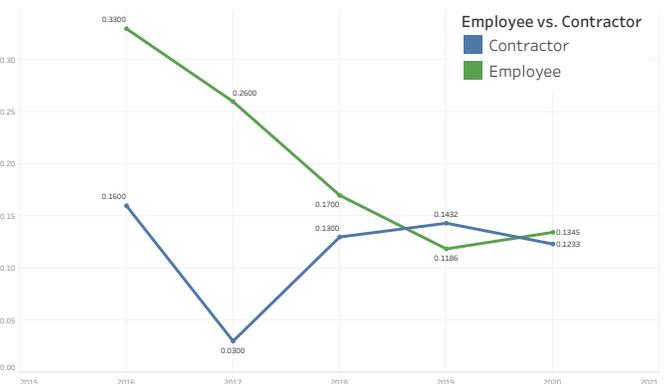


Figure 20. DAWIR Employees vs. Contractors (2016-2020)

WEBINAR

ERM Health and Safety



[Click to read the report](#)

CIAC hosted a webinar with Environment Resources Management (ERM) in May 2021 to gain insights on their global survey of over 270 health and safety leaders across multiple sectors. The survey puts a spotlight on the health and safety challenges confronting the industry and the role health and safety plays in creating a thriving workforce. Webinar participants were able to better understand a number of key findings from the survey, including:

- performance improvement failing to keep pace with rapidly changing expectations;
- game-changing insights from the global pandemic;
- evolved approaches deliver results: putting the “why” back into health and safety;
- changing role of health and safety functions demands new capabilities: bridging the gap;
- success and pitfalls in harnessing data and technology;
- five key challenges call for advanced leadership development methods;
- the persistent challenge with contractor safety performance;
- an escalating crisis on mental health in the workplace; and
- increasing cost of health and safety and changing investment priorities.

Promoting process safety

To protect their workers, the public, and the environment, all CIAC member companies must have comprehensive process-safety management systems in place and adhere to standards established by the Canadian Society for Chemical Engineering. Any gaps between a company's management system and the standards must be assessed, and action plans developed and implemented to raise the company's process safety to the acceptable level. A comprehensive examination of a company's process-safety management system is a fundamental component of the Responsible Care triennial verification process.

In 2005, the Center for Chemical Process Safety (CCPS) developed metrics to track process safety incident trends by the industry, allow companies to track their own

performance against these trends and identify opportunities for improvement. CIAC's Process-Related Incident Measures (PRIM) survey has adopted the CCPS-PRIM metrics, which are of high benefit and importance to CIAC member companies and CIAC's Process Safety Network.

Figure 21 below shows some key insights from the annual PRIM survey. While the classification system for process safety events changed in 2016, Figure 21 does show that the number of Higher Learning Value (HLV- i.e., an event occurred but was of very low consequence or no actual event was recorded) events has increased, most recently overtaking both Tier 1 (loss of primary containment with the greatest consequence) and Tier 2 (loss of primary containment with lesser consequence) events.

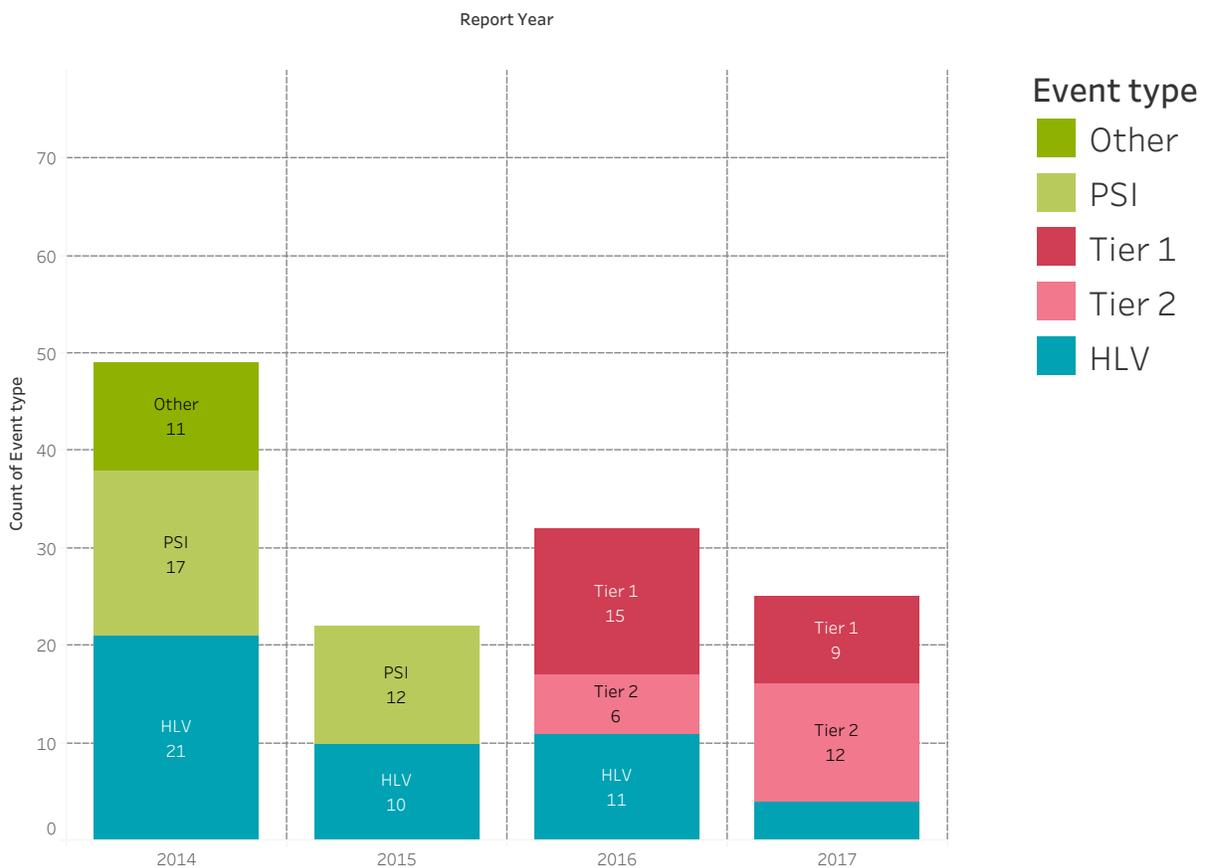


Figure 21. Process safety events, by type (2014-2020).

PROMOTING SAFE AND SECURE WORKING ENVIRONMENTS

Through the PRIM survey, the top five Process Safety Management (PSM) elements and their sub-elements may be cited for each process safety event. **Figure 22** shows the PSM elements that have been cited in process safety events from 2015-2020, with PSM6 (i.e., process and equipment integrity) being the most commonly cited PSM element.

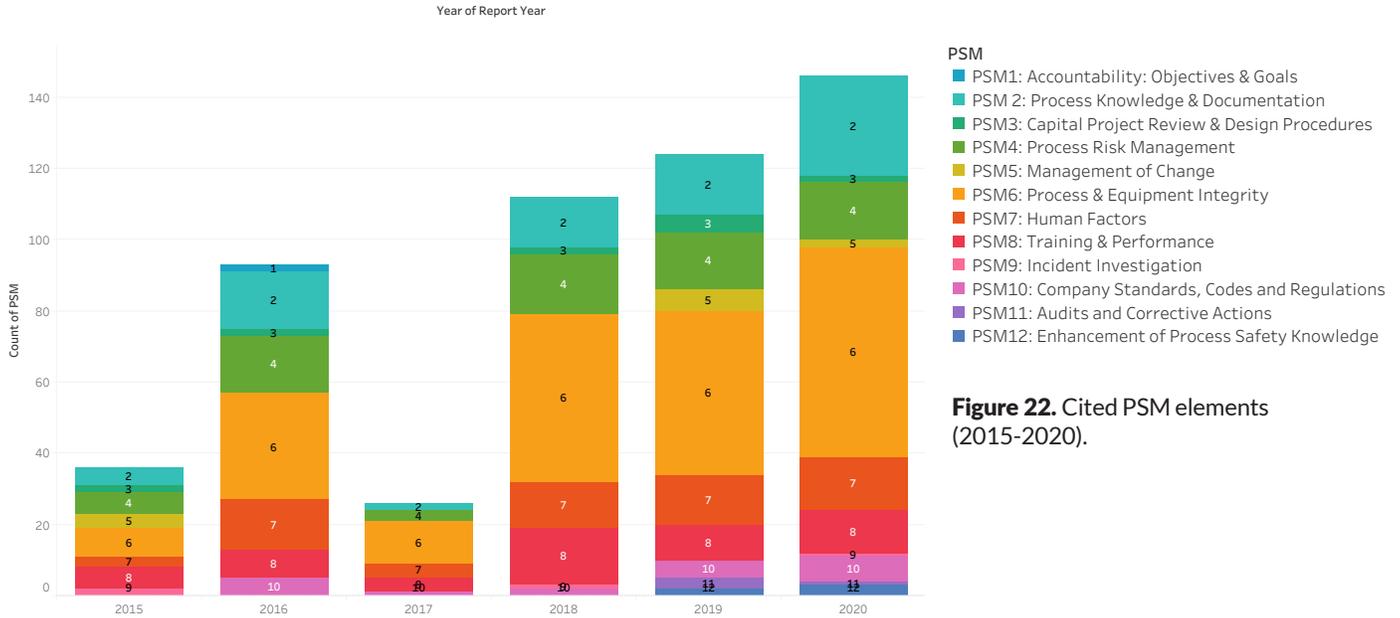


Figure 22. Cited PSM elements (2015-2020).

The following is a breakdown of the PSM sub-elements cited under PSM6 in 2020.

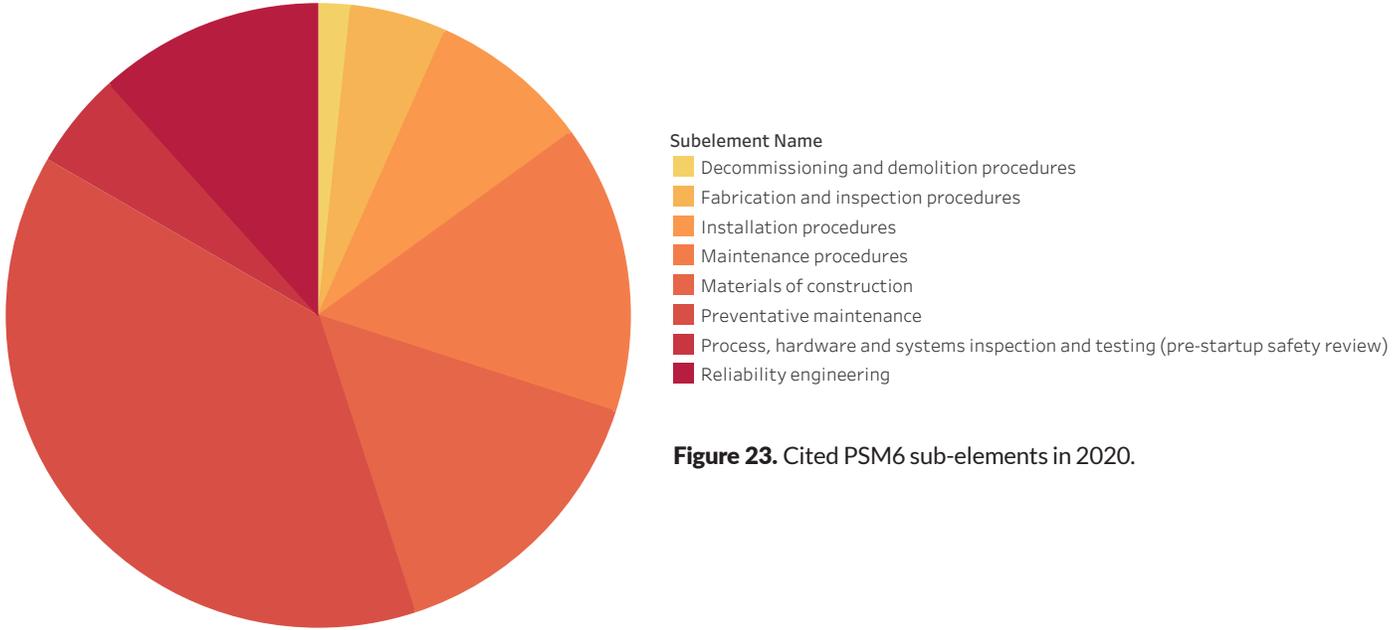


Figure 23. Cited PSM6 sub-elements in 2020.

PROMOTING SAFE AND SECURE WORKING ENVIRONMENTS

To improve members performance in terms of process and equipment integrity, CIAC collected some additional insights on this PSM element in the 2020 PRIM survey. Below are a few insights (sorted from most popular answer to least) that the Process Safety Network gathered and discussed, allowing a helpful exchange of best practices and opportunity for improvement in this area:

What does your organization do to determine which equipment and instrumentation is considered safety critical?

Process Hazard Analysis **Separate assessment**
Layers of Protection Analysis (LOPA)

How does your organization mark that equipment and those instruments to ensure employees are aware of their criticality and report issues in due time?

Field-tagging Equipment database
Tagging in asset management software (e.g., Maximo)
Separate spreadsheet
Standard Operating Conditions (SOC) table
Embedded into maintenance system
SAP data identification
Maintenance software (e.g., recurring workorders)
Piping and Instrumentation Diagram/Procedure notes

What does your organization do to ensure that equipment is regularly inspected/tested once identified as safety critical, in addition to mandatory regulatory inspection requirements (e.g., pressure vessels)?

Spreadsheet
Maintenance software (e.g., recurring workorders)
Inspection software
Internal compliance tracking system

WEBINAR

Chronic Unease: Building a generative safety culture



wood.

Click to watch the webinar!

The industrial resource development sector has made great strides improving health and safety performance; however, the industry has reached a plateau on its journey towards zero loss.

Many believe that we will not reach zero loss without challenging the current mindset and developing a method to implement change on a deeply personal level. In this webinar, **Wood Health and Safety** explored how teams in the chemistry industry use a sense of chronic unease to support our efforts to create a zero-loss environment, to anticipate where loss can occur and build resilient people, processes, and systems in response.

What CIAC members are doing to promote safe and secure work environments



ERCO Worldwide

ERCO Worldwide achieves almost 22 years of safe operation without a recordable injury

ERCO is on a journey to create a World Class Safety Culture, building on the existing management system to further enhance its safety performance. Their vision was to create an injury-free workplace. As part of that cultural change, ERCO focused on leadership engagement and the measurement of leading indicators as critical components. The Journey to World-Class Safety is a multi-year process that they are applying at all their plants.

A significant recent achievement came in January 2021 when their Grande Prairie, Alberta facility reached 1.2 million hours of labour without a reportable incident. This represented almost 22 years of safe operation without a recordable injury. Additionally, that same month the plant reached 29 years without a lost-time incident.

KRONOS[®]

KRONOS focuses on leading indicator for potential Environmental Incidents

KRONOS vigilantly monitors production operations and identifies and quantifies unintentional releases from process equipment and/or piping as a Loss of Primary Containment (LoPC³). These are recorded regardless

³An LoPC is any unplanned or uncontrolled release of material from within its primary containment.

PROMOTING SAFE AND SECURE WORKING ENVIRONMENTS

of whether the material is released directly into the environment, into a secondary form of containment, or into another form of primary containment, other than that intended. LoPCs do not prompt or require reporting to local authorities as they are generally minor events that do not impact the environment; however, in the event a release meets local reporting requirements, it becomes an Environmental Incident. In this way, the rate of occurrence of LoPCs serves as a leading indicator for potential Environmental Incidents.

Tracking of LoPCs at KRONOS began in mid-2018; therefore, full-year data are only available for 2019 and 2020 – notably, the number of LoPCs decreased by 35 per cent from 2019 to 2020. A description of each LoPC recorded is shared in a global monthly report and the data are also summarized in a global database where it can be further analyzed by location, substance, operation mode, degree of human involvement, and/or other criteria as deemed appropriate. Best practices are shared among global Health, Safety, Environment (HSE) and operations personnel to prevent reoccurrence.



Shell Canada uses drones and robots to support workplace safety

The Shell Scotford Robotics and Drones team is developing three new ways of working to remove their workers from harm's way. First with their Drone program, they are now able to do inspections in areas that are hazardous to get to. They can get high resolution views and inspection data from workspaces that would take a lot of effort and risk to set up. Second, their tank cleaning robots provide a great step change in the way Shell works by getting repetitive, dirty, and somewhat hazardous work in the hands of remote controllers instead of physical cleaning tools and humans. Third, Shell has “Bolt” and “Gadget”, their two Boston Dynamics Spot Robots. These quadrupeds or four legged robots are helping with inspections, basic physical manipulation, and enhancing emergency management. Similar to drones, Bolt and Gadget help staff get to areas that are not ideal for humans.

Psychological health and safety at BASF Canada

In 2021, BASF Canada identified the need to improve the psychological health and wellbeing of its employees and enlisted as a participant in the “WSPS Mental Harm Prevention Roadmap” study through Howatt HR and Workplace Safety and Prevention Services. A Mental Fitness Index (MFI) survey was distributed to all Canadian employees to provide anonymous feedback on factors that might impact their experience and psychological

safety in the workplace and how the organization could better support. Since reviewing the results of the survey, several initiatives have been organized to provide awareness on mental health/ illness, disabilities, coping strategies, available resources, ending the stigma, etc. A new Psychological Health and Safety Committee has been established and is working towards adapting to the CSAZ1003 National Standard for Psychological Health and Safety in the Workplace.



Navigating COVID-19 at the DuPont Kingston Technology Centre

When the province first declared a state of emergency due to COVID-19, the DuPont Kingston Technology Centre (KTC) established a COVID-19 Safety Plan to ensure a safe workplace for all essential workers. Employee and contractor diligence in following the newly established protocols has allowed the company to successfully maintain zero COVID-19 Work-Related Cases. Here are just a few examples of protocols and engineering controls they put in place:

- electronic active screening tools with health care consultation and monitoring;
- working from home policies for all non-essential work;
- upgraded personal protective equipment supply;
- thermal imaging technology stations at entrances;
- office relocations to support social distancing;
- one-way pedestrian traffic to support social distancing;
- real-time technology to connect home office employees and customers to essential project work; and
- workplace inspections for COVID-19 protocol compliance.

DuPont remains diligent in their efforts in keeping its facilities safe and clean so their employees and contractors can go home feeling as good as when they walked in.



NOVA Chemicals' NOVA's COP3E Celebrates a Safety Milestone

In 2021, NOVA Chemicals' COP3E Growth Project in Sarnia, Ontario, celebrated 1,000,000 hours worked without a recordable injury. This milestone is a major testament to the project's continued commitment to safely progress work while striving for Goal ZERO. These injury-free results capture the essence of true collaboration and best safety practices.

SUPPORTING SUSTAINABLE AND RESILIENT TRANSPORTATION INFRASTRUCTURE

Every day, chemicals are transported through our communities – whether by rail, road, or pipeline. Ensuring their safe and secure transportation is of paramount importance to CIAC and its members. Being accountable and responsive to the public – especially to the communities in which they do business – is also a fundamental part of being a Responsible Care® company. These efforts allow CIAC members and partners to make progress on the following targets under UN SDG 3 (Good Health and Well-Being) and UN SDG 9 (Industry, innovation and Infrastructure):



3.6 – By 2020, halve the number of global deaths and injuries from road traffic accidents.

3.9 – By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.



9.1 – Develop quality, reliable, sustainable, and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.

Transportation Community Awareness and Emergency Response (TRANSCAER)

Through TRANSCAER®, a voluntary initiative led by CIAC and the Railway Association of Canada, CIAC members work closely with communities along transportation routes to ensure residents, municipal officials, and first responders are aware of hazards associated with their products. They also help ensure communities are aware and prepared for a potential transportation incident involving dangerous goods.



TRANSCAER launches new virtual reality learning tools

In partnership with Transport Canada's Rail Safety Improvement Program, CIAC has developed virtual reality tools that will be used for TRANSCAER outreach efforts. The virtual reality tools offer a 360° view of the retired CCPX 911 safety training tank car. This will provide first responders with the opportunity to increase awareness and familiarization with rail safety, railway equipment, and the transportation of dangerous goods.

SUPPORTING SUSTAINABLE AND RESILIENT TRANSPORTATION INFRASTRUCTURE



TRANSCAER virtual reality learning tools at the BC Fire Training Officers Training and Convention Trade Show in Salmon Arm, B.C. Courtesy of CIAC.



Photo courtesy of CIAC.

TRANSCAER was pleased to launch the delivery of our new web-based virtual reality tool in September 2021 in conjunction with Rail Safety Week in Canada.

The virtual reality tour allows TRANSCAER to reach more communities, elected officials, and first responders than ever before. The self-guided virtual reality tour, available in English and French, allows viewers the flexibility to access this tool on demand from their laptop, smartphone, or desktop computer where they can gain:

- awareness level overview of rail safety;
- understanding of TRANSCAER;
- basic knowledge of tank car anatomy; and
- basic transportation of dangerous goods information.

TRANSCAER Safety Train

Since the retirement of the CCPX 911 tank car in 2018, TRANSCAER members and partners have been seeking ways to evolve the initiative and replace the Safety Train. Working with CIAC members and partners, the Railway Association of Canada, and Transport Canada under the Rail Safety Improvement Program, the development of the new TRANSCAER Safety Train is under way.

The team has made great progress on the planning and designing the new Safety Train and has worked to begin securing donations of funds and material to advance the project to the construction phase.

Once the retrofit is complete, the new Safety Train will embark on a cross-country tour, making stops in communities where dangerous good travel, raising awareness about rail safety and emergency response for transportation incidents involving dangerous goods. By travelling to communities, TRANSCAER will continue to establish partnerships between manufacturers, distributors, carriers, emergency responders, government agencies and residents.

TRANSCAER outreach in 2021

With the absence of TRANSCAER outreach events in 2020 due to the COVID-19 pandemic, the TRANSCAER team was pleased to support and participate in 18 outreach events conducted by Railway Association of Canada and CIAC members. These events saw participation from 315 attendees across Canada. TRANSCAER activities were held between August to October when COVID-19 restrictions were reduced, and outreach events were conducted with respect to local COVID-19 safety protocols.

2021 Events included:

- Railway Incident Simulations / Mock incidents, in North Bay, ON, Cornwall, ON, and Richmond, QC.
- Transport Canada / CN Electronic Shipping Document exercise in Cornwall, ON.

Measuring our progress towards UN SDG 3 and 9

Beginning with the 2021 reporting year, CIAC will re-establish securely collecting aggregate transportation incident data from members annually to fulfill reporting requirements to the International Council of Chemical Associations and support the overall CIAC Strategic Plan. In the past, CIAC collected this type of data using the Transportation Incident Measurements System (TIMS) in both aggregate and detailed incident surveys. Since this initiative was done previously, it is already included in our Responsible Care Commitments.

The intent is to have CIAC members complete a short, annual questionnaire beginning in 2022 to gather aggregate number of transportation incidents (by mode) and the total number of shipments (by mode). The definition of “transportation incident” will parallel that of Transport Canada. Two workshops were hosted in December 2021 to get input and guidance from members and guidance material is being developed to support the initiative.

TEAP III Transportation Emergency Assistance Program (TEAP III)

TEAP III is another CIAC-led program that aims to maintain a national emergency response network capable of safely and efficiently mitigating the impacts of a chemical transportation incident anywhere in the country. TEAP III provides a forum for CIAC members, transportation companies, and emergency response service providers to share information and successful practices, and to encourage continuous improvement around chemical transportation emergency preparedness and response.

Through TEAP III, CIAC and its partner organizations have established two standards:

- CIAC's Transportation Emergency Response Standard sets the minimum criteria that CIAC member companies must meet for road and rail emergency preparedness and response.
- The TEAP III Transportation Emergency Response Service Provider (TERSP) Standard outlines the criteria used by TEAP's assessment teams to evaluate a service provider's ability to safely mitigate the impacts of a chemical transportation incident.

In 2021, there were 16 registered TEAP III Transportation Emergency Response Service Providers across Canada. This ensures that there is a strong network of transportation emergency response service providers available to respond from anywhere in Canada. The TEAP III assessment process encourages the sharing of information, best practices, and opportunities for continuous improvement. It is this commitment to continuous improvement and collaboration that has allowed the program to evolve and remain relevant for

the long term. Over the last two years, adjustments have been made to assessment processes due to the pandemic, yet the program remains strong. TEAP III is always looking to grow and work with other organizations, to continue to evolve over time.

CIAC partners with great carriers

2021 CN Safe Handling Award

CIAC congratulates our members who have been presented with the 2021 CN Safe Handling Award. Launched in 1992, this award is presented to customers who load freight cars with dangerous goods and meet strict standards for the safe handling and shipment of regulated products. The winners must meet established criteria, according to the total number of shipments of dangerous goods for all facilities.



The CIAC members who won CN Safe Handling Awards in 2021 include:

- Arkema
- ARLANXEO
- CCC Sulphur Products
- Chemtrade
- Diamond Petrochemicals Canada
- Dow Chemical
- Dupont
- Evonik
- Glencore
- INEOS Styrolution
- LANXESS
- MeGlobal
- Methanex
- NorFalco
- Nouryon
- NOVA Chemicals
- Olin
- Solvay
- Chemours
- United Initiators
- Wanhua Chemical

2020⁴ CP Safe Shipper Awards

Companies receiving this award transported at least 500 carloads of hazardous materials (non-intermodal) in 2020 with zero Non-Accidental Release (NAR) incidents. A hazardous materials NAR is the unintentional release of a hazardous material while in transportation, including loading and unloading while in railroad possession that is not caused by a derailment, collision, or other rail-related accident.

The CIAC members who won CP Safe Shipper Awards in 2020 include:



Trimac and Harmac win mileage categories in NTTC 2021 Safety Awards

The National Tank Truck Carriers (NTTC) has named Trimac as top in the category of for-hire carriers with over 90-million miles and Harmac was recognized in the 7-12.5 million miles category. They are honoured to be listed with 17 other carriers and private fleets for having the best safety records in the industry. The measure of this success is operating with the fewest accidents per million-mile rate and the lowest personnel incident rates.

“This award acknowledges the dedication and passion to creating safe work cultures here at Trimac. The NTTC Grand Award is just a small token of our team’s outstanding commitment to safety and safe work behaviors, consistent safety training, and watching out for each other to ensure everyone is performing their jobs in the safest manner possible. We couldn’t do it without everyone committing to this way of life and I am extremely proud of everyone.”

– Alex Guariento, VP Safety

⁴2021 winners were not announced by the time of publication of this report.



CLOSING

CIAC is proud to be advancing efforts to support the UN SDGs in their role as a universal translator of sustainability across different industries, organizations, and even countries. From basic human rights, like clean water and reduced inequalities, to innovative technologies related to clean energy and climate change, CIAC and its members are at the forefront of sustainable development solutions. By linking our performance with the eight key UN SDG identified throughout this report and their targets, we can bring more congruency to the sustainability conversation broadly and generate a more harmonized effort across the globe to advance chemistry solutions.

In particular, the Canadian Federal Sustainable Development Act, which was enshrined in legislation in December 2020, and the 2022-2026 Federal Sustainable Development Strategy that is currently in development both serve as important roadmaps that will guide harmonized efforts towards advancing these shared goals for the chemistry industry in Canada and internationally. We look forward to continued collaboration with governments, industries, and other organizations to bring us to a sustainable 2030 and beyond.

List of members and partners

3M Canada Company
Arkema Canada Inc.
ARLANXEO Canada Inc.
BASF Canada Inc.
CCC Sulphur Products
Cabot Canada Ltd.
Canada Kuwait Petrochemical Corporation (CKPC)
Chemtrade
Diamond Petrochemicals Canada Corporation
Dow Chemical Canada ULC
DuPont Canada
ERCO Worldwide LP
Evonik Canada Inc.
Evonik Oil Additives Canada Inc.
H.L. Blachford Ltd.
Imperial Oil
INEOS Canada Partnership
INEOS Styrolution Canada Ltd.
Inter Pipeline Ltd.
Jungbunzlauer Canada Inc.
KRONOS Canada, Inc.
LANXESS Canada Co./Cie
Linde Services Canada Inc. (formerly Praxair Canada Inc.)
MEGlobal Canada ULC
Methanex Corporation
National Silicates Limited
Nauticol Energy Ltd.
NorFalco Sales, GLENCORE Canada Corporation
Nouryon
NOVA Chemicals Corporation
Olin Canada ULC
Procter & Gamble Inc.
SEQENS (legal name PCAS Canada)
Shell Chemicals Canada
Solvay Canada Inc.
Stepan Canada Inc.
The Chemours Canada Company
United Initiators Canada Ltd.
Wanhua Chemical (America) Co., Ltd.
WR Grace Canada Corp.

Responsible Care® Partners

Canadian National
Canadian Pacific Railway
GATX Rail Canada
Harmac Transportation Inc.
Northwest Tank Lines Inc.
PROCOR Limited
Trimac Transportation Ltd.

Associate Members

Busch Vacuum Technics Inc.
Canvass Analytics
ERM Consultants Canada Ltd. (ERM)
Golder Associates Ltd.
Hexagon PPM
KPMG Canada
Lakeside Process Controls
Melloy Industrial Services Inc.
Northern Alberta Institute of Technology (NAIT)
Wood Group

Plastics Division Members

3M Canada Company
Absolute Haitian Corp.
Ampacet Canada
Applied Plastics Technology Inc.
Balcan Plastics
Bamberger Polymers Corp.
BASF Canada Inc.
Bekum America Corp.
BMP Recycling
Canuck Compounders Inc.
CCC Plastics
CKF Inc.
Clean Farms
Colortech Inc.
Dart Canada Inc.
Dominion Colour Corp.

CLOSING

Dow Chemical Canada ULC
Drader Manufacturing
Duchesne et Fils Itée
Dupont
Dyne-A-Pak
Eco-captation
Eligant Poly Product
Emballage St. Jean Itée
Erema North America Inc.
Farnell Packaging Ltd.
Genpak LP
GreenMantra Recycling Technologies Ltd.
Husky Injection Molding Systems
Hymopack Ltd.
Imperial Oil
INEOS Styrolution Canada Ltd.
Inter Pipeline Ltd.
IPL Inc.
Keurig Dr. Pepper Canada
Kongsilde Industries Inc.
Layfield Group Ltd.
Macro Engineering & Technology Inc.
Malpack Ltd.
Mauser Packaging Solutions
Merlin Plastics
Revital Polymers
Van Waste Co.
Micro Interface Design

Modix Plastique Inc.
Nexeo Plastics
Nissei
Norwich Plastics
NOVA Chemicals Corp.
Oasis Alignment Services
Owens-Corning Canada LP
Procter & Gamble
Pack All Manufacturing Inc.
Pactiv Canada
Peel Plastics Products Ltd.
Petro Plastics
Plasti-Fab
Poly Expert Inc.
Polykar Foam Plastics Inc.
Polystar Packaging
Polystyvert Inc.
Polytainers Inc.
Polytarp Products
Pyrowave
Revital Polymers
Shell Polymers
Styro Go Canada
Tempo Plastics Ltd.
Transcontinental Inc.
Wentworth Plastics North America
Winpak Ltd.
Wittmann Battenfeld Canada Inc.



45 O'Connor Street, Suite 1240 Ottawa, ON K1P 1A4
Tel: (613) 237-6215 • info@canadianchemistry.ca



Jeff Stevens
Director
Responsible Care®



Danielle Morrison
Policy Manager
Chemical Health and Data Management



Daniella Muhanz
Coordinator
Responsible Care®