



# Delivering on our Commitments

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2019 Responsible Care® Performance

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Responsible Care®  
Our commitment to sustainability.



Gestion responsable<sup>MC</sup>  
Notre engagement envers le développement durable.

# Our Commitment to Sustainability

For more than 30 years, Canada's chemistry sector has led the journey towards safe, responsible and sustainable chemical manufacturing through its U.N.-recognized sustainability initiative, Responsible Care®. Founded in Canada in 1985, Responsible Care® is now practised in 73 countries and by 96 of the 100 largest chemical producers in the world.

## Responsible Care® Principles for Sustainability

We dedicate ourselves, our technology, and our business practices to sustainability – the betterment of society, the environment, and the economy. The Principles of Responsible Care are key to our business success and compel us to:

- continually work for the improvement of people's lives and the environment, while striving to do no harm;
- be accountable and responsive to the public, especially our local communities who have the right to understand the risks and benefits of what we do;
- take preventive action to protect health and the environment;
- innovate for safer products and processes that conserve resources, minimize waste and provide enhanced value;
- engage with our business partners to ensure stewardship and security of our products, services and raw materials throughout their lifecycles;
- understand and meet expectations for social responsibility;
- work with all stakeholders for public policy and standards that enhance sustainability, act to advance meaningful and science-based legal requirements and meet or exceed their letter and spirit;
- promote awareness of Responsible Care, at all levels, demonstrate visible leadership and inspire others to commit to these principles, throughout the chemistry product value chain.

Over the past 34 years, the Responsible Care® initiative has inspired CIAC's members to continuously work to improve their health, safety, and environmental performance – all while delivering essential products Canadians rely on everyday.

Every CIAC member must commit to Responsible Care's rigorous codes and ethic, covering all aspects of the company's business and product lifecycle, leading to safer and more sustainable products and processing.

## Transparency

The key to making Responsible Care work is transparency. Every three years, a verification team visits each CIAC member company to ensure the Responsible Care ethic and management systems are in place. Each verification report is publicly available on our website:

## Engagement

CIAC seeks feedback and guidance on its performance and reporting from the Association's National Advisory Panel and its Environmental Protection Steering Group - a group of representatives from federal and provincial governments, environmental NGOs, academia, and the chemistry industry.

[canadianchemistry.ca](http://canadianchemistry.ca)

## Since 2004, CIAC members have...



### Air Quality

Reduced sulphur dioxide emissions by 82%



### Climate Change Mitigation

Reduced greenhouse gas emissions by 20% through major investments and product innovation



### Toxic Substances

Reduced emissions of toxic substances by 20%, as part of commitments under CEPA



### Sustainability

Committed to ambitious goals to reduce plastic waste in the environment: 100% of plastics packaging to be reusable, recyclable, or recoverable by 2030



### Hazardous Waste

Reduced hazardous waste for disposal by 53%



### Water Quality

Nearly eliminated discharges to water - a 99% reduction



### Supply Chain Stewardship

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)



### Community Engagement and Dialogue

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)



### Community Safety

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



### Process Safety

Virtually eliminated large-scale incidents



### Workplace Safety

Reduced the number of workplace injuries by 64%

## U.N. Sustainable Development Goals

As part of the International Council of Chemical Associations (ICCA), CIAC is committed to accelerating progress towards the United Nations 17 Sustainable Development Goals. These sustainability goals are identified throughout the report. For more information, please visit [sdg.icca-chem.org](http://sdg.icca-chem.org)





# Reducing Emissions

Under Responsible Care®, CIAC member companies are expected to report all substance releases and transfers of environment and health concern — including those below the reporting threshold of Canada's National Pollutant Release Inventory (NPRI).



Established in 1992, the NERM database is the annual inventory of emissions and transfers by CIAC member companies.

Each year the Association surveys the emissions of chemical substances by the member companies to all environmental media (i.e. air, water, and land) and the off-site transfers of those substances in waste or recyclable materials. While the National Emissions Reduction Masterplan (NERM) is integrated with the National Pollutant Release Inventory (NPRI) through the single-window information management (SWIM) system, the NERM database actually pre-dates and was the basis for the NPRI today. It is also more comprehensive than NPRI, containing over 900 substances on its master list, with no reporting thresholds.

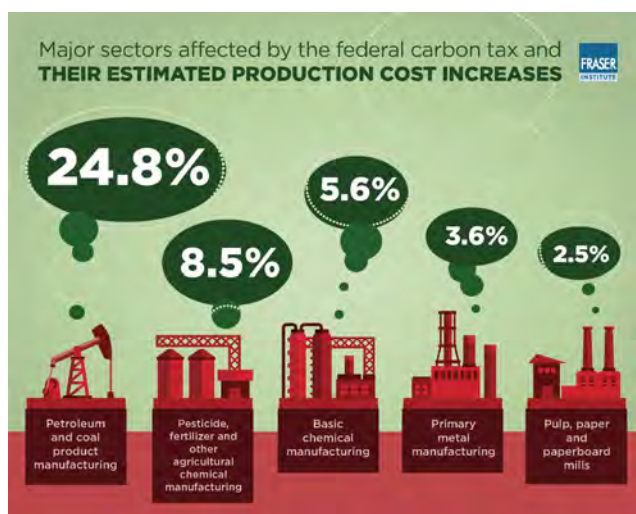
To learn more about the 2018 NERM emissions, explore the figures on pages 5 and 6.

However, several studies have presented Canada as an environmental laggard in recent years, ranking it near the bottom of the list of OECD countries. The Fraser Institute points to many flaws in the methodologies behind these studies, as they unfairly represent Canada's environmental performance in some respects and do not always use the most meaningful and relevant performance measures. The Fraser Institute therefore set out to develop an improved and transparent methodology, allowing them to accurately measure and compare environmental performance among OECD countries.

Their report, Environmental Ranking for Canada and the OECD, ranks 33 high-income countries across two broad objectives: protecting human health and well-being, and protecting ecosystems. Based on their analysis, Canada performs relatively well, obtaining an overall score of 67, which places it 12th out of 33 high-income OECD countries. For air quality, Canada performs very well, ranking highly out of 33 countries based on the two air-quality indicators: average exposure to fine particulate matter (fourth) and fine particulate matter exceedance (first).



Elmira Aliakbari, Jairo Yunis, and Ashley Stedman (2020). *Environmental Ranking for Canada and the OECD: Second Edition*. Fraser Institute.



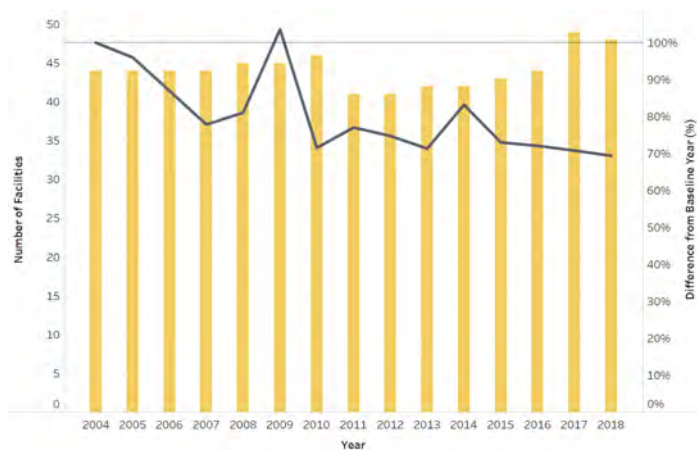
Ross McKittrick, Elmira Aliakbari, and Ashley Stedman (2019). *The Impact of the Federal Carbon Tax on the Competitiveness of Canadian Industries*. Fraser Institute

Despite Canada's strong environmental performance ranking, there is the issue of "carbon leakage", which happens when emission-intensive and trade-exposed industries such as chemical manufacturing—facing costly climate policies (greenhouse gas regulations or carbon taxes)—relocate to jurisdictions with less-stringent environmental policies.

Ross McKittrick, senior fellow at the Fraser Institute and co-author of *The Impact of the Federal Carbon Tax on the Competitiveness of Canadian Industries* states, "the federal carbon tax will likely push investment, economic activity and jobs out of Canada and into other countries, thus increasing emissions abroad".

To minimize negative impacts on Canadian industries and the environment, it is important for greenhouse gas reductions to be realized with consideration to the competitiveness of emission-intensive and trade-exposed sectors and the global impacts of carbon leakage and transboundary air pollution.

## Carbon Dioxide



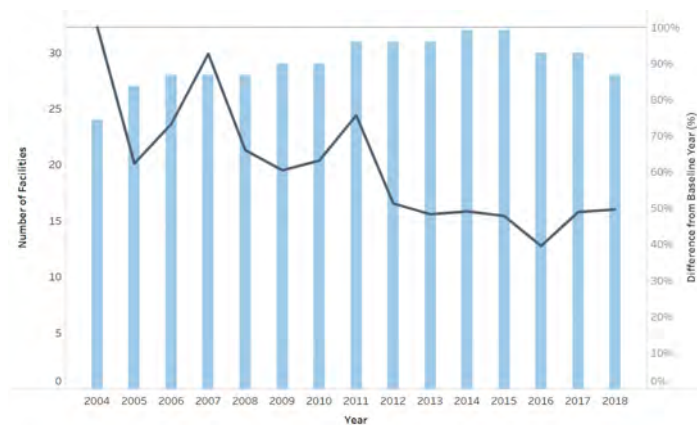
Since 2004, CIAC members have mostly seen a decreasing trend in average carbon dioxide EI, except in 2009 and 2014. The 2009 year saw a decrease in both emissions and production due to the economic downturn. Despite decreased demand at these facilities, operations must be maintained, causing production to decrease at a slower rate than emissions and skewing the EI ratio upwards. In 2014, the chemistry sector saw a large increase in sales and demand, also driving the EI upwards.

## Methane



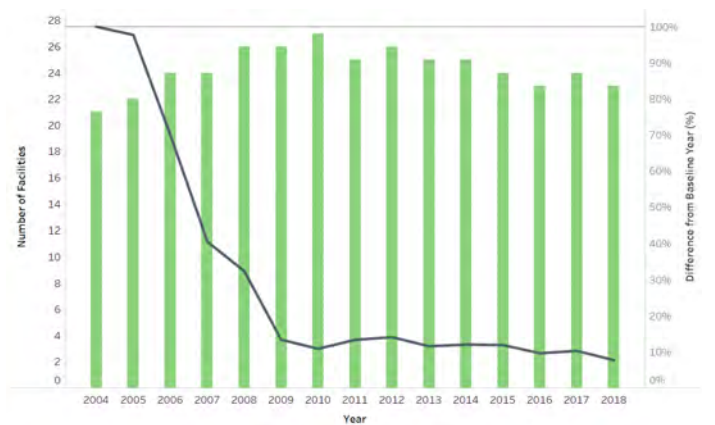
The most notable years for methane EI appear to be in 2011 and 2014. In 2014, a new facility came online and drove up the member average, while in 2014, one member experienced a methane leak. Because of our commitment to Responsible Care, our members must report ALL emissions, including leaks and spills, in the spirit of transparency. The 2014 leak was no exception. More recently, there has been an increase in methane EI in 2018. This was due to a six month compressor outage at one of our facilities that resulted in increased emissions while production remained constant. This issue was resolved after 2018, so the 2019 emissions are expected to be more in-line with 2017 emission levels.

## Volatile Organic Compounds



CIAC members have achieved significant reductions in volatile organic compound emissions since 2004. This can largely be attributed to the flare management and Leak Detection and Repair (LDAR) programs that our members have implemented. The chemistry sector is a leader in VOC emission reduction, and will continue to implement innovative solutions to further drive down these emissions.

## Sulphur Dioxide



CIAC members have achieved significant reductions in sulphur dioxide emissions since 2004, and this can be largely attributed to fuel switching to lower sulphur fuels. CIAC members will continue to strive for reduced SO<sub>2</sub> emissions as new solutions and technologies become available in the future.

## Oxides of Nitrogen



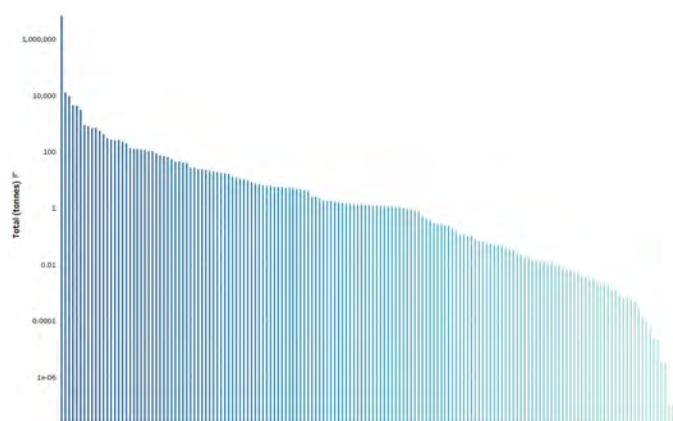
To date, the average emission intensity of oxides of nitrogen has remained below 2004 levels. NO<sub>x</sub> emissions result from fuel combustion, which has implications in the ability for members to make significant reductions. For example, a facility might increase their heat integration to improve the overall production efficiency, however this can result in higher NO<sub>x</sub> emissions. Burner technology is another key factor in NO<sub>x</sub> emission performance, and replacement of burners requires significant investment. Members focus on burner technology and innovation and look for opportunities to upgrade fired equipment when facility investments enable these changes. Note that the small increase in NO<sub>x</sub> intensity in 2015 was the result of the acquisition of a new plant by one of our members

## Total Particulate Matter

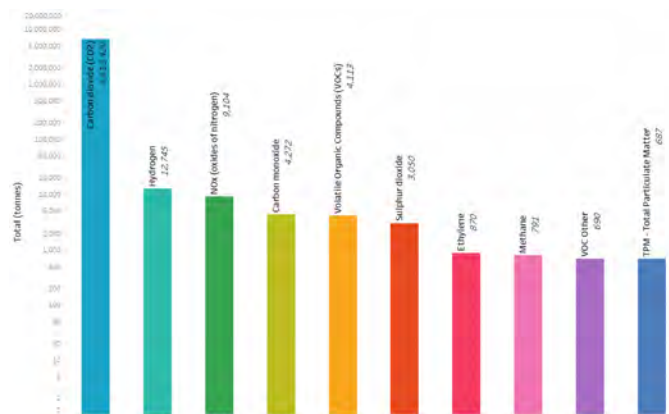


Emissions of Total Particulate Matter are difficult to model, as there was a change in measurement methods around 2014. This makes it hard to compare emissions of TPM year to year, however CIAC members have seen a reduction in emission intensity in more recent years as the measurement methods have remained consistent. Prior to these changes, there were large increases in emission intensity compared to 2004 levels, and these increases are mainly attributed to the petrochemical subsector – the overall emissions for the chemistry sector are in fact much smaller.

The Canadian chemistry industry has made it a priority to reduce emissions of air pollutants such as nitrogen oxides, sulphur dioxide, and volatile organic compounds, helping to ensure cleaner air for all Canadians.



The total emissions, in tonnes, for all reported substances in 2018 from all CIAC members is shown on a logarithmic scale. This includes 253 chemicals, meaning only about a quarter of the ~900 reportable NERM substances are actually emitted by our members. The right side of the figure shows extremely small-scale emissions, whereas chemicals on the left are emitted in larger quantities.



The top ten chemicals emitted by CIAC member companies in 2018 were: carbon dioxide, hydrogen, oxides of nitrogen, carbon monoxide, volatile organic compounds, sulphur dioxide, ethylene, methane, other VOCs (i.e. all volatile organic compounds not listed on NPRI Part One), and total particulate matter. Since NERM's inception, carbon dioxide 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 harmful chemicals, such as hydrogen.

The following figures show the percent difference in average emission intensity (black line) from a baseline year (2004) for a given chemical. Emission intensity (EI) is a standardized emission metric representing the ratio of chemical emissions to the total production value from a given facility. All points below 100% on the right axis represent a decrease from the average EI value in 2004 and vice versa.

The number of facilities that report emission values for this chemical fluctuates from year to year due to operational changes, changes in membership, etc., so the number of reporting facilities is displayed by the bars, as shown on the left axis.



# Addressing Climate Change

Federal and provincial governments are seeking low-carbon solutions as they confront the impacts of climate change. Canada's chemistry sector and its highly skilled workers are uniquely positioned to provide innovative solutions in the fight against climate change.



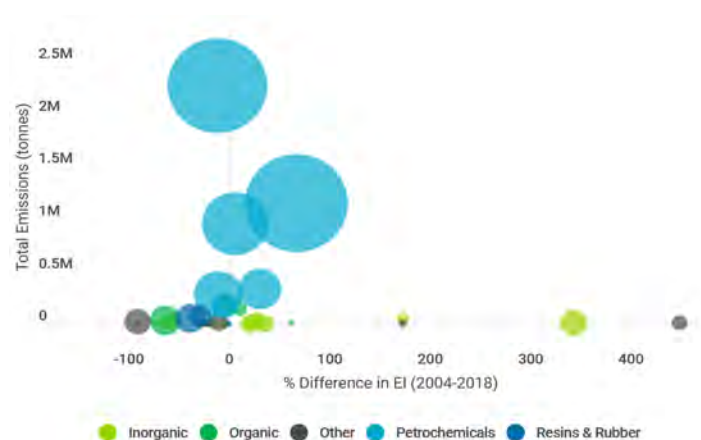
Worldwide, the chemical and petrochemical industries are by far the largest industrial energy users, accounting for 10 per cent of total global energy demand. Over 80 per cent of emissions occur during the manufacturing process. This is a key reason why using low-carbon feedstock and implementing the best available process technologies play such an important role in determining the overall greenhouse gas (GHG) content of chemistry products).

## Explore the figures below to see trends in CIAC members' carbon dioxide emissions since 2004:

This figure shows carbon dioxide emissions from the NERM database overlaid with chemical sales data from Statistics Canada\* from 2004 to 2018. Carbon dioxide emissions are lowest in 2009, which coincides with the economic downturn that resulted in decreased production and investment at most facilities. The relationship between chemical emissions and the economy is not only evident during the 2008/2009 crisis. Comparing emissions and sales\*\* trends, there is a clear correlation between these two metrics.

\* Statistics Canada. Table 16-10-0047-01 Manufacturers' sales, inventories, orders and inventory to sales ratios, by industry (dollars unless otherwise noted) (x 1,000).

\*\* Note that carbon dioxide data represents only CIAC membership, while sales data from Statistics Canada encompasses all of the Canadian chemistry industry.



This figure shows four pieces of information for each of our member facilities: percent difference in carbon dioxide emission intensity in 2018 compared to 2004, total 2018 carbon dioxide emissions, total 2018 production (bubble size), and the chemical sub-sector associated with that facility (bubble colour).

The bubbles that are largest in size and in total emissions largely represent the petrochemical sector. Despite this, none of these facilities exceed a 100% increase in emission intensity; they mainly border the 0% difference line. Comparatively, the bubbles that show the largest increase in emission intensity are facilities with lower production and carbon dioxide emission values, illustrating that small changes (i.e. fluctuations in production) are amplified when considering carbon dioxide emission intensity.

## What CIAC members are doing to address climate change

Canada's chemistry industry is a world leader in low-intensity chemical production for many reasons. Perhaps the biggest natural advantage the chemistry sector enjoys is access to abundant supplies of natural gas liquids. Canada's chemistry industry continues to show global leadership when it comes to its own energy footprint, recognizing its role as both an emitter of GHG emissions and a climate change solutions provider.

The international consulting firm McKenzie & Company has developed a technology roadmap for the global chemistry sector identifying all energy and GHG reduction technology available today. Each of these are already being used at one or more facilities in Canada, even technologies identified as experimental or pre-commercial. Since 2004, CIAC members have invested heavily, allowing them to cut their carbon dioxide emissions by 14.5 per cent through:

- investments in **new plants and technologies**;
- **efforts to conserve energy**, through improved energy and emissions tracking;
- investments in **combined heat and power** facilities;
- substitutions of **lower-carbon fuels**;
- **process changes**;
- **CO<sub>2</sub> capture** and use in production or enhanced oil-recovery operations; and
- **replacements or upgrades** of older equipment such as boilers and heaters.

Below are a number of innovative projects and solutions CIAC members have undertaken to reduce their greenhouse gas emissions.



One of the best ways of minimizing emissions is ensuring production facilities and processes are reliable and efficient. Methanex's primary source of NOx emissions in manufacturing is from their steam methane reformer, an essential part of the methanol production process. They are taking preventive action to protect the environment and innovate for safer processes that conserve resources by using:

1. Low-NOx burners, which prevent the formation of NOx in the reformer (greater than 50% NOx reduction)
2. Selective catalytic reduction (SCR) units, a scrubber system that removes NOx from the exhaust of the reformer unit (99% NOx removal rate).



All MEGlobal production facilities in Canada capture carbon dioxide from the ethylene glycol production process. The captured carbon dioxide is then sold and used in industrial processes by local companies, allowing value capture from ethylene glycol production. In 2019, this resulted in more than 260 kilo tonnes of carbon dioxide being redirected to other uses instead of ending up in the atmosphere.



BASF has a group goal to achieve CO<sub>2</sub>-neutral growth by 2030. Their carbon reductions strategies are guided by the level of control that they have over their operations, and their impact on the environment. They are supporting an innovative approach to growing Canada's renewable energy industry. BASF purchases a total of 10,000 MWh renewable energy from their partner, Bullfrog Power - the equivalent of taking nearly 1305 cars off the road for the year and saving 6185 tonnes of CO<sub>2</sub> equivalents.



On Clean Air Day, NOVA Chemicals was the proud recipient of the 2018 Blue Skies Award. Through incorporation of next-generation burner technology and higher efficiency systems, a 30-40 percent reduction in emissions of NOx was realized from each of the refurbished furnaces at their Jore, Alberta manufacturing facility.



CCC Sulphur has constructed a steam turbine electrical energy cogeneration in cooperation with their local electrical utility provider, Waterloo North Hydro, to supply energy to the local power grid from excess process steam, thereby reducing carbon emissions and improving energy efficiency in the Elmira area.

# Resource Conservation

Responsible Care® drives companies to find innovative ways to eliminate waste, improve their energy efficiency, conserve resources, and reduce their emissions throughout the entire lifecycle of their products — from their design, production, and distribution to their use by customers and beyond.



## What CIAC members are doing to conserve resources

Canada's chemistry industry is highly innovative and recognized globally as the best in its class in energy efficiency and carbon emissions intensity. Through careful monitoring of energy usage during the past 34 years, CIAC members and partners have implemented formal energy management systems and taken action to improve the energy efficiency of their operations.

Research from the International Energy Agency shows that for every unit of GHGs emitted as part of chemical manufacturing, the industry's products and technologies result in a net reduction of 3.1 units of emissions during a product's lifecycle — from extraction of feedstock and fuel, through production, ultimate use and end-of-life management.

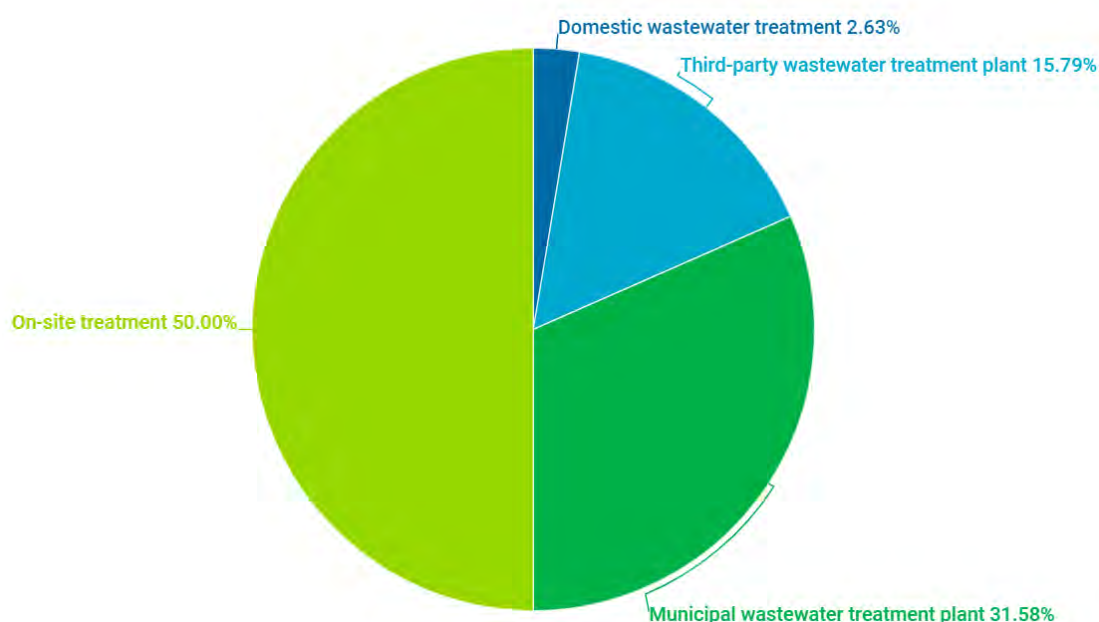
Using emerging technologies, this ratio increases to more than 4:1. Among the most important emerging technologies helping move the world to a low-carbon economy are in the building, transportation, energy, agricultural, air conditioning and refrigerant sectors. Studies show that global emissions would be over nine gigatons of CO<sub>2</sub> equivalents-per-year lower if these technologies were used to their full potential right now. That's more than 12 times the annual emissions of Canada.

## Waste

When CIAC began waste reporting in 1990, members produced more than 87,200 tonnes of hazardous waste for disposal. Since then, CIAC members have reduced the hazardous waste for disposal to 28,500 tonnes – a reduction of 67 per cent. Our members have also established ambitious programs to limit waste disposal to landfills

### Praxair: Zero Waste to Landfill


Praxair's Zero Waste to Landfill program has a target to divert more than 90 per cent process waste from landfill for more than 250 of their sites, through methods like incineration for energy recovery. In 2018, more than 45 thousand tonnes of waste were diverted from landfills. Cumulatively since 2011, the program has saved more than one million dollars. Zero Waste to Landfill helps extend Praxair's mission and values, and promote circular economy practices. In many cases, the program brings social benefits to local communities, from education to job creation.



## Water Usage

Through various methods of wastewater treatment, many CIAC members are actually putting water back cleaner than when they found it. The chart below shows the different water treatment methods used by our members.





### Jungbunzlauer: Water-Saving Projects

In order to counteract industry-related water pollution and prevent a worsening of the global water supply situation, Jungbunzlauer invests in water-saving projects and is constantly seeking to improve these processes to maximize the reuse of water. They operate state-of-the-art wastewater treatment plants and strive for an ongoing reduction of waste and for optimal recycling of waste-flows. Being readily biodegradable and ecologically safe, their by-products can be used in construction and agriculture as well as in the manufacture of biogas.

### Evonik Canada: Eliminating Sulphuric Acid River Pollution

In late 2018, Evonik Canada's Maitland site installed a new technology that allowed the elimination of 98% sulphuric acid, thereby eliminating the possibility of a release to the St. Lawrence River. The material had been subject to the Ontario Toxics Reductions Regulations due to the hazards associated with the material and the volumes at which it was used on site. The project eliminated estimated emissions to the river of approximately 15 MT per year.

### NOVA Chemicals: Reducing Phosphates

To improve water quality, NOVA Chemicals is working to reduce phosphate in residual water so that cleaner effluent water is returned to its source. They have achieved a reduction of phosphate by 30 to 40 per cent at their Joffre, Alberta site by using a different approach to corrosion inhibition and they continue to study other possible ways of further reducing phosphate. Their efforts, which go above and beyond the regulatory requirements, will ultimately be applied across NOVA Chemicals' sites.



### Member Partnerships: Reducing Water Intake

In late 2018, neighboring CIAC members CCC Sulphur Products and LANXESS finalized plans for a steam recovery re-use project. This would allow condensate capture and reuse and would result in a significant reduction of process water requirements for these two facilities.

# Plastics and the Circular Economy

More than 95 per cent of all manufactured products rely on chemistry and many of these include plastic resins. From wind turbines and solar panels, to vehicles and building materials, to the packaging that allows us to feed the world, plastics chemistry is vital to our economy.



**These products that enable our modern way of life, however, do not belong in our waterways or in the environment.**

Today in Canada, as a result of inadequate sorting, contamination, limited end markets and not employing all the technologies available, nearly 80 per cent of all post-consumer plastics end up in landfills – three million tonnes annually. The current approach to producing, using and disposing of plastics poses a real threat to the environment and results in a significant loss of value, resources and energy.

In recent months, images of mismanaged plastic waste in our environment have left many Canadians concerned about the amount of plastic in their lives and the lack of visible and understandable solutions to address plastic waste. Our members are committed to working with all levels of government and other stakeholders to develop a more sustainable approach for waste management.

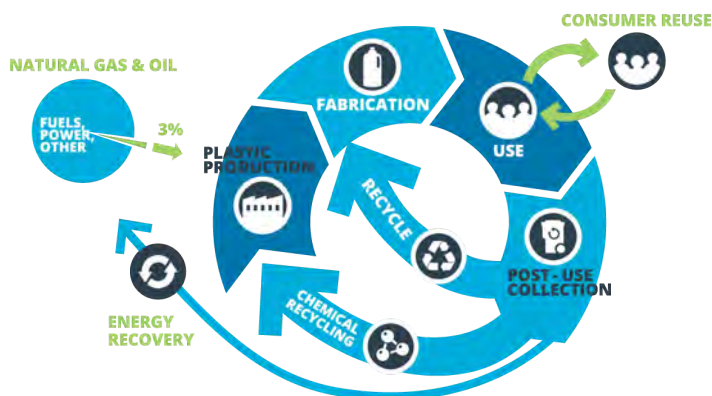
## The Circular Economy

As the numbers show, we still live in a traditional linear economy, where most products start as raw materials and are eventually discarded. The chemistry sector is supporting the transition from a linear economy to a circular economy – one that prioritizes the extension of product lifecycles, extracting maximum value from resources in use, and then recovering materials at the end of their service life.

An important principle of the circular economy is increasing the capture of materials in waste streams so that they can be recycled, recovered and reused in new products. But a circular economy involves far more than just upgrading traditional mechanical recycling — it's a new economic model where, ultimately, the waste of one process becomes a feedstock for another process, and ultimately, waste is eliminated. The guiding principle is to use products and resources in the best way possible without any loss in performance and value or any increase in environmental lifecycle impact.

We will never be able to reach 100 per cent diversion or zero waste goals from mechanical recycling alone. Other waste management options of energy recovery and chemical recycling are needed to advance a circular economy.

## PLASTICS IN A CIRCULAR ECONOMY





## What CIAC members are doing to address plastic waste

Through the Responsible Care initiative, Canada's plastic resin producers are obligated to ensure sound stewardship of resin pellets during manufacture, transport and distribution. The industry is upgrading and implementing its Operation Clean Sweep protocol to eliminate the escape of plastic pellets from industry operations, with a focus on preventing leakage into rivers and oceans.



Efforts to increase recycling rates, implement eco-efficient waste management systems and reduce the amount of litter entering the world's waterways and landfills are important aspects of the Responsible Care commitment to continuous improvement and social responsibility.

Our members also work with their suppliers and customers to prevent product loss while also working to innovate for new products and processes that add value to society while reducing risks to human health and the environment.

In June 2018, CIAC and the Canadian Plastics Industry Association (CPIA) announced ambitious targets that underscore their members' commitment to a future without plastic waste. Representing the broad plastics value chain in Canada, CPIA, CIAC and their members announced the following waste reduction targets:



A NEW ASPIRATIONAL GOAL OF  
**100% OF PLASTICS**  
PACKAGING BEING REUSED,  
RECYCLED, OR RECOVERED BY  
**2040**

AN AGGRESSIVE INTERIM GOAL OF  
**100%**  
**OF PLASTICS PACKAGING**  
BEING RECYCLABLE OR RECOVERABLE BY  
**2030**



## Dow: Hefty® EnergyBag® Program

Dow is working to keep plastic out of the environment by innovating new applications for recycled plastics – demonstrating that a circular world is not that far out of reach. Dow, in partnership with Reynolds Consumer Products and other community collaborators, set up the Hefty® EnergyBag® program to complement existing recycling programs, allowing hard-to-recycle plastics to be picked up from consumers at their curbsides and converting them into valuable resources, including energy, fuels and other durable products. Since inception in Omaha, Nebraska, in 2016, the EnergyBag® program has expanded to 13 communities across the United States, making it available to more than 500,000 households, bringing together communities and companies to help creating end-of-life solutions for plastic waste.

In 2019, the program expanded to Canada in London, Ontario. In March this year, Reynolds Consumer Products announced that the innovative program has officially diverted over one million pounds of hard-to-recycle plastics from landfills.



## Global Alliance to End Plastic Waste

In January 2019, an alliance of global companies from the plastics and consumer goods value chain launched a new organization to advance solutions to eliminate plastic waste in the environment, especially in the ocean, and to do this by transitioning to a circular economy for plastics.

The Alliance to End Plastic Waste (AEPW) committed over US\$1.5 billion over the next five years to help end plastic waste in the environment. Made up of nearly 30 members from around the world, the Alliance is a not-for-profit organization that includes companies that make, use, sell, process, collect and recycle plastics, including chemical and plastic manufacturers, consumer goods companies, retailers, converters, and waste management companies. The Alliance will develop and bring to scale solutions that will minimize and manage plastic waste and promote solutions for used plastics by helping to enable a circular economy.

CIAC members NOVA Chemicals, BASF, Dow, Nouryon and Shell are founding members of the Alliance. For more information, please visit [www.endplasticwaste.org](http://www.endplasticwaste.org)

## Project Stop

In 2018, NOVA Chemicals committed to a three-year investment of nearly \$2 million to Project STOP, with the goal of preventing plastic debris from reaching oceans. Project STOP works with cities to create effective waste management systems that eliminate leakage of plastics into the ocean.

The first city partnership was launched last year in Muncar, a coastal fishing community in Banyuwangi, Indonesia. Project STOP has brought in international waste management experts to provide guidance on implementing a waste management system that is owned and operated by the city government. Project STOP also provides financial support for collection vehicles and containers, equipment for waste collection, reuse, recycle and treatment (including dry marketable and wet compostable waste) and promotes behaviour change and creates jobs in the community.



**AN INITIATIVE CO-FOUNDED  
BY BOREALIS AND SYSTEMIQ**



# Product Stewardship

Product stewardship is a pillar of Responsible Care®. All CIAC member companies must take responsibility for a product throughout its entire lifecycle by reducing any environmental, health, or safety risks associated with it.



## Responsible Distribution®

CIAC has a Responsible Care partnership with Responsible Distribution Canada (RDC). Through this partnership, RDC's Responsible Distribution initiative is recognized as equivalent to Responsible Care for companies engaged in chemical distribution. Their program governs all aspects of a company's actions as they relate to the distribution of chemicals, chemical products, and chemical services. Responsible Distribution plays a critical role in assisting CIAC member companies in meeting their Responsible Care product stewardship commitments.



## What CIAC members are doing to promote product stewardship

Product stewardship is front and centre at all CIAC member companies. Members develop close working relationships with suppliers, distributors, logistics service providers, and customers. They also implement processes to ensure:

- ongoing evaluation of products, to achieve the most efficient use of resources and to reduce risks associated with raw materials and products;
- employees and the public know and understand the inherent hazards, risks, and benefits of each of the company's products;
- customer procedures and equipment are reviewed prior to the first sale and follow-up reviews are conducted on an ongoing basis;
- sales of chemical products are prohibited unless there is reasonable assurance of the customer or supplier's intent and ability to properly manage those substances; and
- suppliers' performance is reviewed regularly, to drive continuous improvement throughout the value-chain.

### Imperial: preventing unplanned releases

Imperial designs and operates facilities with the objective of preventing unplanned releases from entering the environment and causing adverse effects. They strive for zero spill incidents and take action by:

- using Imperial's facility integrity management system (FIMS), which outlines expectations for Integrity programs including spill prevention;
- performing preventative maintenance and testing critical equipment in accordance with regulatory requirements;
- utilizing monitoring equipment to detect any events to mitigate the impact of incidents; and
- building secondary containment such as ditches, ponds, sumps, sewers with pumping mechanisms, or clay pads with berms around production equipment such as wells, processing facilities, product and chemical storage areas.

### BASF Canada awarded for its commitment to the UN Sustainable Development Goals

BASF Canada was recognized by the Global Compact Network Canada for its outstanding efforts to advance action towards the United Nations' Sustainable Development Goals (SDGs). The awards encourage all Canadian organizations to embed the SDGs in their work and highlight some of the amazing progress that has been made towards solving the pressing environmental, social and economic challenges of our time.

# Workplace Safety

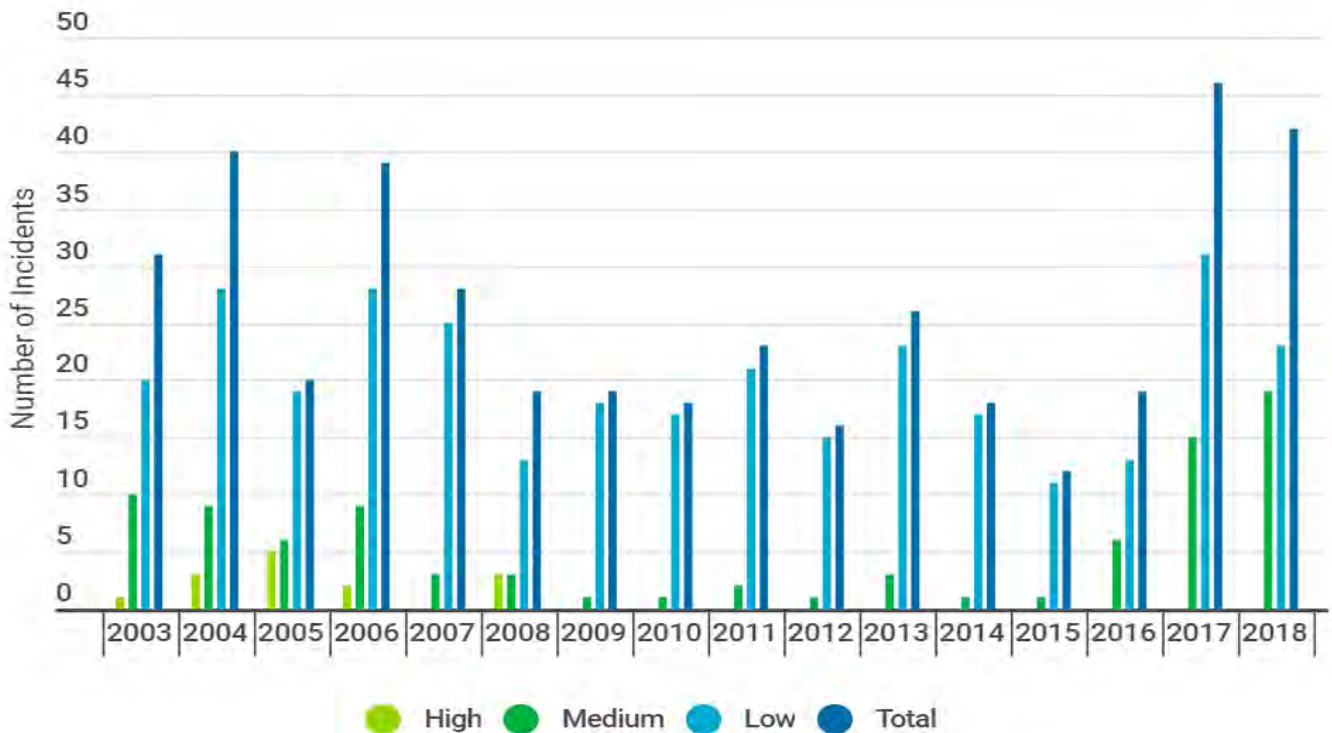
Safety is first and foremost at every Responsible Care® company. For more than 34 years, CIAC members have been creating workplaces which are as healthy and safe as possible through initiatives such as SHARE (Safety, Health, Analysis, Recognition and Exchange network). SHARE brings together CIAC member 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.



## 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.

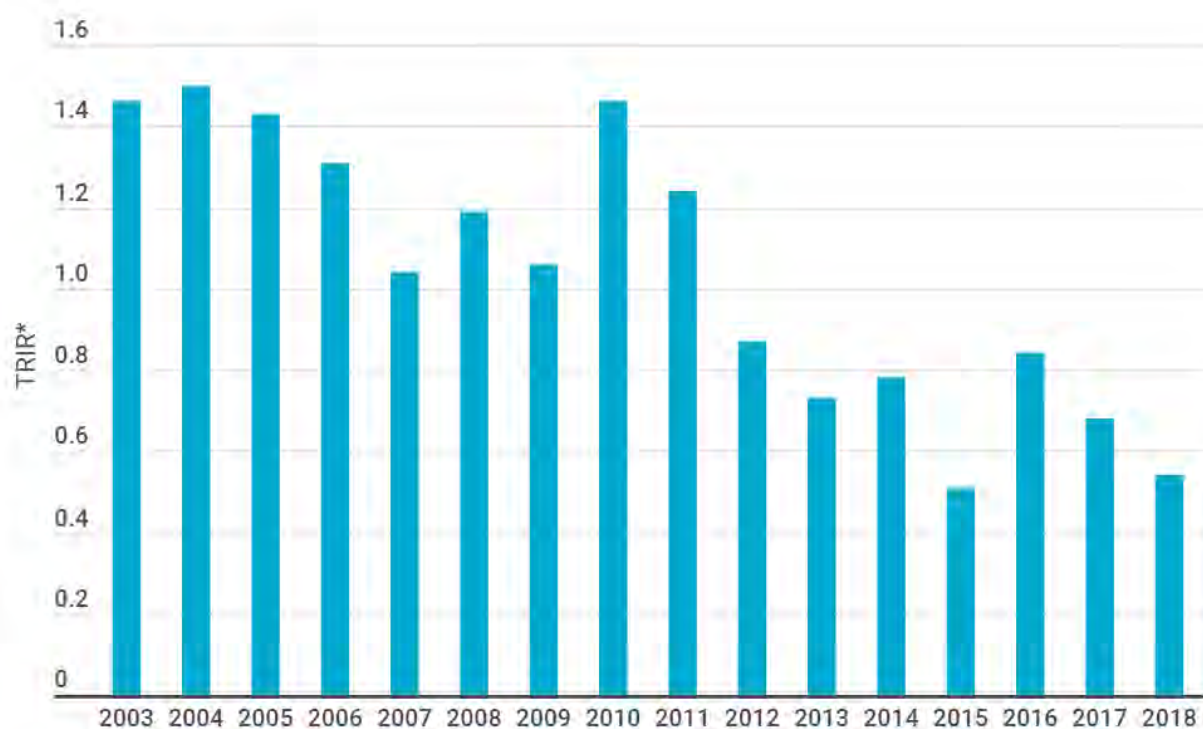
### Process Safety Incidents (Based on Severity)



Note: CIAC's classification criteria for process safety incidents was amended in 2016 to become aligned with the Center for Chemical Process Safety (CCPS) and the Organisation for Economic Co-operation and Development (OECD) thresholds. As a result, some metrics may appear skewed including and following the 2016 year. Once sufficient data has been collected using the new incident tiering system, only data representing the current incident classification criteria will be used.



## Workplace Injuries and Illnesses



\* Total Recordable Incident Rate (TRIR) is calculated as the number of recordable incidents for each 100 full time employees per year, based on 2000 hours worked per employee per year.

## What CIAC members are doing to promote workplace and process safety

Since 1990, CIAC members have reduced the number of injuries and illnesses at their facilities by 78 per cent. CIAC members have also reduced the number of process safety incidents by 50 per cent since 2004 and have fully eliminated Tier 3 incidents — the most severe — since 2009. And they aren't stopping there. Member companies are expanding their efforts and extending their safety programs to contractors and other service-providers to ensure the safety of everyone involved in the business of chemistry.

As part of the SHARE meetings and review of health and safety performance, CIAC identified slips, trips and falls as significant cause of injuries, especially during winter months. This led to the mandatory use of winter cleats at several facilities that have seen a dramatic drop in injuries since this practice was put in place and shared with other member companies.

### BASF Canada wins Canada's Safest Employer Award

BASF Canada received Canada's Safest Employers Gold Winner award in the Chemistry Sector for 2019 at a gala in Toronto in October. Judges pointed to BASF Canada's Exposure Reduction Process, a behaviour-based safety program. This program has empowered employees at all levels with the organization to become more involved and engaged in reducing exposures for themselves and others in the workplace.

### NOVA Chemicals: Goal ZERO

NOVA Chemicals remains deeply committed to Goal Zero, i.e. zero injuries and incidents in the workplace, and believes that all work-related illnesses and injuries can be prevented. In 2018, planning for company-wide implementation of the RC 14001 management system, which combines the Responsible Care Framework with ISO 14001, was launched. This work was further supported by enhancing their Responsible Care governance structure to create functional Strategy Teams designed to leverage learning and safety improvement opportunities and develop program strategies to drive improved operating performance outcomes.

# Community Safety

Every day, chemicals are transported through Canadian communities by rail, road, or pipeline. Ensuring their safe and secure transportation is of paramount importance to CIAC 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.



## The Transportation Community Awareness and Emergency Response initiative (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.

Being a good neighbour is key to being a Responsible Care company, which is why CIAC members must develop an open dialogue with local citizens to ensure they are aware of:

- Any hazards associated with member' operations;
- What members are doing to reduce the risks associated with their operations and the transportation of their products; and
- The specifics of their local emergency warning system and what they need to do to protect themselves and their families in the event of a chemical incident in their community

## What CIAC members are doing to make our communities safer

CIAC members must have an emergency response plan in place demonstrating their capacity to safely and efficiently respond to, contain, and mitigate a chemical transportation incident. They must also develop transportation safety plans which favour:

- the safest **mode** possible;
- the safest **route** possible; and
- the safest transportation **carrier**.

CIAC members must also have site-specific emergency management plans in place demonstrating:

- they have the capacity to safely and efficiently respond to, contain, and mitigate the effects of an incident involving their operations; and
- they have tested their plan, with the active participation of other industries, officials, first responders, and members of the media in their communities.

## TRANSCAER® Safety Train finds a new home at FESTI

After nearly three decades of providing a unique backdrop for municipalities, first responders, and residents to learn about the transportation of dangerous goods from TRANSCAER members by travelling from town to town, TRANSCAER's Safety Train, the CCPX 911, was officially retired on March 28, 2018.

June 26, 2019, it embarked on a new journey by road. It made its way to the Fire and Emergency Services Training Institute (FESTI) grounds at the Toronto Pearson International Airport where it will continue to serve its role training first responders on rail safety and the safe transportation of dangerous goods.

## Chlorine Safety TRANSCAER® Event Hosted at FESTI

The Safety Train was a main feature at the TRANSCAER outreach event hosted in partnership with the Chlorine Institute at FESTI from July 9-11, 2019. The event focused on rail safety and emergency response and featured both field exercises and in-class sessions. Over the three days, 99 participants completed the training.



## 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 on 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, including requirements for planning, administration, training, resource utilization, and assessment; and
- 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.

## TRANSCAER® outreach across Canada

In 2019, TRANSCAER Canada hosted a total of 20 outreach events across the country, helping train 850 students on how to respond to and prepare for transportation incidents involving dangerous goods. Participants represented a wide range of organizations, including firefighters, police officers, government representatives, and various service providers from the chemistry value chain. These outreach and training sessions were delivered in various formats, including presentations on dangerous goods safety, simulations of real-life incidents supported by props such as dangerous goods training trailers, foam trailers, valve displays as well as tank cars.

## TRANSCAER® Investing for the Future

In August, CIAC learned its proposal to Transport Canada to partner on funding for renewed TRANSCAER tools and a cross-country outreach plan was successful! The plan includes developing a virtual reality program and tools, building a new safety training tank car, and hosting a series of outreach events across the country. The first phase of the project, the virtual reality training, is well underway and will launch in 2020.



# Community Dialogue and Engagement

Responsible Care® companies believe Canadians — particularly those living in communities where these companies do business — have the right to understand the risks and benefits of being their neighbours. Responsible Care® companies also believe the opinions and concerns of community members matter.



To give communities a greater voice, local representatives nominated by the community have the opportunity to serve as full participants in the Responsible Care triennial verification process, passing the ultimate judgement on whether members are meeting their Responsible Care commitments.

## What CIAC members are doing to engage communities

To help CIAC member companies better understand the community's concerns, needs and aspirations, as well as their expectations for corporate social responsibility, members foster ongoing community awareness and dialogue by:

- providing proactive information about their operations, products, services, waste, social impacts, benefits, hazards and associated risks, up to and including worst-case scenarios;
- including a formal mechanism for receiving and responding to questions, complaints, concerns or suggestions from the public; and
- providing the community with information about plans to modify operations and allowing for meaningful opportunities to influence those plans before they are implemented.

## Responsible Care Codes for Indigenous communities

On October 17, 2019, CIAC's Board of Directors approved new Responsible Care code elements for Indigenous communities, which were published in January 2020. In 2018, CIAC created a task group made up of CIAC members and Indigenous communities to develop Responsible Care codes for engaging with Indigenous communities located near or exercising traditional land rights near a member facility. These Indigenous code elements are requirements of the Responsible Care Accountability Code.

As part of the new codes, members are expected to identify aspects of the Indigenous code elements that are appropriate for the size, scope and risk profile of the company, including nature, scale and impacts of its operations, activities, products and services. Responsible Care dictates that Indigenous Peoples are a group requiring special considerations and engagement with such Indigenous communities located in the area near a company-owned or leased production facilities shall be undertaken with respect for their unique history, culture and rights.



**ACCOUNTABILITY**

**AC 153:** Identifies and seeks to pro-actively engage with such indigenous communities;

**AC 154:** Seeks to develop and maintain a working relationship with such indigenous communities to enable effective communications, dialogue or response to questions, suggestions or concerns expressed so they are addressed in a timely and respectful manner;

**AC 155:** Provides support, as appropriate, to allow such indigenous communities the capacity to engage meaningfully with the Company;

**AC 156:** Periodically reviews the effectiveness of the outreach, communications and engagement process with such indigenous communities;

**AC 157:** Provides indigenous community members equitable access to employment and contracting opportunities, including procurement and supply chain.

## Community engagement in Sarnia-Lambton

The Clean Air Sarnia and Area (CASA) initiative provides information and timely data from Sarnia's air monitoring network. It includes a community advisory panel made up of representatives from the public, government, First Nations, and industry, who are dedicated to providing the community with a clear understanding of ambient air quality in the Sarnia area. A number of CIAC members are involved in the CASA initiative, initially formed in September 2015.

CASA works to improve air quality in the Sarnia area by:

- sharing information about ambient air quality;
- identifying and researching local air quality issues;
- providing recommendations and information to the Ministry of the Environment, Conservation and Parks and the Sarnia-Lambton Environmental Association;
- informing the public of local air quality

To learn more about the initiative, visit their website [cleanairsarniaandarea.com](http://cleanairsarniaandarea.com)



## Looking Forward

Through Responsible Care, CIAC members strive to "do the right thing and be seen to do the right thing". They innovate for safer and green products and processes, and work to continuously improve their environmental, health, and safety performance. Our members have a number of Responsible Care success stories from 2018 and 2019, and they are committed to exemplifying the Responsible Care ethic and principles as they move into the next decade.

For a full list of companies (as at December 31, 2019), see below.

### Members

Arkema Canada Inc.  
ARLANXEO Canada Inc.  
BASF Canada Inc.  
Cabot Canada Ltd.  
Canada Kuwait Petrochemical Corporation (CKPC)  
CCC Sulphur Products  
The Chemours Canada Company  
Chemtrade  
Dow Chemical Canada ULC  
ERCO Worldwide  
Evonik Canada Inc.  
Evonik Oil Additives Canada Inc.  
H.L. Blachford Ltd.  
Imperial Oil Ltd.  
INEOS Canada Partnership  
INEOS Styrolution Canada Ltd.  
Inter Pipeline Ltd.  
Jungbunzlauer Canada Inc.  
KRONOS Canada, Inc.  
LANXESS Canada Co./Cie  
MEGlobal Canada ULC  
Methanex Corporation  
National Silicates Limited  
NorFalco Sales, GLENORE Canada Corporation  
Nouryon  
NOVA Chemicals Corporation  
Olin Canada ULC  
PeroxyChem Canada  
Praxair Canada Inc.  
Procter & Gamble Inc.  
Pyrowave  
PCAS  
Shell Chemicals Canada Ltd.  
Solvay Canada Inc.  
Stepan Canada Inc.  
Wanhua Chemical  
W.R. Grace Canada Corp.

### Responsible Care® Partners

Canadian National  
Canadian Pacic Railway  
DuPont Canada  
GATX Rail Canada  
Harmac Transportation Inc.  
Northwest Tank Lines Inc.  
PROCOR Limited  
Source Energy Services  
Trimac Transportation Ltd

### Associate Members

Bagwell Supply Ltd.  
Canadian Chlorine Chemistry Council (C4)  
ERM Consultants Canada Ltd.  
Golder Associates Ltd.  
KPMG  
Lakeside Process Controls Ltd.  
Lexon Projects  
Northern Alberta Institute of Technology (NAIT)  
Quinn Contracting Ltd.  
SNC – Lavalin Inc.  
Triangle Fluid Controls Ltd.  
Wood Group

For more information:



**Shannon Watt**

Vice President, Sustainability  
swatt@canadianchemistry.ca  
613-237-6215 ext. 247



**Gilles Laurin**

Director, Responsible Care  
glaurin@canadianchemistry.ca  
613-237-6215 ext. 233



**Danielle Morrison**

Policy Analyst, Environment and Health  
dmorrison@canadianchemistry.ca  
613-237-6215 ext. 255