Chemistry and Plastics:
Solutions 4 building a net-zero future

#chemistrysolutions

CHEMISTRY INDUSTRY ASSOCIATION OF CANADA

In 2019, the federal government committed to the goal of net-zero emissions for all of Canada by 2050 and in 2020, the Net-Zero Emissions Accountability Act came into force. Achieving this will require chemistry-based solutions, which includes the plastics sector. Our industry has historically been a solutions-provider to the world's most challenging problems. In fact, **Canada's chemistry sector has reduced its CO_2 emissions by 67 per cent** on an absolute basis since 1992. We are ready to step up to meet these new ambitious goals.

More than 95 per cent of all manufactured products rely on chemistry. Reducing emissions for all Canadians in key sectors such as green buildings, more fuel-efficient transportation, clean energy, clean technology and sustainable agriculture would be impossible without chemistry and plastics.

Chemistry and plastics' impact on the Canadian economy

Chemistry is vital for the Canadian economy. As the third-largest manufacturing sector in Canada in 2020, industry shipments were:

— $85 BILLION —

$55 BILLION
in chemistry and
$30 BILLION
in plastic.

The chemistry industry employed 88,600 workers in Canada and the plastics sector contributed an additional 108,400 jobs.

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. It is estimated that by 2050, chemical production globally will need to triple in volume to address future economic challenges and address emission reduction targets.

In collaboration with industry, Canada's net zero emissions plan has the potential to strengthen Canada's chemistry sector and contribute to making Canada's economy more resilient and competitive.

The Canadian chemistry advantage

Canada's chemistry industry is delivering made-in-Canada low carbon chemistry products. Thanks to our low emissions electricity grid, our electro-chemistry sector is already close to achieving net-zero production. This sector produces important products to maintain safe drinking water and treat municipal wastewater. It also provides important inputs to key industrial sectors such as forestry, mining and agriculture.

Similarly, Canada's petrochemical sector's access to abundant low-carbon fossil fuel feedstocks is a huge natural advantage. Much of the world's chemistry production is based on crude oil, coal and other high-carbon energy sources. Canada's abundant low-carbon resources — natural gas and natural gas liquids, hydroelectricity, and biomass — give its chemistry sector a built-in advantage over competitors that rely on more carbon-intensive feedstocks and energy sources.

A 2017 study from the Joint Research Centre of the European Commission compared different chemistry production processes and found that ethylene production that uses higher-carbon naphtha (crude oil) as a feedstock has an 82 per cent higher greenhouse gas (GHG) emissions factor than ethylene produced from lower-carbon ethane (natural gas) feedstock. Canada's chemistry sector has converted its ethylene facilities from naphtha to ethane feedstock and are already benefiting from this lower carbon approach to production.

Today, member facility operations are 100 per cent dependent on natural gas feedstocks. The switch has resulted in a near halving of energy consumption and GHGs per tonne of production. One recent example has been demonstrated by NOVA Chemicals' nearly $1.2 billion investment in their Ontario manufacturing facilities in St. Clair Township over the past decade. These investments have included multi-phased upgrades to the Corunna ethylene cracker to utilize 100 per cent ethane feedstock.

As an example, in the last decade CIAC member NOVA Chemicals has invested $1.2 BILLION to convert their Corunna, Ontario ethylene cracker to utilize all-ethane feedstock.

Tracking our industry's emissions reductions

Through significant investment, since 2005, CIAC members have reduced their overall GHG emissions by 13 per cent (67 per cent since 1992) and reduced sulphur dioxide emissions by 71 per cent. CIAC tracks our members' reductions of GHG and criteria air contaminant emissions through the National Emissions Reduction Masterplan (NERM) and these numbers are published annually in our Responsible Care Report, available at CanadianChemistry.ca.

Responsible Care®

For nearly 40 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, a chemistry environmental, social and corporate governance (ESG) program, is now practiced in 73 countries and by 96 of the 100 largest chemical producers in the world.

Through Responsible Care, our members strive to the ethic to "do the right thing and be seen to do the right thing." They are compelled to 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, its employees, the communities, and the environment, over the entire life cycle of its products.

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. These reports are published on our website at **CanadianChemistry.ca**.

Responsible Care®
Our commitment to sustainability.

Solutions to help all Canadians reduce emissions

There is a current urgent need for Canadian chemistry and plastics products to help reduce emissions in Canada and around the world.

In Canada, the building sector alone is responsible for 40 per cent of greenhouse gas emissions (GHGs). Insulation, window coatings and vinyl frames, reflective roofing and other innovative chemistry and plastic-based materials dramatically lower emissions from the building sector by reducing heat loss and the demand for cooling. In transportation, lighter vehicles, alternative fuels and electric vehicles will depend on advances in materials, such as plastics, fuel and batteries developed through chemistry.

Chemistry is also a critical part of nearly every renewable power generation source. From the plastic composite materials in wind turbine blades, to solar panels, and even nuclear and hydropower, chemistry is essential.

And with fully 10 per cent of Canada's GHGs from crop and livestock production, chemical fertilizers and crop protection in farming increases agricultural yields while advanced, lightweight and flexible packaging, made possible by chemistry and plastics, reduces food waste and transportation-related emissions. Our products are essential to a cleaner, greener future.

Plastics and a circular economy

Many of the products and solutions that are key to reducing emissions for all Canadians use plastics. For instance, there are over seven tonnes of plastic resin in a single 17 tonne wind turbine.

However, better end-of-life management of plastic products is required, and we need to move to a circular economy for plastics that recognizes plastics as a resource or feedstock, not a waste. Changes will include simpler product design, improved mechanical recycling technologies across the country, and harmonized recycling systems across provinces. This will allow plastics to be collected at a scale that makes it possible for industry to turn these items into new products.

In addition, many Canadian companies are leading the way on research into advanced recycling. These new technologies transform plastic products back into their basic molecules, allowing the production of new resins, pellets, and plastic products that will continuously recirculate in the economy.

Investing in plastics recycling infrastructure and technology will increase the availability and use of recycled plastics in products. Given recycled plastic resins have a lower environmental footprint than virgin resins, it will also increase the availability of made-in-Canada low-carbon products, providing an important trade advantage.

Canada's Hydrogen Strategy

In 2020, Canada's federal government released its Hydrogen Strategy, setting an ambitious framework with hydrogen as a key part of Canada's path to net-zero emissions by 2050 and to make Canada a global leader in hydrogen technologies. Provincially and federally, hydrogen is expected to be an important decarbonization pathway and CIAC members are well placed to contribute supply given the link with chemical industrial processes.

Today, hydrogen is produced as a primary product or as a by- product from chemistry production processes that can be used as fuel for heat, as a feedstock in chemical production or captured and used for other industrial processes. There is an opportunity for hydrogen to displace more GHG-intensive feedstocks and help transform Canada's energy mix.

Our industry will play a key role in determining which hydrogen production pathways are most economical in Canada. It is important that federal and provincial governments work with industry to support new hydrogen investments as well as support existing hydrogen production to contribute to Canada's Hydrogen strategy and become cleaner using available technologies such as carbon capture, utilization and storage.

What our sector needs to help get Canada to net-zero

We must ensure the Canadian chemistry and plastics sectors remain competitive. Canada must be able to attract world class investments to strengthen the chemistry sector. This will require broad-based policies and targeted measures.

Building a competitive investment environment

For years, CIAC has highlighted the investment potential that exists in the chemistry sector. Ontario and Alberta recognized this potential, and both helped secure global scale investments, with Alberta recently re-committing to the sector through the Alberta Petrochemicals Incentive Program. The federal government has also invested; Budget 2021 recommitted to the Strategic Innovation Fund and critically reinvested in the National Trade Corridors. Canada must build on these programs through a mixture of broad-based investment competitiveness measures and strategically focused policy that will encourage innovation in the chemistry sector.

New investment is critical to the renewal and transformation of Canada's chemistry sector. Deploying Carbon Capture Utilization and Storage (CCUS) at existing and new facilities is a pathway to carbon neutrality for our sector. Examples of innovative new investments in Canada include Nauticol Energy's proposed carbon neutral blue methanol facility in Grande Prairie, Alberta. Blue hydrogen is also being pursued in Canada including Shell's partnership with Mitsubishi to explore a blue hydrogen facility at their Scotford Energy and Chemicals Park.

The world's leading chemical companies, including members of CIAC, are exploring emerging new technologies to decarbonize production, including electrification of steam crackers and Dow's plans to build the world's first net-zero chemistry facility. In plastics, both NOVA Chemicals and Dow are moving forward with post consumer resins to bring circular economy solutions to reduce plastic waste while delivering significant reductions in GHG emissions.

These are just a few examples of innovative emerging technologies required to meet our sector's decarbonization potential. They are not possible without the right conditions for research and development and new investment at both the federal and provincial levels of government in Canada. CIAC recommends extending or making permanent the 100 per cent Accelerated Capital Cost Allowance (ACCA) for major capital projects that will enable critical investments to strengthen domestic supply chains and achieve significant emissions reductions.

The Federal Scientific Research and Experimental Development (SR&ED) tax incentive needs to be re-invigorated to foster made in Canada research and development solutions. And finally, industry needs predictability in recycling carbon compliance revenue to invest in emissions reduction technology at existing and new facilities.

Promoting innovation and enabling a circular economy

Achieving a circular economy for plastics will require collaboration among governments, businesses, academics and scientists to develop solutions that will enhance recycling systems, support innovation and expand end-markets for plastics. Today in Canada, due to inadequate sorting, contamination, limited end markets and not employing all the recycling technologies available, 86 per cent of all post-consumer plastics end up in landfills. This lost opportunity costs Canadians nearly $8 billion per year and is expected to grow to $11 billion per year by 2030.

CIAC recommends that the federal government establish the Circular Plastics Innovation Fund (CPIF) focused on advanced manufacturing solutions in the chemistry and plastics value chain. The CPIF would develop a national ecosystem of SMEs, large companies, governments, industry investors, and research institutions to align stakeholders and partners to scale-up and commercialize circular economy innovations. Priority areas for private-public investment in innovative solutions would include industrial decarbonization technologies, recycling infrastructure and technology acceleration for advanced recycling.

Canada's chemistry and plastic sectors are ready to step up

As the innovative solutions-providers to our world's most critical challenges, the chemistry sector will be vital to the pressing concern of climate change. To successfully transition to a low-carbon economy and achieve net-zero emission goals, the chemistry and plastics sectors require closer collaboration and alignment between the federal and provincial governments.

Achieving net-zero will require transformative changes and policies that involve all Canadians. Industry must be an active partner with collaboration between all stakeholders to support collective action, technological innovation and the sharing of best practices.

POLICY RECOMMENDATIONS

Investment

Make the Accelerated Capital Cost Allowance permanent.

Build on the Strategic Innovation Fund and the National Trade Corridors programs through a mixture of broad-based investment competitiveness measures and strategically focused policy that will encourage innovation in the chemistry sector.

Work with the provinces to maximize the impact of investment support programs by ending the taxation of investment support programs.

Reform the SR&ED program to help foster R&D in Canada.

Decarbonization, Net-Zero and a Circular Economy

Engage in a transparent and inclusive dialogue with industry stakeholders and seek to harmonize regulations domestically and where possible globally.

Incentivize domestic investments in research, the development of clean technology and infrastructure, and the implementation of climate-focused solutions.

Support capital investment in new facilities to drive Canada's net-zero ambitions.

Establish the Circular Plastics Innovation Fund (CPIF) focused on advanced manufacturing solutions in the chemistry and plastics value chain.

Carbon leakage protection measures for energy-intensive, trade-exposed industries (including chemicals) are critical and must be part of Canada's climate policy to maintain competitiveness of Canadian manufacturers.

Implement Carbon Capture Utilization and Storage (CCUS) tax credit.

To learn more, visit: canadianchemistry.ca

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