

➤ Chemistry Industry Association of Canada's Submission
INNOVATION AGENDA



September 2016

CHEMISTRY-BASED INNOVATION

➤ Overview

We are a solutions-provider – the chemistry industry creates jobs, we add value to Canada’s rich natural resources in ways that take advantage of cutting edge R&D, employing some of the brightest minds to do so. We are knowledge-intensive, as CIAC members apply the science of chemistry to create innovative products and services that make people’s lives better, healthier and safer.

We are also committed to continual improvement in our environmental, health and safety performance, and to strong community engagement, outreach, and social responsibility through our Responsible Care® Ethic and Principles for Sustainability. For more than 30 years, Canada’s chemistry sector has been at the forefront of the journey towards responsible and sustainable chemical manufacturing. Founded in Canada in 1985, Responsible Care, CIAC’s U.N. recognized sustainability initiative, is now practiced in 62 countries. Through Responsible Care, CIAC member-companies have committed to continuously improving their products and processes, and their efforts have been paying off.

To date, ahead of national regulations and policies, CIAC members-companies have achieved the following results through their commitments to sustainable development:

- *Reduced their absolute GHG emissions by 69% from 1992 levels;¹*
- *Reduced emissions of toxic substances by 90%;*
- *Reduced emissions of sulfur dioxide emissions (linked to acid rain) by 87%;*
- *Reduced discharges to water by 99%;*
- *Reduced hazardous waste disposal by 64%;*
- *Implemented emergency prevention and response plans at all facilities;*
- *Maintained active community advisory panels at all facilities; and*
- *Externally verified their commitments and performance, every three years, against Responsible Care codes and management tools.*

An effective innovation policy fosters the development of products, services and industries that can best capitalize on the rich resources, history, and talent that already exist in our country. Our members demonstrate all of the characteristics of Canada’s most innovative companies in terms

¹ These reductions are in addition to those associated with the use, by other industries, of chemically-derived products and technologies which have been shown to deliver emission savings of more than 2 units for each unit of direct and indirect emissions coming from the chemistry sector.

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of outstanding labour productivity; investment and output growth; high-quality and high-paying jobs; high knowledge intensity; and outward, export orientation. We believe the chemistry industry will provide the sustainable growth linkage that can best advance Canada's innovation agenda – an agenda that builds on a heritage of rich natural resources and highly-skilled talent to deliver value-add processing.

This analysis and these recommendations will focus on three of the six **Areas for Action: world-leading clusters and partnerships, grow companies and accelerate clean growth, and ease of doing business**. These are the areas where the chemistry industry – as competitive solutions providers – can compete and provide solutions to the world. Specifically, together we can advance sustainable growth, be globally competitive and offer options for adding innovative value to our resources.

➤ Areas of Action

1. World-Leading Clusters and Partnerships

Super clusters that are the destination of choice for ideas, talent and capital

Canada has many world-leading clusters that are hotbeds of innovative R&D. For the chemistry sector, CIAC advocates that we collaborate to focus on the areas which utilize the potential of our natural resources and move them along the value chain, attracting the best and brightest talent in order to capitalize on success. The best example of such an area is the Sarnia-Lambton Biohybrid Chemistry Cluster. Combining integrated industrial infrastructure, diverse feedstocks, and outstanding access to markets, this world-leading cluster has created a unique culture of collaborative innovation between industry, government, labour, education, and R&D organizations.

One of the most innovative successes of this cluster is the way in which waste from one company serves as the raw material input for another, with the co-products and co-streams allowing for the overall site to not only produce innovative synergies for the different plants, but to also lower net emissions for all the companies that make up this cluster. This is accomplished further by each player specializing in the infrastructure contributions – walking the talk. One company provides a site for cogeneration – steam and electricity from one process – cutting in half energy demands by using energy twice. Another provides the waste treatment for itself and neighbours, to take advantage of efficiencies of scale. Still another leads on emergency response (e.g., fire-fighting) and all work together to share safety best practices, one of the key tangible deliverables of Responsible Care. In our sector, environmental, health and safety (EH&S) performance is a shared experience, not a competitive company secret.



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Consisting of companies, associations, and individuals representing the chemistry value chain, this competitive cluster is establishing Ontario as a global leader in innovative, environmentally sustainable chemical products, technologies, and processes. We would welcome the opportunity to invite you as our guest to tour our member facilities and see a super cluster in action.

This sector has other examples in Alberta, where clusters work to deliver overall global competitiveness. Here we are working to take 20%-25% of local natural gas production and produce high value commercial products that in turn address global challenges (food spoilage, medical needs, renewable energy challenges and communications). It all starts with an invisible, low value gas, and ends in high value jobs and technology-driven solutions to the challenges we are all facing every day. Come and visit the clusters at Fort Saskatchewan, Red Deer, Medicine Hat and discover the future for Canada's resource economy – innovative products, leading edge technologies and best in class performance.

Recommendation 1: *Recognize that these chemistry clusters are the right model for long-term, made-in Canada innovation led by business, financially support them, and develop similar clusters across the country.*

2. Grow Companies and Accelerate Clean Growth

Canadian companies compete to win and create jobs

Very few people are aware that more than 95 per cent of all manufactured products rely on chemistry. In fact, addressing the challenges of clean energy, clean air, clean water and a sufficient supply of safe and nutritious food on a global scale is entirely dependent on chemistry-based solutions.

From improved building insulation and lighter plastics for automobiles, to the production of solar and wind energy equipment, these, and other innovative chemistry products and processes are essential in helping society meet its needs while reducing its carbon emissions.

Foam insulation

Multiple benefits in one application: high insulation value, near-zero air permeability, increased building strength, weather resistance, improved comfort, improved air quality and reduced operating costs and emissions.



Our products not only improve quality of life, but also improve the performance of other sectors and help them to lower their own GHG emissions – from specialty food wrap to reduce food spoilage globally, to fertilizers that advance and enhance food production.



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Nitrogen stabilizer



Instinct Nitrogen Stabilizer works more effectively for farmers (increased yield) and the environment (reduced leaching losses) resulting in a reduction of 664,000 tons of CO₂ equivalent in 2014 alone.

Bio-based food seasoning

Disodium succinate, is an important ingredient of complex seasoning agents used for flavor enhancement. BioAmber uses sugars (from corn, cane, beets, and other biomass) as feedstock to produce the same building blocks as petrochemicals. The process results in a 100 per cent reduction in GHGs and 60 per cent reduction in energy consumption.



Lightweight products

Reducing a vehicle's weight by 100 Kg cuts its GHG emissions by 10 g/Km due to improve fuel efficiency. New polymers and high-tech plastics-based solutions, such as glass or carbon fiber, are designed to replace metal effectively in cars and airplanes without compromising performance, comfort or safety.

Polyethylene barrier film

High-performance polyethylene resins reduce food wastes by extending food freshness, reducing packaging weight, enhancing barrier properties and providing product protection. Because of reduced weight and size, packaging increases the capacity of every container resulting in less trucks on the road and reduced fuel emissions.



Green sense concrete technology

Enables formulation of concrete mixture that contains a greater proportion of recycled materials, this greatly decreases the carbon footprint and environmental impact of construction. On average each ton of waste material used in replacement for clinker in cement brings reductions of more than 650 kg per ton.

CIAC member-companies are willing and well-positioned to continue to demonstrate a proactive approach to environmental protection, to resource conservation and to product development consistent with the U.N.-recognized Responsible Care[®] ethic so they can contribute to improving the life of all Canadians.

Building on an abundance of natural resources, a well-educated workforce and a low carbon energy grid, Canada is uniquely positioned to take advantage of the industry's continuous stream of innovations to build a safe, prosperous and resilient sustainable economy.

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Recommendation 2: *Recognize that technological innovation and emissions reductions that accelerate clean growth are completely dependent on new capital investment and provide assistance during the development and deployment of pre-commercial emission reduction technologies in chemical value-add processing.*

Recommendation 3: *Partner with the industry to attract some of the nearly \$200 billion in new investment already coming to North America in this sector – new capital, new jobs, best available technologies – and a sustainable foundation for future innovation.*

3. Ease of Doing Business

Canada is the location of choice for investment and growth

Today, chemical value-add processing is one of the fastest growing sectors in North America. Investments approaching \$US 200 billion, or more than 260 projects, are at various stages of development. A vibrant and sustainable chemistry sector can provide Canada, through its products and technological innovations, with a sustainable competitive advantage.

Canada must capture a share of these new investment dollars and projects. Based upon historical investment levels, the Canadian chemistry sector will realize about \$20 billion of the projected investment activity. But it is currently tracking at about one third of that – partnering together with government we can triple our investments and in turn deliver on our mutual innovation and sustainability goals.

Ultimately, it is new investment that drives innovation in value-add sectors like the chemistry industry by enabling the transfer of leading-edge technologies, and by building the critical mass that helps to support R&D programs that are vital to building Canada as a global centre of innovation.

Canada's chemistry industry is already a world leader in low-intensity carbon chemical production due to: the abundance of low-carbon feedstock; relatively new plants and upgraded equipment; process and product re-engineering; access to, on average, one of the lowest GHG-intensive national electricity grids; and energy conservation measures. These reductions are the result of significant new investments, including more than \$12 billion in the last decade alone. In fact, the link between capital investments and emissions reductions is very evident in the chemistry sector because the industry has always had energy efficiency as a core element of its business practices.

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Recommendation #4: *Recognize that an industrial development strategy that moves products along resource value chains (value-add processing) is the best method to create jobs and economic value for Canada and develop policy frameworks that preserve the benefits of an efficient, modern and responsible domestic chemistry value-add industry.*

➤ Conclusion

Today, Canada's chemistry sector is poised for growth, thanks to new shale gas and biomass feedstocks and a growing market for chemistry-based solutions. Our industry could continue to bring sustainable, creative, and high-paying jobs to communities across the country. By working with the federal government to improve Canada's competitiveness, the chemistry industry hopes to continue delivering innovative economic and environmental benefits for all Canadians.

If you have questions or comments, please contact:

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