

# Chemistry and Business that are Benign by Design:

## Leveraging the Canadian Chemistry Industry's Leadership in Sustainability



By Dr. Steve Maguire and Dr. Stephanie Bertels

FIFTY YEARS AGO, Rachel Carson published her bestseller, *Silent Spring*, and the chemical industry was changed forever. An indictment of inattention to the flow and negative consequences of synthetic chemicals in the environment, Carson's book catalyzed the environmental movement in North America. It also undermined the public's confidence in simple assertions of "better living through chemistry" which, while not untrue, did not represent a full accounting of the risks and benefits of chemical technologies. The industry has been challenged to regain the public's confidence ever since.

Twenty-five years ago, the United Nations Commission on Environment and Development published its report, *Our Common Future*, documenting severe environmental problems on a global scale. Also an indictment of ongoing inadequate attention to the hazards of synthetic chemicals, the report contained grounds for optimism by introducing the concept of "sustainable development" and encouraging its embrace by industry.

On the occasion of these notable anniversaries, we invite members of the Chemistry Industry Association of Canada (CIAC) to reflect upon the steps already taken along the path towards sustainability and to renew their commitment to global leadership in the management – and, why not, elimination – of chemical risks. With Canadian universities serving as global hubs for cutting-edge academic research on green chemistry and business sustainability, and with its tradition of stakeholders working together collaboratively to find solutions to pressing problems, Canada is well-placed to generate the ideas and technologies required to transform the global chemical enterprise. We encourage CIAC members to take up this challenge.

CIAC has every reason to be proud of its Responsible Care initiative. Born in Canada in 1985, Responsible Care was one of the first comprehensive industry initiatives to address environmental issues through self-regulation. It quickly spread to chemical industry associations around the world and has become a model for

other sectors. In particular, the initiative's leadership with regard to ensuring senior-level management commitment, engaging local communities and implementing meaningful verification procedures has shaped the design of self-regulatory programs in a variety of industries.

CIAC's response to heightened stakeholder expectations with respect to sustainable development is also notable. Canada is now home to the most ambitious and forward-thinking Responsible Care initiative on the planet, including its incorporation of sustainable development and emphasis on green chemistry. CIAC's newly updated "Responsible Care Ethic & Principles for Sustainability" brings a new commitment to sustainability.

Canadians can also appreciate the way that chemical risks are managed in Canada and our country's important role in chemicals management globally. While there are, certainly, aspects of domestic chemicals management that can be improved, the approach of the Canadian government – the Chemicals Management Plan (CMP) and its Challenge program in particular – is generally widely appreciated and endorsed by industry members and environmental NGOs in Canada, and is recognized as groundbreaking by experts in other countries.

With its innovative regulatory framework characterized by strict timelines and an explicit commitment to precaution, Canada was the first country in the world to complete the categorization of legacy substances and is on track to meet its ambitious objective to assess and, where appropriate, formulate risk management strategies for all chemicals in commerce by 2020, thus achieving a goal established by the World Summit on Sustainable Development for sound chemicals management. Internationally, Canada is well respected for its domestic achievements and for its contributions on the global stage. Canada played a leadership role, for example, in developing the Stockholm Convention on Persistent Organic Pollutants.

Canadian scientists are also leading the world in making significant contributions to the rapidly growing field of green or sustainable chemistry – the design of chemical products and processes that reduce or eliminate the generation or use of hazardous substances. For example, Canadian universities are home to several world-class green chemistry laboratories, including at Queen's University and the Centre for Green Chemistry and Catalysis which spans McGill University and Université de Montréal, to name but a few. Canada also boasts a unique Centre of Excellence for Commercialization and Research (CECR) which serves as a "one-stop-shop" for industry members to access Canada's green chemistry and material science technologies. Established in 2009 and located in Kingston, Ontario, GreenCentre Canada works to convert bench-scale breakthroughs into commercial-scale green products by providing researchers with

the business development, intellectual property and manufacturing scale-up services they require.

Canada is also home to incredible “bench strength” in terms of university-level research on organizations and sustainable development. Front and center in this effort is the Network for Business Sustainability (NBS) which connects thousands of scholars and professionals worldwide who believe in the value of research-based practice and of practice-based research. A Canadian non-profit established in 2005, NBS produces authoritative resources on important sustainability topics, such as how to develop an organizational culture of sustainability or best practices for engaging stakeholders, with the goal of shaping management practice and research. CIAC’s participation in the NBS industry association council has helped to inform where management academics need to focus their efforts in order to better support businesses as they transition towards sustainability.

Despite some notable successes at reducing or eliminating hazardous substances (e.g. CFCs), chemical risks continue to multiply. One reason for this is the global expansion of industrial activity, which is increasing the production volume of chemicals in commerce and unintentionally produced by-products, and thus ‘exposure’. Another reason is evolving science, with research into endocrine disruption, for instance, expanding the list of possible ‘hazards’ being linked to individual chemicals. For businesses, it is important to acknowledge that chemical risks associated with an organization’s products or processes have a nasty tendency to become translated into business risks for the organization, such as regulatory, legal or reputational risks. With its emphasis on eliminating *hazards* from the materials purchased, used and produced by organizations, green chemistry represents a radical departure from the typical approach to risk management which assumes  $risk = f(hazard, exposure)$  but focuses almost exclusively on *exposure* reduction. In this way, green chemistry can be seen as a novel approach to *both* chemical and business risks – it can provide the technological platform for business sustainability.

As Canada is the birthplace of Responsible Care, wouldn’t it be great if Canadian companies once again led the world in the

management of chemical risks – this time by committing to incorporating green chemistry into their business models and implementing it throughout their operations?

We believe the conditions are in place to make this a realistic if ambitious goal: for Canada to become a major exporter of the ideas and technologies needed to remake the global chemical enterprise in a sustainable way.

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There are several concrete actions that CIAC’s member companies can take to make this happen. First, Canadian companies should continue their advocacy and promotion of Responsible Care along their supply chains and internationally. Secondly, CIAC members should increase and strengthen their ties with university researchers working on green chemistry and business sustainability topics. Whether it relates to natural science research on a particular sustainable chemistry technology or

social science research on the adoption of green chemistry principles and creation of a culture of sustainability, there are lots of opportunities to fund – and to participate as a partner in – innovative scholarship here in Canada. Third, there are also lots of opportunities to come into Canadian university classrooms to inspire students with stories of your successes, as well as your challenges, in implementing sustainable business practices and green chemistry.

Our main message is “let’s work together.” The path towards sustainability remains uncharted, so partnerships between academics and industry members (and government and NGOs too) are required in order to co-produce actionable knowledge. Working collaboratively, we can learn how to reduce the chemical footprints of organizations and move towards a world where one day, everywhere around us, there is only chemistry and business that are benign by design.



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expected to be completed by 2014 and made available to all Canadian universities free of charge. The first 11 modules will be developed in 2013 by eight Canadian universities under Minerva’s leadership and will see Imperial Oil, DuPont Canada and NOVA Chemicals among the companies working with post-graduate engineering students.

Minerva is very appreciative of all the past financial sponsorship received from CIAC and several of its member-companies. It is especially grateful to two of its founding sponsors, DuPont Canada and Imperial Oil Limited, for their recent generous financial support of

the teaching modules initiative. Minerva will continue making a difference in advancing H&S education in post-secondary teaching institutions with the financial and in-kind support it continues to receive from CIAC and its member-companies.



*Tony Pasteris is President, Minerva Canada Safety Management Education Inc. Anyone interested assisting and sponsoring the Minerva Teaching Modules initiative can contact him at [minerva@safetymanagementeducation.com](mailto:minerva@safetymanagementeducation.com). For more information about Minerva, visit [www.safetymanagementeducation.com](http://www.safetymanagementeducation.com).*