General Magnetic Canada Inc.: MagnoSol Solar-Powered Chemical Injection System

SUMMARY

This case study highlights how Alberta's investment in methane-reduction innovation has supported the development and commercialization of practical technologies that deliver both environmental and operational benefits. Through collaboration between industry, technology developers, and the innovation ecosystem, Alberta has helped local companies bring solutions from early field validation to widespread industry adoption.

General Magnetic Canada Inc. is a strong example of this success. The Alberta-based company developed and commercialized its proprietary permanent magnet motor (PMM) technology, which powers solar chemical injection systems that replace production gas-driven pneumatic equipment with a reliable and cost-effective methane-reduction solution. General Magnetic reported that close to 8,000 systems have been delivered through its distributor over approximately 14 years, with most deployed in Alberta. Through the commercialization of its solar-powered chemical injection system, the company has achieved a total of $24 million in commercial deployments of its core technology, with fully integrated installed systems including solar and skid components totalling $126 million, which includes approximately $16 million from projects outside Canada. Based on controller-recorded pump strokes and established emission factors, the deployed fleet is estimated to avoid approximately one million tonnes of carbon dioxide equivalent emissions annually.

Alberta is proud to highlight General Magnetic as a company that has successfully translated Alberta-developed technology and expertise into broader market opportunities. Building on its success in Canada, the company has expanded into international markets, particularly Brazil, where it has supported methane-reduction efforts through technology deployment, stakeholder engagement, technical education, and knowledge sharing. General Magnetic's achievements demonstrate how practical innovation developed in Alberta can contribute to emissions-reduction objectives internationally while reinforcing Alberta's reputation for technology commercialization and environmental leadership.

TECHNOLOGY INCEPTION AND DEVELOPMENT IN ALBERTA

General Magnetic developed its technology in Alberta to overcome the limitations of conventional pneumatic and early solar-powered chemical injection systems at oil and gas sites. Gas-driven pneumatic pumps use

pressurized production gas and release methane during operation. Wet or rich gas can also interfere with these systems, while use at sour-gas sites can introduce additional safety and environmental concerns.

Earlier solar chemical injection systems imported from the United States offered an alternative, but often struggled under Canadian operating conditions. Their conventional motors required relatively high electricity consumption, larger solar panels, and greater battery capacity. Battery failures and poor field performance created industry skepticism, making producers cautious about adopting another unproven system.

General Magnetic turned these challenges into an innovation opportunity by integrating its proprietary permanent magnet motor into a solar-powered chemical injection system. The low-speed, high-torque motor operates efficiently with less electricity than conventional technologies. Its lower power requirements permit smaller solar panels and fewer batteries while maintaining the power and torque needed for chemical injection, supporting reliable operation at remote sites where grid electricity is limited or unavailable.

The technology advanced through development, small initial field demonstrations, and five to six years of credibility building before achieving broad adoption. Early installations proved that the system could operate reliably under Alberta conditions and overcome concerns created by earlier technologies. As producers gained confidence and Alberta's carbon-offset market strengthened the financial case for replacing pneumatic pumps, adoption accelerated. The Alberta-developed solution progressed from limited field trials to thousands of installations and created a strong foundation for expansion outside Canada.

ALBERTA FUNDING AND INNOVATION SUPPORT

General Magnetic’s development and commercialization were supported by Alberta’s innovation ecosystem. Early in the commercialization process, the company’s distribution partner approached Petroleum Technology Alliance Canada (PTAC), leading to initial demonstration projects that helped establish technical credibility and introduce the system to industry. Alberta Innovates supported multiple development programs and funded engineering and commercialization capacity, which was particularly important for a small company where adding one engineer or technician could significantly increase its ability to develop, test, and commercialize technology. Alberta Innovates and NRC-IRAP later supported technology testing in Brazil, helping General Magnetic demonstrate Alberta-developed solutions in an international market. Alberta’s carbon offset program was also pivotal to commercial adoption, as offset values increased, the financial case for replacing gas-driven pneumatic pumps became stronger and producer interest accelerated. General Magnetic indicated that this combination of demonstrations, technical capacity, funding, industry connections, and market incentives was critical to the company’s growth and that it would likely not have reached its current stage without government and ecosystem support.

TECHNOLOGY COMMERCIALIZATION LESSONS

General Magnetic’s experience demonstrates that technical performance alone is not enough to achieve commercial adoption. The company’s first major challenge in Alberta was establishing credibility after earlier imported solar chemical injection systems experienced battery failures and poor performance in Canadian conditions. Producers were cautious about assuming additional operational risk, resulting in small trial orders

and several lean years before broader adoption. Field demonstrations and reliable operation under Alberta conditions were essential to rebuilding confidence and establishing the technology's commercial value.

International expansion created another important learning opportunity. General Magnetic found that placing an innovative product in a distributor's catalogue did not ensure that local personnel could explain, operate, or support it. Customers needed direct education, demonstrations, troubleshooting, and sustained technical assistance. This was evident in Brazil, where a problem attributed to another General Magnetic PMM product sold through a distributor was ultimately traced to other distributor-supplied equipment that had not received adequate aftermarket support.

General Magnetic responded by adopting a more direct and sustained approach to international commercialization. Its experience confirms that technology developers must remain active in target markets, build capable local partnerships and relationships, and help customers understand how a solution addresses their operating needs. In distant and developing markets, success may also require government engagement and regulatory knowledge sharing. However, building these conditions can take years, but it is essential to earning confidence and enabling adoption.

DRIVERS FOR INTERNATIONAL TECHNOLOGY ADOPTION

General Magnetic's progress in Brazil confirms that international adoption accelerates when proven technology is supported by local demonstrations, knowledgeable technical assistance, practical regulatory frameworks, and trusted relationships. Customers often need to see a solution operating under local conditions and receive direct training, troubleshooting, and confirmation of aftermarket support before committing to broader deployment. Engagement with local partners, trade officials, governments, and regulators reduces uncertainty and helps align Alberta-developed technologies with emerging methane requirements. By combining proven Canadian technology with sustained in-market support and Alberta's regulatory and implementation experience, General Magnetic is helping international operators modernize mature assets, reduce methane emissions, and improve operating performance at the same time.

QUOTES

"General Magnetic and its Canadian distribution partner have been working with PTAC since 2011. PTAC was instrumental in providing a forum to introduce General Magnetic's solar chemical injection technology to Alberta producer members. It supported initial demonstration projects with producers, along with supporting product development funding through the technology's early stages. PTAC has also been instrumental in the broader methane emissions reduction ecosystem in Alberta, supporting a number of the complimentary emissions reduction technology companies that General Magnetic represents internationally."

- Al Duerr, CEO of General Magnetic

CONCLUSION

General Magnetic's success demonstrates how Alberta-developed innovation can progress from solving local industry challenges to delivering environmental and commercial value at an international scale. Through the development of its MagnoSol solar-powered chemical injection system, the company has helped operators reduce methane emissions while improving operational reliability in remote oil and gas applications. Supported by Alberta's innovation ecosystem, field demonstrations, and industry partnerships, General Magnetic successfully transformed a proven technology into a widely adopted solution in Canada and emerging international markets. Its growth highlights the importance of sustained technology development, collaboration, and market engagement in bringing practical emissions-reduction solutions to industry and reinforces Alberta's reputation as a leader in energy innovation and technology commercialization.

PTAC

Petroleum Technology Alliance Canada (PTAC) has supported innovation, operational performance, and environmental improvement across Canada's oil and gas sector for three decades. As a neutral, industry-led organization, PTAC connects industry challenges with practical technology solutions, helping reduce risk, attract investment, and advance innovations from concept to field deployment. Through this work, PTAC continues to deliver value across Canada's energy innovation ecosystem. https://ptac.org/