



FERTILIZER CANADA

FERTILISANTS CANADA

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September 30, 2015

Ms. Angela Adams
Ms. Stephanie Cairns
Ms. Linda Coady
Mr. Gordon Lambert
Dr. Andrew Leach, Chair
Climate Change Advisory Panel
11th Floor, South Petroleum Plaza
9915-108 Street
Edmonton, AB T5K 2G8

RE: Alberta's Climate Leadership Discussions – Other Industrial Emitters Technical Engagement Session

Dear: Members of the Advisory Panel,

Following our discussion at the Other Industrial Emitters Technical Engagement Session on September 16, 2015, Fertilizer Canada (formerly known as the Canadian Fertilizer Institute) and our Alberta-based members appreciate the opportunity to provide additional information to address key questions raised. The inclusion of our perspective, informed by decades of research, will be useful to the Advisory Panel as it considers its recommendations to the Government of Alberta.

Nitrogen Fertilizer Manufacturing

Current Operating Conditions

The fertilizer industry is a significant contributor to Alberta's manufacturing economy. We are the province's largest value-added industry, with several facilities producing nitrogen-based fertilizers such as ammonia and nitric acid, using natural gas. Ammonia production is heavily dependent on natural gas, with 65 per cent of the gas used as a feedstock to produce the hydrogen required for ammonia synthesis. Carbon dioxide (CO₂) or equivalent emissions are then produced: this is basic chemistry, and the only way to reduce these process emissions is to produce less ammonia. The remaining 35 per cent of fuel consumed is used to generate the heat and steam required to drive reaction conditions.

Production in Canada is highly efficient. Significant investment has been made to implement the best combustion technology and practices currently available to minimize carbon dioxide and other greenhouse gas (GHG) emissions. Ammonia producers make substantial use of energy interchange and waste energy minimization within their facilities to reduce the amount of energy consumed. A benchmarking study performed on 93 ammonia plants across the globe by the International Fertilizer Industry Association (IFA) showed an average net energy efficiency of 36.6 GJ/ t NH₃¹. The top ten performers of the group had net energy efficiencies

¹ International Fertilizer Industry Association. (2009). *Energy Efficiency and CO₂ Emissions in Ammonia Production*. [Online]. Available: <http://www.fertilizer.org/ItemDetail?iProductCode=8965Pdf&Category=ENV&WebsiteKey=411e9724-4bda-422f-abfc-8152ed74f306>



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in the range of 28 – 33 GJ/ t NH₃. Canadian facilities perform better than the world average despite their relative maturity, with an average net energy efficiency of 33.2 GJ/ t NH₃². Several of these facilities fall within the range of the top ten performers of the IFA benchmark.

Any remaining on-site efficiencies, though negligible, could potentially benefit from support of the Climate Change and Emissions Management Corporation (CCEMC). After seven years of substantial contributions to the CCEMC technology fund as part of compliance with Alberta's *Specified Gas Emitters Regulations* (SGER), the fertilizer sector suggests a realignment of the corporation's mandate, so that Alberta nitrogen producers can be eligible to fund projects which are financially challenging but may result in marginal gains in energy efficiency. Due to the sector's early actions to reduce GHG emissions through energy efficiency gains, the industry currently has limited access to the fund; the majority of remaining projects available are difficult to justify due to their high cost and low GHG reduction return.

The hydrogen required for ammonia manufacturing can be produced by steam methane reforming, or by partial oxidation with varying energy efficiency and emission production depending on the fuel source. Hydrogen production by steam methane reforming with natural gas, which all Canadian ammonia producers employ, is the most energy efficient and has the lowest CO₂ intensity with Best Available Technology (BAT). However, with a mature collection of ammonia facilities operating in Canada for at least 25 years, manufacturing plants have reached the end of available economic upgrades which would produce significant emission reductions and gains in energy efficiency.

Nitric acid plants operating in Alberta supply both the fertilizer and explosives market globally. All of these facilities employ nitrous oxide (N₂O) abatement systems to Best Available, Economically Achievable emission reduction levels. This subset of our sector has reduced GHG emissions over years of operation, with the most significant reduction between 2005 and 2011 where Canadian GHG emissions were reduced by 40 per cent³. Although small iterative improvements may be possible in abatement technologies, breakthrough innovations with significant GHG reductions are not currently available, nor are they expected in the near future.

Upstream Actions and Downstream Opportunities

The fertilizer industry has been proactive in working with the Government of Canada to develop a regulatory framework to reduce GHG emissions from ammonia and nitric acid production. In doing so, a science-based approach has been taken using a number of studies, including a third-party engineering analysis organized collaboratively with Natural Resources Canada, to inform the process of setting achievable reduction targets for stationary combustion emissions.

² Natural Resources Canada. (2008). *Canadian Ammonia Producers: Energy Efficiency and Carbon Dioxide Emissions*. [Online]. Available: http://publications.gc.ca/collections/collection_2009/nrcan/M144-155-2007E.pdf

³ Determined using the Environment Canada GHG reporting Program. [Online]. Available: <http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=040E378D-1>



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Knowing our limited ability to reduce emissions on site, the industry has also invested in developing programs like the 4R Nutrient Stewardship program (Right Source @ Right Rate, Right Time, Right Place®) and the “Made in Alberta” Nitrous Oxide Emissions Reduction Protocol (NERP) which help reduce environmental impacts downstream. These voluntary, industry-led programs focus on improving fertilizer application practices where emissions reductions – an estimated 15 to 25 per cent - can be achieved, utilizing the fertilizer industry’s vast retail networks and direct relationships with farmers. Fertilizer Canada has made extensive efforts to continuously improve these systems, working with governments, NGOs, universities and other stakeholders to develop research and metrics, and to promote global adoption. Government programs supporting public participation in offset programs, such as adoption of the NERP by farmers, are a powerful tool in creating additional incentive for voluntary emission reductions from a broader demographic. Expansion of the NERP to other jurisdictions and adoption of the 4R principles by corporate leaders will create a national or international network, increasing overall GHG reductions. The Government of Alberta is supportive of the NERP, and continued promotion, coupled with broader acceptance will make the province a world leader in climate-smart agriculture.

A Climate Change Policy for Alberta

Currently, the Government of Alberta has imposed a 12 per cent reduction target under the SGER, which is unachievable by our sector given its maturity and its early adoption of emissions reduction technologies and operation practices. The fertilizer sector agrees that a regulatory philosophy of an overall reduction target with a single price on carbon is important for certainty and stability. However, the diversity of Alberta’s economy necessitates the recognition of different technologies, different levels of sectoral maturity, and different records of achievement for early action. For these reasons, while attractive due to its simplicity, a one-size-fits-all policy cannot be effective or fair, nor will it achieve the reductions desired or positive economic outcomes for Alberta.

The extensive collaborative research and policy development undertaken by industry and the Government of Canada, with participation from the Government of Alberta, over the last several years has resulted in a meaningful target which also protects the potential for economic growth. This research is a resource that could be utilized and is accessible to the province. Aligning targets and processes with the Government of Canada will reduce compliance burden, recognize both the significant early action on emissions reduction undertaken by our sector and our sector’s leading performance on an international scale, and put in place challenging targets which result in a meaningful reduction in GHG emissions.

In addition, achievable performance targets can help manage the economic impact of carbon policy, sustaining the global competitiveness of Alberta’s value-added industry and maintaining the province’s position as an attractive location for investment in industry. Nitrogen fertilizer products are part of an international market. Compared to other fertilizer products phosphorous and potassium, nitrogen is the most consumed crop nutrient globally, with approximately four times the demand of these products in 2014⁴. Canada has the eighth highest nitrogen fertilizer capacity in the world, representing approximately 2.5 per cent of

⁴ Determined using International Fertilizer Industry Association. (2014). Fertilizers and Raw Materials Global Supply: 2014-2018. [Online].



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estimated global fertilizer capacity, most of which is exported³. As the fifth largest fertilizer exporter, the majority of exported ammonia is sent to the United States and is competing with product from Ukraine, Russia and Trinidad and Tobago, all of which have a larger share of the market⁵. Some producing jurisdictions with increasing market share (through increasing production) have not achieved the same levels of energy efficiency, and may be using other more carbon intensive fuel sources such as coal. Policy which does not recognize Alberta nitrogen fertilizer manufacturers' relative efficiency and early emissions reductions will place the province's manufacturers at a competitive disadvantage.

Recommendations: As the Government of Alberta considers changes to its GHG emissions reduction regime, Fertilizer Canada recommends the following:

- Set achievable, sector-specific performance targets which challenge sectors but acknowledge the realities of industry to reduce emissions, using the extensive research and information available from the Governments of Canada and Alberta.
- Support the expansion of the offset system, including our industry's "Made in Alberta", world-leading NERP program, and promote the NERP's national and international adoption to achieve meaningful reductions.
- Continue the Climate Change Emissions Management Corporation's technology fund, with broadened access including a program for on-site energy efficiency improvements.

Sustainability is a pillar of the fertilizer industry, as we work to feed a growing world population. We recognize the challenges in developing a climate change policy for the province, and trust that the Climate Change Advisory Panel will take great care in considering the realities of all sectors when it makes its recommendations. We appreciate the opportunity to provide input, and stand ready to work with the Government of Alberta as it moves forward in developing a climate change policy which supports the province's diversified economy.

Sincerely,

Garth Whyte
President and CEO
Fertilizer Canada

More information can be found in our nitrogen manufacturing resource library at:
https://www.dropbox.com/sh/6rk1t3ng24ucmy/AAClCHViLay6kBr9ZvMDKI_ka?dl=0

⁵ International Fertilizer Industry Association. (2014). Fertilizers and Raw Materials Global Supply: 2014-2018. [Online]