

Aluminium
Association
of Canada



Submitted to the public consultation held by
Natural Resources Canada

**Clean Technology
in Canada's Natural Resource Sectors:
A position paper**

By:

Jean Simard

President and CEO

Anik Dubuc

Vice-President, Sustainable Development

October 28, 2016

The Aluminium Association of Canada (AAC) would like to thank Natural Resources Canada for taking its opinion into consideration at this consultation on the use of clean technology in Canada's Natural Resources Sector to ensure competitiveness in a sustainable world.

AAC and the industry

The Aluminium Association of Canada is a non-profit organization representing the Canadian aluminium industry with the population, end-users, public authorities, and key environmental and economic stakeholders.

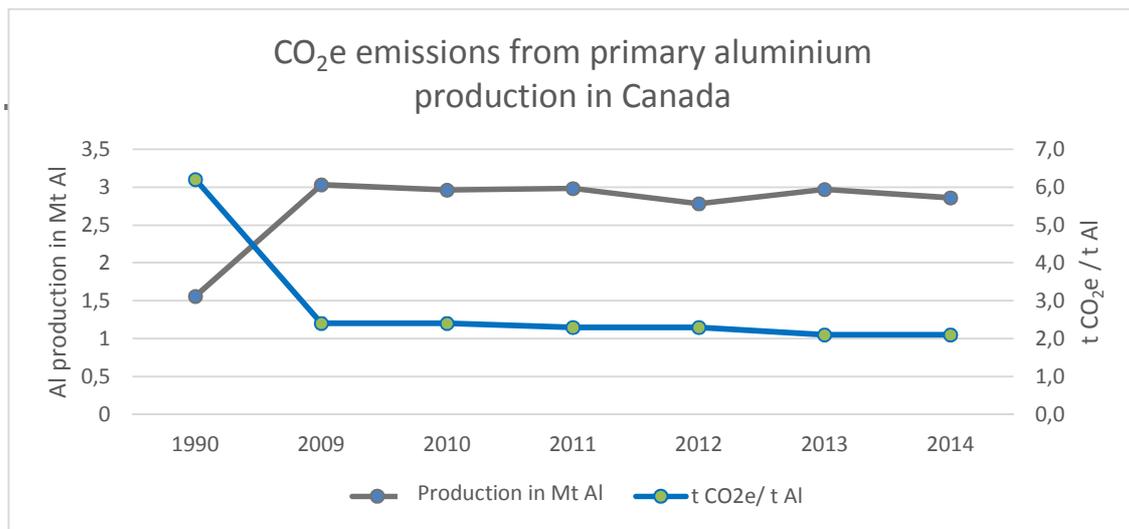
AAC brings together three Canadian producers of primary aluminium: Alcoa, Aluminerie Alouette, and Rio Tinto. **Our industry is active in three Canadian provinces: British Columbia, Alberta, and Quebec. 90% of all Canadian aluminium is produced in Quebec and 10% in BC; the Alberta installations are producing input for the primary aluminium process.**

The Canadian aluminium industry is the fourth largest in the world, producing three million tons of primary aluminium a year and **supporting over 9,000 of the highest-paying jobs in the manufacturing industry.** Over 4,500 suppliers of all kinds are involved in the industry, contributing to the economic vitality of Canada and its regions. The aluminium industry alone makes up around 8% of Quebec's manufacturing exports, and the Kitimat plant is a major contributor to the BC and Canadian economies.

Introduction

AAC has long been a supporter of the fight against climate change having already made a significant contribution to reducing Canada's GHG emissions. Compared to the reference year 1990, **the Canadian aluminium industry has nearly doubled its output while reducing its total emissions by 37% (in CO₂-equivalent tons) and its emissions intensity by 66%**. This was achieved by implementing new technologies and a policy of major investments in recent years.

CO₂e emissions from primary aluminium production in Canada



1. Canada and the fight against climate change

Canada has decided to join other societies around the world in the fight against climate change. The aluminium industry has supported this vision of progress for over two decades.

On this long road towards decarbonizing the economy, the Government of Canada has stated that it would like to adopt various measures to contribute to international efforts and work together with the provinces and territories to invest in clean energy and technology. It intends to set objectives that will help it reduce GHG emissions and contain the global increase in temperature at under 2°C.

Matching our ambitions

The only way to achieve our ambitious goals of greatly reducing GHG emissions between 2030 and 2050 is by bringing about far-reaching behavioural changes and developing technologies that do not yet exist, that are under development, or that are currently constrained by a market-driven economy because they are not financially justifiable.

Since the Canadian government has stated its intention to boost the economy and protect the environment, it is vital to get economic, governmental, and institutional and citizen stakeholders to work together to expedite the shift towards a green economy. The Canadian aluminium

industry cofounded SWITCH, the Alliance for a Green Economy, and is one of the national leaders of SMART PROSPERITY, the Canadian group of green economy leaders.

Many other regions around the world are already working on innovations to fight climate change. The Canadian government must commit to maximizing its efforts and investing in targeted developments within the country in order to be the first to benefit from advances made.

AAC believes that Canada needs to manage its funds wisely and transparently to create a low-carbon economy.

2. The aluminium industry and GHG reductions: a perfect match

Although the Canadian industrial sector is often perceived as a large emitter of GHG, it has been actively participating in the fight against climate change.

The Canadian industrial sector as a whole has already reduced its GHG emissions by over 12% since 2005 by investing in and modernizing its facilities and, unfortunately, by closing certain businesses.

The aluminium industry has substantially contributed to reducing GHG emissions in Canada. Quebec aluminium smelters have been proactive, entering into two voluntary agreements with the Quebec government on reducing their GHG emissions. In both cases the targets were successfully met and surpassed.

The 2002–2007 agreement was aimed at reducing CO₂e by 200,000 tons, and the 2008–2012 agreement sought to reduce CO₂e by a further 150,000 tons.

In British Columbia, the \$4.8 billion that was invested to fully upgrade the Kitimat plant was one of the largest private investments in the province. The upgrade increased production by 48% while reducing GHG emissions by 50%.

As a result of these agreements and upgrades, GHG emissions reductions actually outstripped the government's ambitious objectives. We delivered on our promises, and then some. The intensity of GHG emissions from Canadian aluminium production has steadily declined and currently stands at 66% of what it was in 1990. Emissions (in absolute tons) were also reduced by 37%, which is nearly 3.6 million tons of CO₂e—the annual amount of CO₂e emitted by 175,000 inhabitants.

Canadian aluminium production plants also took action to modernize and renovate their operations, as evidenced by the closing of facilities that used Söderberg technology, which produces more GHG emissions. By capitalizing on over 100 years of expertise and investing in operational excellence and cutting-edge technology, we achieved tremendous results—and production nearly doubled as well.

3. Canada's low-carbon footprint aluminium: An industry at the forefront of technology

By investing in and modernizing its plants, the Canadian aluminium industry is now one of the world's top performers. This leadership, combined with Canada's clean energy, results in Canadian aluminium having the lowest carbon footprint in the world.

Canadian aluminium is currently produced at a rate barely exceeding two tons of CO₂e per tonne of aluminium. This rate includes the direct emissions from the smelting process and the indirect emissions produced by the electricity that powers the industry. That's up to seven times less GHG emissions than aluminium produced outside Canada.

CO₂ emissions rates for primary aluminium production

In tons of CO₂e per ton of aluminium produced



Ref : AAC and IAI 2014

It's also a huge asset for Canada—especially since global demand for aluminium is expected to double by 2030 in a period of sustained, long-term growth—in terms of reducing the carbon footprint of the sectors such as transportation and construction.

Aluminium is part of the solution in the fight against climate change. It is light and durable and is increasingly being used to manufacture cars, trains, and planes to reduce emissions in the transportation sector.

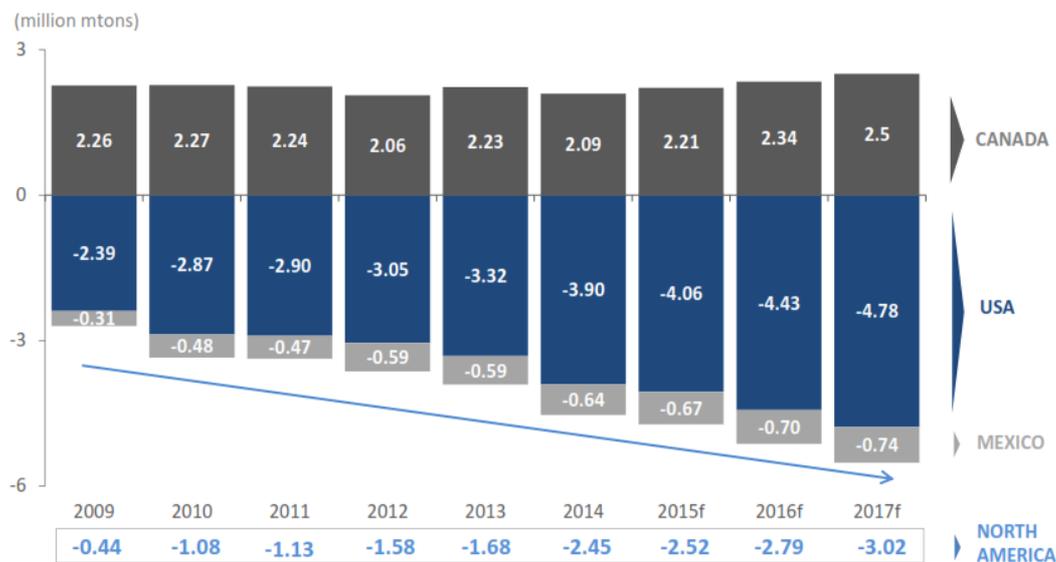
Aluminium is also infinitely recyclable and does not deteriorate. This unalterable life cycle has economic and environmental advantages.

While the global aluminium industry has a bright and promising future, Canada is at a crossroads: It holds part of the solution to the world's growing need to decarbonize the planet, and has the capacity to produce it with the lowest carbon footprint. Canada's commitments to

reducing emissions should capitalize on this strength and build on it in the future. The increased use of aluminium by North American car manufacturers has already created a demand that outstrips the supply in North America. If we don't take advantage of this opportunity to position Canadian manufacturing on the world stage, tons of foreign aluminium linked to higher GHG emissions will enter our markets. According to the International Energy Agency, in the future two thirds of the increases in worldwide aluminium production capacity will be in regions where energy is produced with fossil fuels.

The graphic below illustrates the trend in the primary aluminium deficit in North America in the short term. This shows us that Canada, with its low-carbon aluminium could deliberately boost its production of aluminium in the next few decades, even if this leads to an increase in emissions locally in this sector, while still helping to reduce worldwide emissions. That way the increase in emissions in our sector would remain in line with the global objectives of reducing GHG emissions. In fact the more the world's aluminium is produced in Canada (with its low carbon content), the fewer the GHGs emitted worldwide to meet the growing demand for aluminium.

Primary aluminium deficit in North America



Source : HARBOR Aluminum 2015

In other words, the best contribution Canada can make to reducing global GHG emissions is to make sure it stays competitive, assumes leadership in game changing world class clean technology development while increasing aluminium production in the country.

The Canadian aluminium industry is at a technological threshold

The aluminium industry has done its part to fight climate change in the past by drastically reducing its emissions. If the industry wants to continue its involvement in this area, significant investments in R&D and an unprecedented level of collaboration will be required to make the technological breakthroughs needed to push the limits of current processes before the competition does.

Over 92% of the total emissions from primary aluminium production are known as fixed process emissions (i.e., inherent to the chemical reaction that drives aluminium production), and they cannot be eliminated or reduced without developing a new manufacturing process. Non-fixed process and combustion emissions represent less than 8% of all emissions. Actually only a minimal reduction of this already tiny fraction is possible, but at a high cost.

We are therefore at the limit of what current technology can do with regard to production processes. Just like the global industry, the Canadian aluminium industry has already invested heavily in research and development to find solutions, but current and foreseeable market conditions mean that the effort required to develop a revolutionary process is no longer sustainable. Such a technological advance requires time, effort, and financing, and the Canadian industry will have a hard time achieving this on its own. This collaborative effort will require significant funding and the pooling of all of Canada's various areas of expertise.

A number of major global players in the primary aluminium industry are searching for such a breakthrough that would give them an unrivalled competitive advantage and many benefits. The Canadian aluminium industry is ready to invest itself to tackle this major challenge, but it needs the federal government's help with this crucial step to position the industry and Canadian businesses advantageously in the global arena and make the Canadian government a true strategic partner in the fight against climate change.

We need to pursue and step up R&D in partnership with the industry and the Canadian government in order to innovate and achieve a technological advance to push the process limits currently at play in the primary aluminium industry. This collaboration will shine the spotlight on Canada's desire to be a global leader in climate change while generating significant social, environmental, and economic benefits.

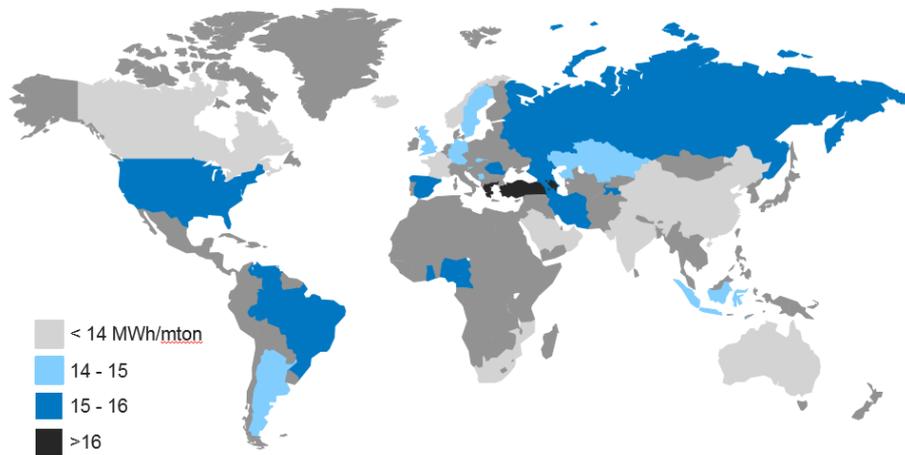
An energy efficiency focused industry

Despite the technological limits encountered with process emissions, Canada's aluminium industry produces the fewest GHG emissions in the world because it uses almost exclusively carbon-free electricity; 96% of the energy used by the industry is hydroelectric.

All of Quebec's aluminium smelters are members of Hydro-Québec's Energy Savers' Circle, which recognizes industrial excellence in energy efficiency. A number of sites are even Distinction members—the highest recognition possible. In British Columbia, the investments made to modernize the Kitimat plant resulted in a 33% reduction in energy consumed per tonne of aluminium produced.

In addition to using renewable energy, Canada is among the first quartile in the world in terms of energy efficiency thanks to its electrolytic process that uses fewer than 14 MWh/t Al.

Energy efficiency for primary aluminium production per country



Source : © HARBOR [Aluminum Intelligence Unit 2015](#)

Conclusions

- » The Canadian aluminium industry has made significant investments for over two decades to reduce its total GHG emissions by 37% while increasing production by 80%;
- » Its technological leadership, combined with Canada's clean energy, means aluminium produced in Canada has the lowest carbon footprint in the world.
- » The Canadian industry has already reached the current technological limit for reducing GHG emissions and pushing further requires the development of a game-changing technology.

Recommendations

- » Our industry believes that the race is on and time is against us ,and against every other region of the world in the quest to decarbonize the planet.
- » Canada must seize the momentum and assume leadership in developing game changing technologies.
- » It is time to mobilize our resources, public and private, around shared strategic undertakings, in sectors where we have comparative advantages to build on.
- » We must leverage government financing, with institutional and academic research capacity alongside with market aligned private research capacity.
- » Those projects must be world scalable, industry focused in pre-competitive phase with a high potential for decarbonizing large chunks of Canada's industrial production
- » They must be developed through Canadian based and owned IP, and derisked through government financing and long-term commitment.
- » They will call for innovative approaches in structuring a Canadian partnership, between government, institutions and private sector organizations with an overall objective of contributing to Canada's clean growth through IP protected Canadian innovation aimed at decarbonizing the world.
- » It's time to bend the future in Canada's favour.