

Aluminium  
Association  
of Canada



## **Position paper**

Submitted at the Public Hearings Held by  
Environment and Climate Change Canada

### **Development of Canada's Way Forward on Climate Change**

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**French document deposited on July 20, 2016**

**August 29, 2016**

The Aluminium Association of Canada (AAC) would like to thank Environment and Climate Change Canada for taking its opinion into consideration at this hearing on developing a Canadian approach to tackling climate change.

## AAC and the industry

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

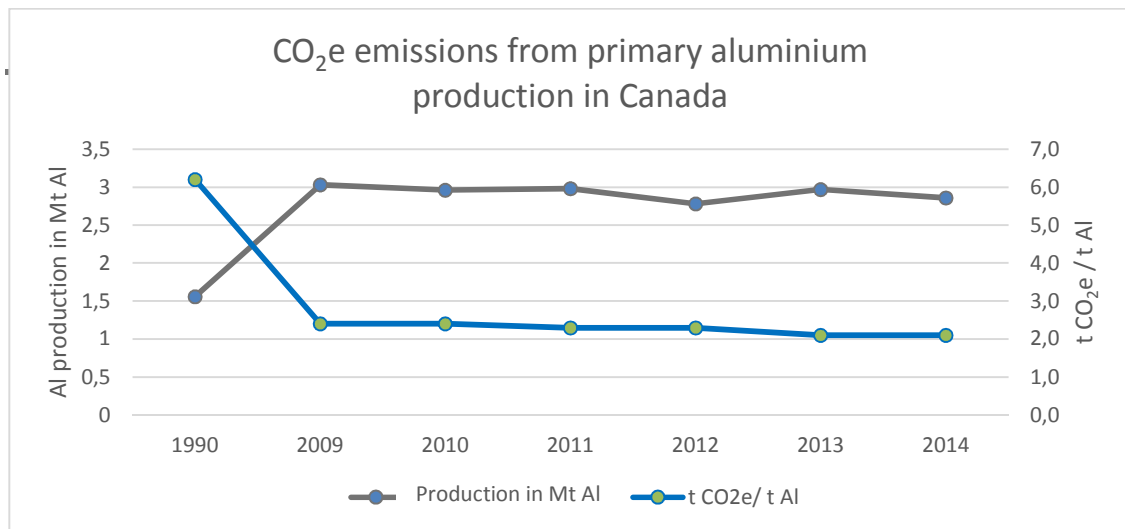
AAC brings together three Canadian producers of primary aluminium: Alcoa, Aluminerie Alouette, and Rio Tinto. **Our industry is active in three Canadian provinces: British Columbia, Alberta, and Quebec. 90% of all Canadian aluminium is produced in Quebec and 10% in BC; the Alberta installations are producing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

The Canadian aluminium industry is the fourth largest in the world, producing nearly 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 industry in Canada.

## Introduction

AAC has long been a supporter of the fight against climate change and would like to remind the Government of Canada that the aluminium industry has 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 CO<sub>2</sub>-equivalent tons) and its emissions intensity by 66%**. This was achieved by implementing new technologies and a policy of major investments in recent years.

### CO<sub>2</sub>e emissions from primary aluminium production in Canada



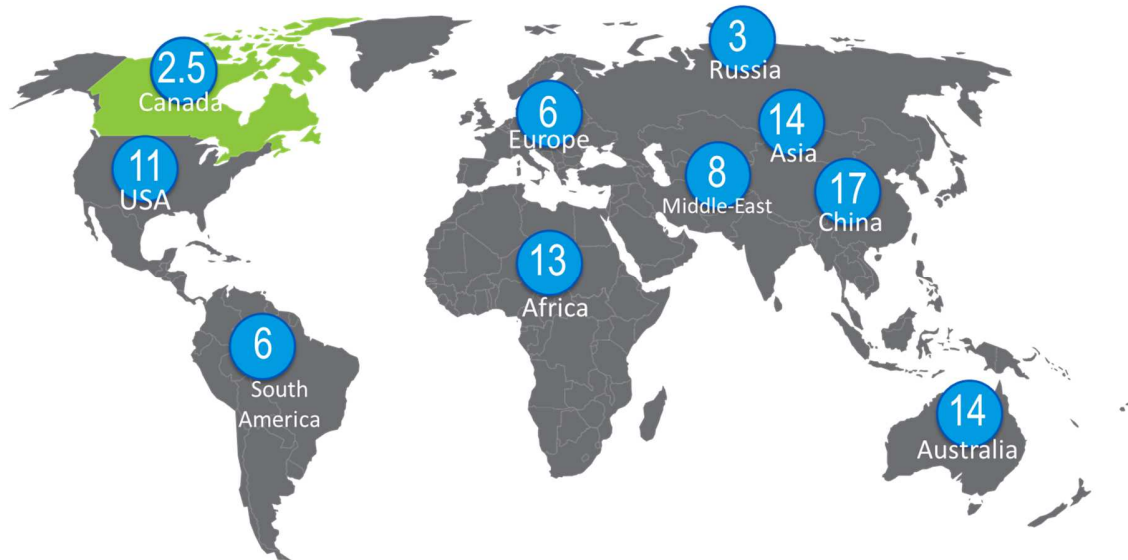
From 2005–2014 in Canada, all the reduction efforts made by the industrial processes sector (-7 Mt) were completely negated by the growth in emissions in the transportation sector (+8 Mt).

The aluminium industry therefore asks Environment and Climate Change Canada to exercise good judgement in its strategy to achieve its 2020–2030 reduction targets. **Canada already produces aluminium with the lowest carbon footprint worldwide. Furthermore, aluminium is a solution in the fight against climate change, particularly in the transportation and construction sectors.**

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## CO<sub>2</sub> emissions rates for primary aluminium production

In tons of CO<sub>2</sub>e per ton of aluminium produced



Ref : AAC and IAI 2014

The government must take these environmental, economic, and strategic factors into consideration when allocating its reduction objectives. It should also recognize that it's time for certain sectors to make an effort to reduce their own emissions while building on synergies from strategic industrial assets such as aluminium, which have a low carbon footprint in Canada.

After heavily investing in reducing GHG emissions for over 20 years, primary aluminium production in Canada has reached the limit of what current technology can do. Since the industry cannot reduce its emissions any further, **asking it for an additional contribution would actually undermine the primary objective of reducing GHG emissions worldwide, by jeopardizing further growth projects and opening the door to foreign aluminium production. The latter emits up to seven times more GHG than aluminium produced in Canada. Finally, the wide disparity in the intensity of carbon leakage among production regions would be accompanied by a massive loss of investment dollars.**

### 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 decarbonising 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.

One of the main initiatives proposed to achieve this objective is carbon pricing. AAC would like to reiterate its position on recognizing the systems in place in provinces where its members operate, and highlight the importance of a pricing method that takes into account competitive challenges. As they currently stand, these systems protect sectors exposed to international competition, particularly from regions not subject to regulations on GHG emissions. This type of protection consists of compensating or disregarding emissions from fixed processes, thus keeping the Canadian industry competitive while still limiting global GHG emissions.

### **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 co-founded 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 input of the industrial sector, particularly the aluminium industry, regarding the reduction of GHG emissions**

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 and GHG reductions: very positive results**

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.

The 2002–2007 agreement was aimed at reducing CO<sub>2</sub>e by 200,000 tons, and the 2008–2012 agreement sought to reduce CO<sub>2</sub>e 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 CO<sub>2</sub>e—the annual amount of CO<sub>2</sub>e 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 capitalising 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 of two tons of CO<sub>2</sub>e 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.

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.

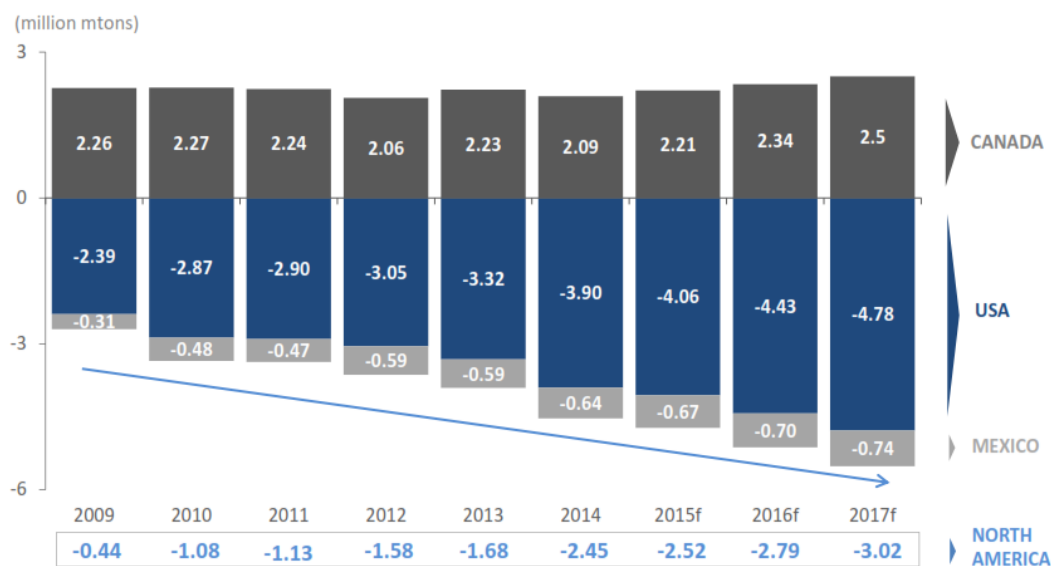
Aluminium is also infinitely recyclable and does not deteriorate. This unalterable life cycle has economic and environmental advantages.

While the global aluminium industry has a bright and promising future, Canada has a strategic choice to make. It holds the solution to the world's growing need to decarbonise the planet, and has the capacity to produce it with the lowest carbon footprint. Canada's commitments to reducing emissions should not detract from this advantage, but rather capitalize on it. 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 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

### The Canadian aluminium industry cannot do much more

The aluminium industry's contribution to the fight against climate change must be considered on two levels. First, it 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 quickly 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 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

### **The Canadian aluminium industry is focused on energy efficiency**

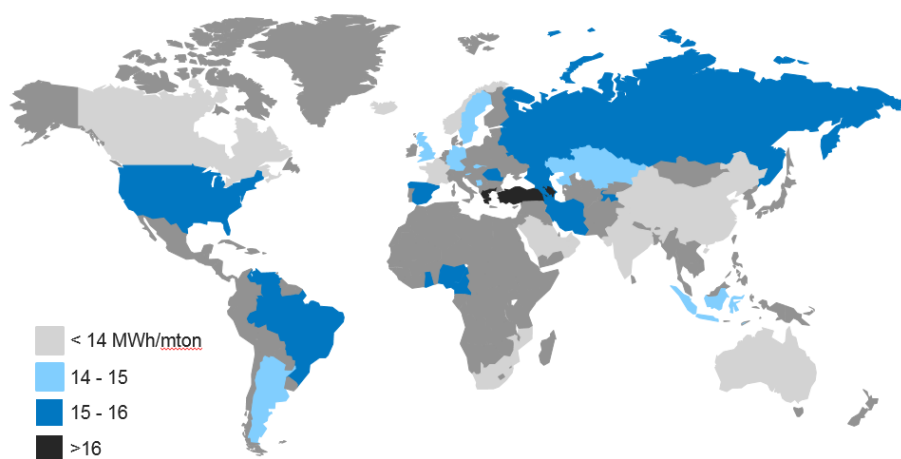
Despite the technological limits encountered with process emissions, Canada's aluminium industry produces the fewest GHG emissions in the world because it uses almost exclusively carbon-free electricity; 96% of the energy used by the industry is hydroelectric.

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.

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#### **Energy efficiency for primary aluminium production per country**



Source : © HARBOR Aluminum Intelligence Unit 2015



Only 4% of the total energy used by Canadian aluminium smelters comes from fossil fuels, which are used for certain ancillary processes and heating. In recent years, a concerted effort has been made to improve energy efficiency. However, there is one area for improvement that is still not an option for aluminium smelters on Quebec's Côte-Nord because they are not part of the gas supply network.

For these plants, liquefied natural gas (LNG) would open up new possibilities for progress. Discussions with potential suppliers and the government are underway to transport LNG to regions that are not a part of the distribution grid.

Converting plants in the Côte-Nord region to natural gas under competitive conditions is one of the only ways the aluminium industry could further reduce its operational GHG emissions.

#### **4. A better understanding of the context to guide our actions**

When we look at all the indicators in the fight against climate change (GHG emissions per capita, renewable energy sources, and GDP carbon intensity), it will take a lot of effort and hard work for Canada to reach its intended targets.

As stated in Quebec's 2015 consultation document on its greenhouse gas reduction targets for 2030: "Each industry sector has its own dynamic, and its own reduction challenges and potentials. Measures to reduce GHG emissions must be adapted to the reality of each sector."

Environment and Climate Change Canada must not lose sight of this notion.

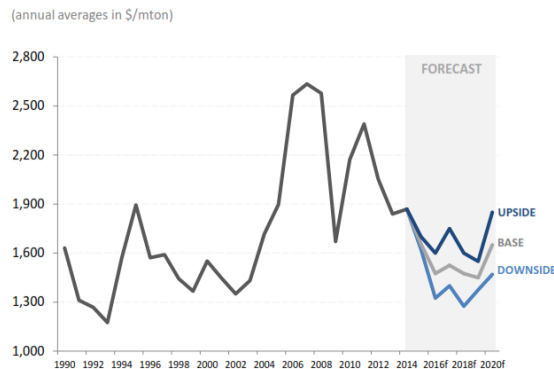
The Aluminium Association of Canada cannot overstate the importance of considering the efforts Canadian aluminium smelters have already made and the limits with which they are now being confronted. **Maintaining the results already achieved and remaining competitive on the global market is in itself a significant challenge.**

The industry was hit hard by the 2008 financial crisis, and prices have not bounced back since. Prior to the crisis in the summer of 2008, the price of aluminium on the London Metal Exchange was over \$3,000 per tonne and today it sits around \$1,600 per tonne. And as recently as 2015, the price of aluminium plunged nearly 25% to its lowest level in six years. Even if the increased demand means we can expect prices to rise in the long term, all the forecasts point to prices remaining—for an extended period—below what they were before the financial crisis. This situation is exacerbated by global inventories that have accumulated over twice the level required, in large part due to overproduction and overcapacity in China (Harbor 2016).

In this context, forcing the Canadian aluminium industry to further reduce its emissions or introducing substantial carbon costs would further erode the industry's competitive position and doubly penalize it economically.

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## LME forecast for aluminium prices (cash) (yearly averages in \$/tm)



Source : HARBOR Aluminum 2015 Intelligence Unit 2015

A parametric approach requiring each economic sector to reduce its emissions by the same amount between 2030 and 2050 would have a significant negative impact on the Canadian aluminium industry and economy. Such an approach would actually have the opposite effect and would increase global GHG emissions by replacing lower-emission Canadian production with units produced with energy from fossil fuels.

The federal and provincial governments of Canada should weigh the efforts required based on the characteristics of each emission sector.

Furthermore, the government should act in accordance with the vision detailed in the Aluminium Development Strategy (SQDA) recently adopted by the Quebec Government. The strategy specifically promotes the aluminium value chain as a pivotal economic lever while emphasizing Quebec's low-carbon-footprint aluminium. Here is an excerpt:

*“In fact, the average carbon footprint of a Quebec aluminium ingot is about 50% less than that of the global average (excluding China). A carbon footprint is the sum of greenhouse gas emissions accumulated during a product's lifecycle. Including China, the world's largest producer, in the totals would considerably increase Quebec's carbon advantage since Chinese smelters get most of their electricity from coal-powered plants. If we include just the stages that take place in Quebec (foundry, electrolysis, and anode production), Quebec aluminium smelters account for three times fewer greenhouse gas emissions than the global average per tonne of aluminium produced. »*

- Quebec Aluminium Development Strategy  
2015-2025, p. 40.

**Canada must not make a strategic error for appearance's sake that will penalize the country economically by trying to reduce our national GHG emissions while increasing the global amount as worldwide aluminium demand rises.**

What is of importance for the Canadian aluminium industry:

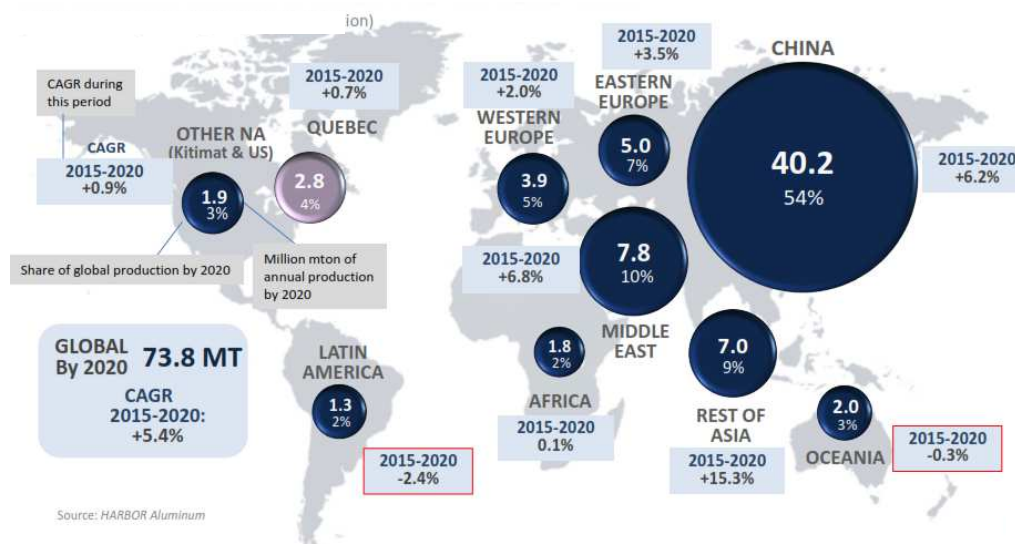
a) **Promote the excellence of the Canadian industry**

Imposing additional reduction objectives on the aluminium industry would penalize it for having taken serious action early on. Since the industry has already reduced its emissions in CO<sub>2</sub>-equivalent tons by 37% while increasing production by 80%, requiring it to substantially reduce its emissions again would be difficult to achieve in the short term and could cause the industry's downfall.

The Canadian industry has reached the limits of what today's technology can do and would incur significant costs that its competitors do not have to bear because they are mainly less-efficient and have been slower to reduce their emissions. For example, the Canadian industry will become less competitive than Chinese businesses, which rely partially on financial assistance from the government and have the highest carbon footprint in the industry but do not have to pay significant carbon costs.

The North American market is experiencing a growing deficit in the production of primary aluminium that will be filled by foreign aluminium with a high carbon footprint. Over 66% of the global growth in aluminium production will occur in countries that use fossil fuels for energy. In this situation, the best contribution Canada can make to reducing global GHG emissions is to make sure it stays competitive while increasing aluminium production in the country.

**Projected net output of primary aluminium by region in 2020**  
(millions of tm and % of global production)



b) **Protect our current low-carbon aluminium output rather than make it vulnerable**

If Canada jeopardizes the aluminium production sector with the lowest carbon footprint in the world, the direct result will be an influx of foreign aluminium in North American markets that uses seven times more carbon. In order to improve at the national level, Canada would hinder efforts at the international level. For example, if we closed

Canada's plants that produce nearly three million tons annually and transferred that output to China, it would add 51 million tons of GHG emissions—more than a third of Canada's total reduction target for 2020.

c) **Encourage expansion rather than jeopardize it**

Forcing the aluminium industry to further reduce its emissions would immediately jeopardize development projects, particularly those currently backed by the Quebec government as part of SQDA. Current financial modelling for carbon costs after 2020, in the absence of any firm direction, will affect the feasibility of projects in development. The projected financial burden for the period after 2020 will affect the profitability of projects and put them at risk of never being completed.

The Canadian aluminium industry has been doing its duty for decades now, and conditions must be put in place to increase aluminium production in Canada to create value for the country and benefit the environment worldwide.

## 5. The advantages of aluminium in transportation

Although there is little the aluminium industry can do in terms of production to reduce GHG emissions, because of the efforts already made and technological constraints, it can still play an active role in supporting other sectors, such as transportation, that have the potential to significantly reduce their emissions.

As we have mentioned previously, aluminium is being used more and more by car manufacturers. This trend will continue, because regulatory authorities worldwide are imposing stricter GHG emission limits on cars. In order to comply, automakers need to make cars lighter, and aluminium is the best solution. Aluminium is light and durable and reduces the weight of the vehicle itself, as well as the brakes, suspension, and engine.

Additionally, making vehicles lighter by using aluminium encourages the development of electric vehicles and opens the door to batteries that are more self-sufficient.

When we consider that the transportation sector alone was responsible for 28% of Canada's GHG emissions from 2005–2014—and was the only to see its emissions rise during this period—the potential to reduce these emissions is great, and adding aluminium is a definite asset.

Aluminium has short-term benefits such as reducing vehicle GHG emissions, but it also has long term benefits. Because aluminium is infinitely recyclable, aluminium parts of a car at the end of its useful life can be recycled using just 5% of the energy initially required to produce primary aluminium. The entire aluminium value chain is strengthened by industrial development, from initial production, transformation, and retrieval to recycling.

For the purpose of the discussion, we illustrated the benefits of using aluminium in the automobile industry, but similar advantages can be leveraged in other transportation sectors, such as public transportation and air travel.

## RECOMMENDATIONS

Considering:

- » 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%;
- » The Canadian industry has already reached the current technological limit for reducing GHG emissions and now needs to focus its efforts on maintaining its GHG intensity;
- » Its technological leadership, combined with Canada's clean energy, means aluminium produced in Canada has the lowest carbon footprint in the world.

### **The Aluminium Association of Canada has five recommendations for Environment and Climate Change Canada for sustainable prosperity:**

1. **Recognize all of the past contributions made by the aluminium industry**, which have made it one of the biggest industrial source of Canadian GHG reductions to date, by limiting the future requirements placed on it to maintain a low GHG intensity and not imposing additional reductions.
2. **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.
3. **Preserve and promote the intrinsic value of Canadian aluminium as part of Canada's bilateral and multilateral trade relations by demonstrating what an extraordinary asset it is to have aluminium with the lowest carbon footprint in the world.** Canada should commit to actively promoting its aluminium, which generates far fewer GHG emissions than any other aluminium in the world. The Canadian industry can thus develop and provide the world with the best option: a metal that is in itself a solution in the fight against climate change.
4. **Take advantage of aluminium to make vehicles lighter**, in keeping with the political drive to devote considerable effort to reducing GHG emissions in the transportation sector. Aluminium is a preferred material because it is infinitely recyclable and requires just 5% of the energy needed in its initial production.
5. **Establish a Canadian system that dovetails with provincial initiatives and set long-term carbon tax rules, while ensuring competitiveness and targets for 2030–2050.** This will enable the Canadian industry, including the aluminium sector, to evolve in a predictable business environment allowing it to maintain its competitive position in the international market.

**In conclusion, the aluminium industry must be recognized for its important past contributions and its current performance. Its potential role as a solution in transportation must be emphasized to illustrate Canada's commitment to reducing GHG emissions and engaging in the fight against climate change.**