



On the Road Towards Sustainability

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The Canadian Aluminum Industry: Facts and Figures

- 3 member companies: Alcan, Alcoa, Alouette
- 11 smelters: ten primary aluminum smelters in Quebec and one in British Columbia
- Direct employment in primary smelters: approx. 11,000 employees
- Canadian primary production in 2005: 2,894,200 tonnes (2,651,692 Quebec)
- Canada ranks third among world producers (after China and Russia) and second among aluminum exporters



The Canadian Aluminum Industry: Facts and Figures (cont'd)

- Approximately 80% of production is exported. The value of exports totals more than \$8 billion (CAD) per year.
- Aluminum is one of the only sectors with continuous growth since 1901 – and demand is surging.
- Alcan and Alcoa also have several upstream and downstream operations: production of energy, packaging, port facilities, manufacturing (rolling and extrusion), engineered products, etc.
- 75% of Canadian primary aluminum production is made from modern and state-of-the-art smelters. The oldest facilities will be shut down before 2015.



Production: How Aluminum is Made

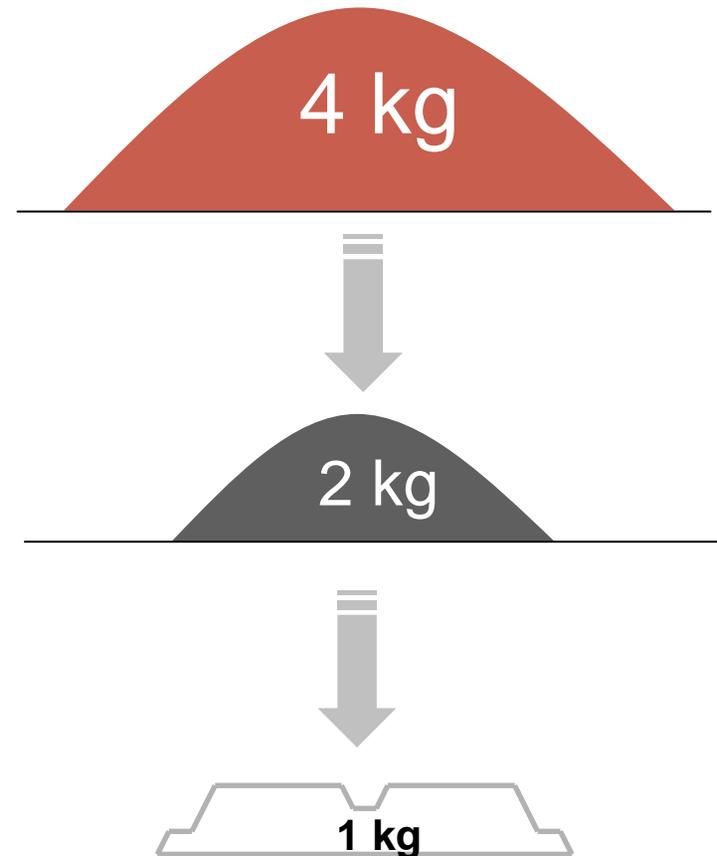
Bauxite

Alumina

- 50% imported from Brazil, Australia, Jamaica
- 50% produced from imported bauxite at the Alcan facilities in Saguenay.

Aluminium

- electrolysis



Production of Aluminum: A Global Industry

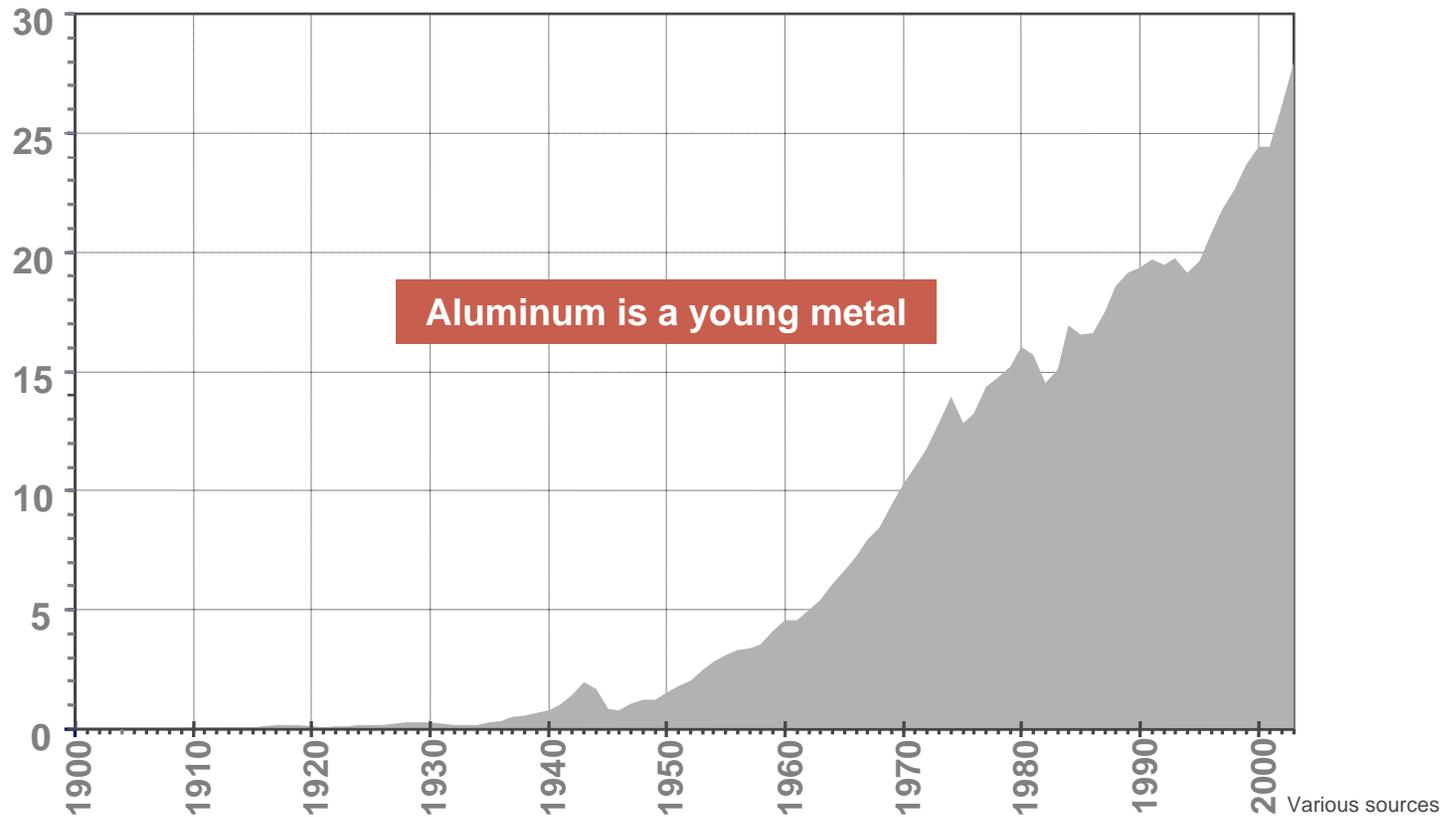
- Demand for aluminum is fulfilled via 2 sources:
 - **primary aluminum** production from ore, and
 - **recycling** aluminum from process scrap and used aluminum products.
- 30% of world demand is derived from recycled aluminum (scrap), a finite commodity.

Recycling is considered an integral part of the raw material supply and contributes to significant environmental savings.

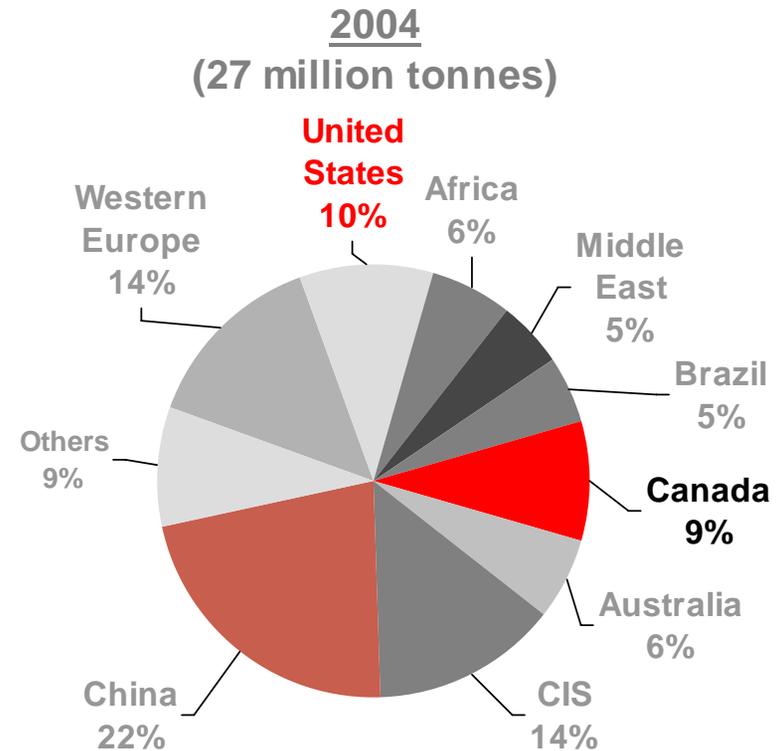
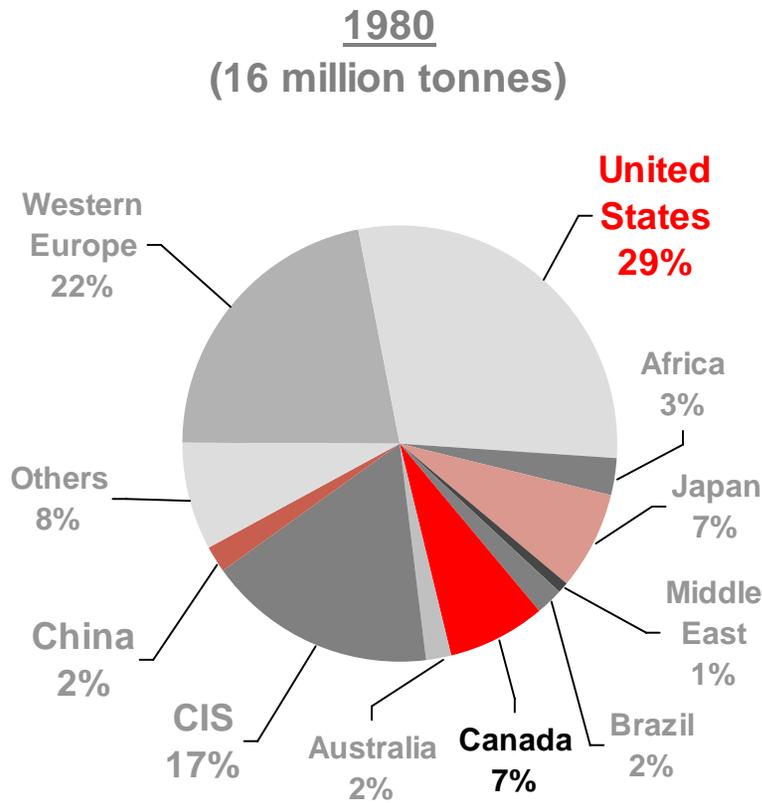


1/3 of all Primary Aluminum ever produced was in the last decade

World Primary Aluminum Production since the beginning of the XXth Century



Primary Aluminum Production by Region 1980-2004



Main areas of growth are in Non-OECD countries. e.g. China, Gulf States, Southern Africa and Brazil.

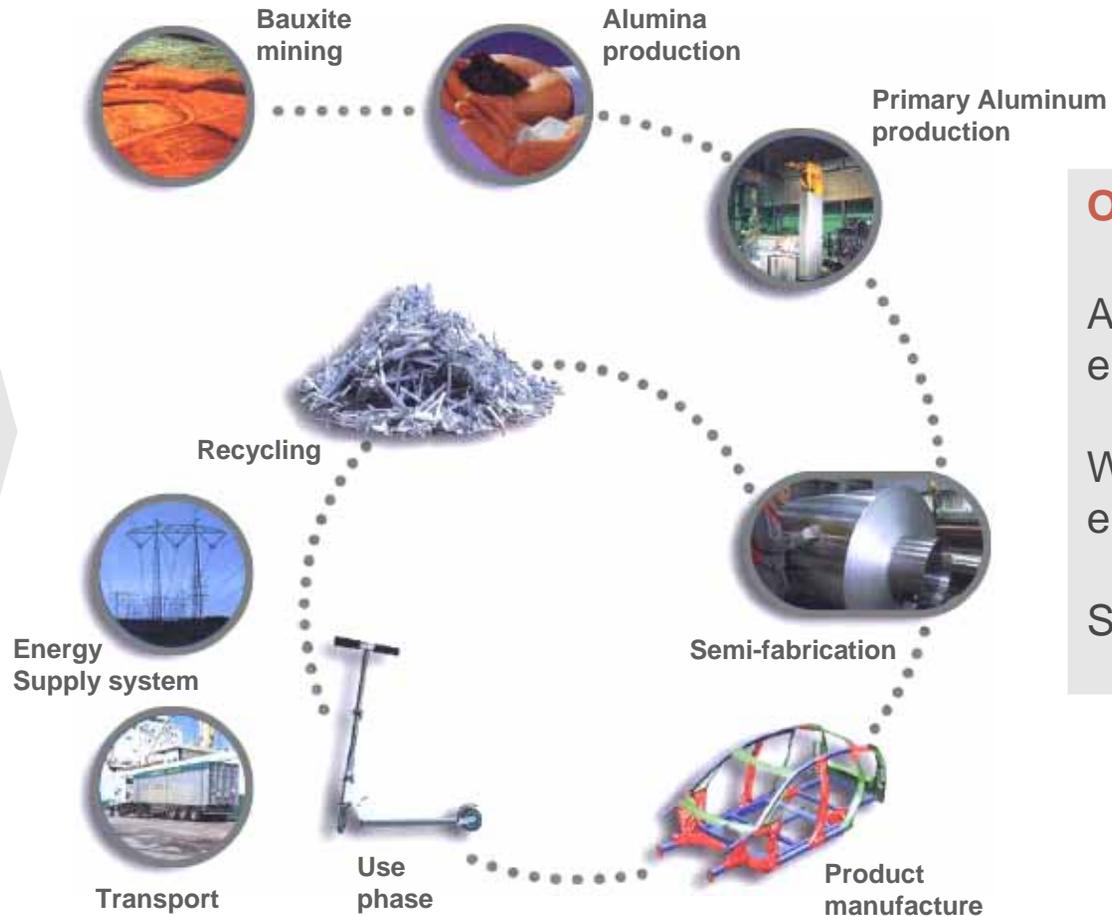


Aluminum Life Cycle Inventory Analysis

INPUTS

Raw
Material
Resources

Energy
Resources



OUTPUTS

Air
emissions

Water
emissions

Solid waste

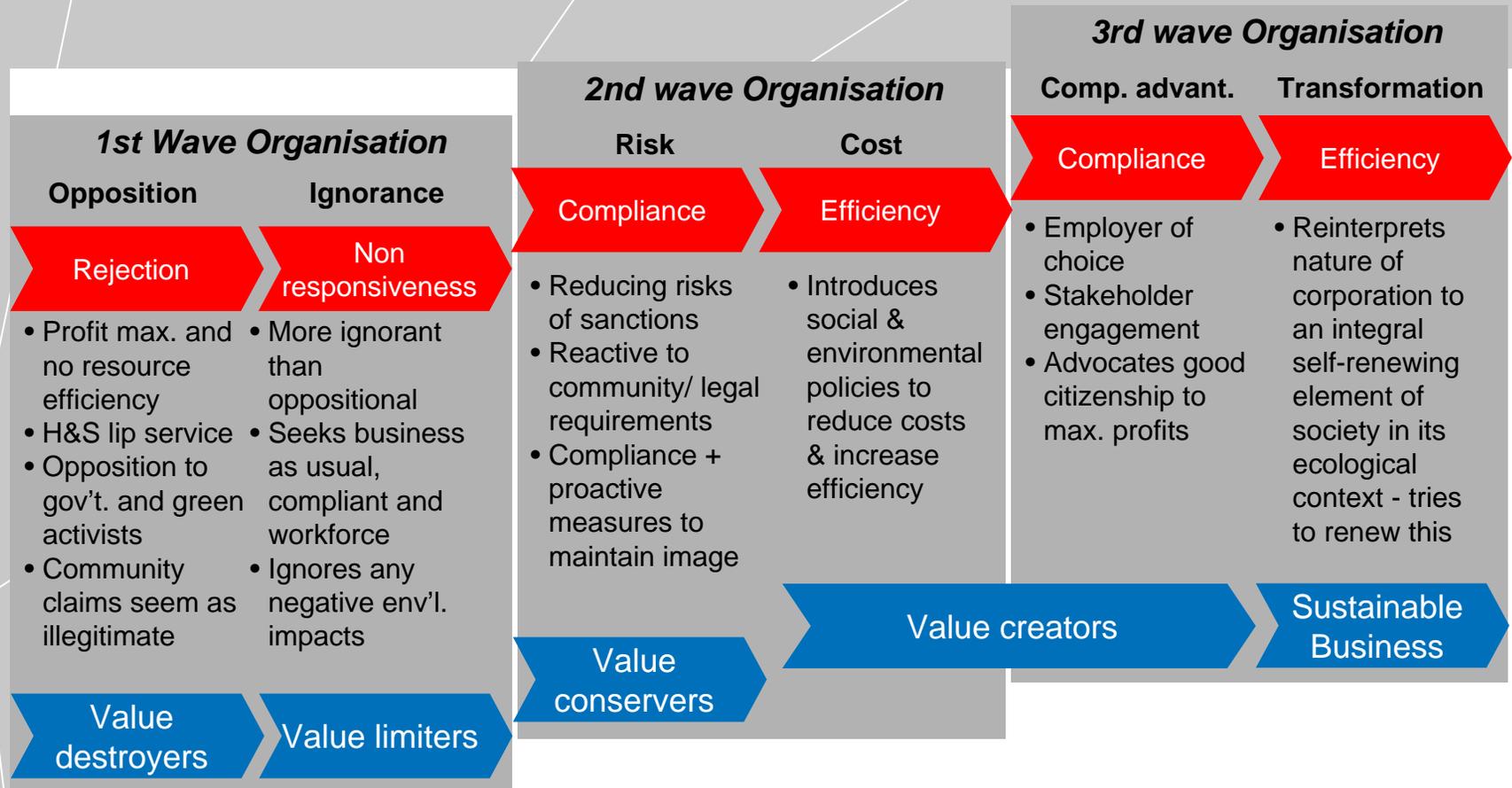


NPRI: National Pollutant Release Inventory (Canada)

- Since 2002, the aluminum industry in Canada has been reporting pollutant release data to Environment Canada
- The National Pollutant Release Inventory (NPRI) is the only legislated, nation-wide, publicly-accessible inventory of its type in Canada. It is a database of information on annual releases to air, water, land and disposal or recycling from all sectors - industrial, government, commercial and others.
- NPRI aims to enhance public access to environmental information through the establishment of an electronic database – *raison d'être*.



Value creation through sustainable business performance



Source: Adapted from Durphy et al, 2003, Organisational change for corporate sustainability, Routledge, London



Pollution Prevention Measures: Engagement

- **Canadian Centre for Pollution Prevention** encourages action that avoid or minimize the creation of pollutants and waste
- The **National Office of Pollution Prevention (NOPP)** is Environment Canada's focal point for the management of toxic substances, implementation of federal pollution prevention policy and legislation, and the development of new concepts and policy instruments that facilitate the transition to pollution prevention in Canada
- **Canadian Pollution Prevention Information Clearinghouse (CPPIC)** is an online database and comprehensive resource that provides Canadians with the information they need to put pollution prevention (P2) into practice
- **Pollution Prevention Award—Canadian Council of Ministers of the Environment (CCME):** Alcoa Aluminerie de Deschambault—Québec, Canada



NPRI: Lessons / Some Areas of Concern

- The data is not placed within the environmental context, such as the most dangerous contaminants, but only considers mass quantity
- The inventory does not demonstrate improvement over the years (i.e.: contaminants per tonne of aluminum produced)
- The inventory does not take into consideration changes in production capacity or production capacity
- Mis-use of the data can increase due to the incomparability of pollutants and between industrial sectors as they are currently presented
- It also does not provide decision makers with information about possible environmental improvements
- Paradox: industry reports the data but unhappy with outcome.



NPRI: How Aluminum Industry is using data

- Used to benchmark with International Aluminium Institute (IAI)
- Partner/ outreach with various organisations, NGOs, institutions (WBCSD, Greenpeace, IISD, Aboriginal communities, etc.)
- Will be used as a basis for future Sustainable Development Indicators initiative (create an Advisory Panel with key stakeholders)
- Data is submitted to corporate offices and (in most cases) incorporated in Sustainability Reports (for primary production only)
- CEC: should use data to identify industrial leaders



Les champions de la pollution au Québec



- *Le Journal de Montréal*
27 March 2006

- Data compiled by Pollution Watch (ENGO) using NPRI figures

- Consequences: erodes support from EHS managers

- AAC sought expert advice (see U of C Report on AAC site)

International Aluminium Institute (IAI): Global Voluntary Objectives

1. 80% reduction in PFV GHG emissions /t of alu produced by 2010 vs 1990: - **73% 1990 – 2003**
2. 33% reduction in FI emissions: - **62% 1990 – 2003**
3. 10% reduction in average smelting energy usage: - **5.5% 1990 – 2003**
4. 50% reduction in Lost Time Accident Rate and Recordable Accident Rate by 2010 vs 2000: - **55% in LTAR 2000 – 2004; - 60% Total Recordable Accident Rate from 2000 - 2004**
5. Implementation of Management Systems for Environment (ISO 14000) and for H&S by 2010: **EHS systems 78% smelters; ISO 79%**
6. Implementation of an Employee Exposure Assessment and Medical Surveillance Programme by 2010: **86% of companies with systems in place**



International Aluminium Institute (IAI): Global Voluntary Objectives (cont'd)

7. Sustainability Material Flow Model to identify future recycling flows. Model projects that global recycled metal supply from post-consumer will double by 2020 from 2005 level of 6.4 million tonnes: ***industry's global supply of aluminum products from recycled post consumer and customer scrap increased from 17% (1960) to 33% (2005) and is projected to approach 40% by 2020***
8. Monitor annually shipments for use in transport in order to track aluminum's contribution through light-weighting which reduces GHG emissions from road, rail and sea transport: ***shipment to the automotive and light truck industry increased by 5.5% from 2000 – 2003***
9. Reduce freshwater consumption /t of alu produced: ***-17% 2000-2003***
10. Rehabilitated mines: ***ratio of area rehabilitated to area mined increased from 70 – 83% from 1991 – 2002***



1. **Production**
 - 1.1. Total production
2. **Policy and management efforts**
 - 2.1. EAA sustainability mission statement
 - 2.2. Plant certification
3. **Competitiveness**
 - 3.1. Aluminium use per capita
 - 3.2. R&D expenditure
 - 3.3. R&D persons employed
 - 3.4. Value added
4. **Revenues and payments**
 - 4.1. Total revenue
 - 4.2. Taxes
5. **Employee development and relations**
 - 5.1. Training performance
 - 5.2. Wage level
 - 5.3. Total number of employees
6. **Community relationship**
 - 6.1. Community expenditure
 - 6.2. Community dialogues
 - 6.3. Community health initiatives
7. **Health and Safety**
 - 7.1. Lost time incident rate
 - 7.2. Total recordable incident rate
 - 7.3. Fatalities
 - 7.4. Severity rate
 - 7.5. Employee exposure assessment
 - 7.6. Employee health assessment
8. **Resource use at global level**
 - 8.1. Bauxite availability
 - 8.2. Mine rehabilitation
9. **Resource use at European level**
 - 9.1. Energy consumption
 - 9.2. Renewable energy
 - 9.3. Fresh water use
10. **Emissions**
 - 10.1. Water effluent
 - 10.2. Climate gases emissions
 - 10.3. Fluoride emissions
 - 10.4. BaP emissions
 - 10.5. Bauxite residue deposited
 - 10.6. SPL deposited
11. **Product life cycle**
 - 11.1. Use phase
 - 11.2. End of life phase
 - 11.3. Life cycle aspects



US TRI and Canadian NPRI

- Significant differences between two systems and within Canada:
 - Water releases reported in US (not in Canada)
 - NPRI reports are per metric tonnes; US measures in pounds
 - CO is reported in Canada (not in US)
 - Emission factors reported differently between Quebec and Canada
- Early days of both systems useful: enabled companies to establish a reporting framework and kick-start pollution prevention programmes
- Facilities in North America: no longer use the PRTRs as pollution prevention initiatives: other motivating factors, such as Sustainability Reporting, Community Programmes, etc.
- Companies value systems have evolved and improved. Company goals broader than TRI and NPRI frameworks (old EHS Reports vs. Sustainability Reports)
- Facilities: holistic thinking (bigger picture)

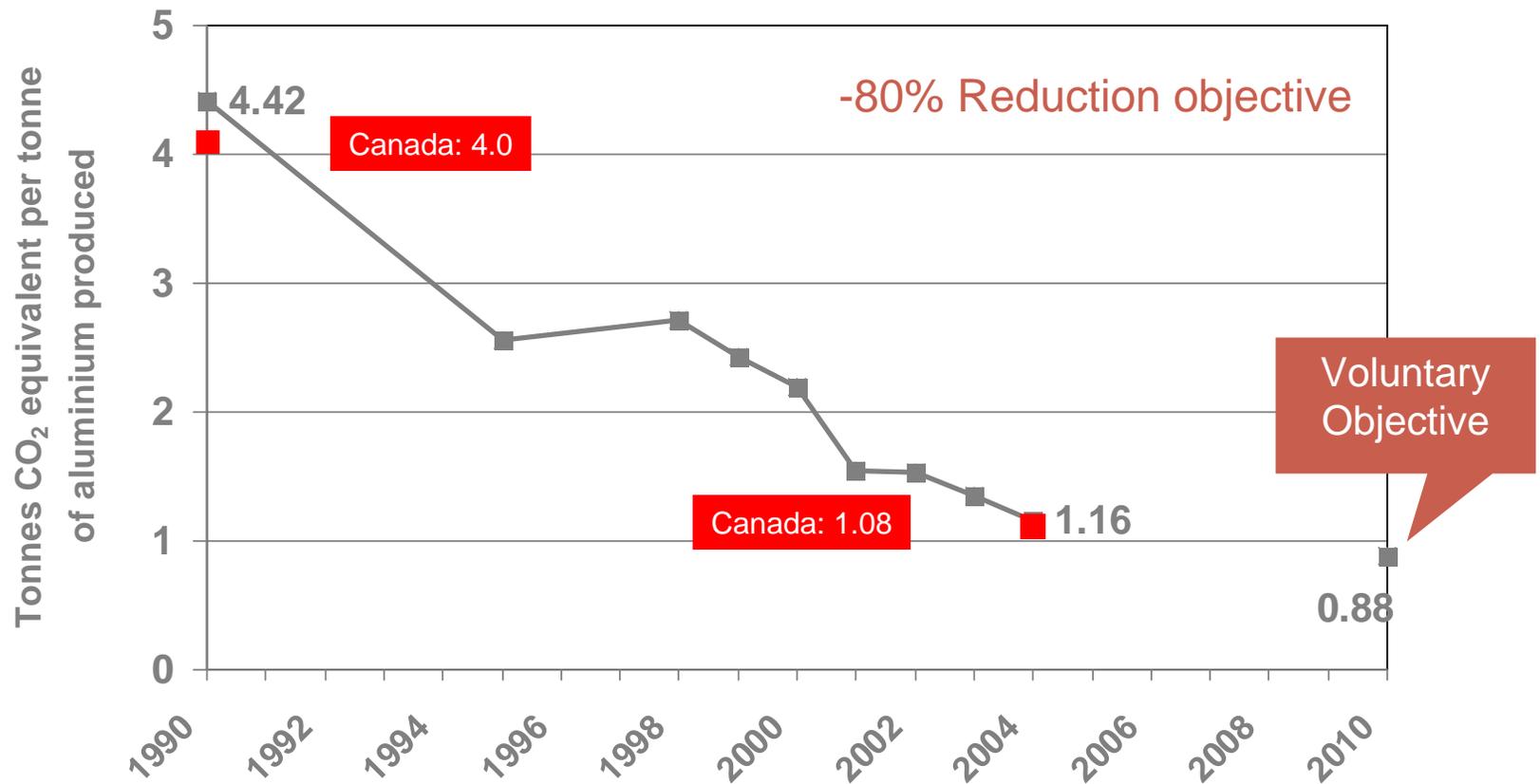


US TRI and Canadian NPRI (2)

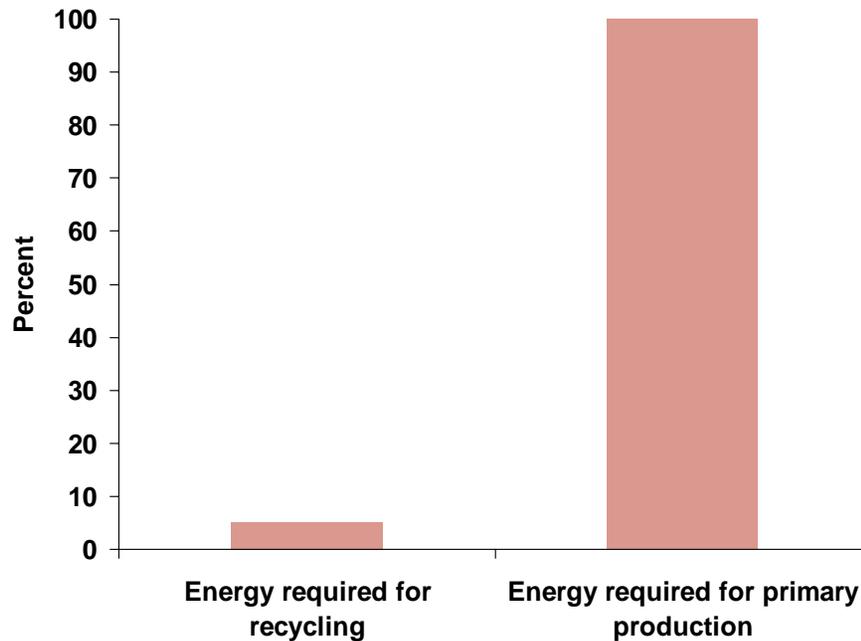
- Both are small pieces of the environmental story but remain a large element of internal compliance programmes
- In the past, facilities compared with others but today we are very aware of where we stand
- Both been a “game changer”. Data on publicly available emissions exposes those emissions. Result = significant reductions in all emissions included on those sites –especially during the early years.
- Some of the trouble spots include:
 - Changes in the substances on the reporting list (confusion and erodes support)
 - Confusing reporting of results (differences btw transfers and emissions)
 - No feedback directly to the reporters (useful: summary report to each company showing their aggregate data)
 - Can become useful data for locations, BUs and corporate management but not used enough because data is too difficult to compile



Global PFC emissions have been reduced by 74% since 1990



Recycling Aluminum Conserves Energy



The recycling of aluminum requires up to 95% less energy than that required for primary aluminum production.

Recycling aluminum from used products saves an estimated 84 million tonnes of GHG emissions per year.

Integrate these elements into NPRI and TRI?



The Potential of Aluminum

1 kg of aluminum replacing
conventional vehicle materials

has the potential to eliminate

20 kg of CO₂ over the life of the
average vehicle

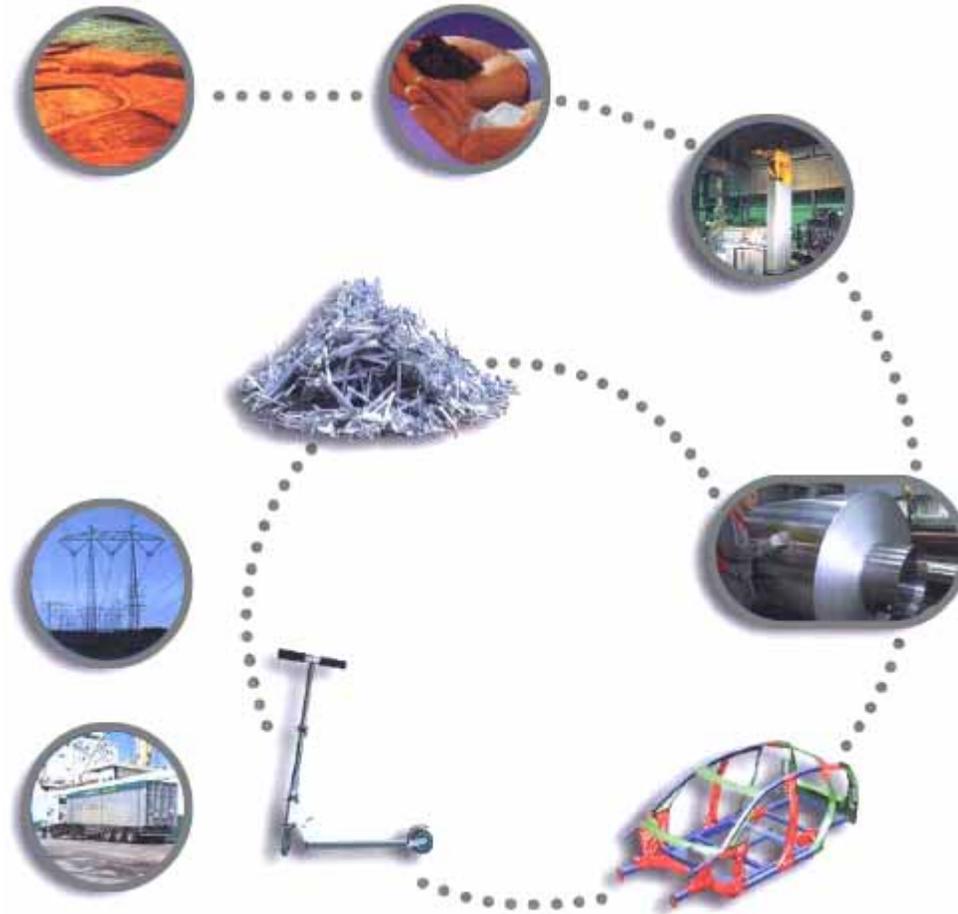


Sustainable Development Indicators: Future Challenge

- The AAC is seeking to develop sustainable development indicators which aims to **demonstrate continuous improvement** in the environmental, social and economic areas.
- An “Advisory Panel” consisting of external stakeholders (ENGOs, community leaders, labour unions, First Nations, etc.) will be established. Aim is to create a forum for **dialogue** in order to understand and address their expectations.
- **Decoupling growth** from environmental and social impact is the driving principle behind any successful industrial sustainable development strategy.



The Strength of Aluminum is its Sustainability



the future shines with aluminum

