International Aluminium Institute

A voluntary sectoral approach – a case study: Aluminium

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Sectoral Approaches Workshop
Bonn – 24-25 March 2009

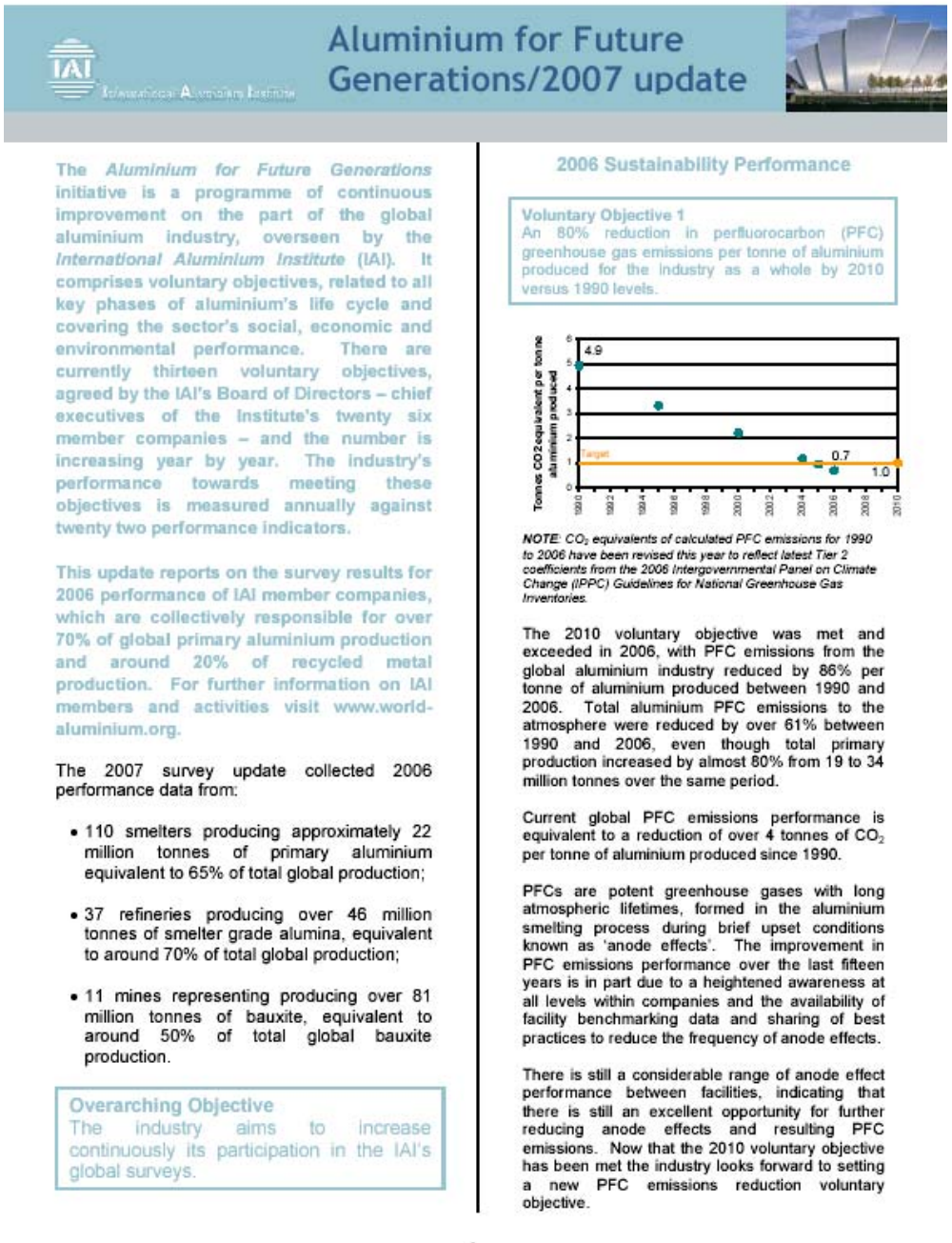
Hosted by EC, Japan and Poland

Sectoral arrangements have momentum within international climate change discussions

- **influential groups remain actively pursuing global sectoral arrangements for some sectors (such as aluminium)**
- **mixed messages resulted due to level of ambiguity over what is intended and/or meant by sectoral arrangements**
- **Sectoral Approach: a voluntary arrangement between companies to improve (bottom up)**
- **Sectoral Agreement: a binding position negotiated with governments (top down)**
- **hybrid government/industry co-operative arrangements now emerging – to support voluntary industry activities.**

Sectoral arrangements do exist . . .

- **The IAI sustainability initiative “Aluminium for Future Generations” is an example of a voluntary global industry sectoral approach aimed at improving industry performance globally, covering greenhouse emissions, energy and other key performance indicators**
- **with common quantifiable goals on performance improvement, timetable and measurement methodology**
- **an opportunity to communicate the benefits and potential of a voluntary industry-based global sectoral approach**



Aluminium for Future Generations/2007 update

The *Aluminium for Future Generations* initiative is a programme of continuous improvement on the part of the global aluminium industry, overseen by the *International Aluminium Institute* (IAI). It comprises voluntary objectives, related to all key phases of aluminium's life cycle and covering the sector's social, economic and environmental performance. There are currently thirteen voluntary objectives, agreed by the IAI's Board of Directors – chief executives of the Institute's twenty six member companies – and the number is increasing year by year. The industry's performance towards meeting these objectives is measured annually against twenty two performance indicators.

This update reports on the survey results for 2006 performance of IAI member companies, which are collectively responsible for over 70% of global primary aluminium production and around 20% of recycled metal production. For further information on IAI members and activities visit www.world-aluminium.org.

The 2007 survey update collected 2006 performance data from:

- 110 smelters producing approximately 22 million tonnes of primary aluminium equivalent to 65% of total global production;
- 37 refineries producing over 46 million tonnes of smelter grade alumina, equivalent to around 70% of total global production;
- 11 mines representing producing over 81 million tonnes of bauxite, equivalent to around 50% of total global bauxite production.

Overarching Objective
The industry aims to increase continuously its participation in the IAI's global surveys.

2006 Sustainability Performance

Voluntary Objective 1
An 80% reduction in perfluorocarbon (PFC) greenhouse gas emissions per tonne of aluminium produced for the industry as a whole by 2010 versus 1990 levels.

NOTE: CO_2 equivalents of calculated PFC emissions for 1990 to 2006 have been revised this year to reflect latest Tier 2 coefficients from the 2006 Intergovernmental Panel on Climate Change (IPPC) Guidelines for National Greenhouse Gas Inventories.

The 2010 voluntary objective was met and exceeded in 2006, with PFC emissions from the global aluminium industry reduced by 86% per tonne of aluminium produced between 1990 and 2006. Total aluminium PFC emissions to the atmosphere were reduced by over 61% between 1990 and 2006, even though total primary production increased by almost 80% from 19 to 34 million tonnes over the same period.

Current global PFC emissions performance is equivalent to a reduction of over 4 tonnes of CO_2 per tonne of aluminium produced since 1990.

PFCs are potent greenhouse gases with long atmospheric lifetimes, formed in the aluminium smelting process during brief upset conditions known as 'anode effects'. The improvement in PFC emissions performance over the last fifteen years is in part due to a heightened awareness at all levels within companies and the availability of facility benchmarking data and sharing of best practices to reduce the frequency of anode effects.

There is still a considerable range of anode effect performance between facilities, indicating that there is still an excellent opportunity for further reducing anode effects and resulting PFC emissions. Now that the 2010 voluntary objective has been met the industry looks forward to setting a new PFC emissions reduction voluntary objective.

The IAI "Aluminium for Future Generations" Global Sustainability Initiative . . .

now 13 voluntary objectives

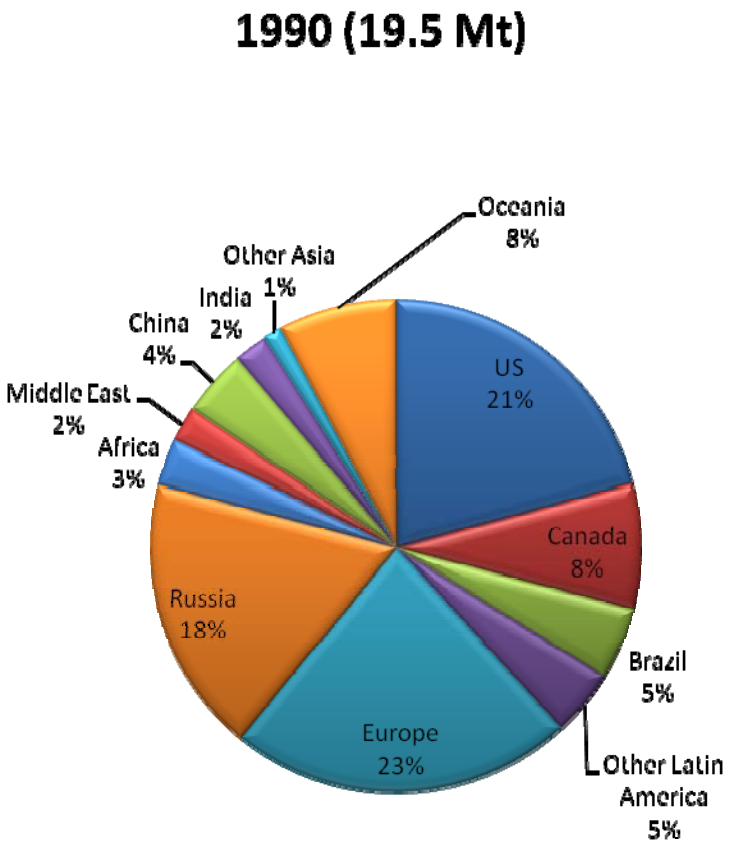
The IAI voluntary global sustainability initiative – an industry sectoral approach case study

- **The IAI voluntary global sustainability initiative covers the full aluminium life cycle, including direct emissions reduction, promotion of greater energy efficiency, metal recovery and recycling as well as product responsibility with respect to transport light-weighting and energy saving potential in construction and packaging – and safety, etc.**
- **the success of the IAI global sectoral initiative comes from its voluntary nature, encouraging broad global industry support and participation.**

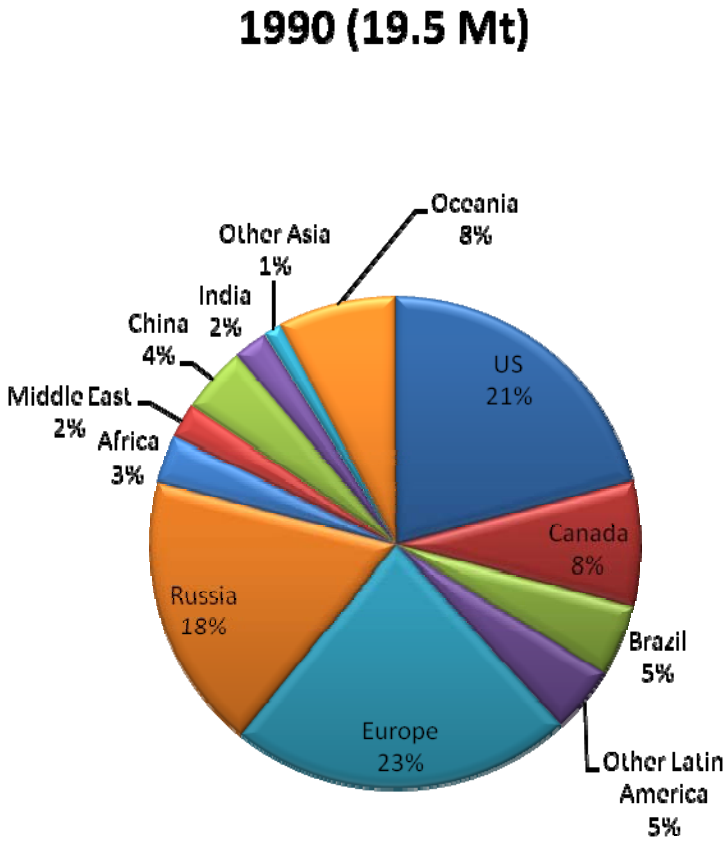
Recognise opportunities and constraints to industry (sectoral) responses . . .

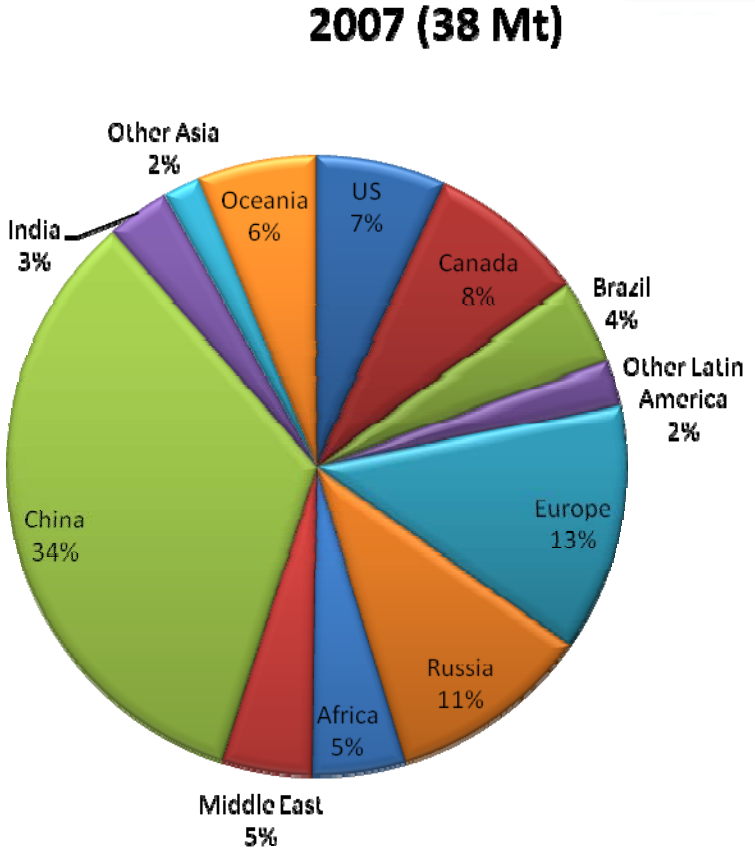
- **opportunities to change to best operating practice – for example: changes to pot-room best practice bringing major reductions in PFC emissions; management engagement; (relatively) low capital cost in software upgrading**
- **upstream input changes and reduced imbedded emissions**
- **constraints from long-life, high-cost, large scale facilities**
- **hardware/plant configuration set in place on establishment limits the short and medium term changes possible within the structure of the facility – anode technology, energy systems, indirect emissions from electricity inputs.**

Primary Al production 1990

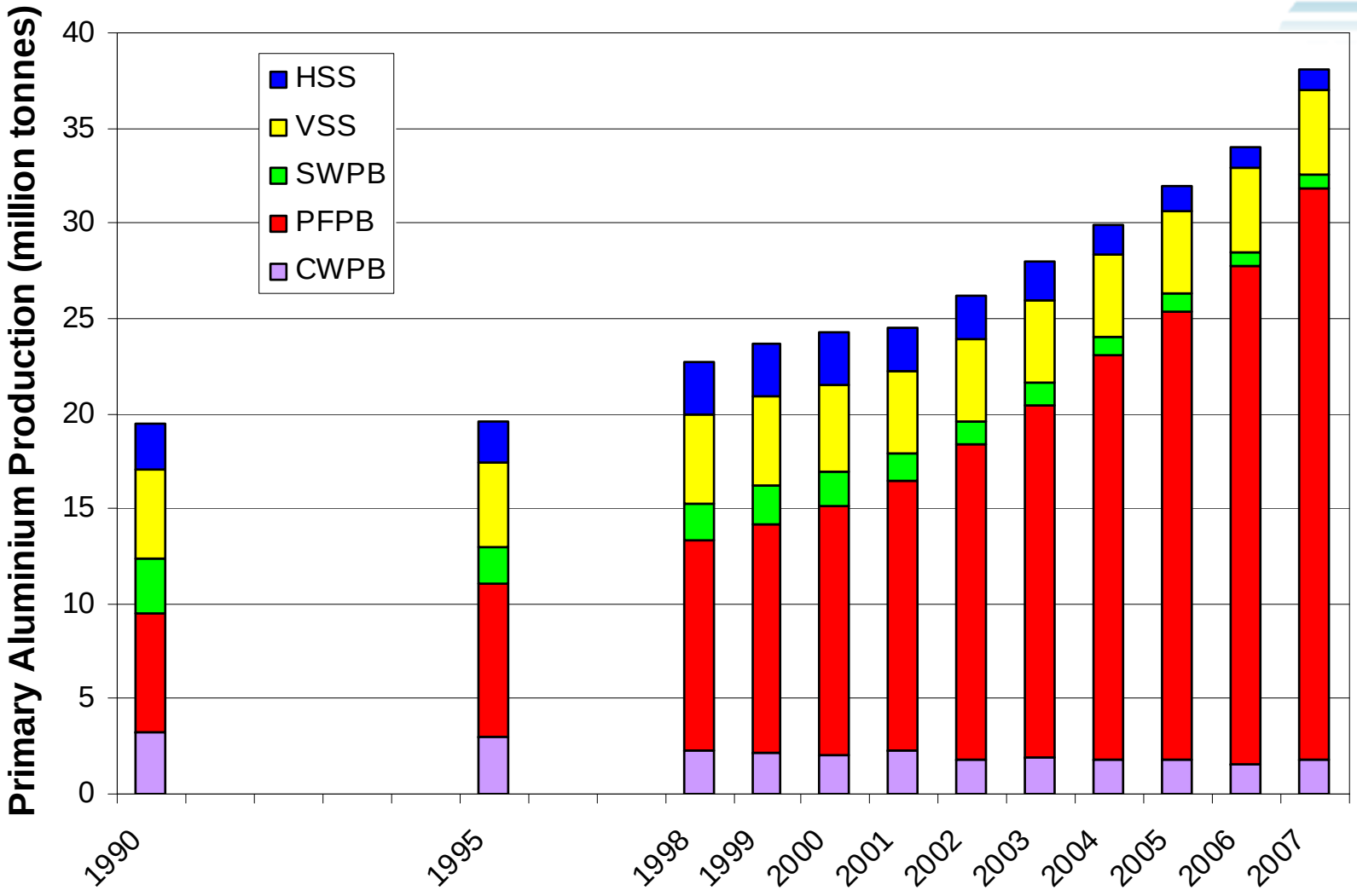


Primary Al production 1990 & 2007

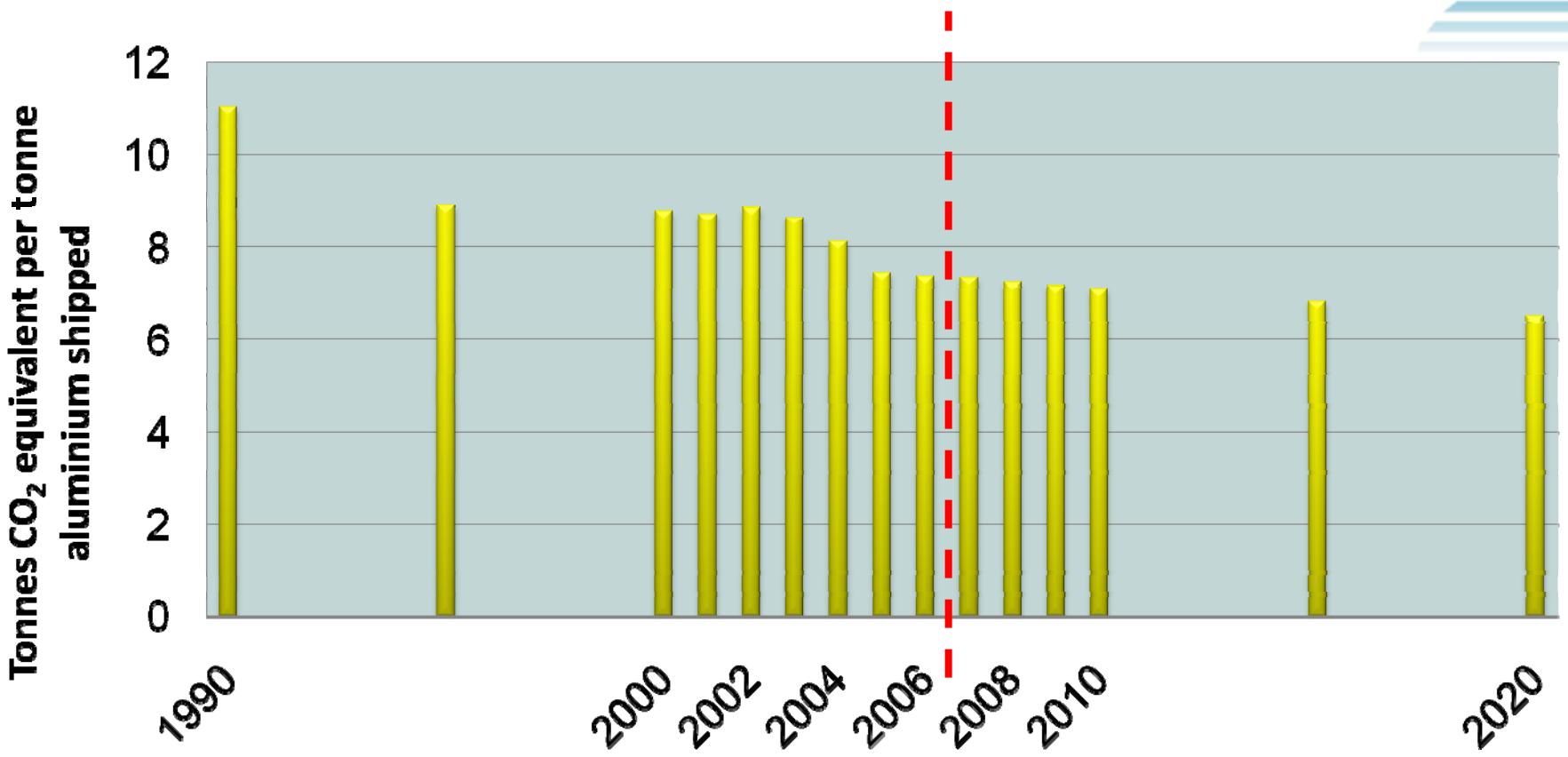




Global Primary Aluminium Production by Technology Type (1990-2007)

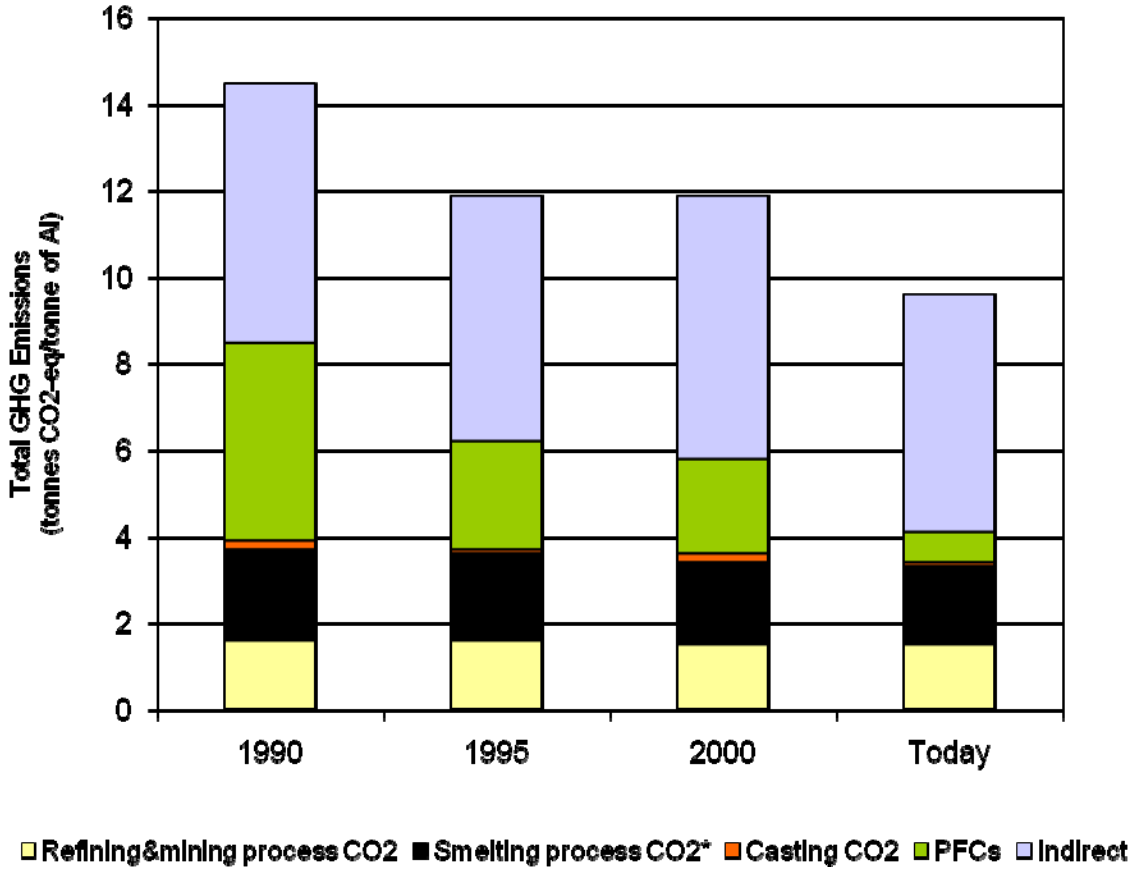


Worldwide, aluminium is becoming less GHG intense per tonne, due to ...



- lower emissions from primary aluminium facilities
- improvements in energy efficiency (driven by growth and new plant)
- increases in the percentage of recycled metal relative to primary metal

Primary aluminium production
Average GHG emissions by process



* incl. anode production & consumption, excl. PFC

SOURCES: 2000 and 2005 Lifecycle Inventories
2007 Anode Effect Survey

GHG Emissions and Aluminium Production

Alumina Production

1.0 – 2.5 t CO_2eq/t Al

IAI survey average = 1.5

Perfluorocarbon (PFC) Emissions

0.03 – 18.9 t CO_2eq/t Al

Global average = 0.65

Electricity Input

15.2 MWh/t Al

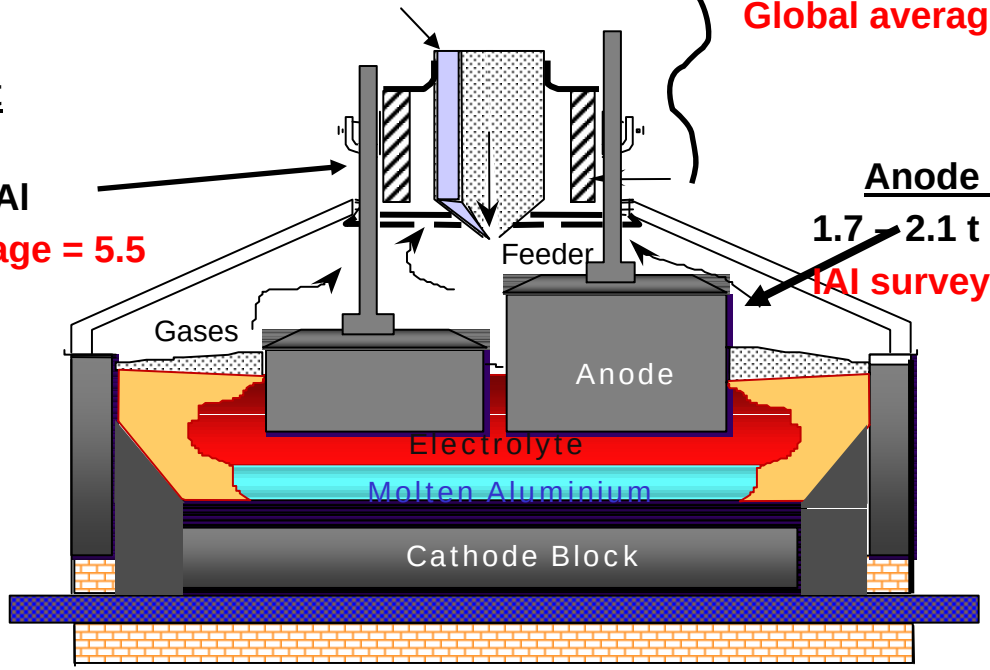
0 – 20.8 t CO_2/t Al

IAI survey average = 5.5

Anode Production/Consumption

1.7 – 2.1 t CO_2eq/t Al

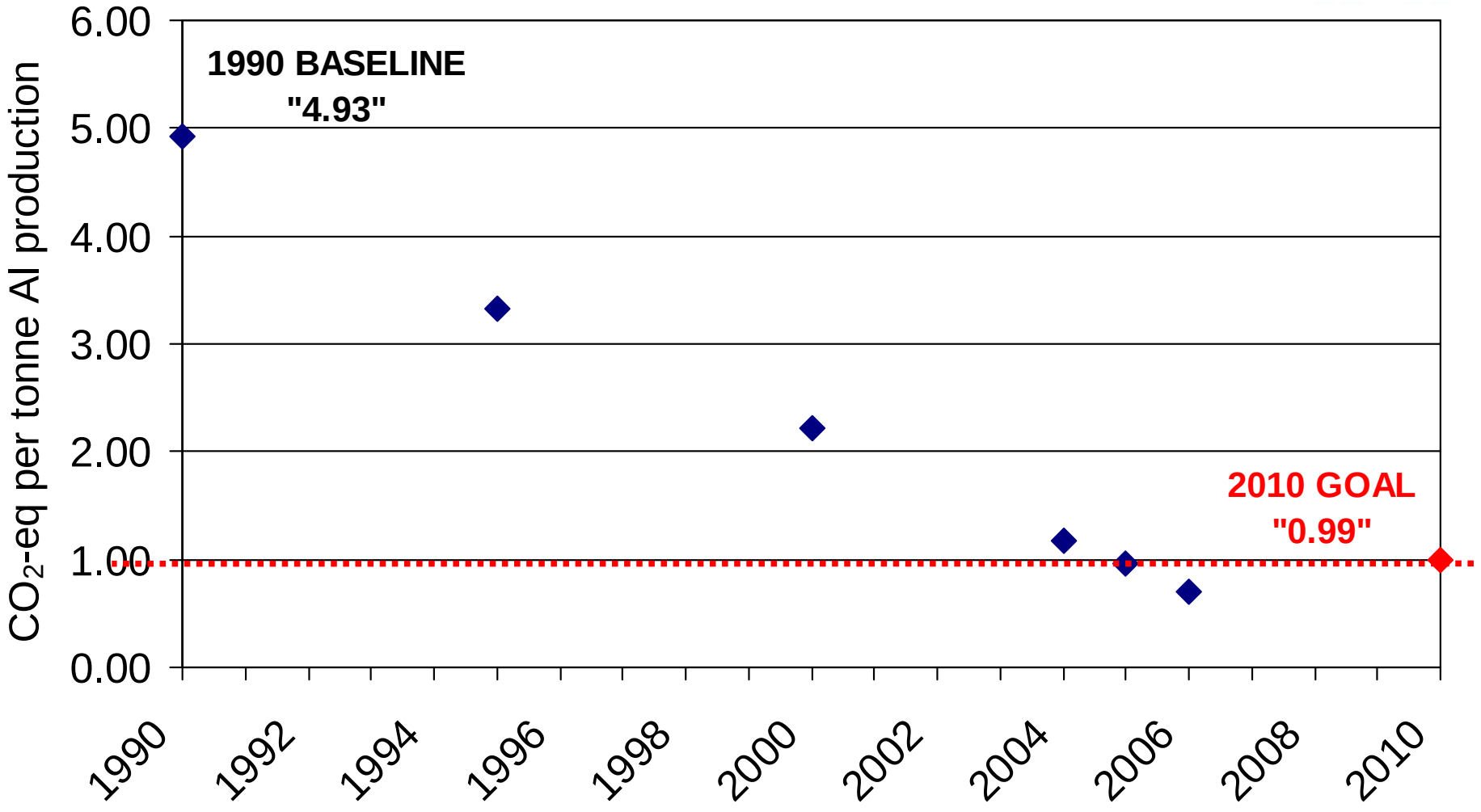
IAI survey average = 1.8



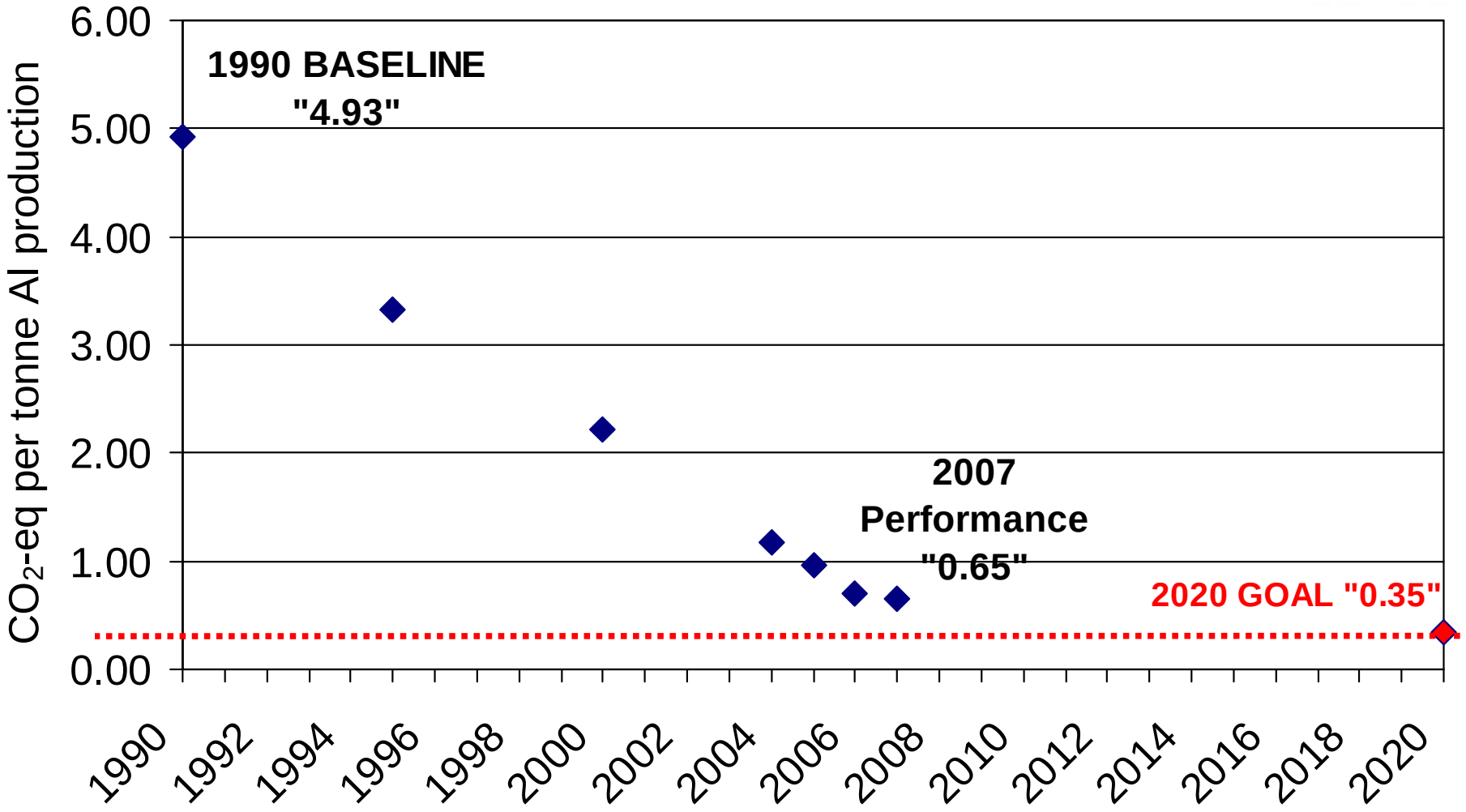
Source: IAI 2005 Life Cycle Inventory
IAI 2007 Anode Effect Survey
IAI 2007 Energy Survey

- **Less than 10 tonnes CO_2 equivalent emitted for each tonne of primary aluminium produced from bauxite mining to ingot casting (over half from power generation)**
  - **compared to around 12 tonnes CO_2e per tonne in 2000.**

Global PFC Specific Emissions (1990-2006)

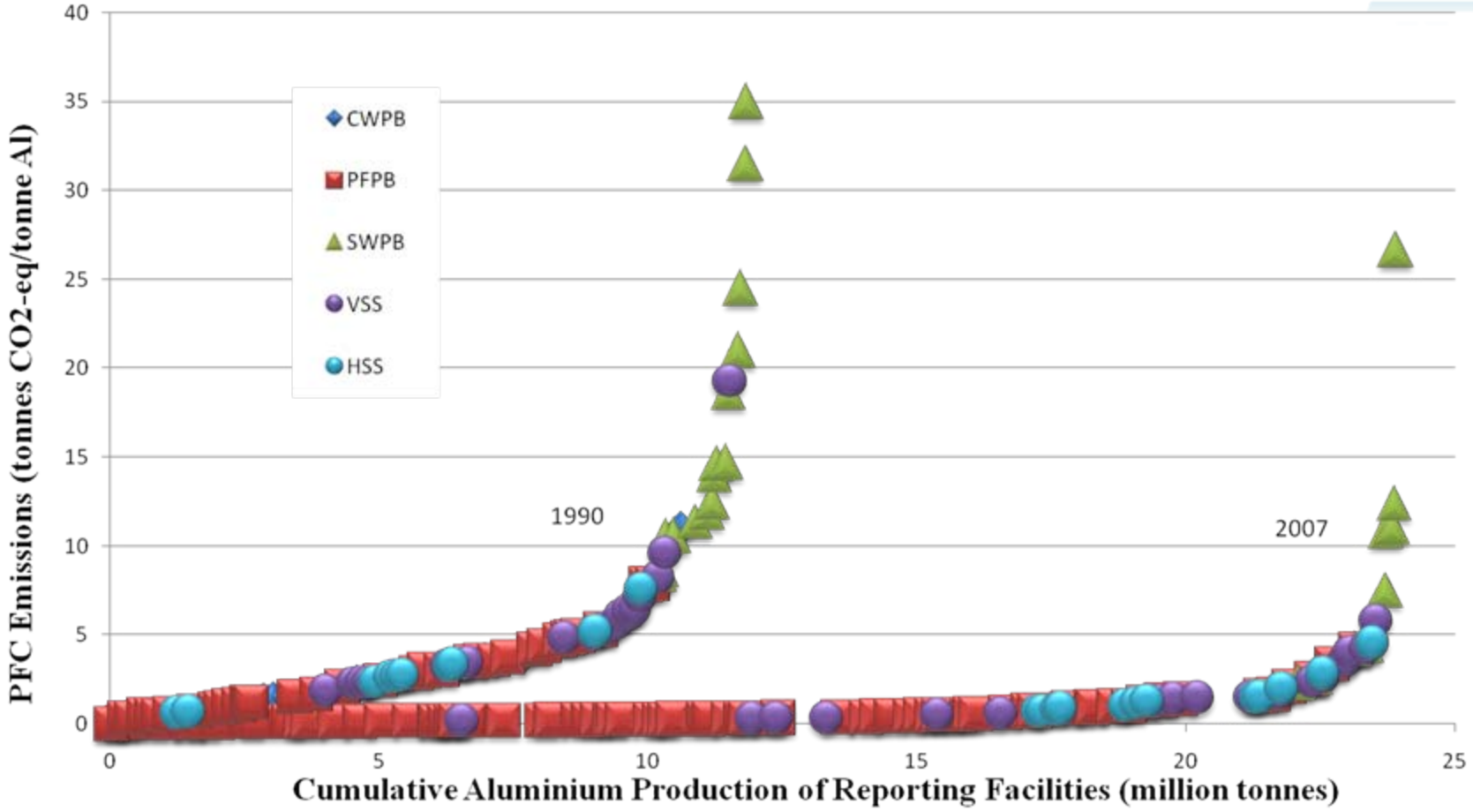


Global PFC Specific Emissions (1990-2007)

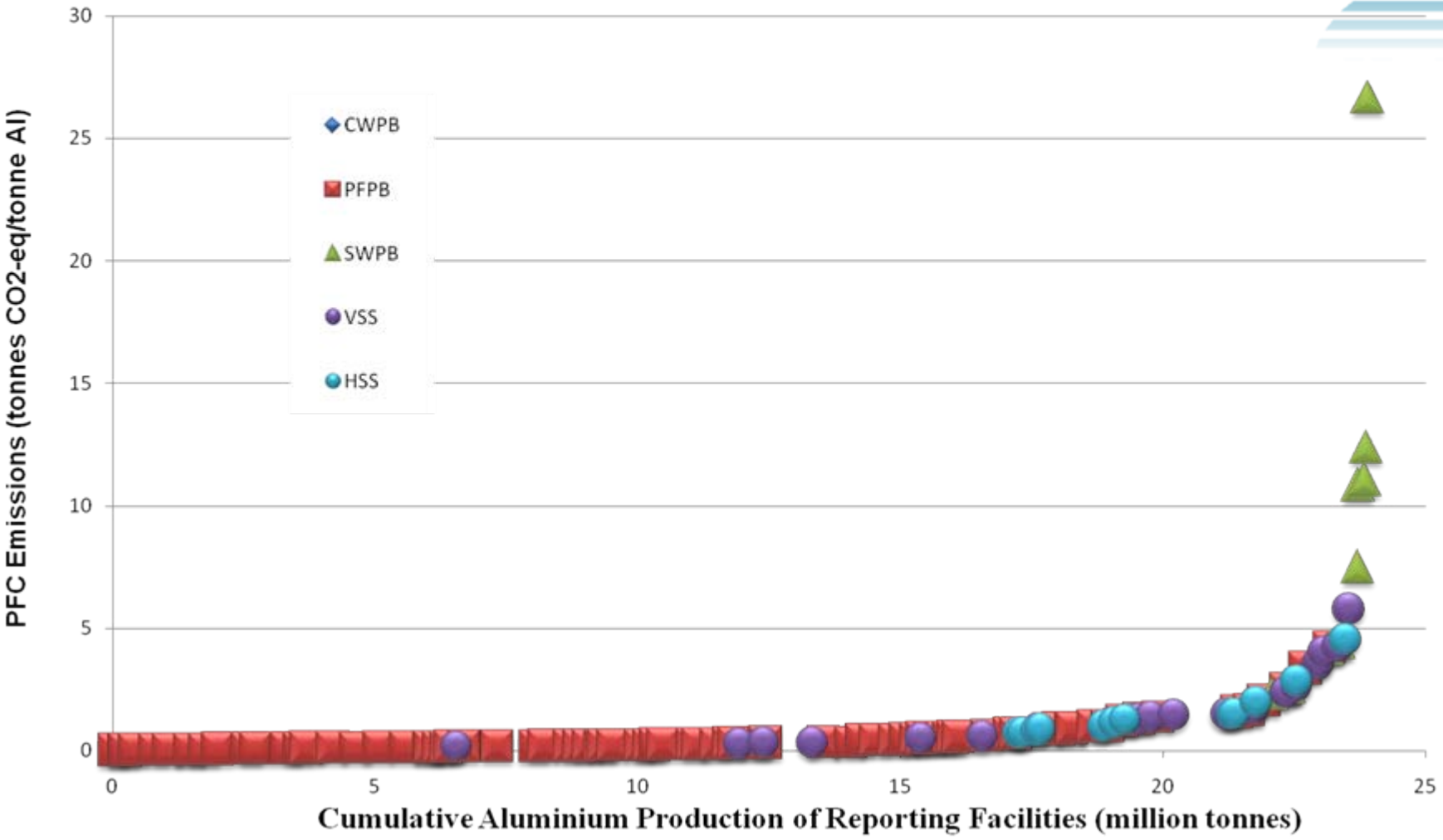


PFC emissions profile 1990 vs 2007

(tonnes CO_2-e per tonne aluminium)

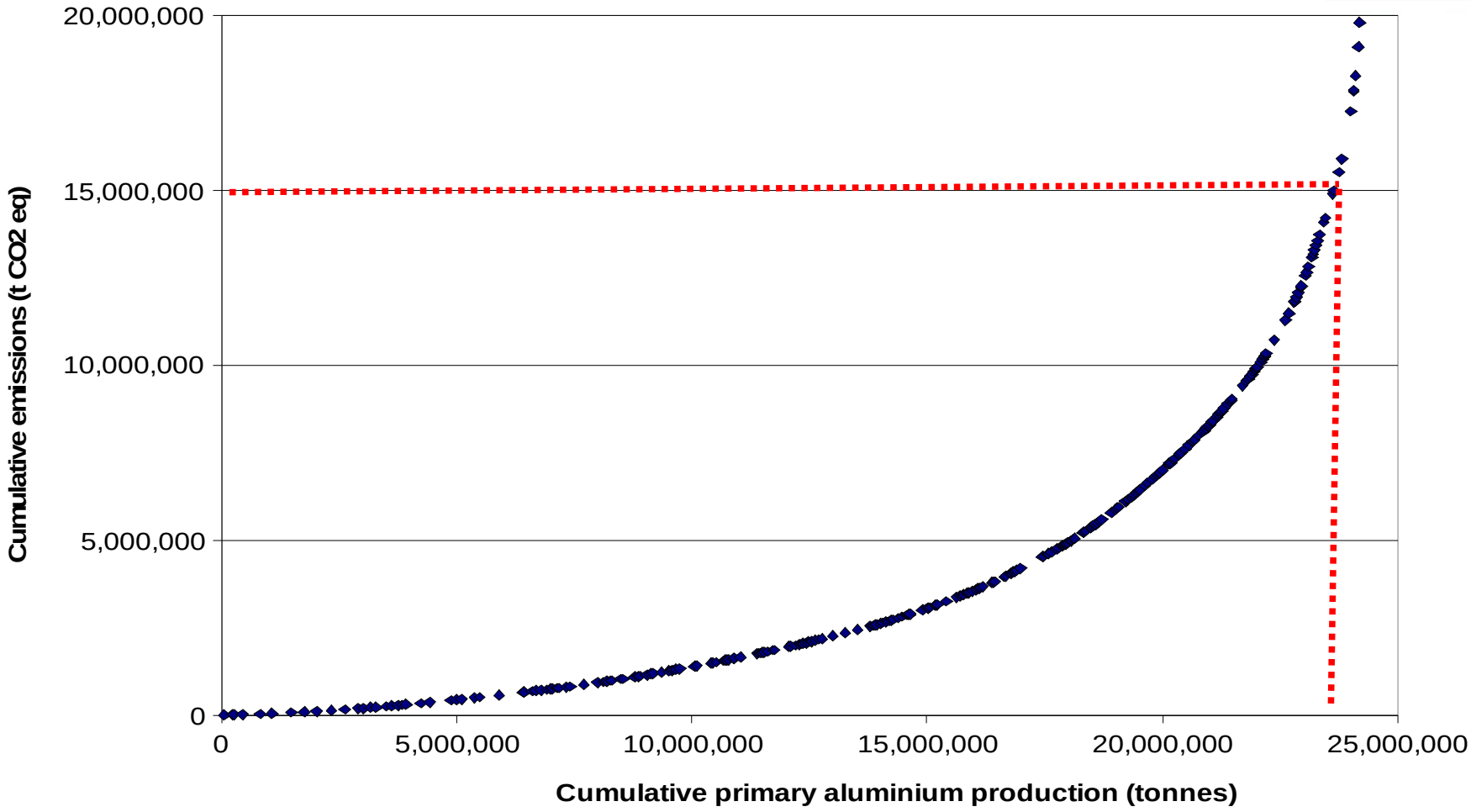


PFC emissions profile 2007
(tonnes CO_2-e per tonne aluminium)



Total PFC emissions by reporting facilities

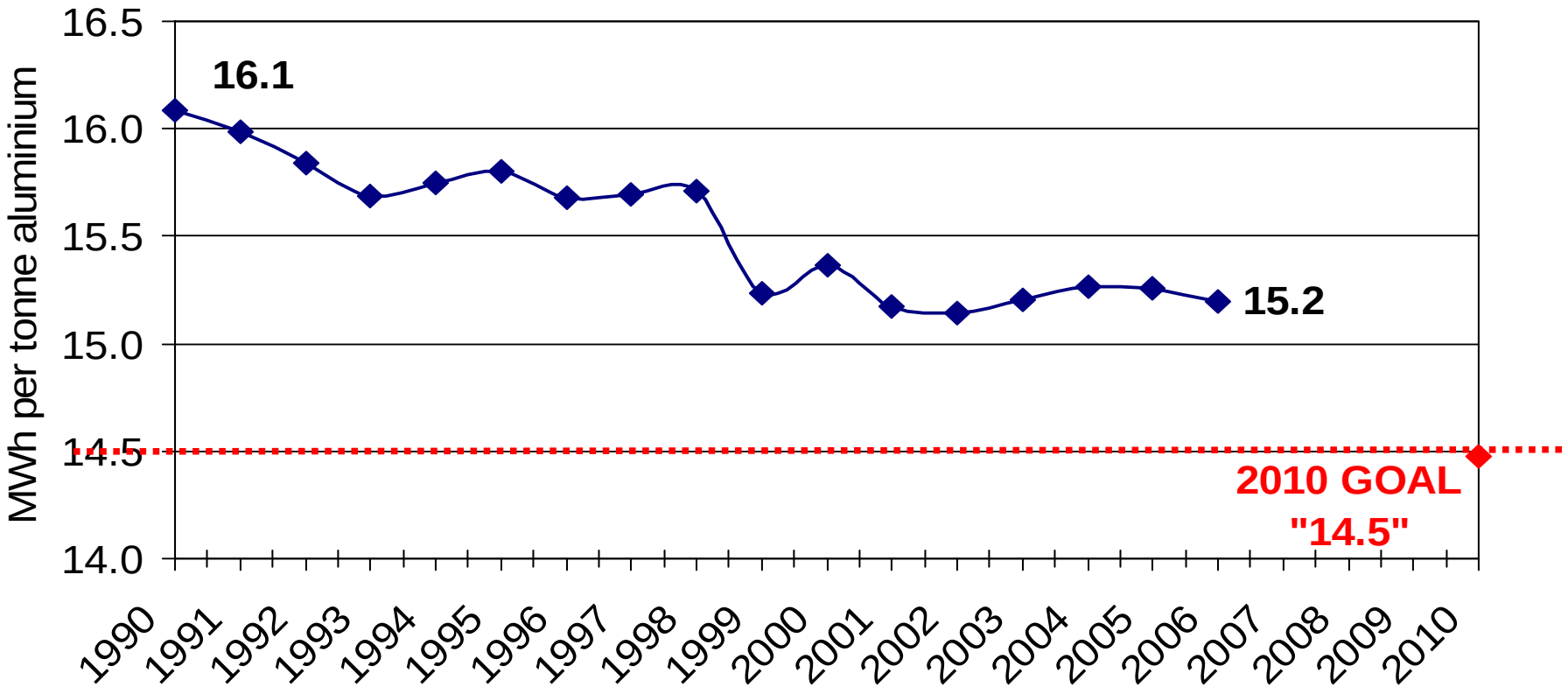
(ranked by specific PFC emissions performance)



Source: IAI 2007 Anode Effect Survey

Smelting Electricity Voluntary Objective

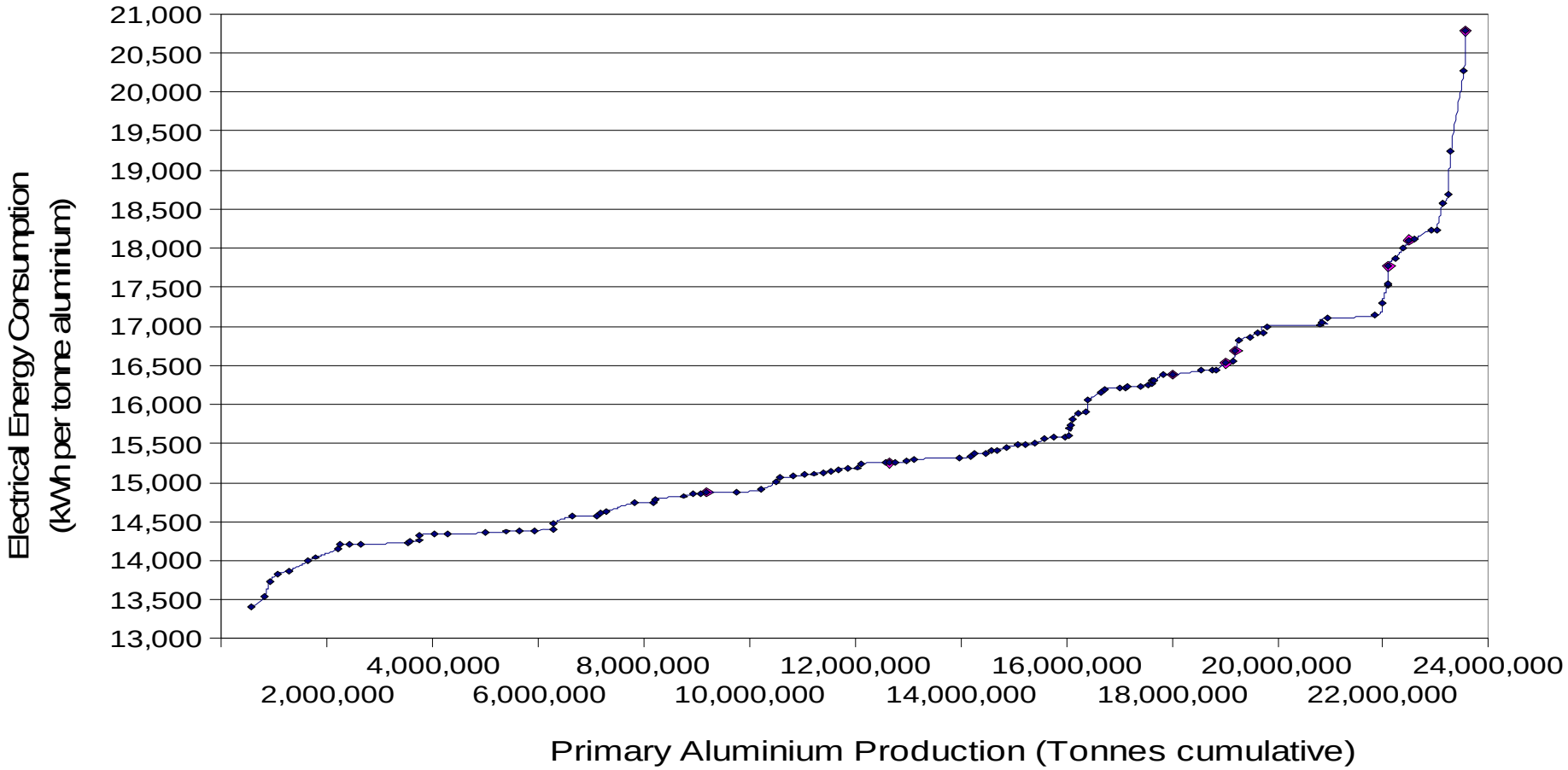
10% reduction in electrical smelting energy consumption per tonne of aluminium produced between 1990 & 2010



Source: IAI SDI Report

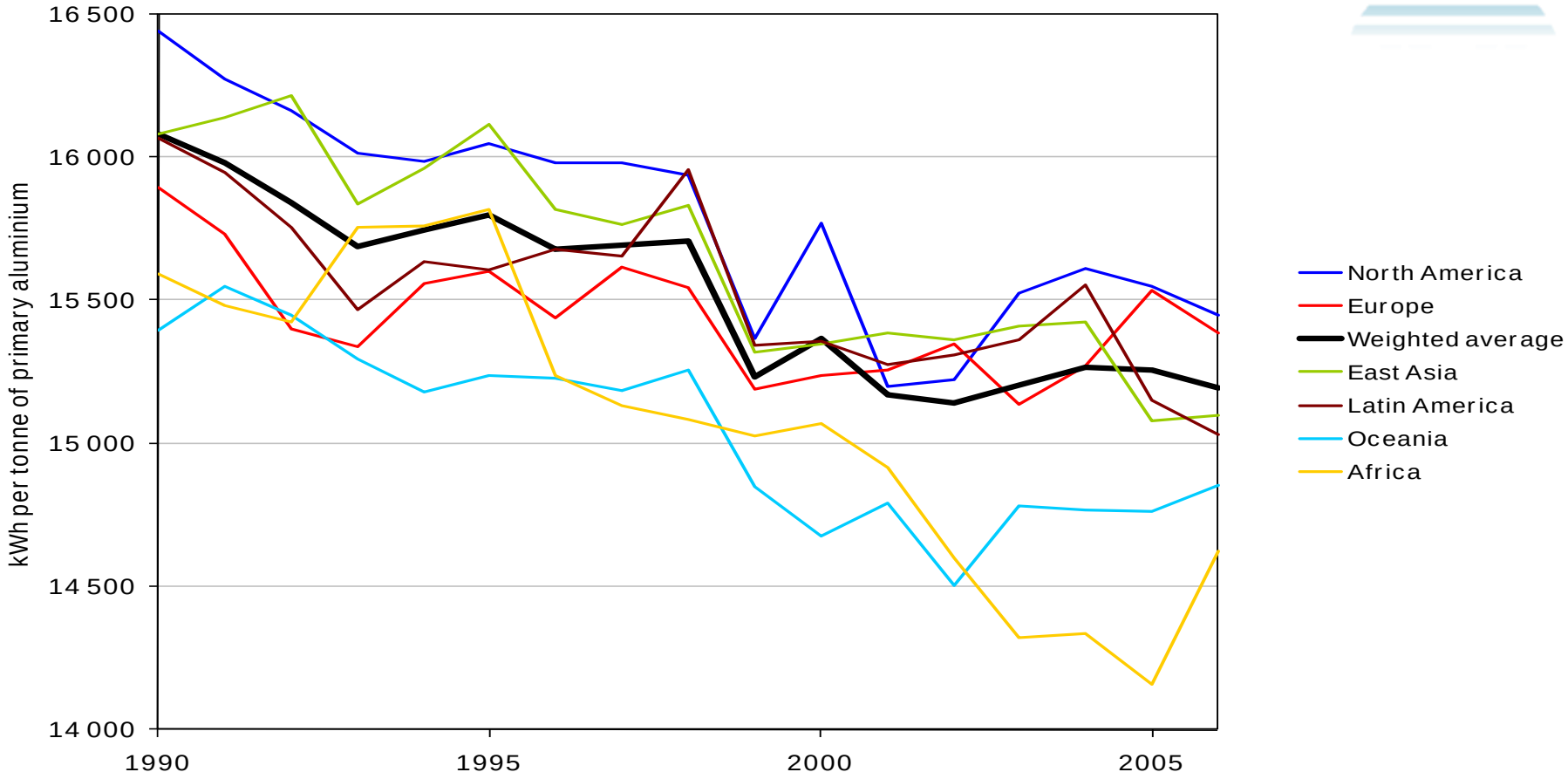
2007 IAI Energy Survey: Primary Aluminium Smelting – Electrical Energy Consumption All technologies

[115 smelters, 23.5 million tonnes (62%) total global production]



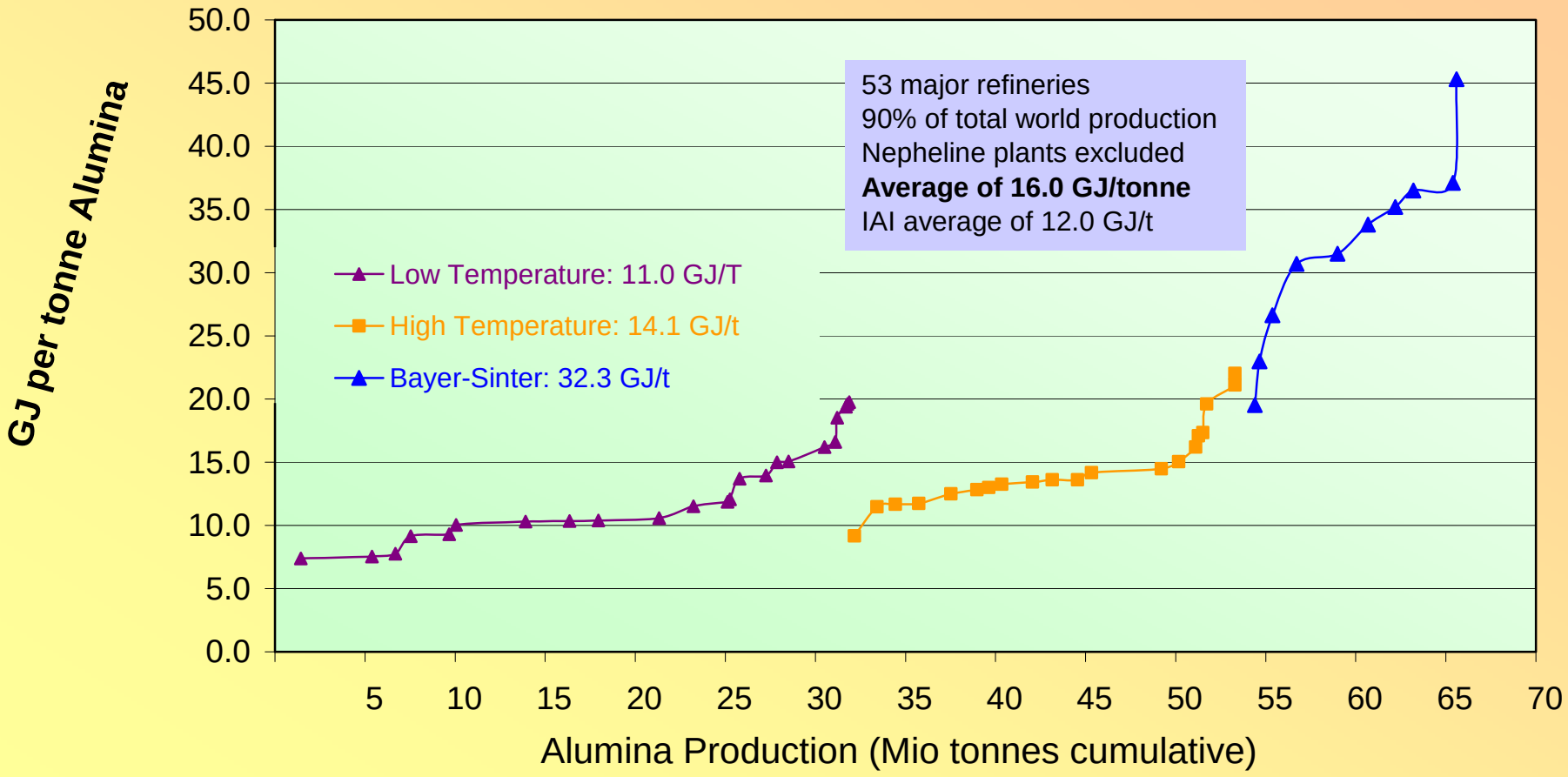
Source: IAI 2007 Energy Survey

Regional Average Specific Power Consumption in Aluminium Smelting



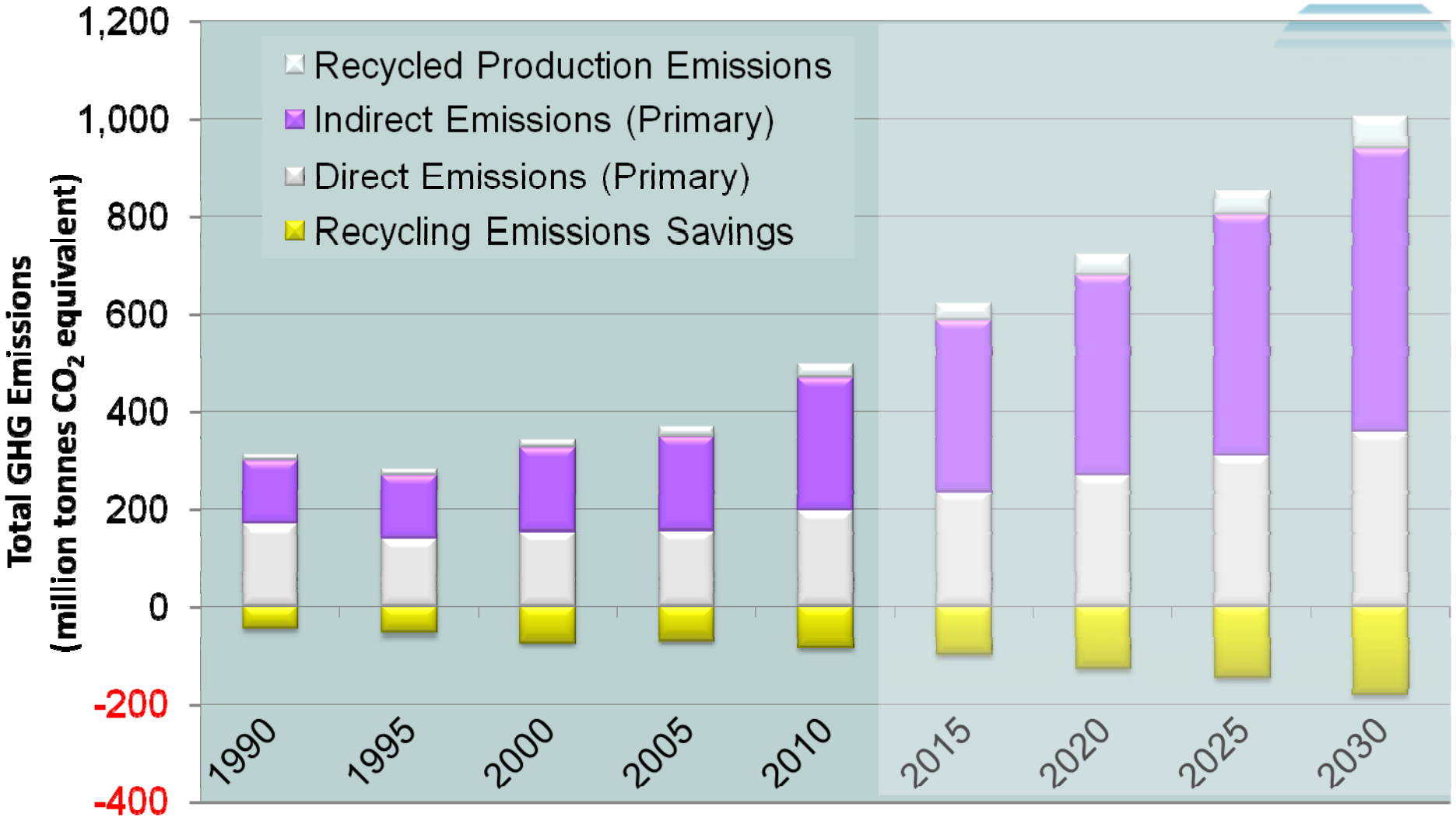
Note: In this graph, Europe includes EU25 plus Iceland, Norway, Switzerland, Bosnia and Herzegovina, Croatia, Romania, Russian Federation, Serbia and Montenegro and Ukraine. Source: IAI, 2008c

2006 IAI Energy Survey
Metallurgical Alumina Production - Energy Consumption



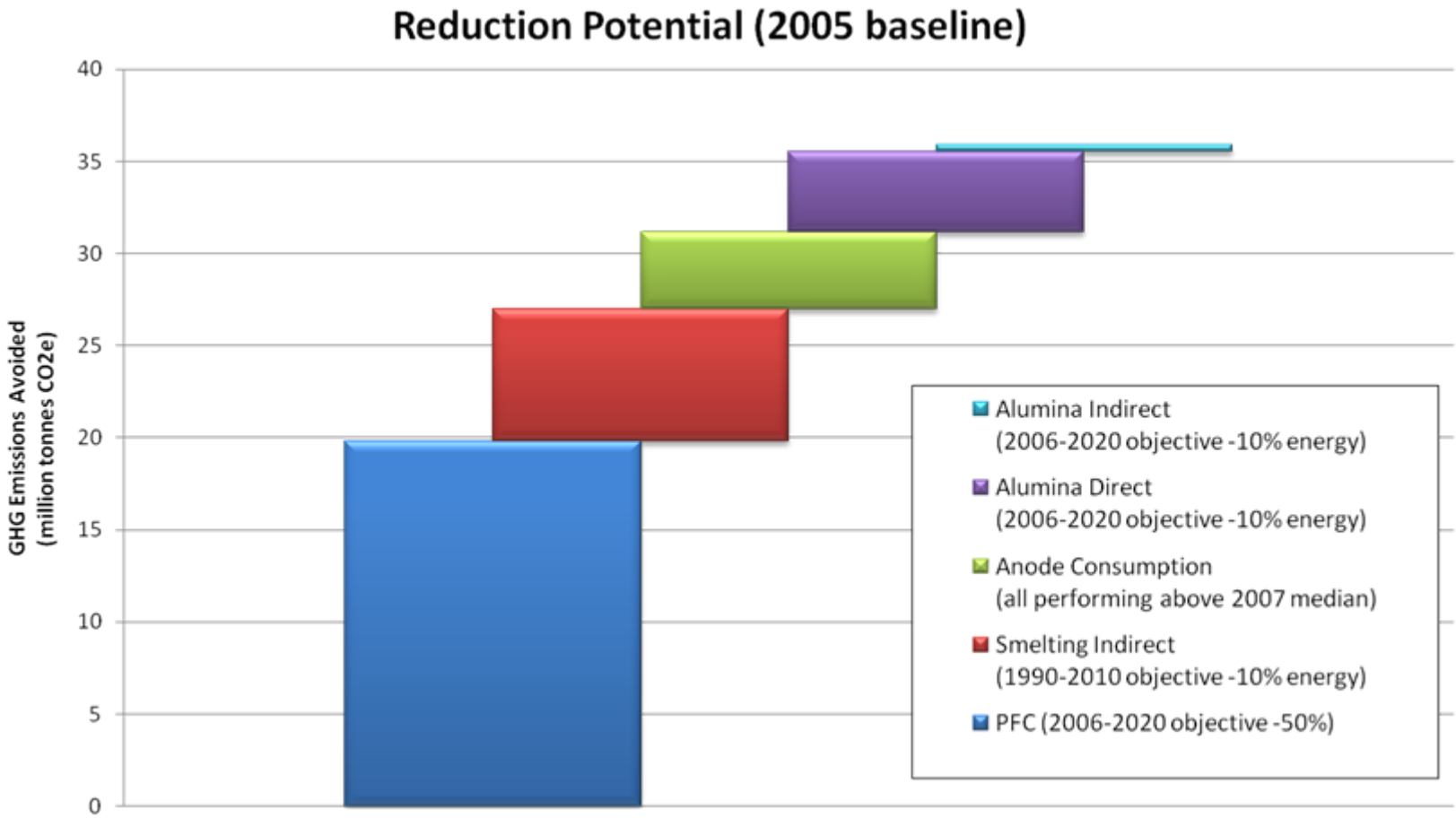
Source: IAI and CRU data

Greenhouse gas emissions from aluminium production



SOURCES: 2000 and 2005 Lifecycle Inventories; 2007 Anode Effect Survey; 2008 GARC Mass Flow Model; 2020 IAI Voluntary Objectives; CRU

Global GHG reduction potential from aluminium production (2005 baseline)



The aluminium industry supports voluntary sectoral approaches, but not mandatory sectoral agreements

- **with the success of the industry's voluntary global initiative, the aluminium industry is often seen as the leading example of a successful sectoral approach – and is identified by some governments, NGOs and other climate change commentators that the industry would be an ideal sector for the introduction of a sectoral agreement . . .**

Sectoral approaches or agreements or arrangements . . . only a transitional step towards comprehensive global solutions

- **while advocating voluntary global sectoral approaches, the IAI does not regard aluminium as a suitable industry sector for introducing some form of obligatory intergovernmental transnational sectoral agreement.**
- **impractical, due to the many jurisdictions involved and to the need to cover all the various industries producing competing materials under the same regime**
- **could cause both inter- and intra-sectoral level distortions in the global market, impacting on competitiveness and causing carbon leakage.**

Transnational sectoral agreements could cause competitive distortions in the global market

- **Sectoral emission caps and production constraints at the national level are anti-competitive – and have not received support from key developing countries/producers.**
- **Sectoral baseline crediting now being promoted (in place of caps/constraints) as a transitional measure to engage developing countries is a concept worth exploring, but it is important that any baselines/benchmarks be set at levels to reward real performance improvements and do not constitute subsidies.**

National level sectoral agreements

- National level sectoral agreements are an alternative approach used by some (national) governments to deliver specific policy objectives
- companies are required to take the necessary steps to comply with local legislative requirements
- the IAI supports a bottom-up approach based on dialogue with industry but the position to be adopted towards a national (or regional) sectoral agreement remain a matter for individual member companies in consultation with relevant governments.

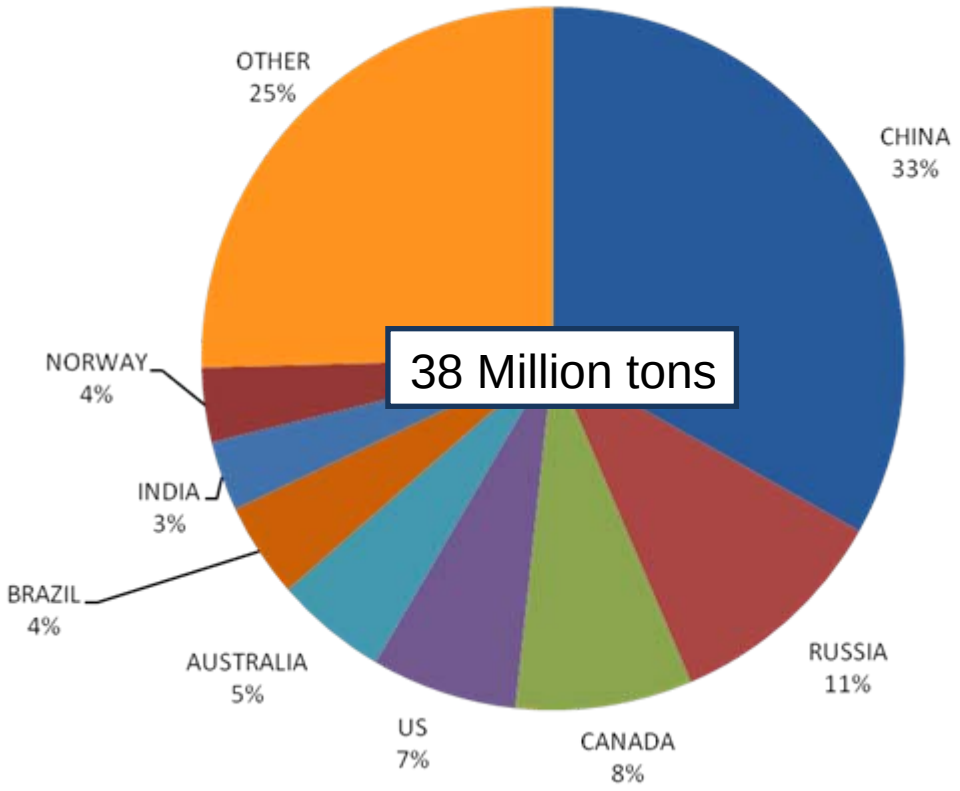
IAI collaboration with Asia Pacific Partnership on Clean Development & Climate as a voluntary sectoral approach

- **The Asia Pacific Partnership on Clean Development and Climate is a growth-led, performance-enhancing approach based on a voluntary co-operative partnership between governments and industry – and very compatible with the sectoral goals of enhanced environmental performance within the IAI 'Aluminium for Future Generations' sustainability initiative**
- **and a useful model for future developments and initiatives.**

Thank you.

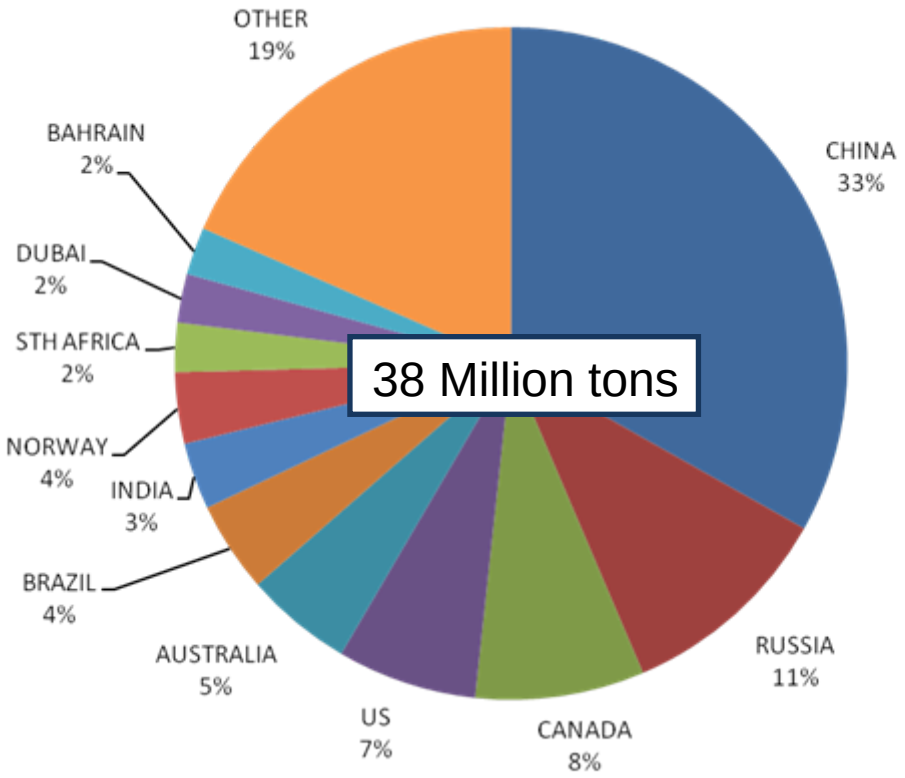
www.world-aluminium.org

2007 Global Primary Aluminium Production



Source: USGS 2007

2007 Global Primary Aluminium Production



Source: USGS 2007