australia's aluminium
SINCE 1963

ALCOA

Alcoa World Alumina Australia is the global leader in alumina production and Australia's sixth largest resources sector exporter. Alcoa is an integrated business comprised of bauxite mining, alumina refining, aluminium smelting, rolling and canned sheet products, with operations in Victoria, Western Australia and New South Wales.

Alcoa of Australia Submission

Design Options for the Expanded National Renewable Energy Target Scheme

July 2008

1. Background & policy context

Alcoa has been a major Australian exporter and employer for over 40 years. Alcoa's operations in Victoria, Western Australia and New South Wales form an integrated aluminium industry which produces about 47% of Australia's alumina and 30% of the national aluminium output. These operations include bauxite mines, refineries, smelters, rolling mills and aluminium recycling facilities adding value to Australian resources throughout the manufacturing process.

Alcoa directly employs over 6,000 people in Australia with thousands more employed as contractors across Alcoa's operations. It is conservatively estimated that Alcoa's Australian operations provide employment, through direct and indirect means for over 20,000 people – most in regional areas of Victoria and Western Australia.

Alcoa has a long history with renewable energy and is a major supporter/facilitator of Pacific Hydro's Portland Wind Energy Project which will soon become Australia's largest wind farm.

Both the refining of bauxite into alumina and its subsequent conversion, through smelting, to aluminium are energy intensive. On average in Australia the direct cost of energy represents over 20% of the total cost of both alumina refining and aluminium smelting, with some sites experiencing energy costs well above this average. The alumina refining and aluminium smelting processes have been accepted as part of the Emissions-Intensive Trade-Exposed (EITE) sector in the recent Carbon Pollution Reduction Scheme (CPRS) Green Paper released for consultation by the Australian Federal Government (July 2008).

Regional Average Electricity Use for Primary Aluminium Production (kWh/tonne)

	2006
Africa and South Asia	14 622
North America	15 452
Latin America	15 030
Asia	15 103
Europe	15 387
Oceania	14 854
Weighted average	15 194

Source: International Aluminium Institute Electrical Power Used in Aluminium Production ES002 21 December 2007

Regional Average Energy Use of Metallurgical Alumina Production (GJ/tonne)

	2006
Africa and South Asia	14.5
North America	11.9
Latin America	11.2
Europe	13.1
East Asia and Oceania	11.8
Weighted average	12.0

Source: International Aluminium Institute Electrical Power Used in Metallurgical Alumina Production ES012 21 December 2007

The proposed CPRS recognises the potential for international competitiveness impacts on the EITE sector and the risk this poses to the Australian economy and jobs. Accordingly the CPRS has proposed mechanisms to reduce these potential competitiveness impacts. The proposed NRET poses a similar international competitiveness risk to Australian EITE industries, particularly the aluminium industry, due to its heavy reliance on purchased electricity.

Climate Change is one of the key sustainability issues of our time. As Alcoa recognised well over a decade ago, the public debate has moved from whether climate change is occurring to what can we do to address it. The Federal Government has identified emission trading as the most efficient means of reducing emissions. Alcoa of Australia and our parent company Alcoa Inc strongly share this view.

Alcoa took a voluntary global leadership position in addressing climate change and reducing greenhouse gas emissions at a very early stage. The company set an ambitious target to reduce its 1990 global direct greenhouse gas emissions by 25 per cent by 2010. This was achieved in 2003. Alcoa is now working to maintain that reduction as the company grows.

The task of responding to climate change is large and it is critical that Australia's policy response encourages a "least cost" (high efficiency) method of reducing carbon emissions.

Alcoa shares concerns expressed in the submission provided by the Australian Aluminium Council (AAC) that the concurrent implementation of emissions trading and an NRET does not represent a least cost climate change response and, without key considerations, presents significant potential to prejudice Australian international competitiveness

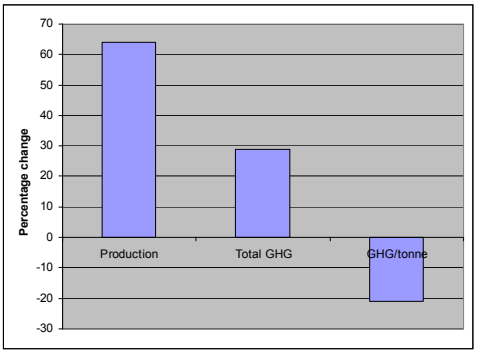
2. Progress to date

Alcoa and other parts of the aluminium industry have long recognised the importance of responding to climate change through increased energy efficiency and emissions reductions.

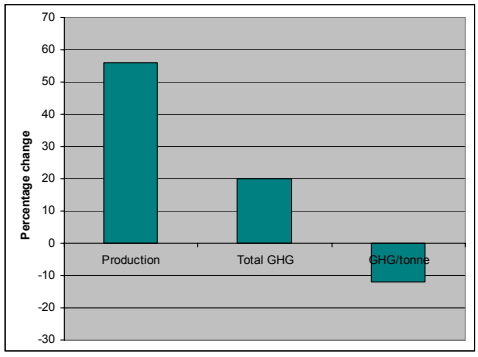
The aluminium industry acknowledged long ago the issue of climate change and took early action to reduce CO2-e emissions. The greenhouse gas intensity of Australian aluminium smelting has fallen sharply over time, reflecting advances in emission controls and investment in efficiency technology. With a production increase of 56% since 1990, the changes in direct emissions per unit of production are impressive. They have fallen from 5.05 tonnes of CO2-e per tonne of metal produced in 1990 to 2.04 tonnes of CO2-e per tonne of metal in 2006. The industry also achieved a 20% reduction in direct CO2-e emissions during 2006.

Total indirect emissions have risen in absolute terms, reflecting growth in purchases of electricity. Importantly, indirect emissions growth has been at a rate below the increase in production demonstrating an improvement in energy efficiency for indirect emissions. Growth in the alumina refining sector has been even higher than in aluminium smelting with a 64% increase in production from 1990 levels. During this period, growth in total industry CO2-e emissions was only 29% higher, representing a 21% improvement in energy efficiency.

Alumina Production & Emissions Efficiency
(1990 – 2006)



Aluminium Production & Emissions Efficiency
(1990 – 2006)



The available data suggest the Australian alumina and aluminium industry is a world-leading performer in energy efficiency and greenhouse gas performance. For example, Alcoa of Australia's Western Australian alumina refineries produce less than half the amount of greenhouse gases per tonne of alumina in comparison to Chinese alumina refineries.

Key Characteristics Comparison 1990 : 2006

Australian Alumina		
	2006	**Variation on 1990**
Production	18.4 Mt	+ 64%
Share of global production	28%	
Alumina export tonnage	14.7 Mt	+ 68%
Alumina export value	$5.99 billion	+ 101%
Total alumina ghg emissions	13.9 $MtCO_{2-e}$	+ 29%
Per unit ghg emissions	0.75 t CO_{2-e}/t	- 21%
Australian Aluminium		
Production	1.94 Mt	+ 56%
Share of global production	5.8%	
Aluminium export tonnage	1.62 Mt	+ 73%
Aluminium export value	$5.46 billion	+ 173%
Total direct ghg emissions	4.0 $MtCO_{2-e}$	- 37%
Per unit direct ghg emissions	2.1 tCO_{2-e}/t	- 59%
Total indirect ghg emissions from electricity	27.4 $MtCO_{2-e}$	+ 37%
Per unit indirect ghg emissions from electricity	14.2 tCO_{2-e}/t	- 12%
Total indirect ghg emissions from alumina	2.9 $MtCO_{2-e}$	+ 23%
Per unit indirect ghg emissions from alumina	1.5 tCO_{2-e}/t	- 21%
Total aluminium ghg emissions	31.4$MtCO_{2-e}$	+ 20%

Source: Australian Aluminium Council Sustainability Report 2006. Note: In the Report, indirect emissions from the alumina consumed in the smelting process are not included to avoid double counting these emissions.

Alcoa also continues to find innovative technologies that can contribute to climate change solutions. For example, Alcoa and Alinta Limited are partnering to build greenhouse friendly cogeneration power plants at our refineries in Western Australia. The plants produce

electricity and steam from natural gas, delivering substantial greenhouse efficiency benefits.

Cogeneration plants at Alcoa's Pinjarra and Wagerup refineries can save over 1.8 million tonnes of greenhouse emissions each year compared to coal-fired plants. This is equivalent to taking 450,000 cars off the road in Australia – a significant greenhouse benefit.

Alcoa has developed new carbon capture technology that uses waste CO_2 to treat bauxite residue. Bauxite residue is produced by alumina refineries and currently requires long term storage. This new process delivers significant greenhouse benefits by permanently locking up CO_2 that is otherwise released into the atmosphere.

Alcoa's first residue carbonation plant is operating at Alcoa's Kwinana refinery in Western Australia and uses waste CO_2 from a nearby ammonia plant. Eventual deployment across Alcoa's operations in Australia alone could save up to 300,000 tonnes of CO_2 each year. The company will also deploy the technology to its refineries across the globe when practical.

3. The positive role of aluminium

Aluminium's lifecycle properties provide significant climate change management benefits through recycling and light weighting, particularly the increased use of aluminium in transport. Aluminium is almost endlessly recyclable and recycling saves around 95% of the energy it would take to make new metal. These advantages have resulted in nearly three quarters of all aluminium ever made since 1886 remaining in use today. Alcoa is the largest recycler of aluminium in Australia and recycles around 70,000 tonnes of aluminium at our remelting facility in Yennora, NSW. Globally, Alcoa utilises about 20% of recycled metal for fabricated products and is working to increase this to 50%.

The use of aluminium in transport provides significant lifecycle benefits from improved performance, fuel efficiency and lower greenhouse emissions. For example, every kilogram of aluminium used in a car potentially saves a net 20kilograms of greenhouse gas emissions over the life of the car – because of the lightweight property of aluminium. Approximately every 10% reduction in weight produces 6% to 8% in fuel savings, with a consequent reduction in the vehicle's greenhouse gas emissions. A life cycle study

demonstrated that the use of aluminium in passenger cars manufactured in 2006 will lead to potential global savings of around 140 million tonnes of CO_2-e emissions.

Recycling and the use of aluminium in transport can make aluminium climate neutral by 2020.

4. Trade Exposed Energy Intensive Industries

Government has recognised the potential for climate change response to have disproportionate impacts on energy intensive trade exposed industries, such as the Australian aluminium industry. In the lead up to the 2007 federal election the document "Labor's Plan for a Stronger Resources Sector" committed the Rudd Government to:-

- "Ensure that Australia's international competitiveness is not compromised by the introduction of emissions trading" and
- "Establish specific mechanisms to ensure that Australian operations of emissions intensive trade exposed firms are not disadvantaged by emissions trading."

These policy positions are driven by two converging desires; to ensure Australia's international competitiveness is not jeopardised and to ensure carbon leakage to other countries does not result from Australian climate change policy response.

An NRET poses the same challenges for the energy intensive trade exposed sector. It is a potentially significant increase in power cost that cannot be passed on to customers and which is not imposed on key competitors and, as such, may have unsustainable cost impacts on some industries. For example, at a price premium of AU$57/REC a mandatory 20% NRET would expose the Australian aluminium smelting industry to a cost increase of over $300 Million per annum – none of which could be passed onto customers in the absence of a comparable impost on international competitors.

Such a cost increase, in the absence of global parity would inevitably lead to a series of events that would be counter to Australia's economic, environmental and social interests. Disproportionate cost increases of the order described above would quickly damage the prospect of growth in the Australian aluminium smelting industry – this in itself would result in carbon leakage as the shortfall is taken up by low cost centres in Asia, Africa and Latin America. Depending on the level of cost increase exposure the situation would also

prejudice sustaining capital investment eventually leading to site closures and associated job losses while further exacerbating carbon leakage.

The government's ability to manage carbon leakage is made more complex if energy intensive, trade exposed industries are exposed to two market based measures (the Carbon Pollution Reduction Scheme and NRET), increasing the risk that carbon and jobs leakage will occur.

A recent study undertaken by the Per Capita group (for the Australian Workers Union) (Hetherington 2008) investigated the social value of jobs in the Australian aluminium industry. Amongst other things the study found:

- The value of an aluminium job considerably exceeds its nominal wage and includes health, justice system and social capital benefits;
- An aluminium industry job generates a total value to the community of over $89,000 p.a.;
- Around $25,000 of this $89,000 is of social or public value

The Per Capita report also emphasised the regional nature of the Australian aluminium industry and the towns that rely on the sector. Australia hosts seven alumina refineries and six aluminium smelters with aluminium employees contributing up to 29% of local town employees. Considering flow-on and value adding effects the real contribution to direct and indirect employment would rise to well above this figure.

Exemption of the most energy intensive trade exposed industry sectors from the NRET (as has been incorporated in the Victorian scheme) should be a transitional measure implemented in the absence of comparable imposts in key competitor countries. This is required to ensure carbon leakage, job losses and substantial social impacts are not a consequence of Australian climate change policy.

5. Other specific design considerations

All Renewable Energy schemes should be brought under a single national scheme (as proposed) and be phased out by 2025. This would allow current investors to recover costs. Beyond that date the impact of the Carbon Pollution Reduction Scheme on power prices should provide the price signal for investment for renewable energy investment.

On the basis that Renewable Energy policy is designed to reduce emissions, current eligibility under MRET should be maintained. Artificial eligibility barriers that bias one technology over another on the basis of perception rather than emissions reduction should be avoided.

Banking should be allowed on the basis that it reduces the risk for investment both in terms of using current certificates for future periods and stabilises forward markets.

Project eligibility periods and existing generators – all projects eligible under current renewable legislation should be eligible for the term of the scheme to 2025. Artificial eligibility criteria and periods only add to the increasing perception of the inherent sovereign risk under NRET.

References

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Hetherington (2008). The Full-Cost Economics of Climate Change Aluminium: A Case Study by David Hetherington Executive Director, Per Capita July 2008