

The European Emission Trading and the Aluminium sector

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IEA Workshop Paris, September 2005

omer · development · empennage · agriculture · responsibility · connections · recycling · scaffolding · service · alcoa foundation · capping · commercial built
s · distribution · industrial services · environment · alcoa business system
s · end products · pipe · health · communication · hardcase · façades
performance · cabling · seatings · graphics · automotive · construction
beverage · cars · accomplishments · moulds · closures · building · CDs
is · engines · computer · people · actions · doors · cable wrap · homes
velopment · lighting · telecommunications · excellence · surrounds
unshades · fastening · profitability · success · insulations · ventilators
· shareholder value · cornices · forging · accountability · structures
afety · fuselage · specialty metals · metals · solutions · community · ramps · roofing · design · transportation · integrity · cans · beverage · cars · accomplishments



ALCOA

In the business of being the best.

shutters · growth · teams · engines · computer · people · actions · doors
plastics · sheet · floors · consumer · energy · trays · wheels · architecture
wings · trucks · aerospace · tube · vans · tables · foil · film · cups · cable
confectionery · ownership · frames · engineering · equal opportunities
ships · cosmetics · leisure · customer · development · empennage · agr
cable
owne
frame

Aluminium and ETS

- **Is the European ETS achieving its goals ??**
- **Is it impacting sectors not included in the Directive ??**
- **What is the best way of including other sectors ??**

Aluminium Offers...

Innovative products



Innovative processes



While contributing to a sustainable progress !

How aluminium is made

First Bauxite extraction (Guinea Boké)



refractories - ownership - frames -
development - lighting - telecommunications
shades - fastening - profitability - success - insulation - ventilators - pharmaceuticals - furniture - innovation - spacetrains - end products - pipe - health - communication - hardware - facades
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foundations - capping - commercial building
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wings - trucks - aerospace - tube - vans - tables - foil - film - cups - cable
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frames
In the business of being the best.

Mining and reforestation



reflections - ownership - frame
 development - lighting - basecoat
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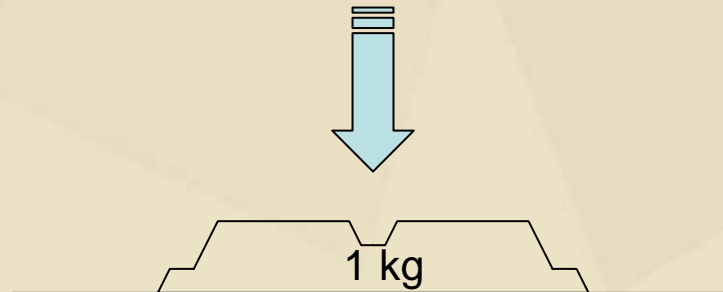
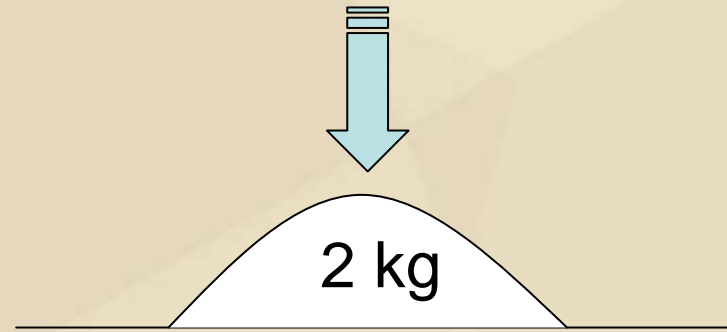
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How aluminium is made

Bauxite



Alumina



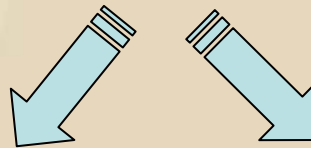
How aluminium is made

Second, Alumina production (San Ciprián)



How aluminium is made

Bauxite



Alumina



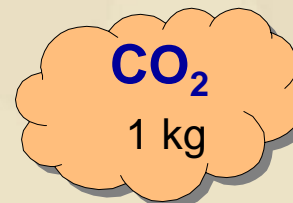
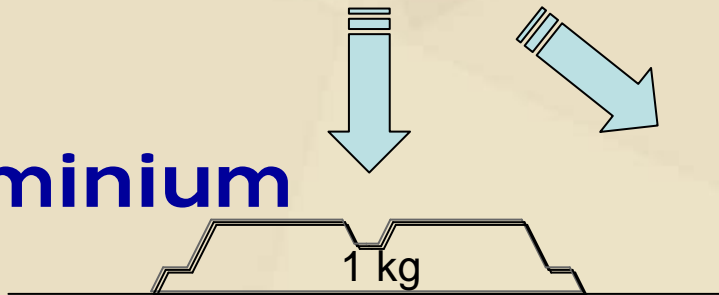
mud



water



Aluminium



How aluminium is made

Third, Aluminium smelting (Porto Vesme)



reflexion - ownership - frames - engine
development - lighting - base - insurance -
trades - fastening - profitability - success -
shareholder value - cosmetics - tagging - accountability - structure - primary aluminum - commitment - cladding - food - performance - cabling - seating - graphics - automotive - construction
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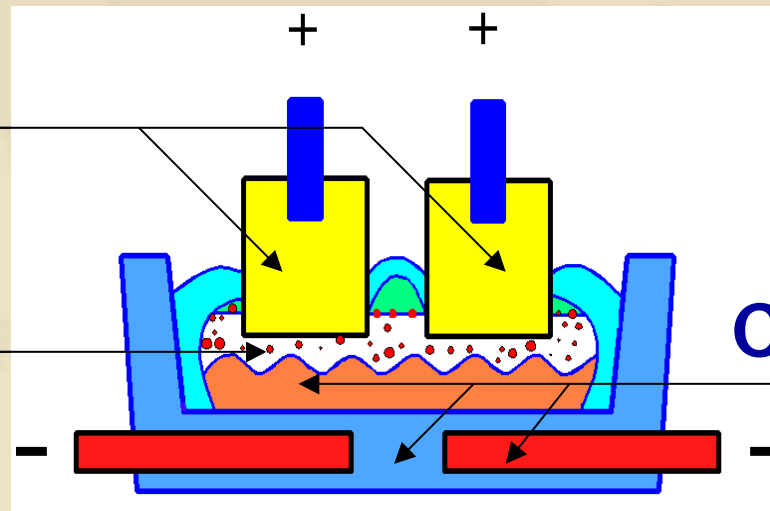
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owner
frames
In the business of being the best.

How aluminium is made

- **Electrolytical process, Hall Héroult (early '900):**

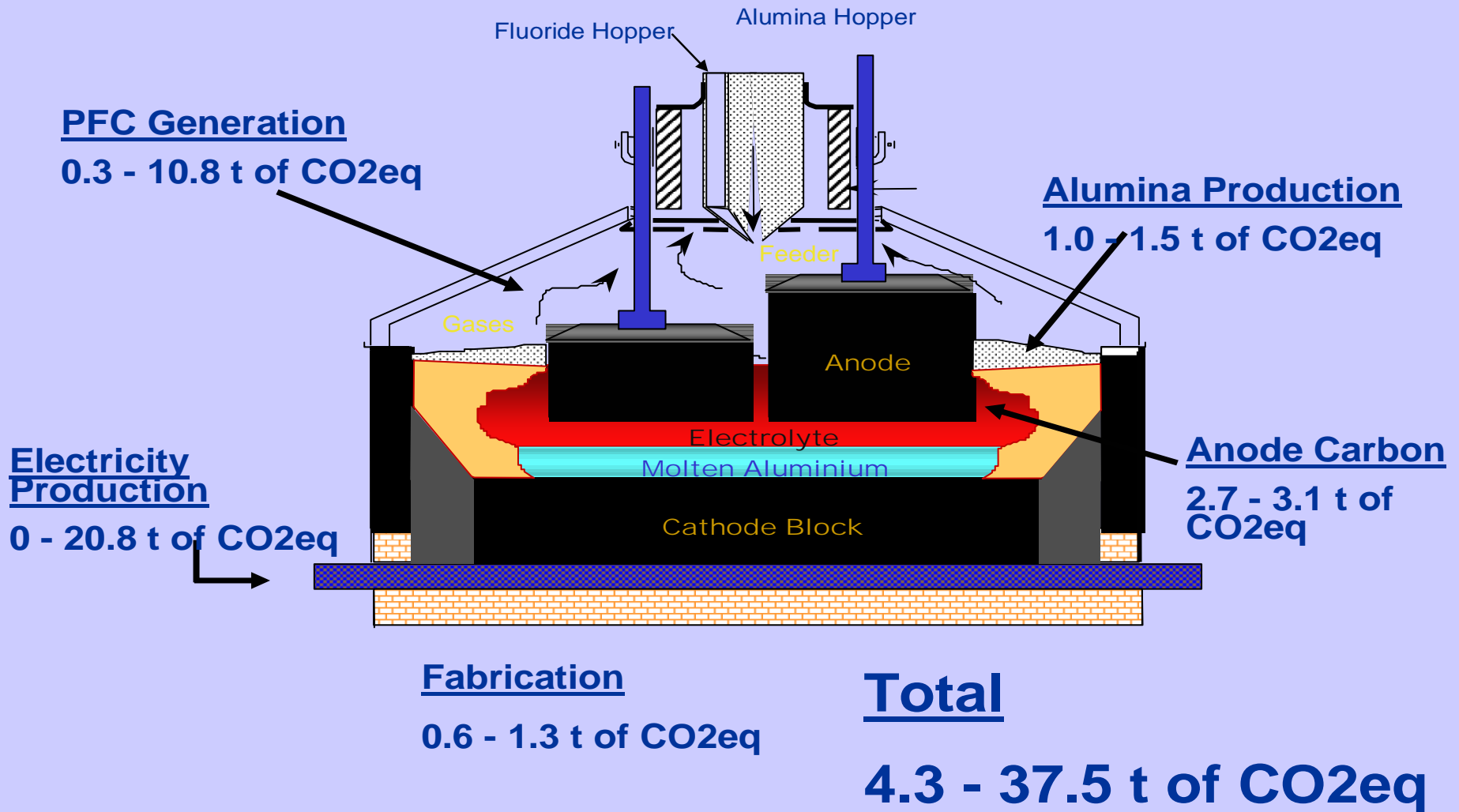
Anodes

Bath



Cathode

GHG Emission Sources



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retailer value - complex - logging - accountability - structural - primary aluminum - commensal - claddings - food - performance - coating - sealings - graphics - automotive - construction - fuelage - specialty metals - metals - solutions - community - ramps - roofing - design - transportation - integrity - cars - beverage - cans - accomplishment - moulds - closures - building - CD - big - flats - windows - packaging - medical - wraps - sports - casting - mechanics - supports - shufflers - growth - lears - engines - computer - people - filters - door - cable wrap - homes - y - connectors - recycling - scaffolding - service - flood foundation - cupping - commercial buildings - automotive development - lighting - telecommunications - experience - surround - ie - problem solving - fastening systems - distribution - industrial services - environment - data business system - rail - suntrades - fastening - profitability - success - insulation - ventilation - cable - furniture - innovation - spacetrains - end products - pipe - health - communication - hardware - facades - sensors - shareholder value - complex - logging - accountability - structures - i - commitment - claddings - food - performance - coating - sealings - graphics - automotive - construction - results - safety - fuelage - specialty metals - metals - solutions - community - ramps - roofing - design - transportation - integrity - cars - beverage - cans - accomplishment

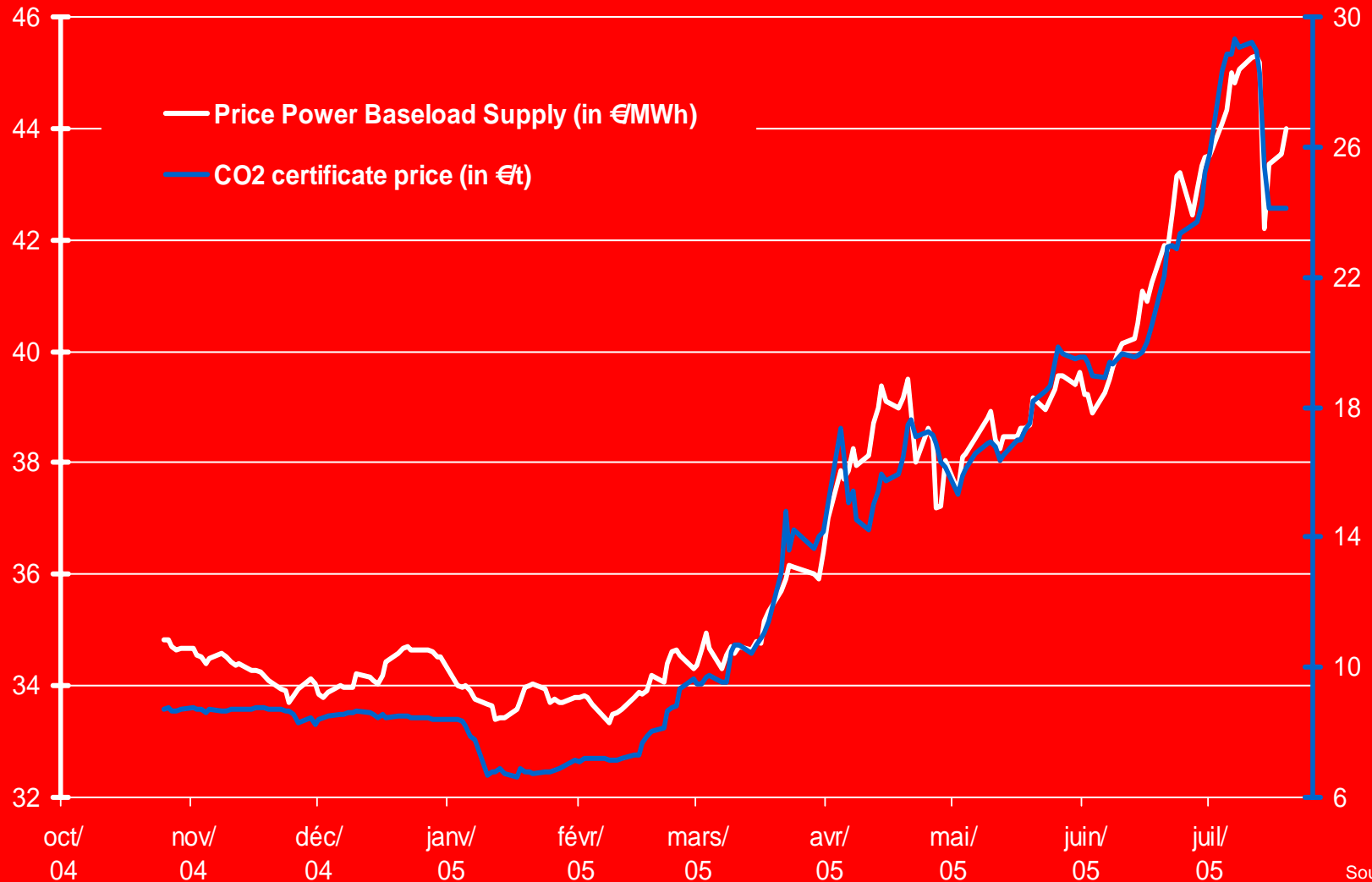
Aluminium and ETS

- **As all non-ferrous metals, Alu currently not included in European ETS, but affected by indirect cost**
- **Can be considered a good “leading indicator”**
- **Aluminium smelting is the most electricity intensive industrial process; 15 kW/hrs needed per kilo of aluminium; 5 kW/hrs for zinc**
- **Electricity represents up to 40% of production costs**
- **Global commodity submitted to strong competitive pressure – no passing on of costs**



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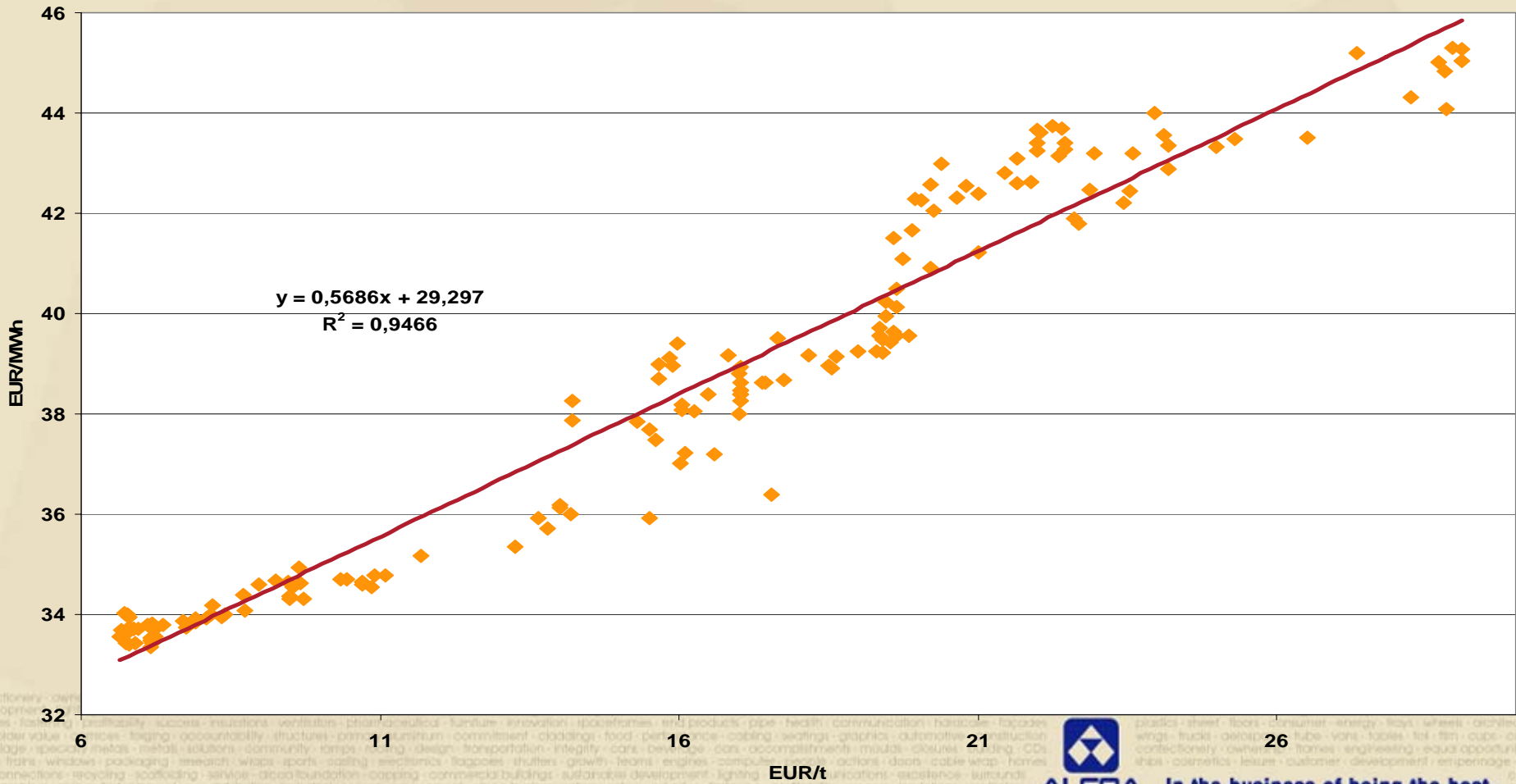
CO₂ certificate trade increases power price, despite free of charge allocation



Source: EEX / VIK

Very Strong Correlation - 95%

Regression analysis between EEX Cal 2006 and ETS

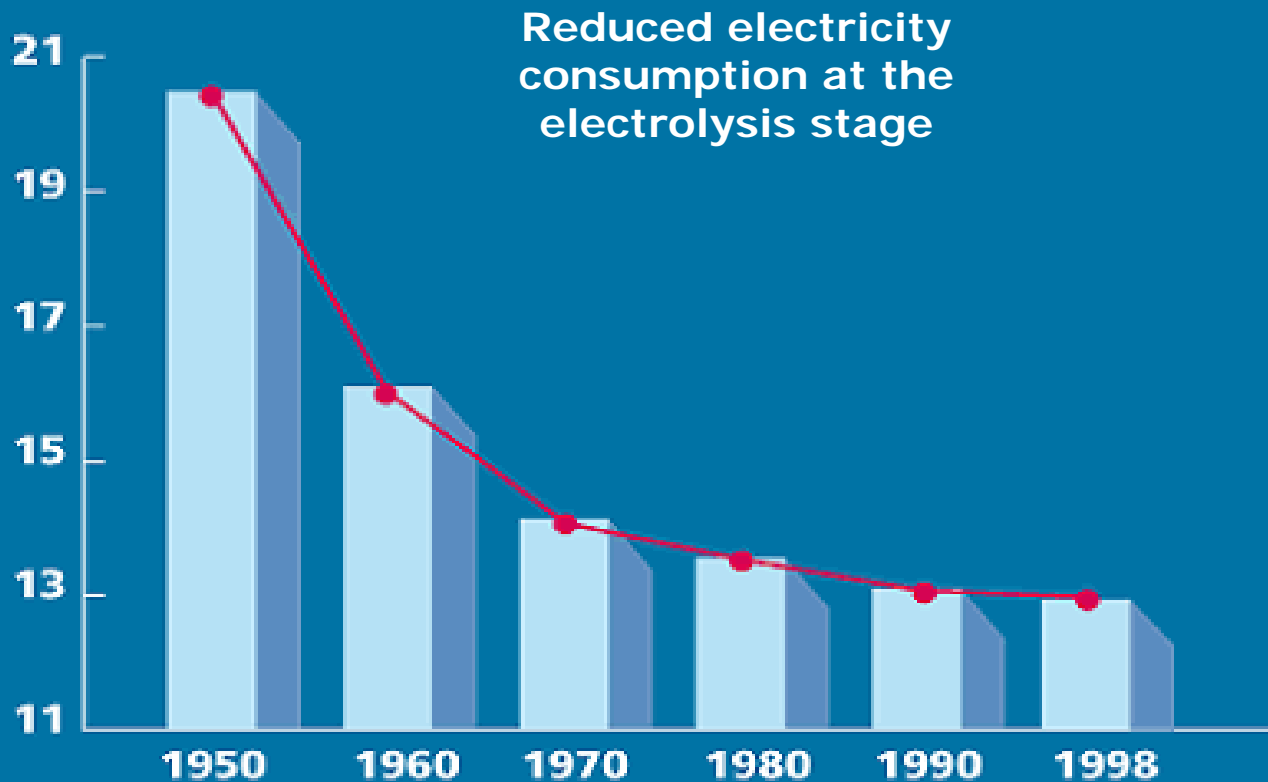


The Aluminium Industry has identified 3 main paths to reduce its Climate Change Impact

1. Reducing emissions per ton of primary metal produced through:
 - a) investment in modern technology;
 - b) attention to good operating practices.
2. Maximising the potential for aluminium recycling.
3. Encouraging applications of aluminium in transport which reduce weight and GHG emissions from transport, a sector responsible for a third of GHG emissions globally.

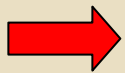
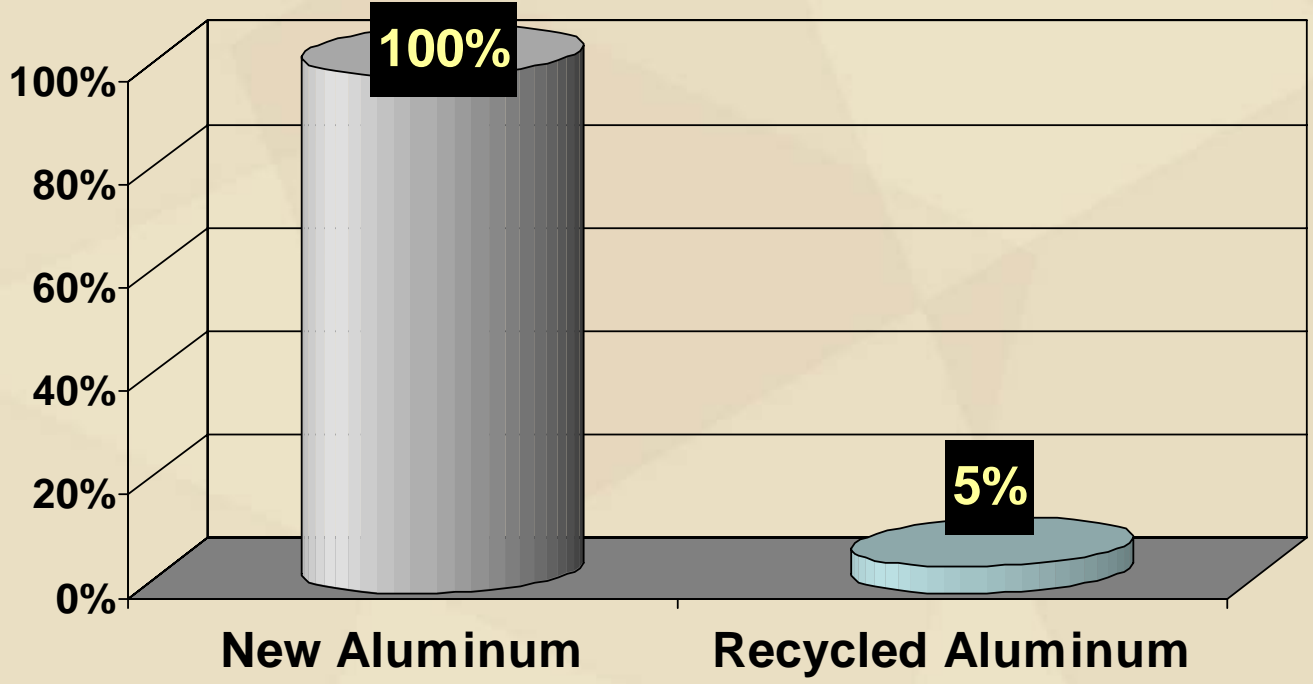
1) Significant Reduction of Electricity Consumption for Smelters

kWh per kg of aluminium



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2) Aluminium Recycling

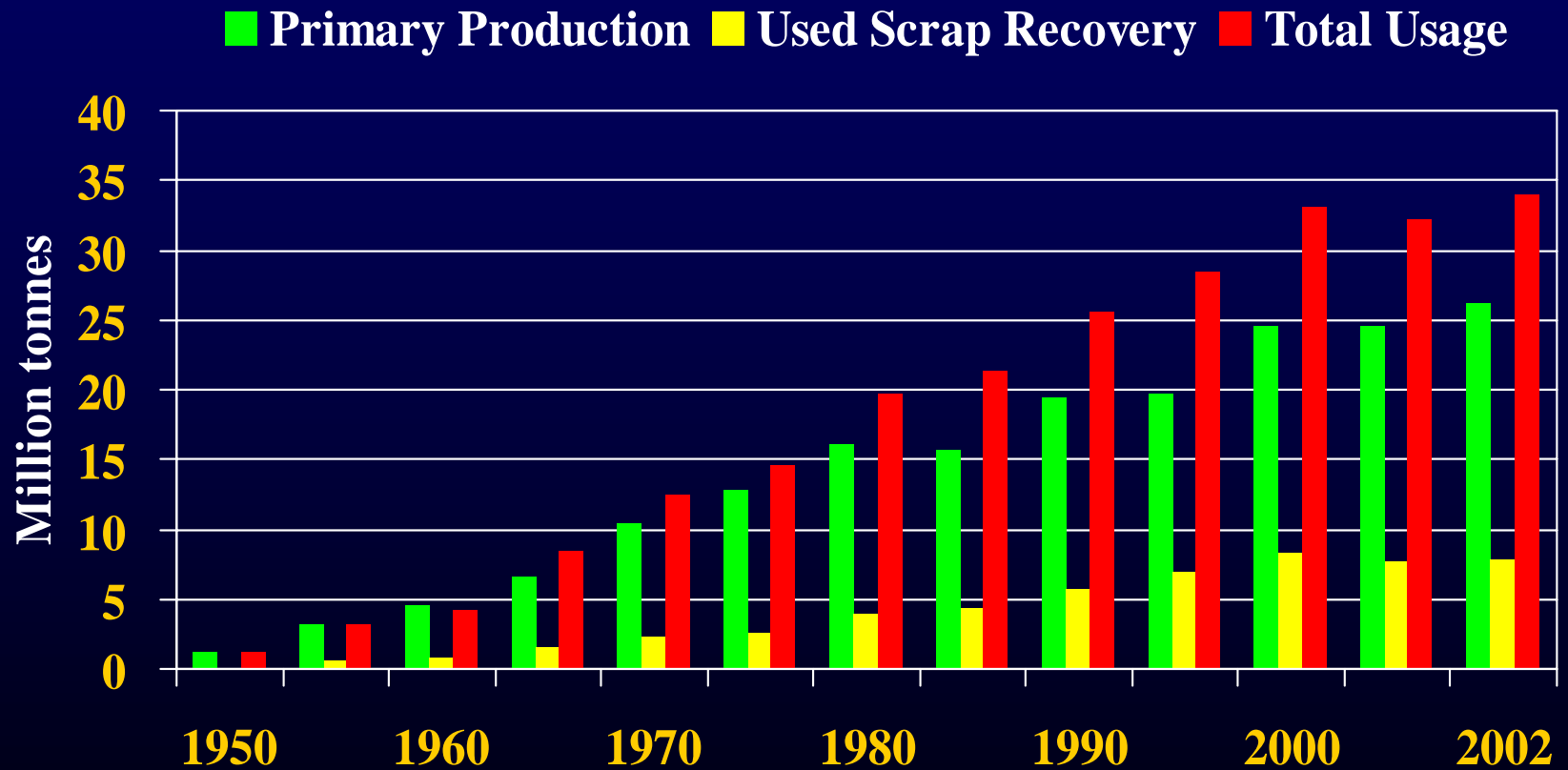


Recycling only needs 5% of the energy



Recycling emits 95 % less greenhouse gases

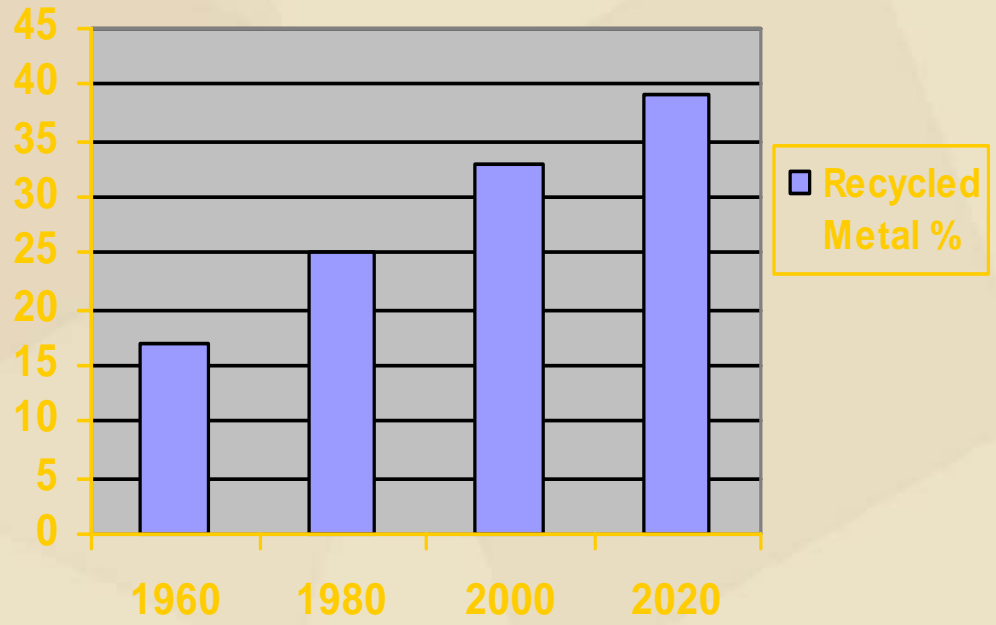
World aluminium usage and recycling 1950-2002



Global Aluminium Supply Mix

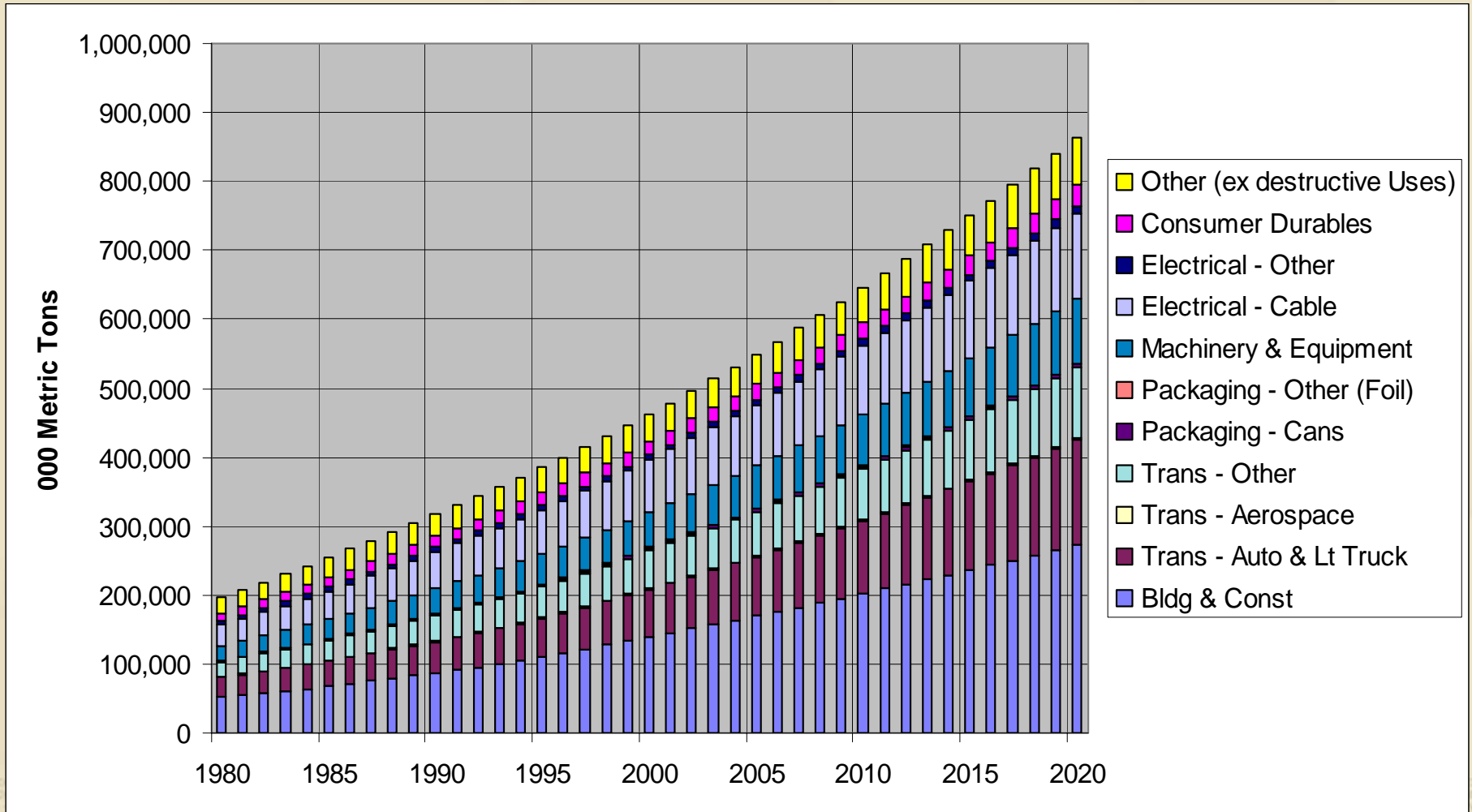
Modeling indicates that the industry's average metal supply from old & new scrap:

- has increased from 17% in 1960 to over 33% today;
- is predicted to increase to 39% by 2020.



% Old & New Scrap to Total Metal Consumed

Global Product Inventory by Market



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3 – Aluminium in Transport



A380 – New Solutions for a Super-sized Aircraft



New alloys and solutions for very large parts

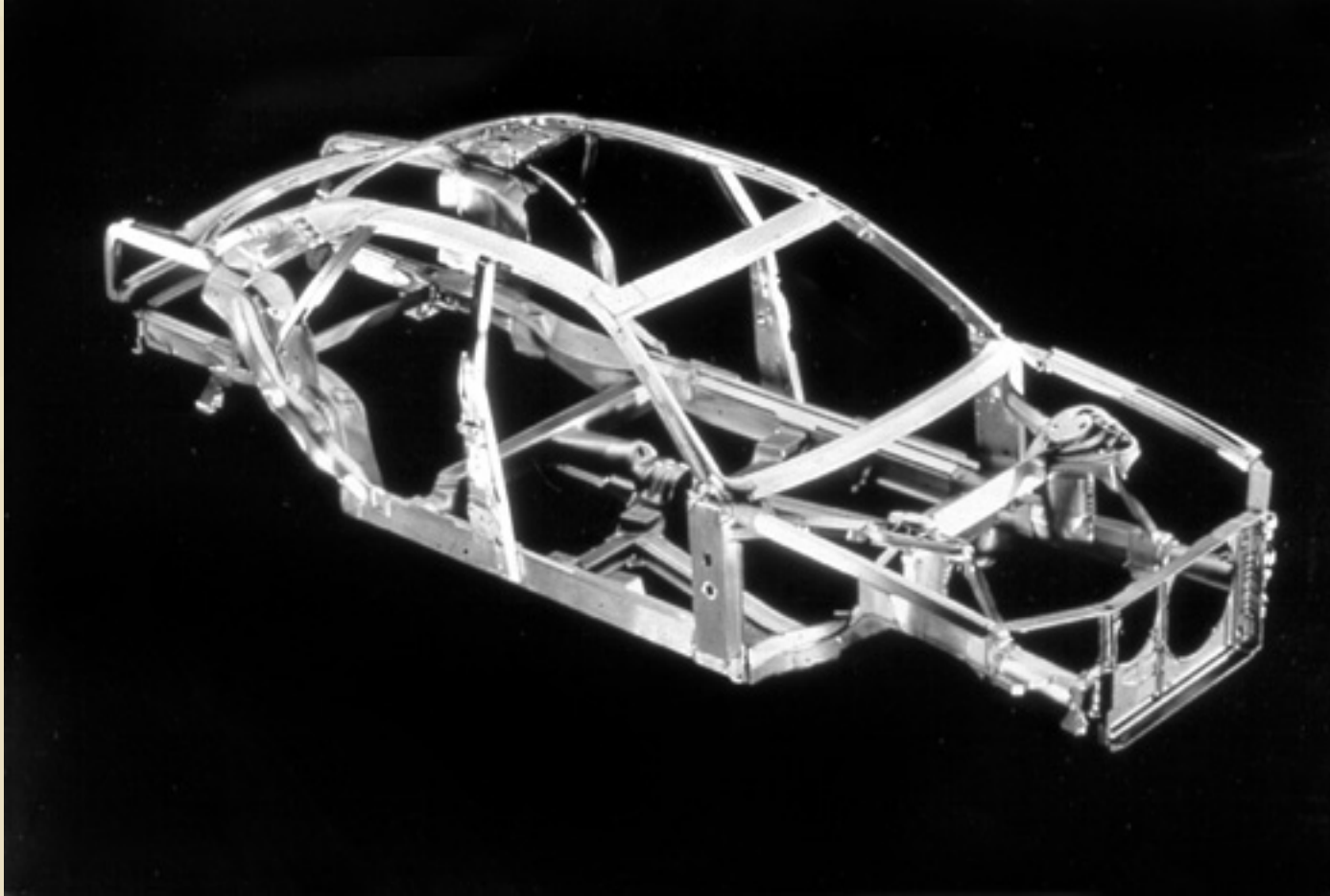


Europe's New Generation of Mass Transport



directors
 development
 modes - fastening - profitability - success - insulation - ventilators - pharmaceuticals - furniture - innovation - spacetrains - end products - pipe - health - communication - hardware - facades
 shareholder value - composites - forging - accountability - structures - primary aluminum - commitment - claddings - food - performance - coating - sealings - graphics - automotive - construction
 fuelage - specialty metals - metals - solutions - community - ramps - roofing - design - transportation - integrity - cars - beverage - cans - accomplishment - moulds - closures - building - CDs
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Moving towards the all-alu car



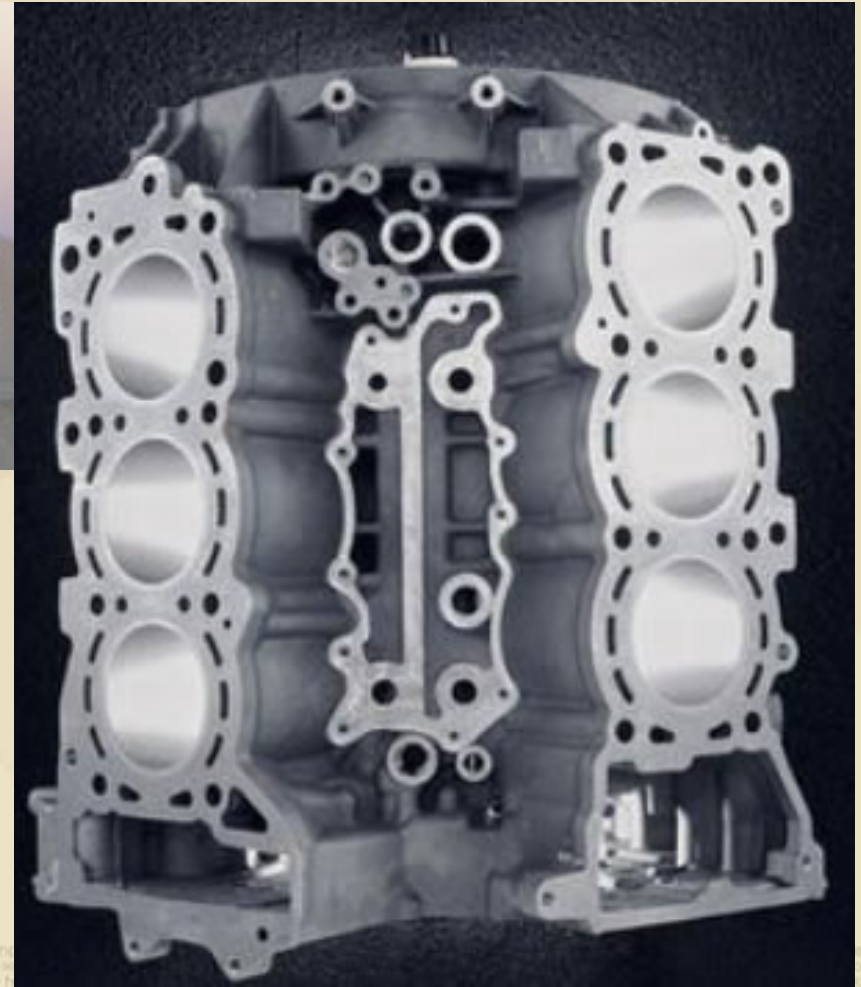
The Audi A8 Spaceframe



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reflexology - ownership - frames - engineering - equal opportunities - outsourcing - ships - cosmetics - leisure - customer - development - emperance - agriculture - responsibility - connections - recycling - scaffolding - service - alcohol foundation - capping - commercial build - development - lighting - telecommunications - excellence - surrounds - horizontal - shuffles - growth - teams - engines - computer - people - actions - doors - plastics - sheet - floors - consumer - energy - trays - wheels - architecture - modes - fastening - profitability - success - insulation - ventilators - pharmaceutical - wings - trucks - aerospace - tube - vans - tables - hot - film - cups - cable - shareholder value - comics - testing - accountability - structural - primary air - design - transportation - integrity - cars - beverage - cars - accomplishment - off - moulds - closures - building - cars - luggage - specialty metals - metals - solutions - community - ramps - roofing - design - transportation - integrity - cars - beverage - cars - accomplishment - off - moulds - closures - building - cars - rige - frame - windows - packaging - medical - wraps - sports - casting - electronics - supports - shuffles - growth - teams - engines - computer - people - actions - doors - cable wrap - homes - y - connectors - recycling - scaffolding - service - alcohol foundation - capping - commercial building - automobile development - lighting - telecommunications - excellence - surrounds - ble - problem solving - fastening systems - distribution - industrial services - environment - data business system - rals - sunrideres - fastening - profitability - success - insulation - ventilators - i - furniture - innovation - spacetrains - end products - pipe - health - communication - hardware - facades - extrusion - shareholder value - comics - testing - accountability - structures - n - commitment - clothing - food - performance - casting - heating - graphics - automotive - construction - results - safety - luggage - specialty metals - metals - solutions - community - ramps - roofing - design - transportation - integrity - cars - beverage - cars - accomplishment

Innovative breakthrough to support dieselization



Light Weighting for Performance and Energy Saving

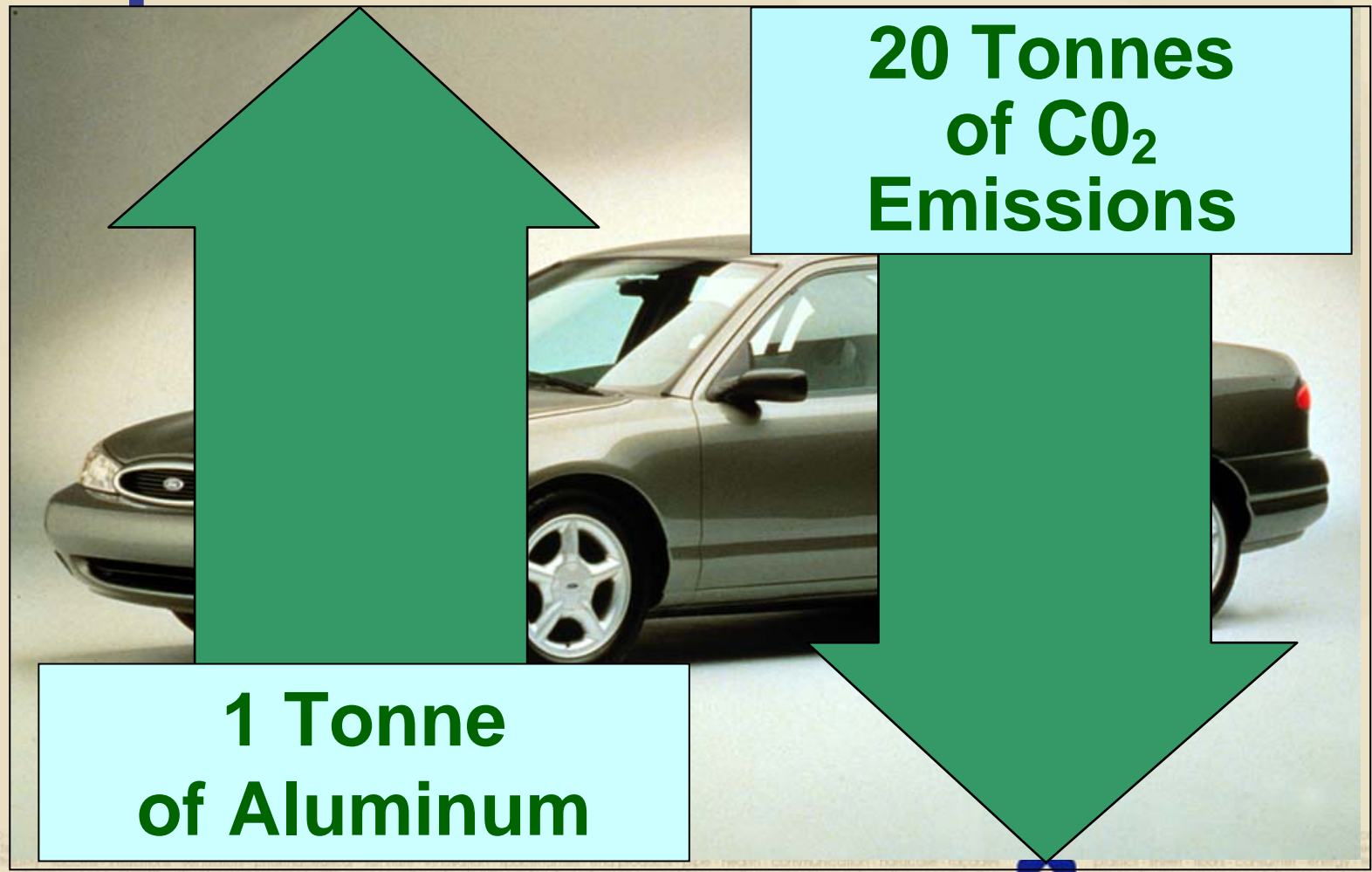


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 able - owner - frames



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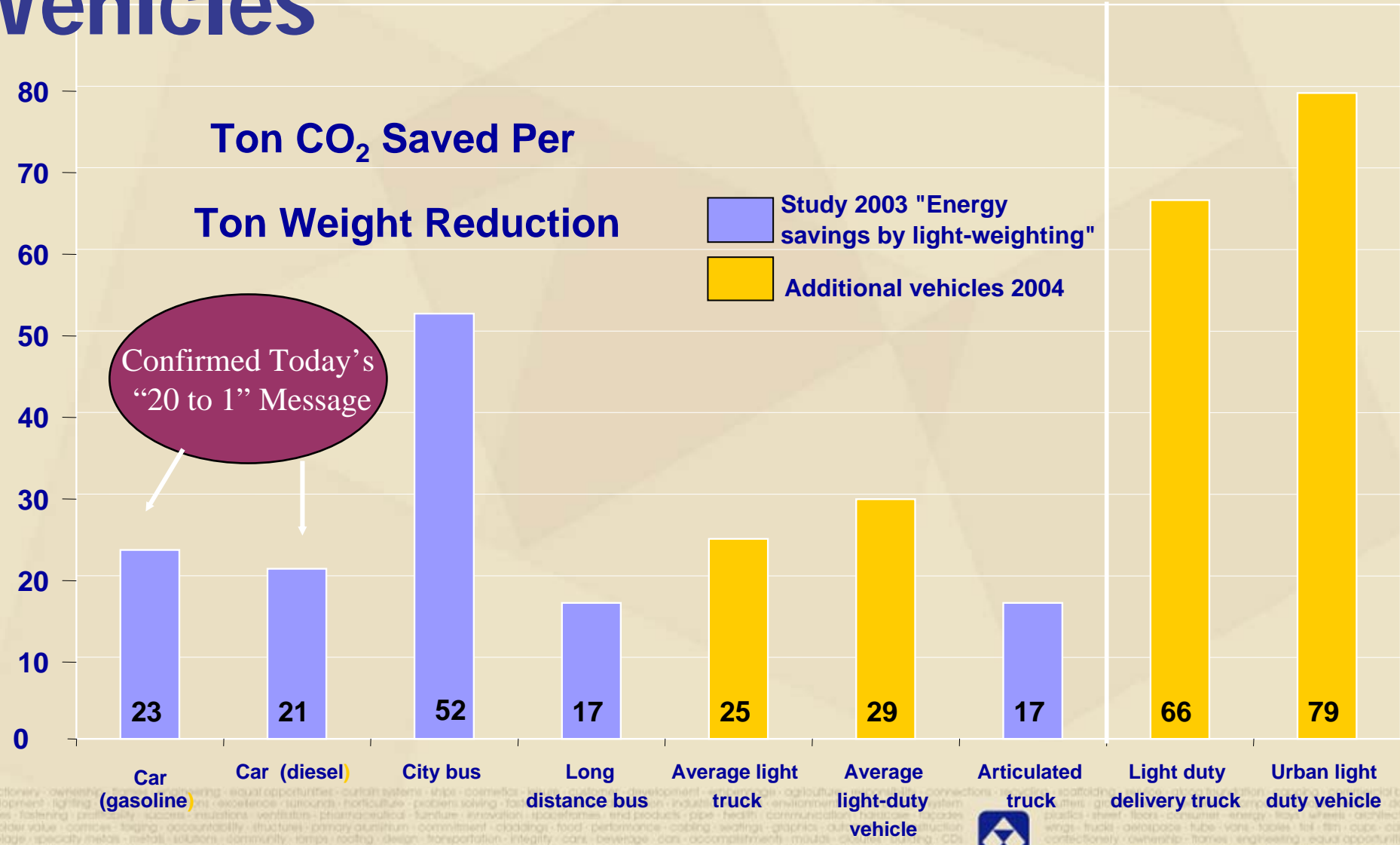
Aluminium Light-weighting: Impact on CO2 Emissions



**1 Tonne
of Aluminum**

**20 Tonnes
of CO₂
Emissions**

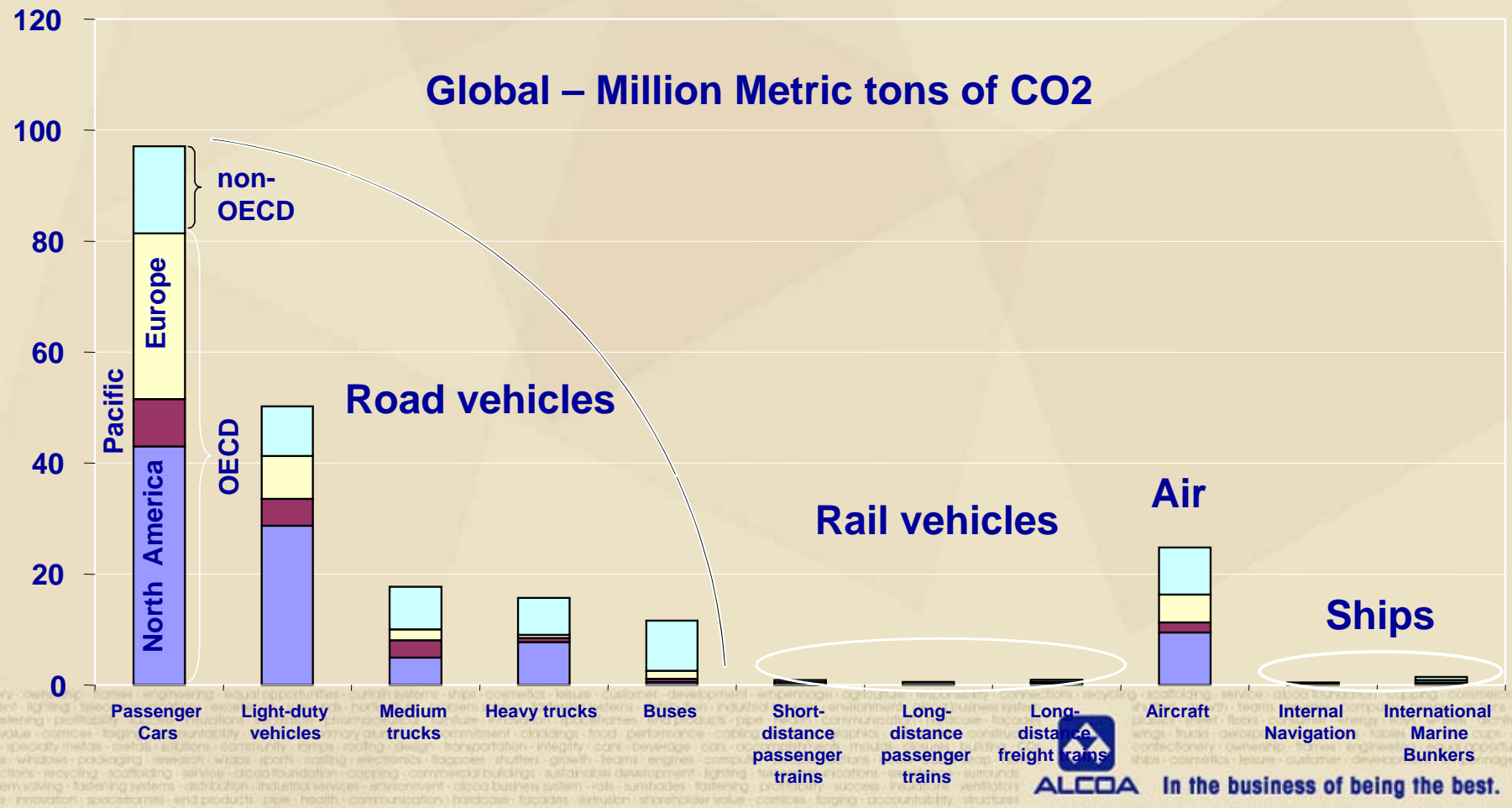
Life-time CO₂ Savings for Road Vehicles



Light duty commercial delivery vehicles show highest relative savings



Total CO₂ Savings Potential by Transport Market

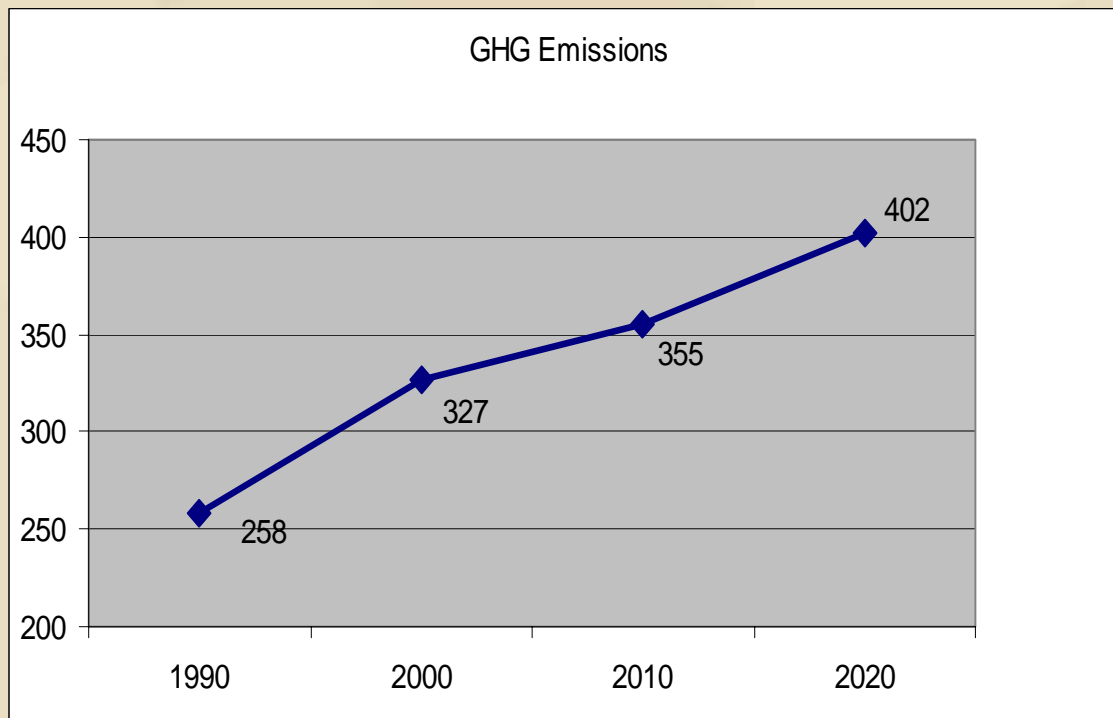


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In summary

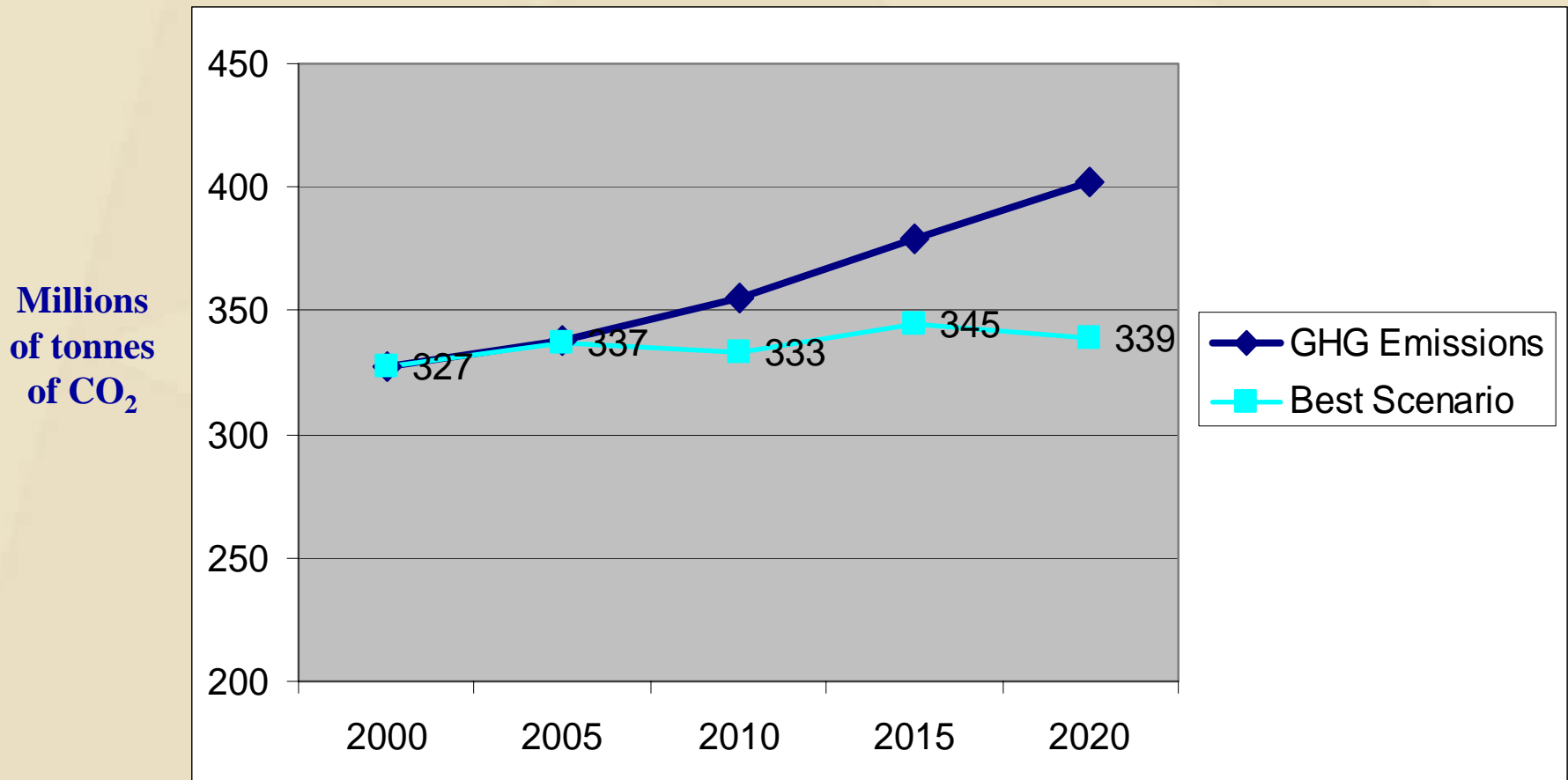
Despite emission reductions, total emissions would still increase due to growth in production

Millions of tons of CO₂



Aluminum Production

Movement to "Today's Best Practice"



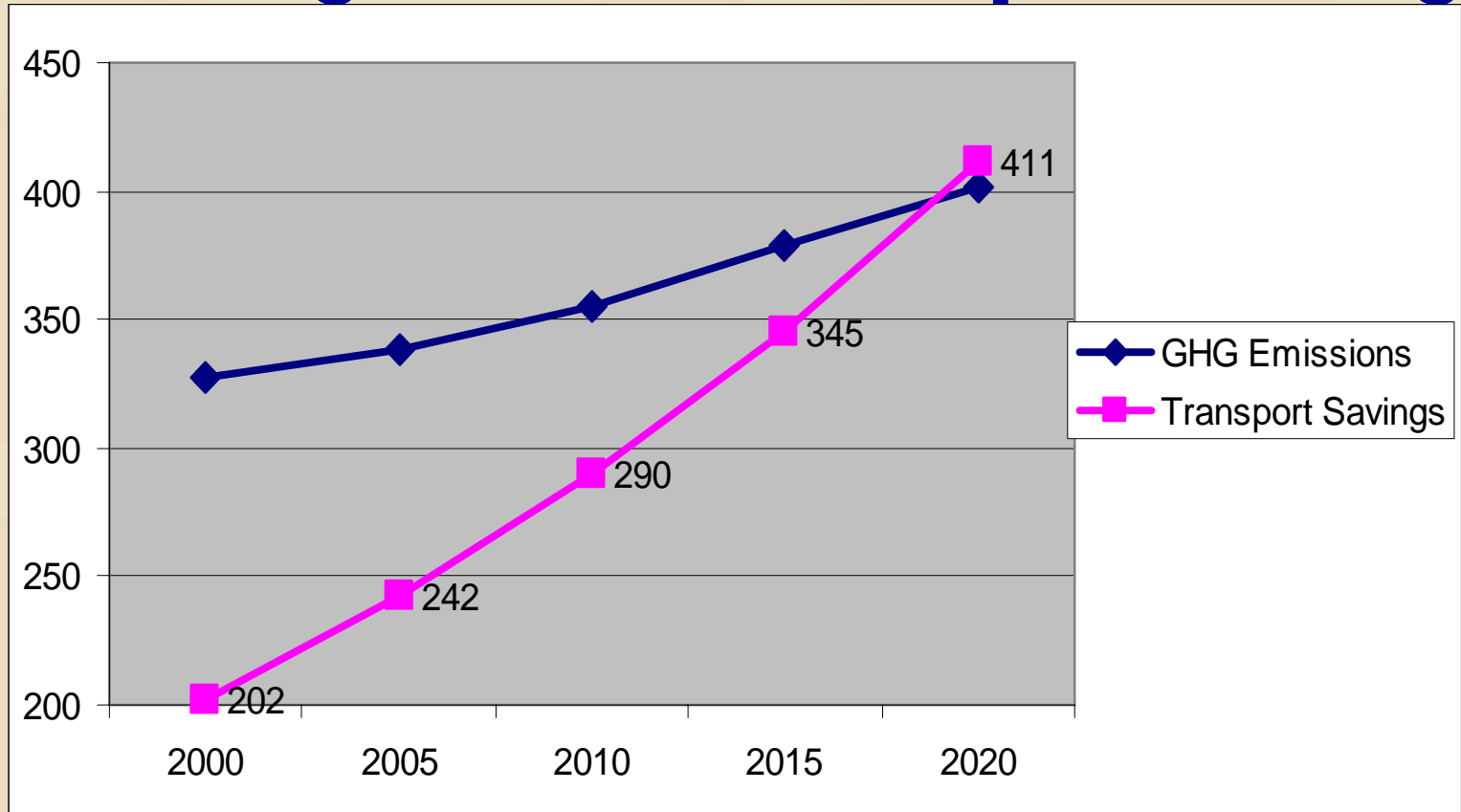
Full Industry Adoption of "Today's Best Practice" Could Stabilize Growth of Global Production GHG Emissions



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Potential Magnitude of Transport Savings

Millions
of tons
of CO₂-e



**Potential Emissions Savings From Transport Growing Faster
than AI Production Emissions**

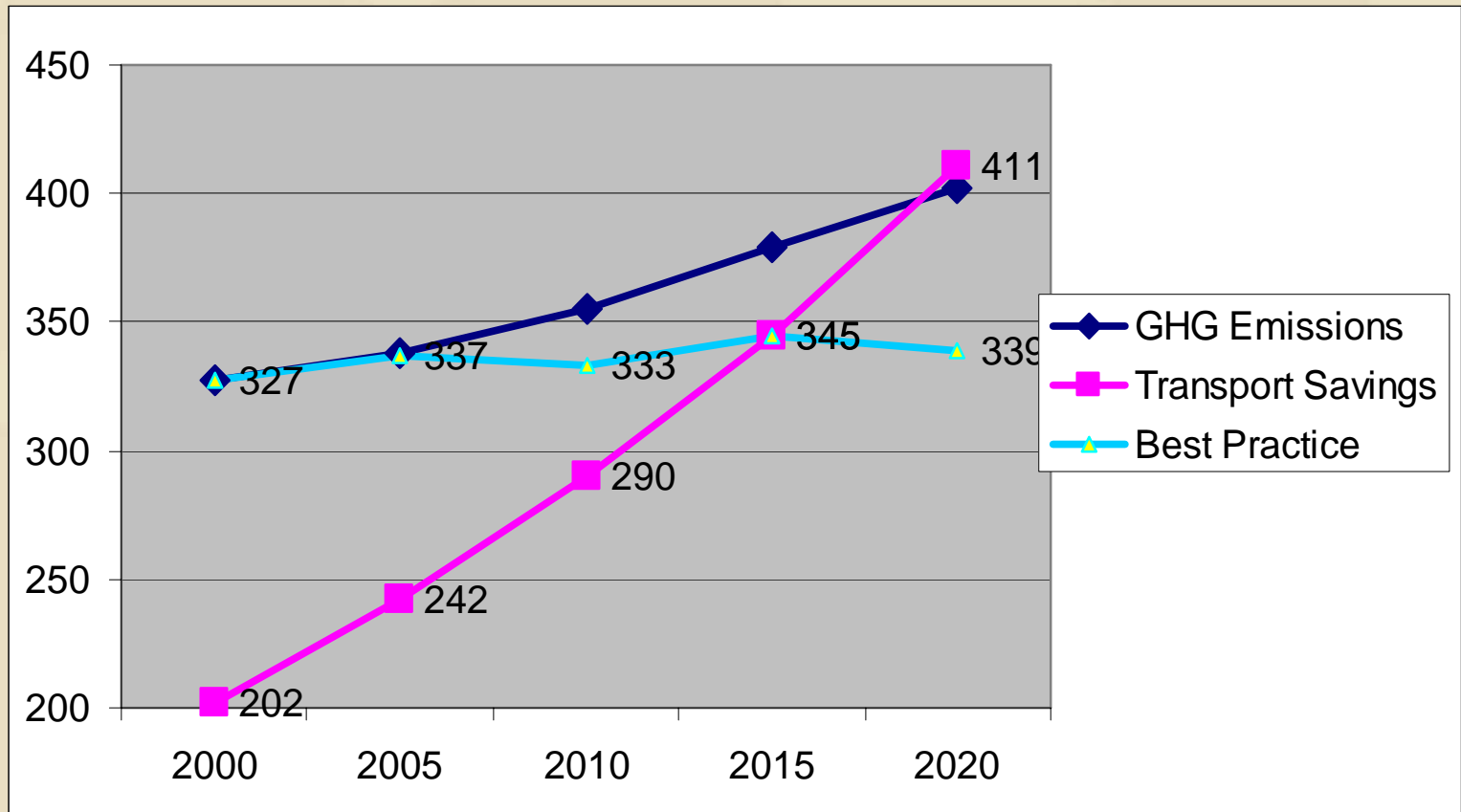
Potential for AI Industry to be "Climate Neutral" By 2020



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Best Practice and Transport Savings

Millions
of tons
of CO₂-e



Potential for AI Industry to be "Climate Neutral" By 2015 by accelerating movement toward today's best practice



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The STORY!

The Aluminium Industry may be able to demonstrate, on the basis of GHGs, that the net impact on society of the use of aluminum as a material is a positive contribution to the challenge of Global Climate Change.

The Aluminium Industry and the European ETS

1. **Climate Change can only be resolved globally:**
 - a) **Not by delocalising industry away from Europe;**
 - b) **Global sector approach.**
2. **Maximising the recovery for aluminium recycling.**
3. **Encouraging the use of aluminium in transport, a sector responsible for a third of GHG emissions globally.**

The Aluminium Industry and the European ETS revision

1. Solve the non-functioning of the Electricity market
2. Before adding new sectors:
 - a) must evaluate cost of abatement;
 - b) Must evaluate capability to pass along costs.
3. Include all gases.
4. Eliminate distortions and harmonise definitions.