

# 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 build  
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



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# 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!



ALCMA

# How aluminium is made

## First Bauxite extraction (Guinea Boké)



refractory - ownership - frames -  
development - lighting - telecommunications  
shades - fastening - profitability - success - insulation - ventilation - pharmaceuticals - furniture - innovation - spaceframes - end products - pipe - health - communication - hardware - facades  
enhancer value - cosmetics - tagging - accountability - structure - primary aluminium - commitment - claddings - food - performance - cabling - sealings - graphics - automotive - construction  
fuelage - specialty metals - metals - solutions - community - ramps - roofing - design - transportation - integrity - cars - beverage - cans - accomplishment - moulds - leisure - building - CDs  
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n - commitment - claddings - food - performance - cabling - sealings - graphics - automotive - construction - results - safety - fuelage - specialty metals - metals - solutions - community - ramps - roofing - design - transportation - integrity - cars - beverage - cans - accomplishment



undation - capping - commercial build  
s - 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  
shis - cosmetics - leisure - customer - development - remittance - agiti  
epile  
owner  
frames

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# Mining and reforestation



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# How aluminium is made

Bauxite

4 kg

Alumina

2 kg

1 kg

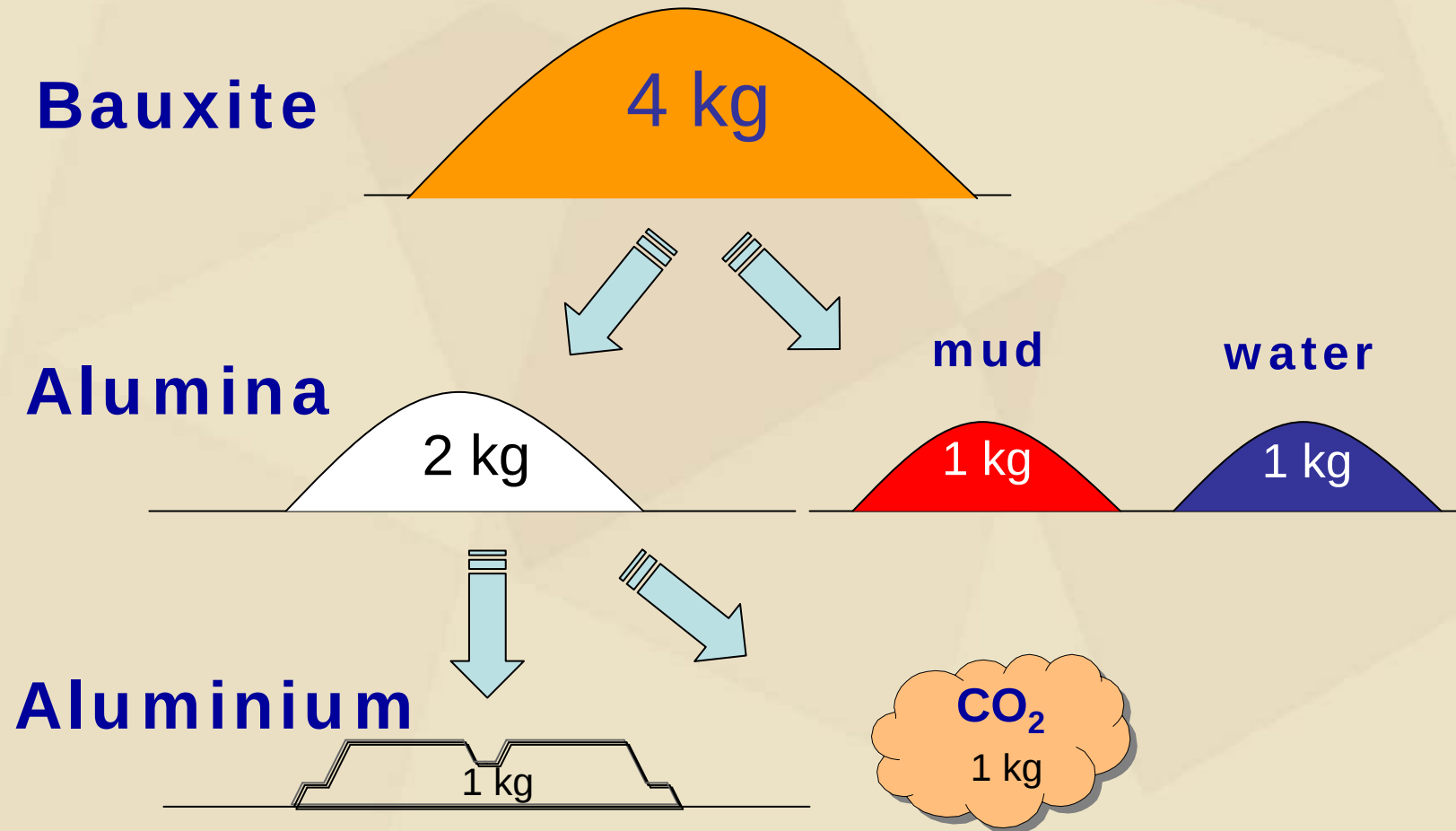
# How aluminium is made

## Second, Alumina production (San Ciprián)



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# How aluminium is made



# How aluminium is made

## Third, Aluminium smelting (Porto Vesme)



refractory - ownership - frames - engine  
development - lighting - telecommunications  
trades - fastening - profitability - success -  
shareholder value - cosmetics - tagging - accountability - structure - primary aluminium - commitment - claddings - food - performance - cabling - seating - graphics - automotive - construction

ings - trucks - aerospace - tube - vans - tables - foil - film - cups - cable  
confectionery - ownership - frames - engineering - equal opportunities -  
ships - cosmetics - leisure - customer - development - remittance - agri  
furniture - innovation - spacetrains - end products - pipe - health - communication - hardware - facades - situation - shareholder value - cosmetics - tagging - accountability - structures  
commitment - claddings - food - performance - cabling - seating - graphics - automotive - construction - results - safety - fuselage - specialty metals - metals - solutions - community - lamps - roofing - design - transportation - integrity - cans - beverage - cans - accomplishment - maids - leisure - building - CDs



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foundation - capping - commercial build  
ings - computer - people - actions - doors  
net - energy - trays - wheels - architecture  
confectionery - ownership - frames - engineering - equal opportunities -  
ships - cosmetics - leisure - customer - development - remittance - agri  
furniture - innovation - spacetrains - end products - pipe - health - communication - hardware - facades - situation - shareholder value - cosmetics - tagging - accountability - structures  
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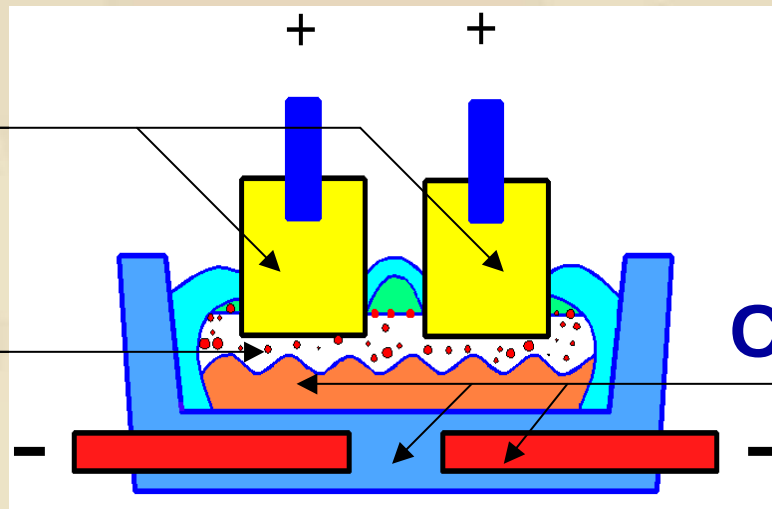
# How aluminium is made

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

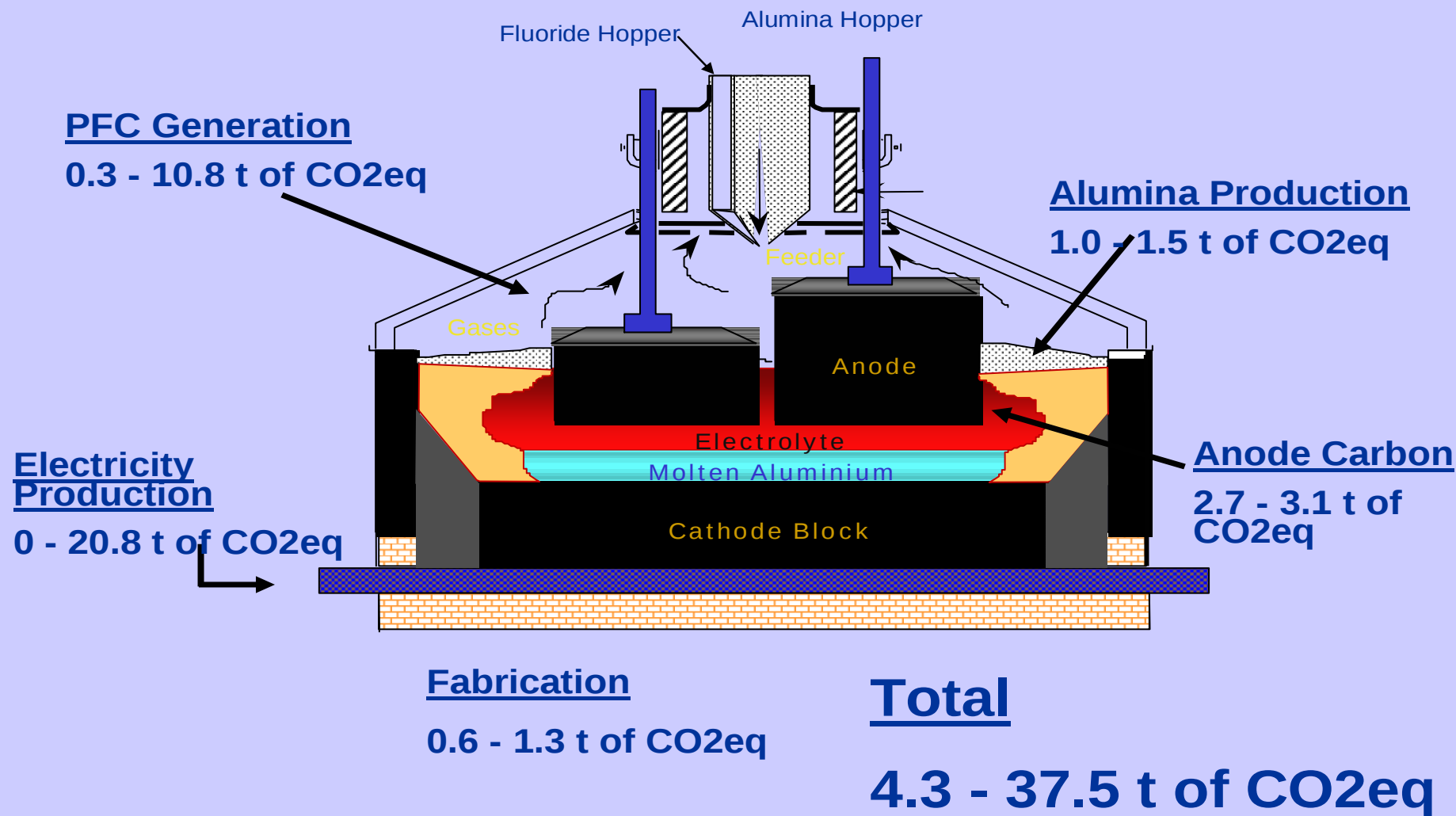
**Anodes**

**Bath**

**Cathode**



# GHG Emission Sources



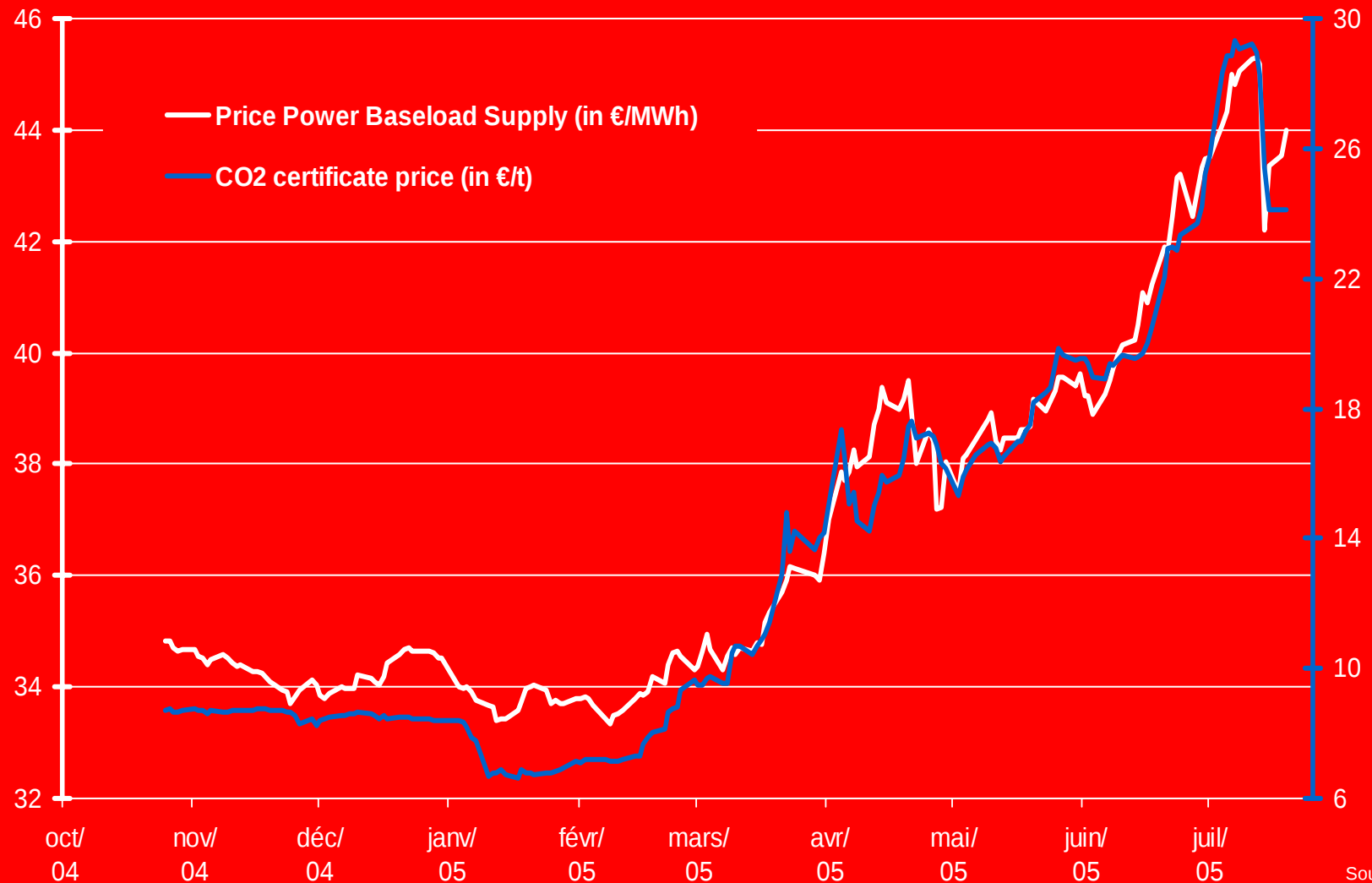
# Aluminium and ETS

- 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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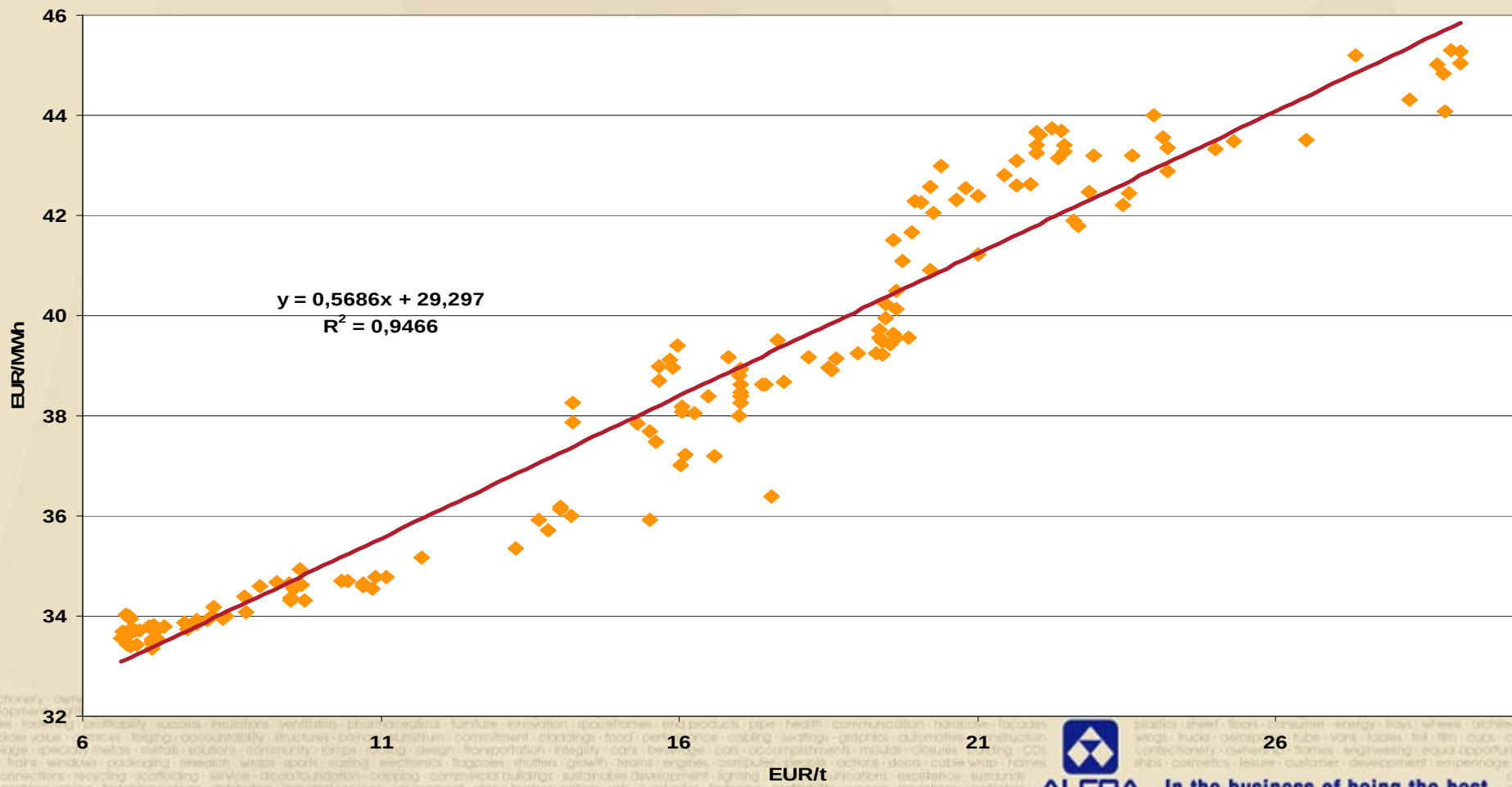
# CO<sub>2</sub> certificate trade increases power price, despite free of charge allocation



Source: EEX / VIK

# Very Strong Correlation - 95%

Regression analysis between EEX Cal 2006 and ETS



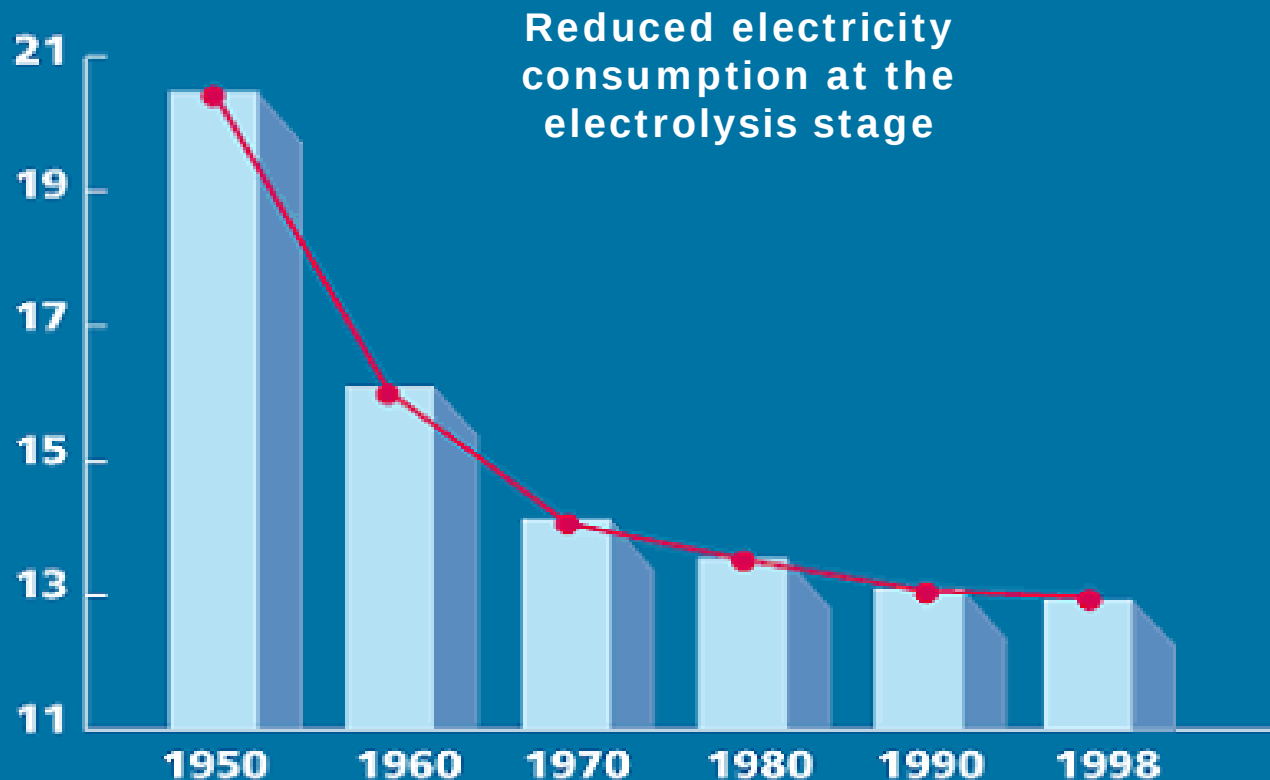
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# The Aluminium Industry has identified 3 main paths to reduce its Climate Change Impact

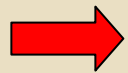
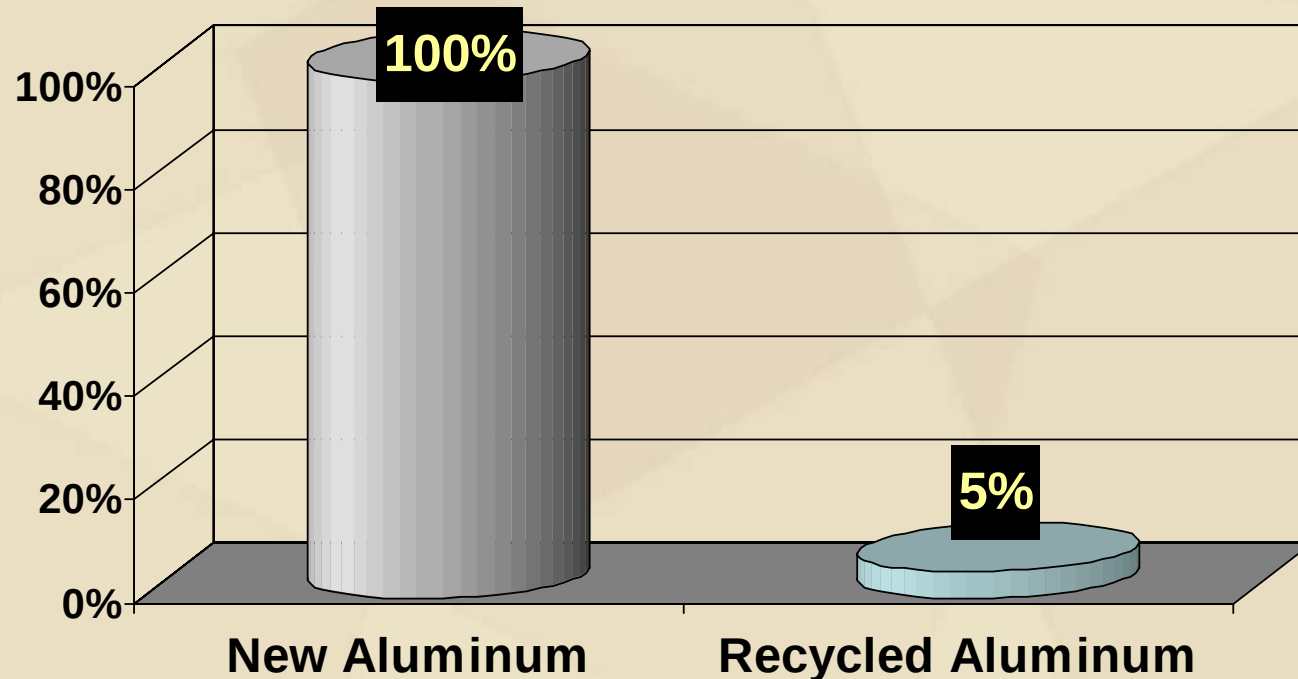
1. Reducing emissions per ton of primary metal produced through:
  - a) investment in modern technology;
  - b) attention to good operating practices.
2. Maximising the potential for aluminium recycling.
3. Encouraging applications of aluminium in transport which reduce weight and GHG emissions from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

# 1) Significant Reduction of Electricity Consumption for Smelters

kWh per kg of aluminium



## 2) Aluminium Recycling



Recycling only needs 5% of the energy

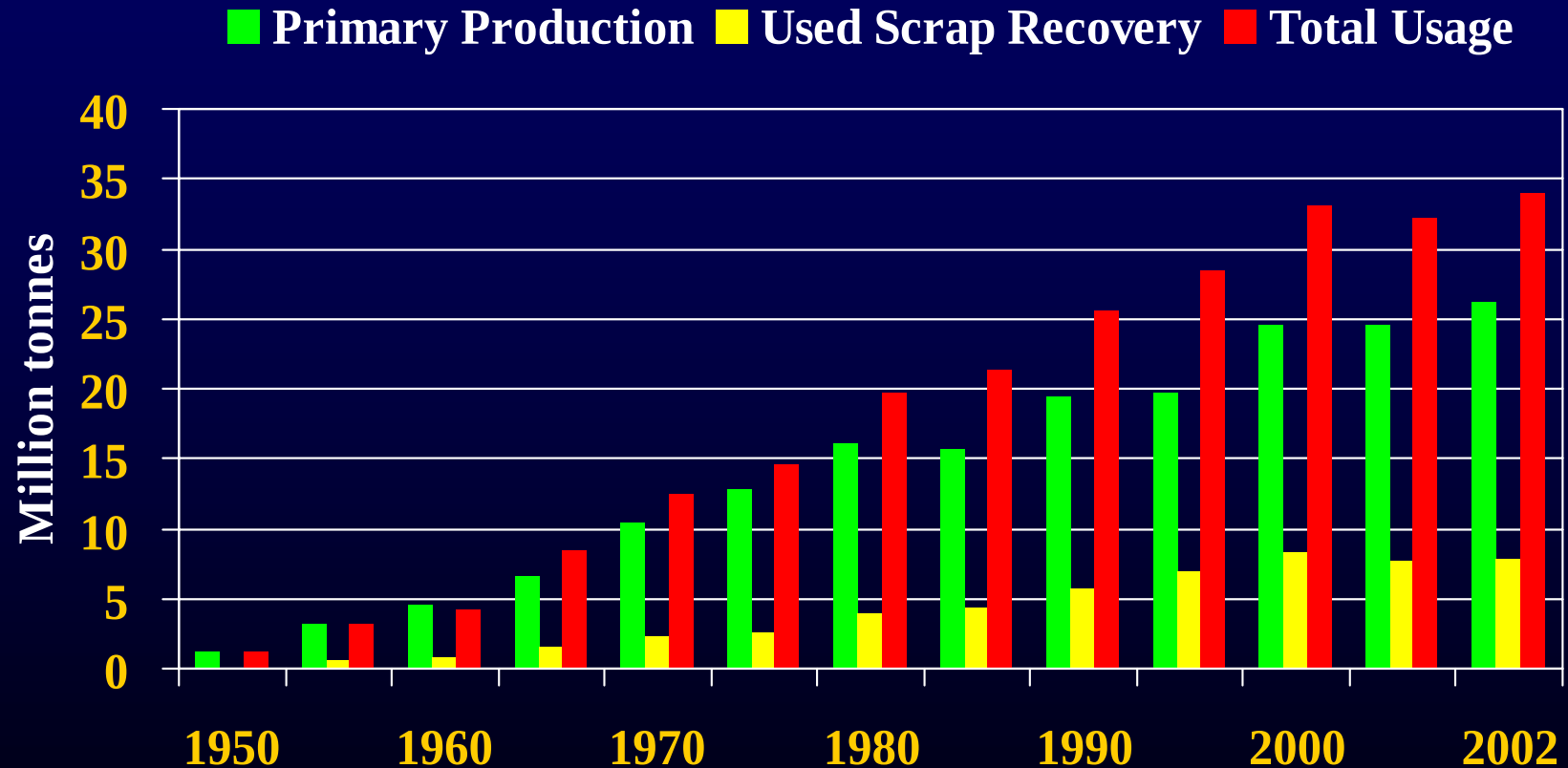


Recycling emits 95 % less greenhouse gases



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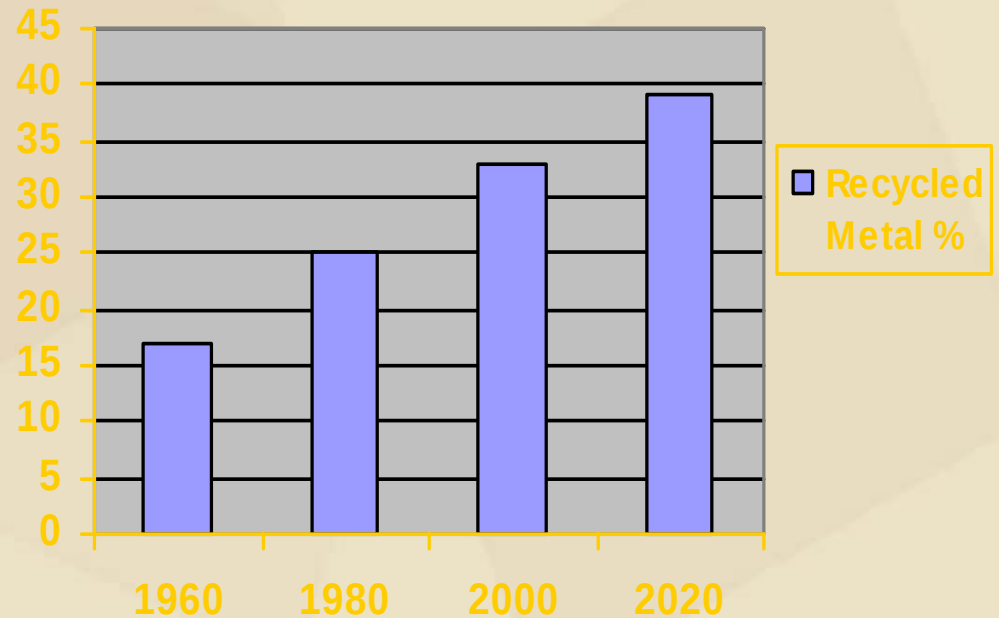
# World aluminium usage and recycling 1950-2002



# Global Aluminium Supply Mix

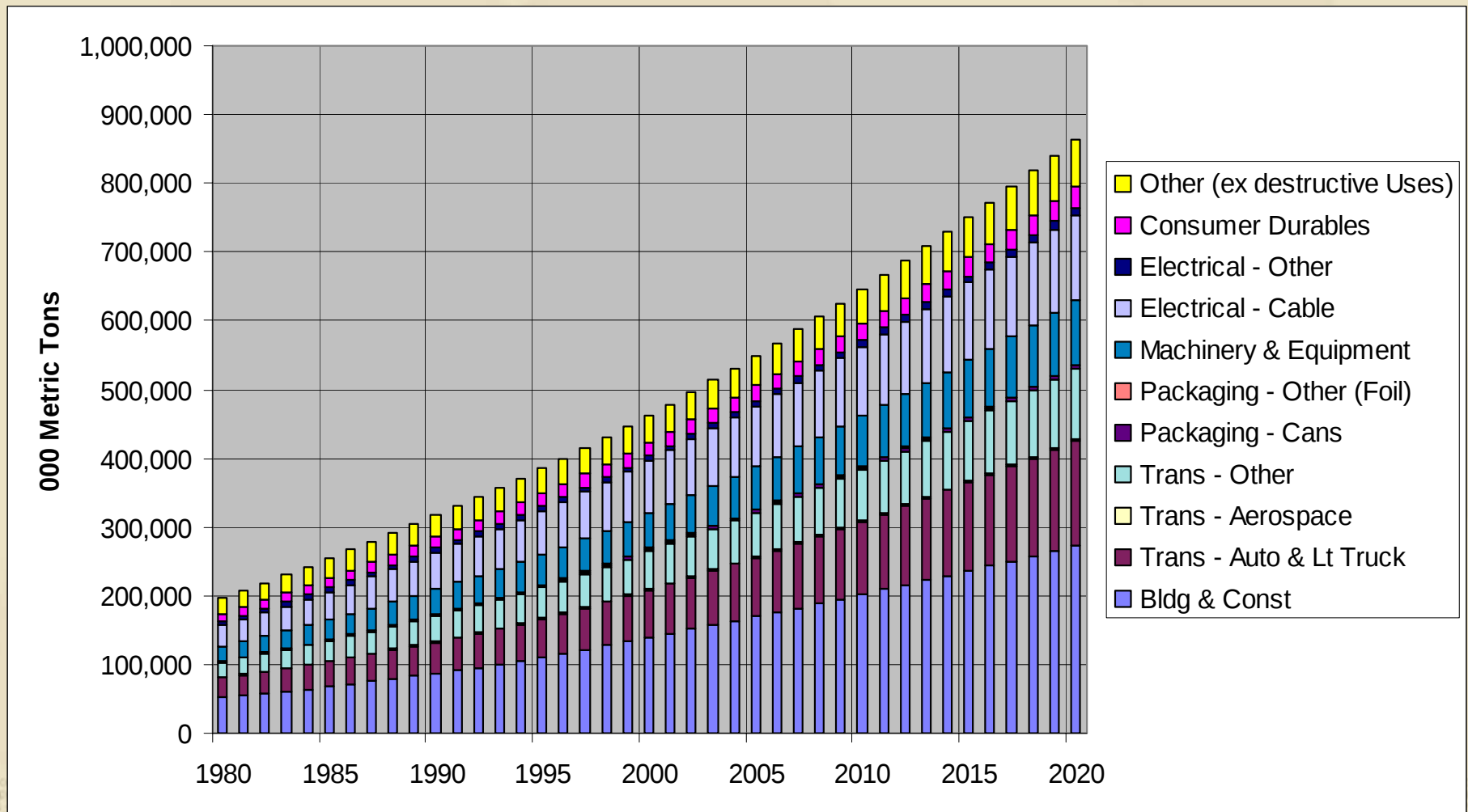
Modeling indicates that the industry's average metal supply from old & new scrap:

- 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



refractory - development - aerospace - food - performance - cabling - seating - graphics - automotive - construction - results - safety - fuselage - specialty metals - metals - solutions - community - ramps - roofing - design - transportation - integrity - cans - beverage - cans - accomplishment - moulds - closures - building - CDs - change - frame - windows - packaging - research - wraps - sports - casting - electronics - flagpoles - shutters - growth - teams - engines - computer - people - outlets - doors - cable wrap - homes - connections - recycling - scaffolding - service - aircraft foundation - capping - commercial buildings - automotive development - lighting - telecommunications - excellence - surrounds - furniture - problem solving - fastening systems - distribution - industrial services - environment - alcoa business system - rails - sunrivers - fastening - profitability - success - insulation - ventilators - commitment - claddings - food - performance - cabling - seating - graphics - automotive - construction - results - safety - fuselage - specialty metals - metals - solutions - community - ramps - roofing - design - transportation - integrity - cans - beverage - cans - accomplishment - moulds - closures - building - CDs - change - frame - windows - packaging - research - wraps - sports - casting - electronics - flagpoles - shutters - growth - teams - engines - computer - people - outlets - doors - cable wrap - homes - connections - recycling - scaffolding - service - aircraft foundation - capping - commercial buildings - automotive development - lighting - telecommunications - excellence - surrounds - furniture - problem solving - fastening systems - distribution - industrial services - environment - alcoa business system - rails - sunrivers - fastening - profitability - success - insulation - ventilators



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commercial buildings - doors - architecture - wings - fuselage - aerospace - tube - vans - tables - foil - film - cups - cable - confectionery - ownership - frames - engineering - equal opportunities - ships - cosmetics - leisure - customer - development - emperage - agriculture - furniture - problem solving - fastening systems - distribution - industrial services - environment - alcoa business system - rails - sunrivers - fastening - profitability - success - insulation - ventilators - commitment - claddings - food - performance - cabling - seating - graphics - automotive - construction - results - safety - fuselage - specialty metals - metals - solutions - community - ramps - roofing - design - transportation - integrity - cans - beverage - cans - accomplishment - moulds - closures - building - CDs - change - frame - windows - packaging - research - wraps - sports - casting - electronics - flagpoles - shutters - growth - teams - engines - computer - people - outlets - doors - cable wrap - homes - connections - recycling - scaffolding - service - aircraft foundation - capping - commercial buildings - automotive development - lighting - telecommunications - excellence - surrounds - furniture - problem solving - fastening systems - distribution - industrial services - environment - alcoa business system - rails - sunrivers - fastening - profitability - success - insulation - ventilators

# A380 – New Solutions for a Super-sized Aircraft

22



New alloys and solutions  
for very large parts



Courtesy Airbus

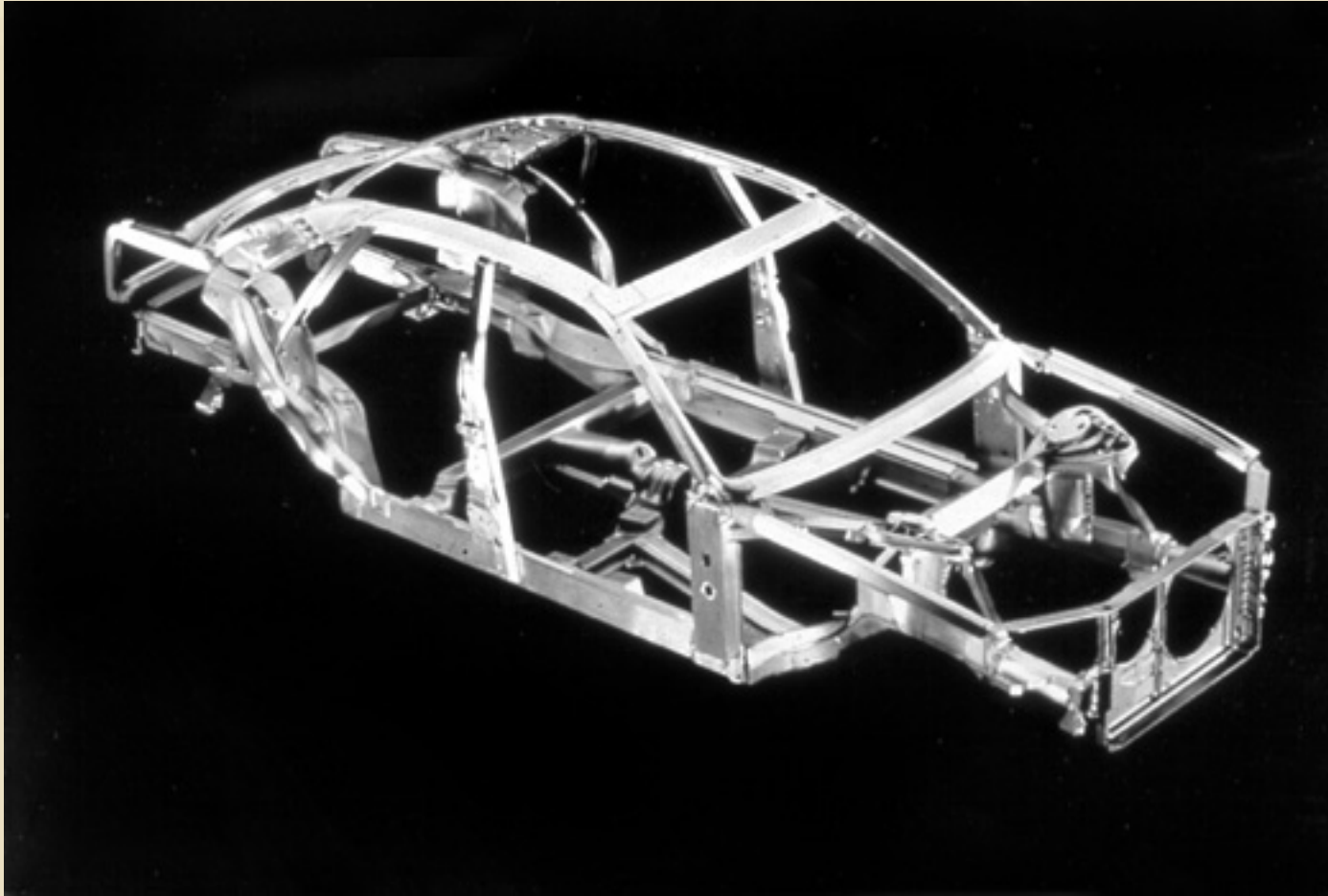
# Europe's New Generation of Mass Transport



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refractories  
development  
shades - fastening - profitability - success - insulation - ventilation - pharmaceutical - furniture - innovation - spaceframes - end products - pipe - health - communication - hardware - facades  
retailer value - cosmetics - lagging - accountability - structure - primary aluminum - commitment - claddings - food - performance - cabling - sealings - graphics - automotive - construction  
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n - commitment - claddings - food - performance - cabling - sealings - graphics - automotive - construction - results - safety - fuelage - specialty metals - metals - solutions - community - lamps - roofing - design - transportation - integrity - cars - beverage - cans - accomplishment

# Moving towards the all-alu car



# The Audi A8 Spaceframe

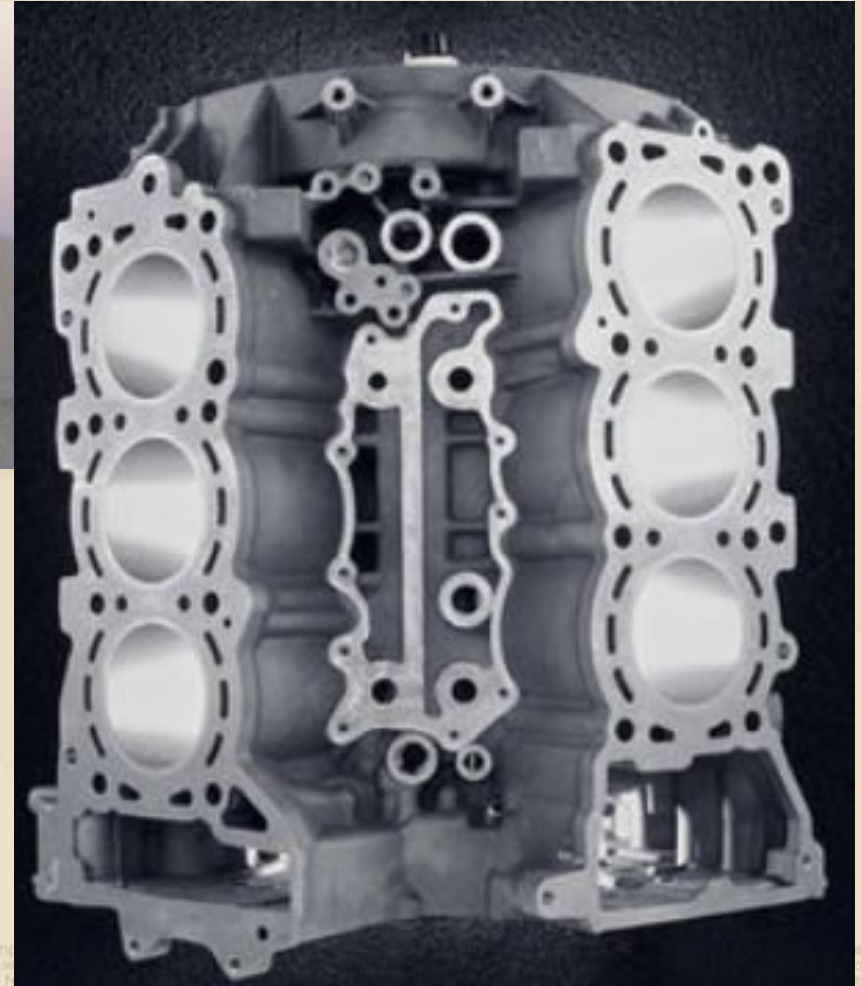


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# The Audi A8 Spaceframe

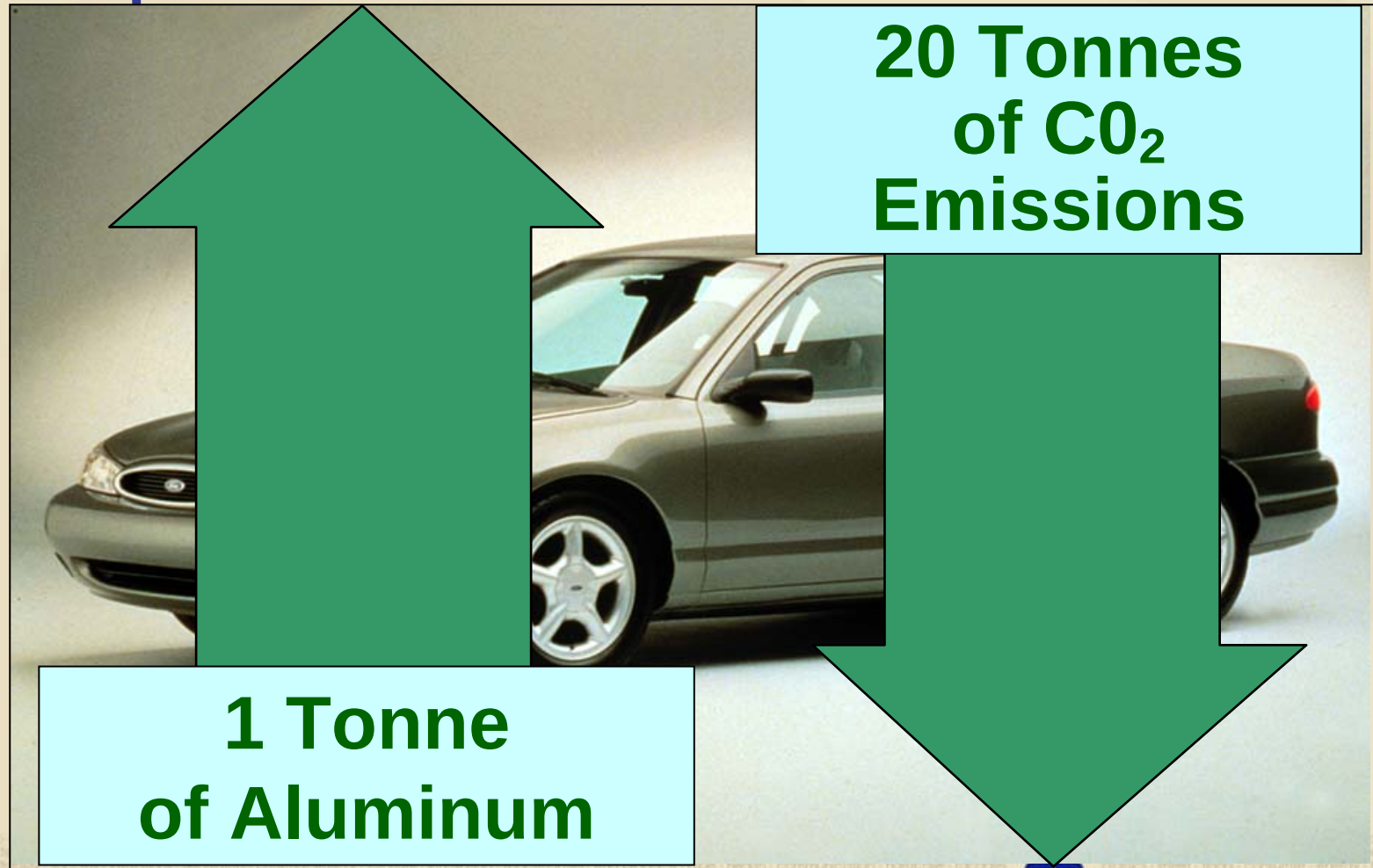
# Innovative breakthrough to support dieselization



# Light Weighting for Performance and Energy Saving

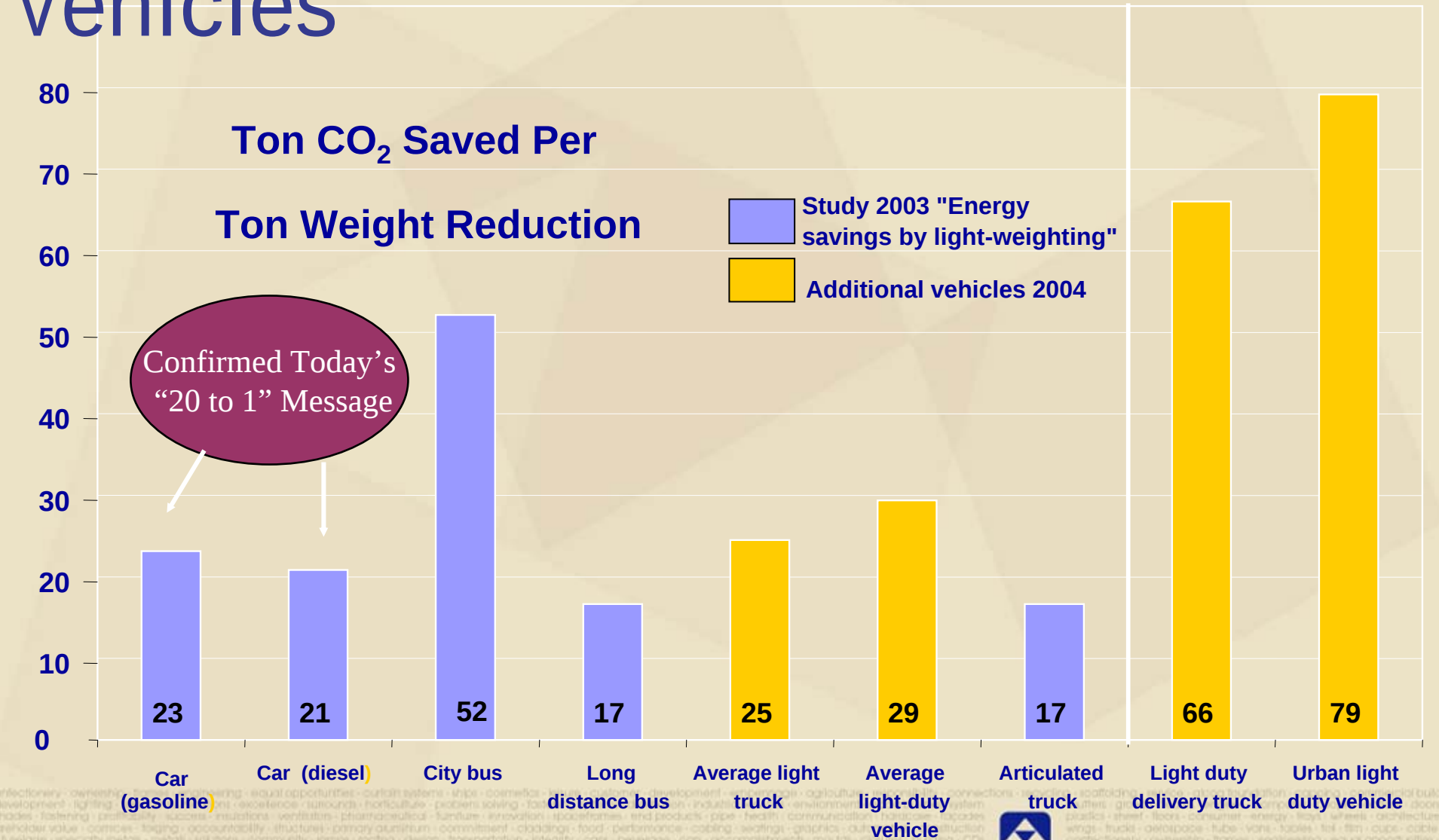


# Aluminium Light-weighting: Impact on CO<sub>2</sub> Emissions



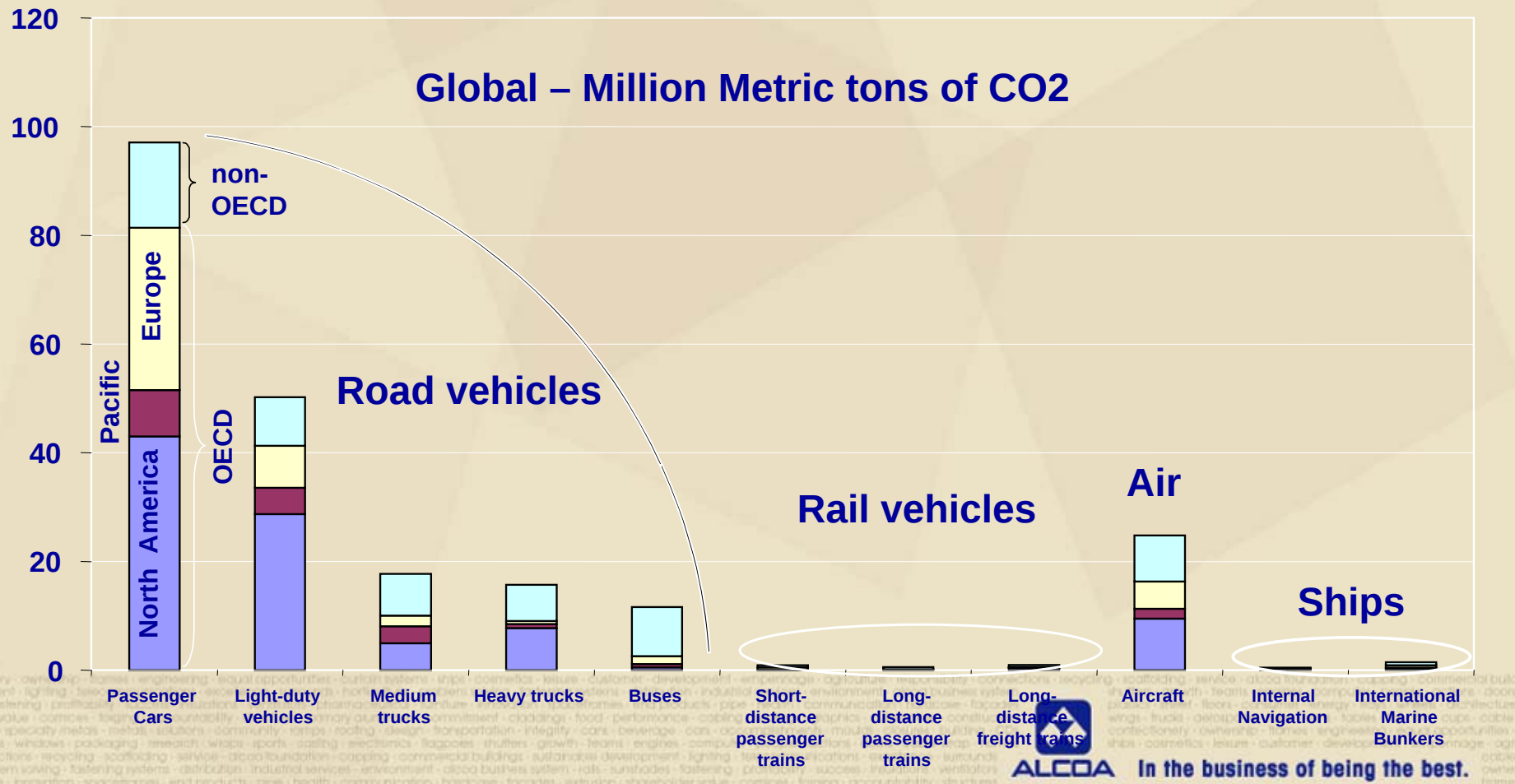
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# Life-time CO<sub>2</sub> Savings for Road Vehicles



**Light duty commercial delivery vehicles show highest relative savings**

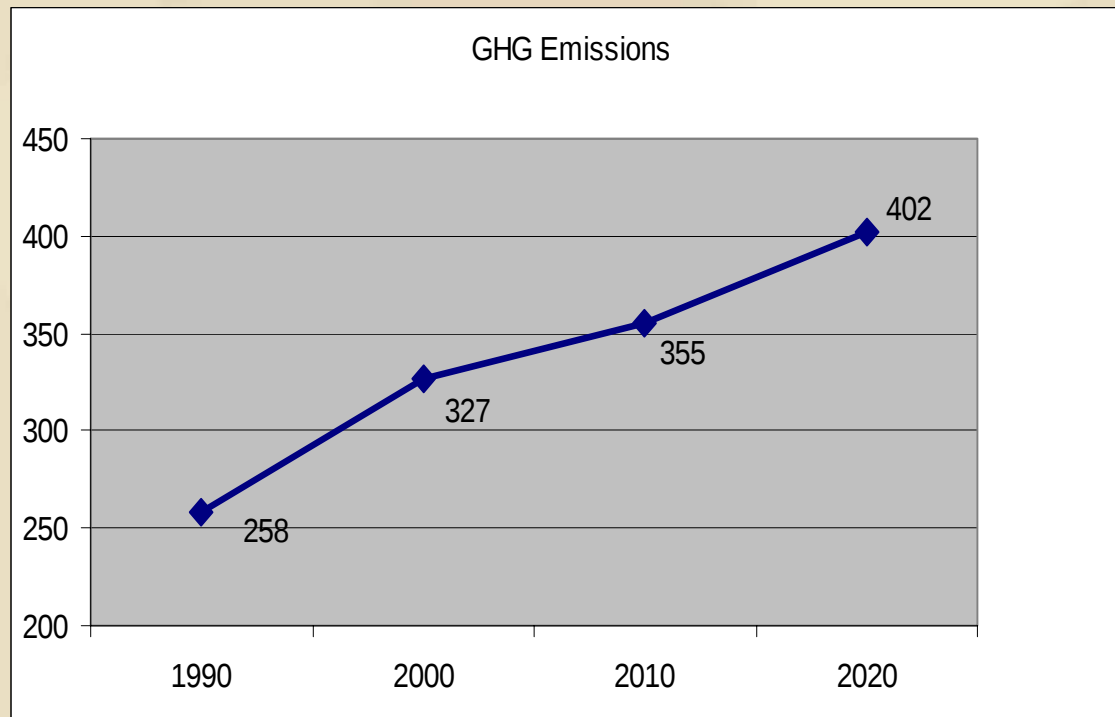
# Total CO<sub>2</sub> Savings Potential by Transport Market



# In summary

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

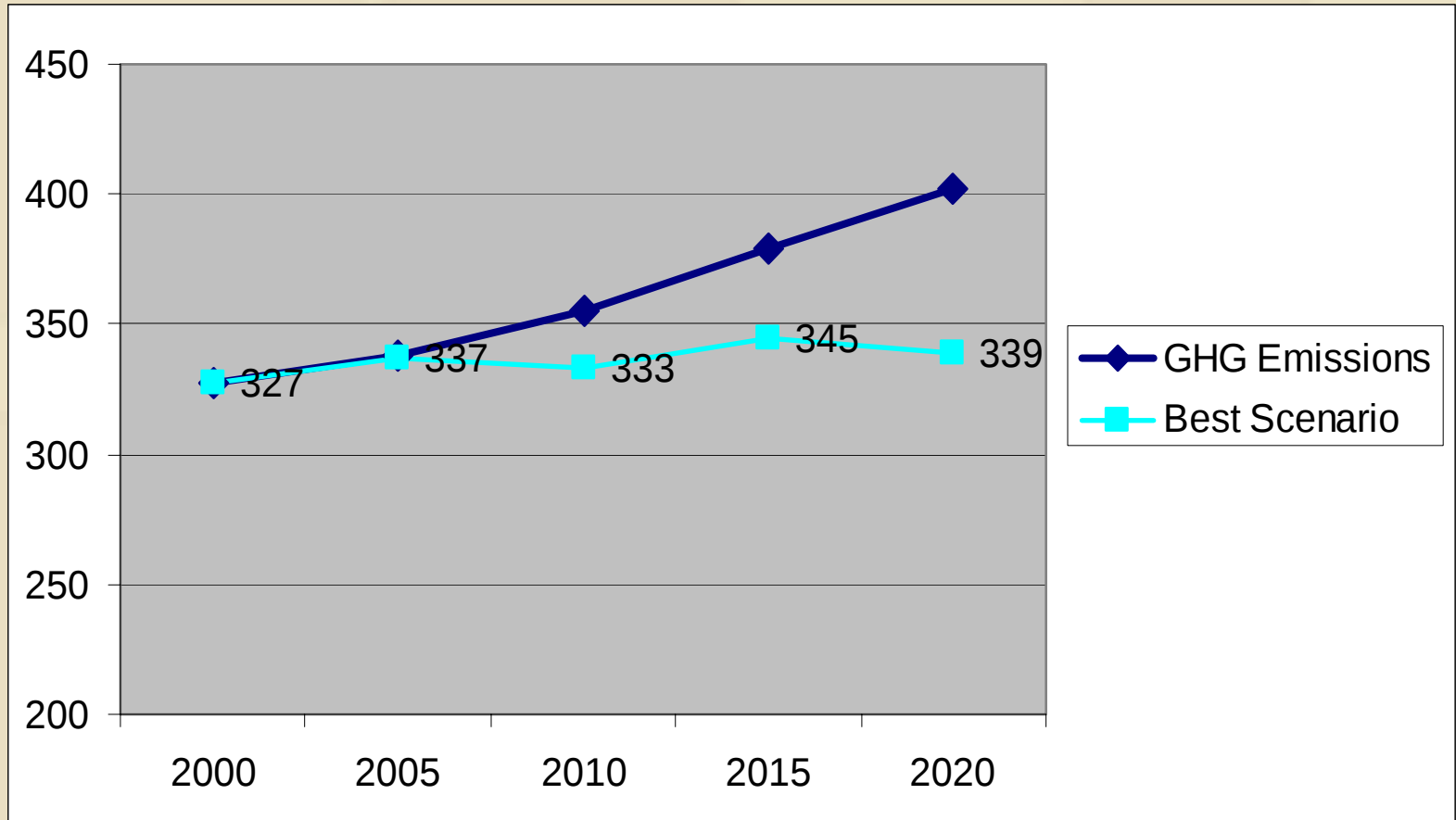
Millions  
of tons  
of CO<sub>2</sub>



# Aluminum Production

## Movement to “Today’s Best Practice”

Millions  
of tonnes  
of CO<sub>2</sub>



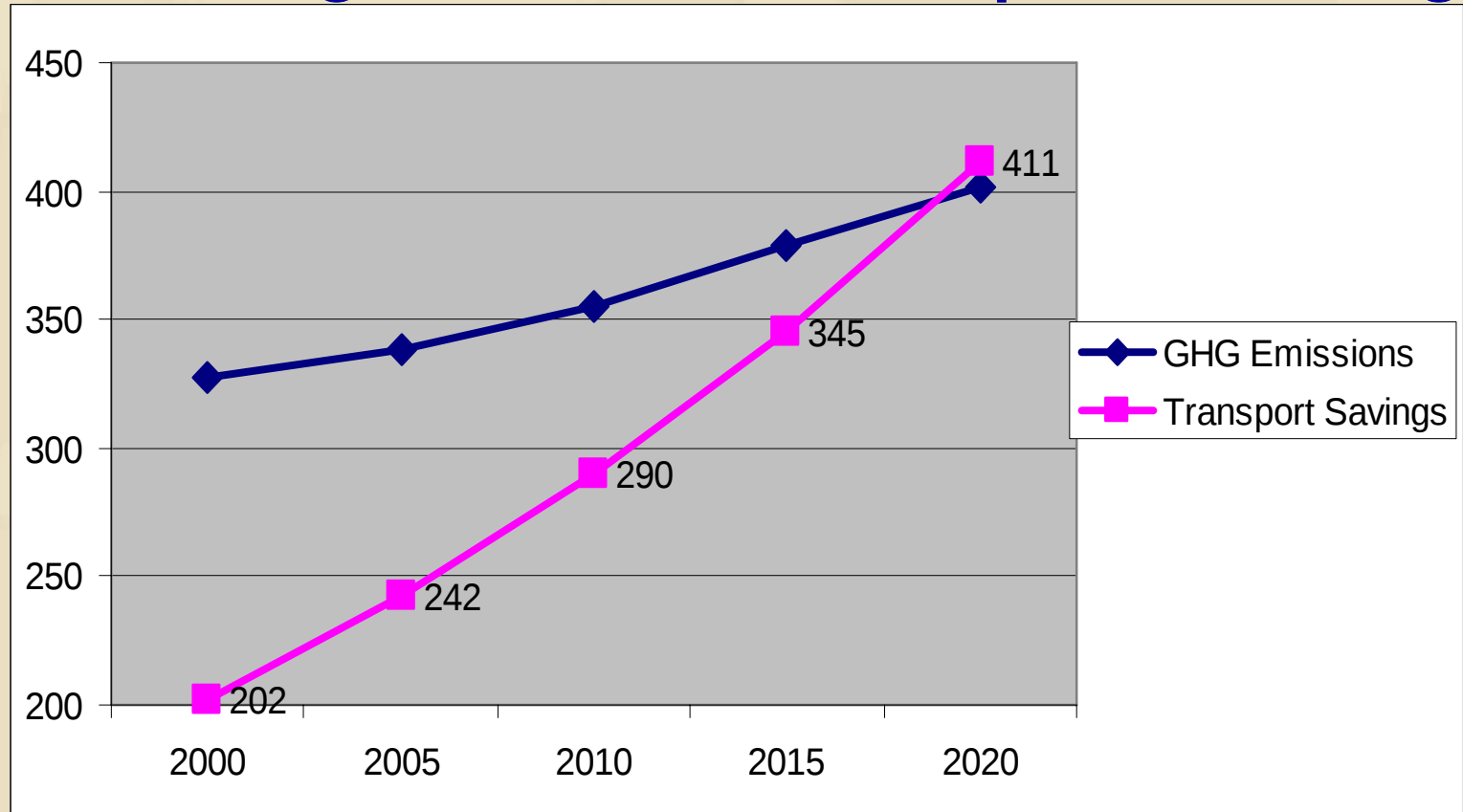
Full Industry Adoption of “Today’s Best Practice” Could Stabilize Growth of Global Production GHG Emissions



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# Potential Magnitude of Transport Savings

Millions  
of tons  
of CO<sub>2</sub>-e



Potential Emissions Savings From Transport Growing Faster  
than AI Production Emissions

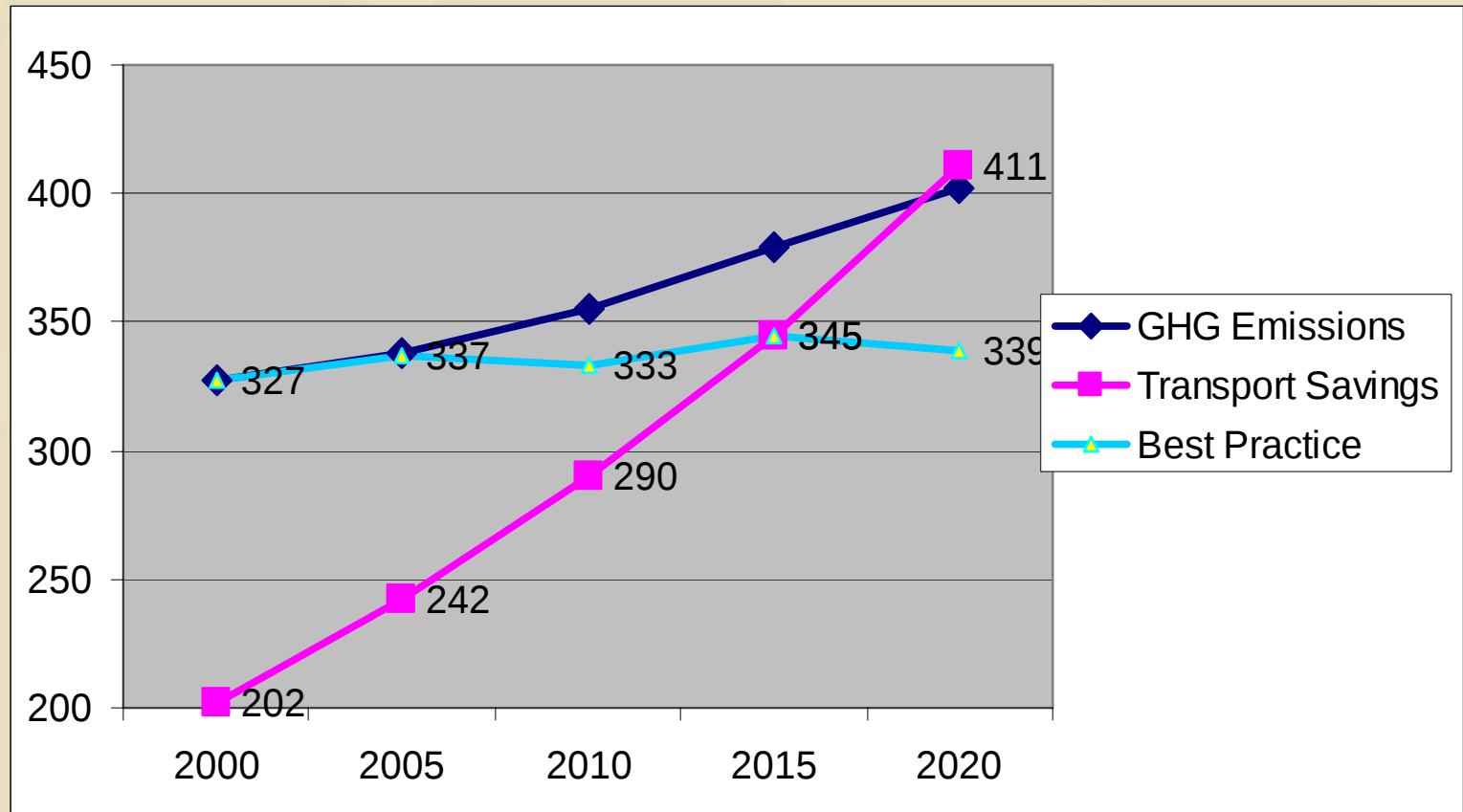
Potential for AI Industry to be “Climate Neutral” By 2020



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# Best Practice and Transport Savings

Millions  
of tons  
of CO<sub>2</sub>-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.