



SYERSTON PROJECT
AUSTRALIA

Clean TeQ Holdings
Limited
(ASX:CLQ)

Sam Riggall – Executive Chairman and CEO

Melbourne Mining Club – Cutting Edge Series

17 May 2016

DISCLAIMER

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Any information in this document that relates to Exploration Results, Mineral Resources or Ore Reserves for the Syerston Scandium Project is based on information compiled by Sharron Sylvester, who is a Registered Professional Geoscientist (10125) and Member (2512) of the Australian Institute of Geoscientists, and a full time employee of OreWin Pty Ltd. Sharron Sylvester has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity which she is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Sharron Sylvester, who is a consultant to the Company, consents to the inclusion in the report of the matters based on her information in the form and context in which it appears.

For further details on the content of this presentation, please refer to the ASX releases on the Company's website.

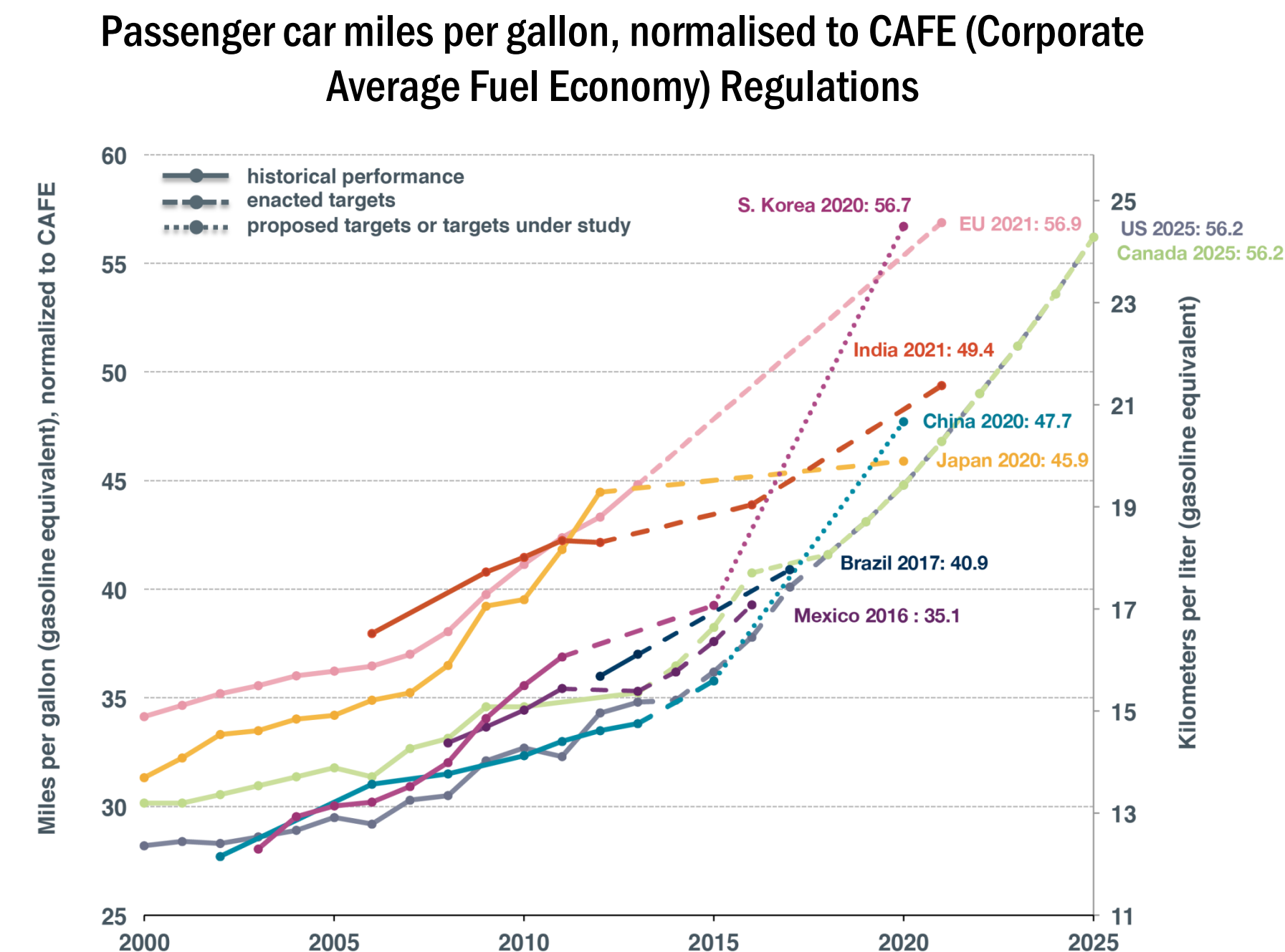
A red Ford pickup truck is shown from a front-three-quarter view, parked on a dark road. The truck has a chrome grille with the Ford logo, a chrome bumper, and silver alloy wheels. The background features a hazy landscape with mountains under a twilight sky. The text "THE MARKET IMPERATIVE" is overlaid in white, bold, sans-serif capital letters, with a thin white horizontal line underneath it.

THE MARKET IMPERATIVE

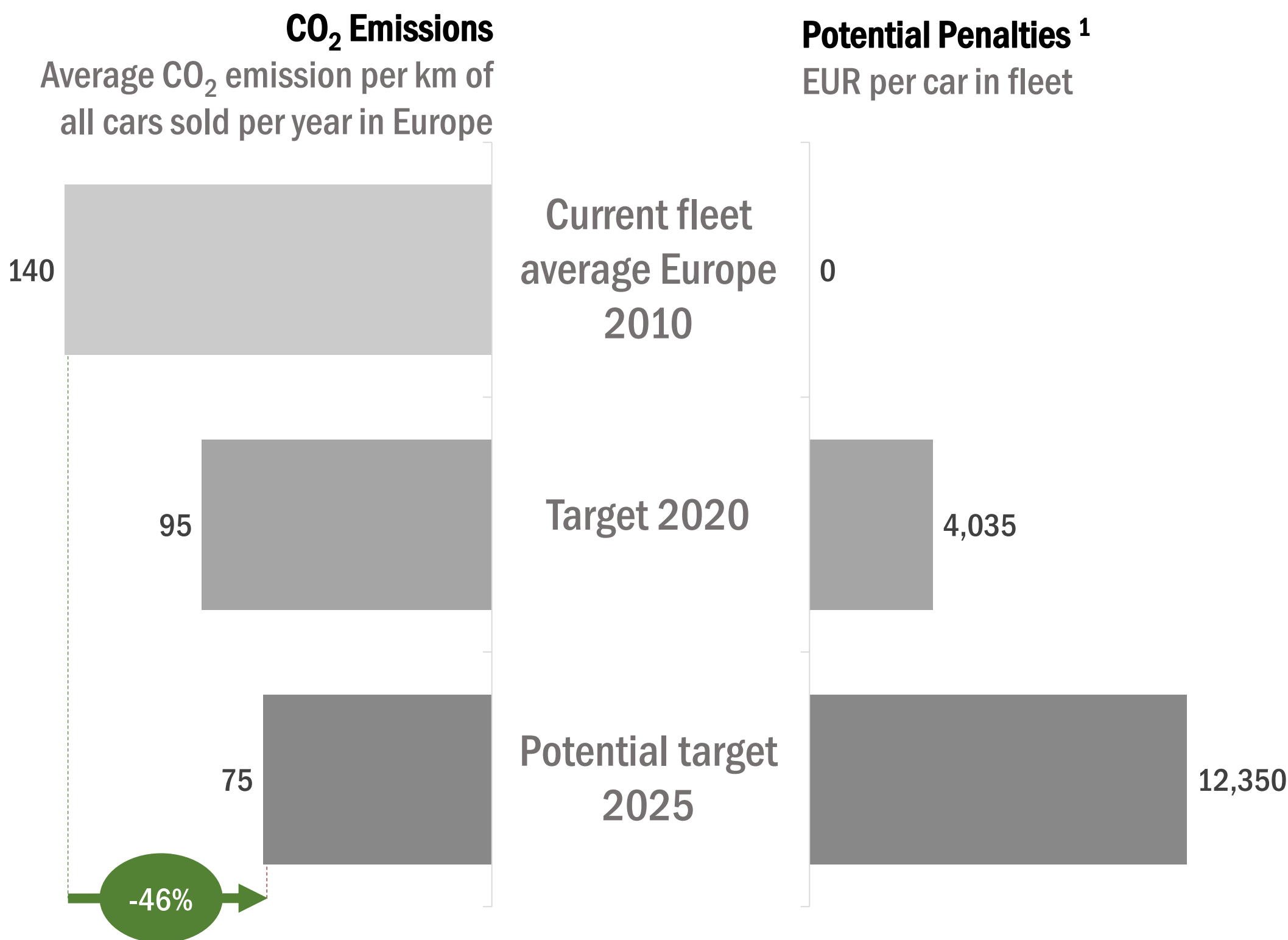
THE WORLD NEEDS LIGHTWEIGHT SOLUTIONS

THE IMPERATIVE DRIVING THE GLOBAL TRANSPORT INDUSTRY

Increasing Fuel Efficiency Targets



Increasing CO₂ Emission Limits



CAFE regulations source: The International Council of Clean Transportation (enacted or proposed targets)

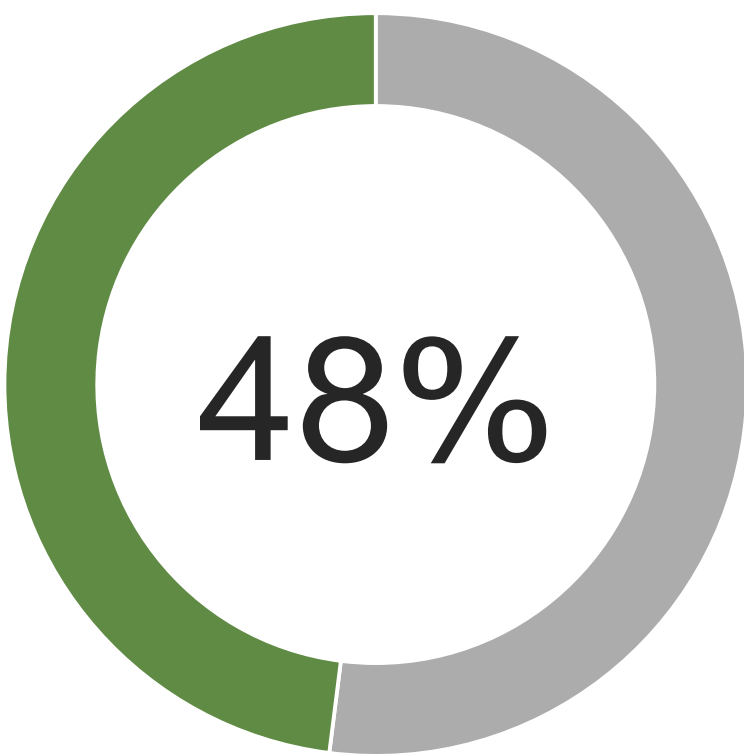
CO₂ emission penalty source: Mckinsey

¹ Assumption in comparison to today's average European CO₂ emission of 140g CO₂ per km car; penalties for exceeding CO₂ emissions in 2020: for 1st gram EUR5, 2nd gram EUR15, 3rd gram EUR25, 4th gram and beyond EUR95; penalties in 2025: EUR190 for each gram.

ALUMINIUM IS A CRITICAL LIGHTWEIGHT MATERIAL

ALUMINIUM IS TRANSFORMING THE WAY WE BUILD CARS AND PLANES

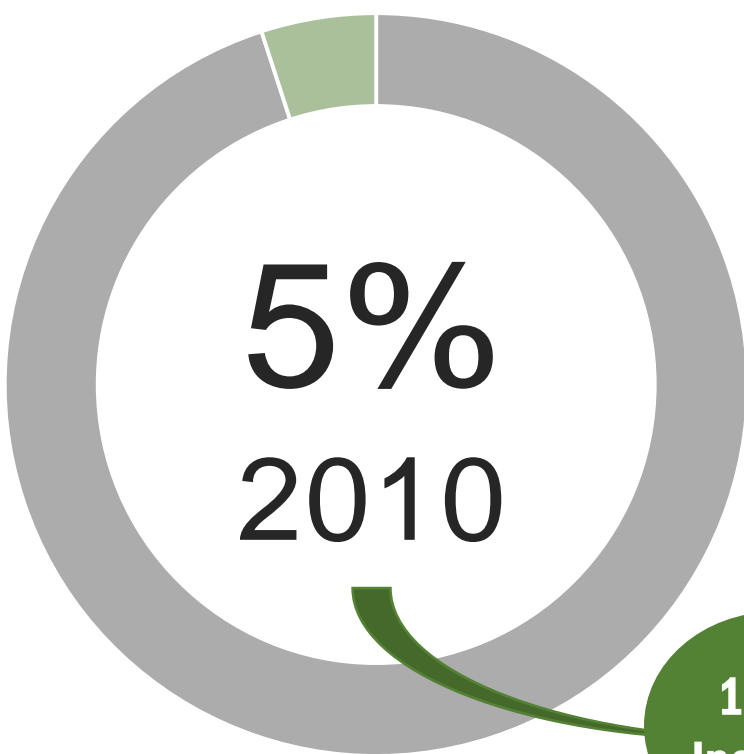
AEROSPACE



Aluminium in Aircraft Materials

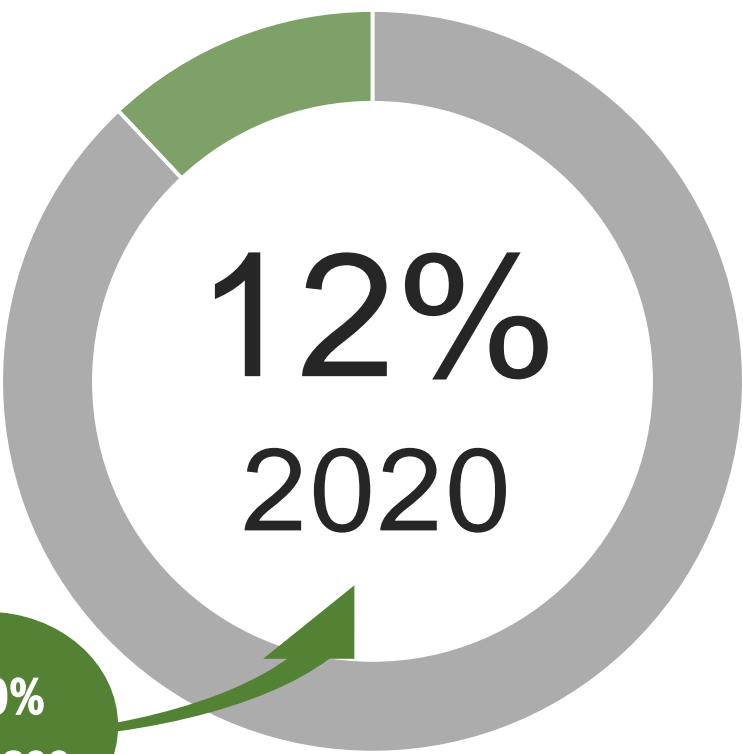
Aluminium is 25% lighter than high strength steel and 75% cheaper than carbon fibre, well established in providing the lowest cost light weighting material available today.

AUTOMOTIVE

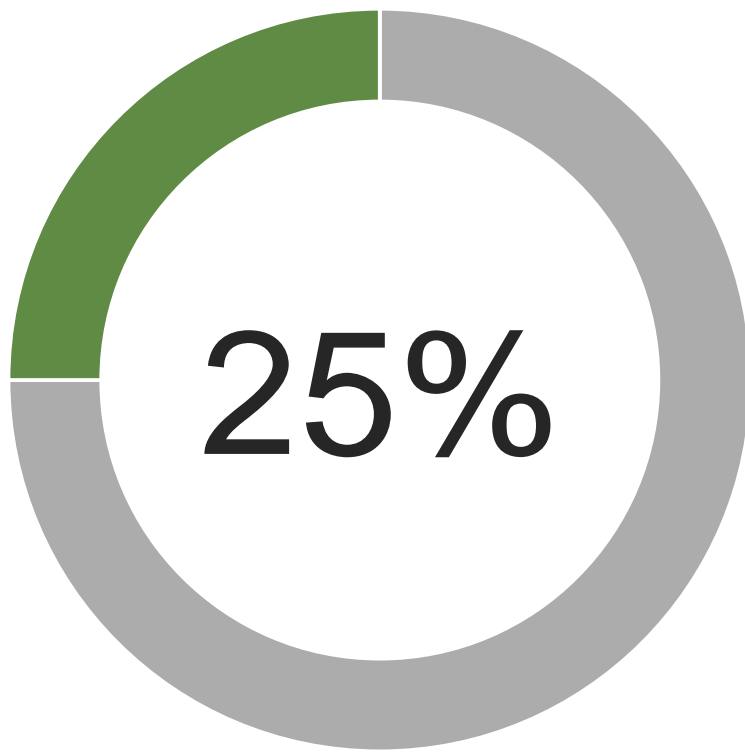


Aluminium in Automotive Materials

Aluminium is quickly being recognised as a important material for reducing the weight of cars. In many cases the learnings of the aerospace industry are being used to produce lighter, stronger aluminium components in automotive.



150% Increase



Aluminium in the Ford F150

Ford's F150 is a model for the industry. Aluminium was critical in the F150 reaching its fuel efficiency requirements. The F150 is Ford's #1 selling vehicle and a driver of the Group's profit.

A photograph of a white Shinkansen (bullet train) on a railway track. The train is sleek and aerodynamic, with a blue stripe running along its side. It is positioned on a track with gravel and overhead power lines. The background shows some greenery and a clear blue sky. The word "SCANDIUM" is overlaid in white, bold, sans-serif capital letters, underlined, in the center of the image.

SCANDIUM

SCANDIUM: THE MOST POTENT ALLOYING ELEMENT



STRONGER

Scandium increases the strength of aluminium alloys allowing for less material to be used.



WELDABLE

A key benefit for transport, weldable aluminium will fundamentally change the way we build cars and planes, which are currently riveted.



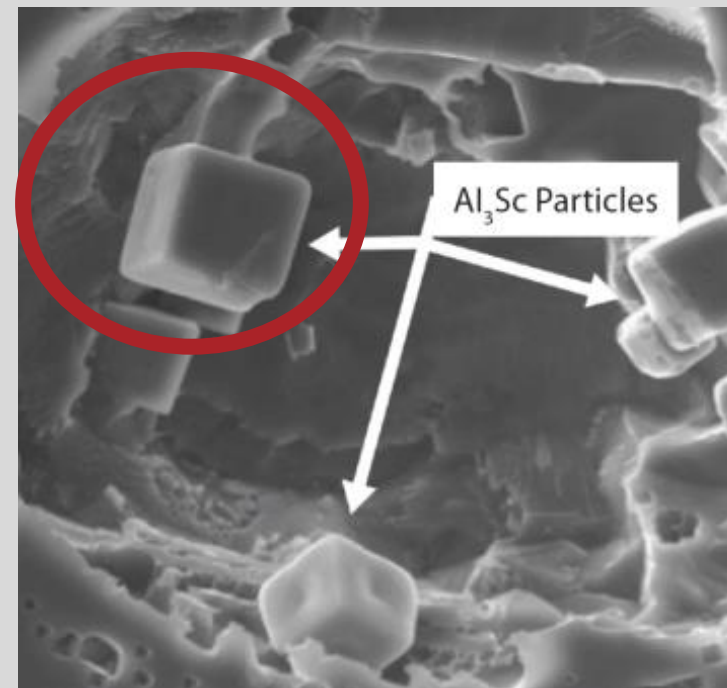
CORROSION RESISTANT

Higher corrosion resistance means thinner material can be used, lower maintenance and longer service life.

SCANDIUM: GRAIN REFINER

The micro structure of aluminium is **fundamentally changed** when scandium is added:

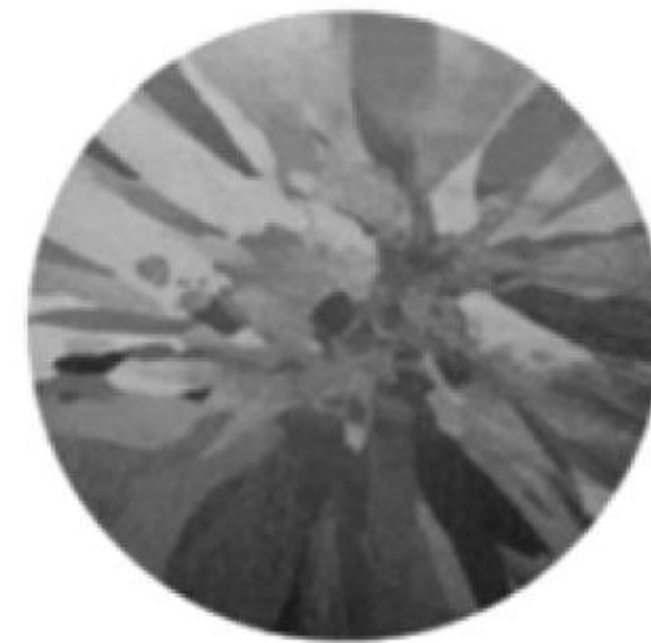
Cuboid Structure of Al_3Sc :



Source: AMG Aluminum

This leads to finer grains of aluminium being formed. The implications of this “grain refinement” on the performance of the alloy, including strength and weldability are enormous.

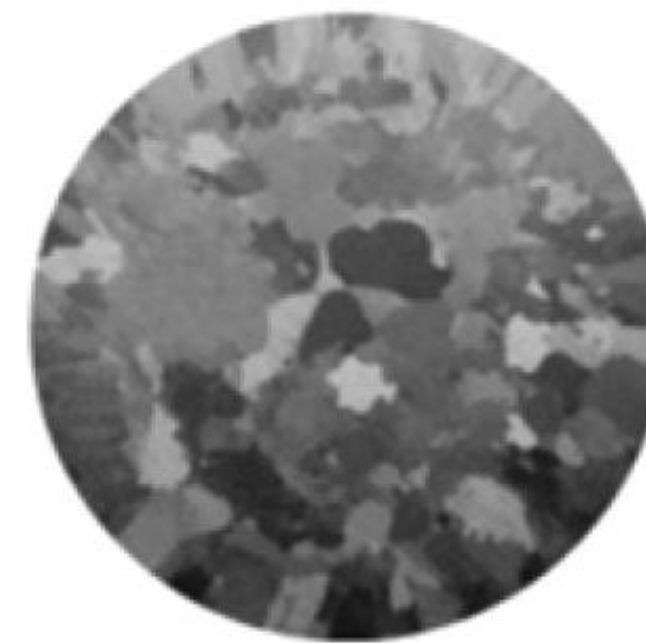
Source: Zhang et al, 2013



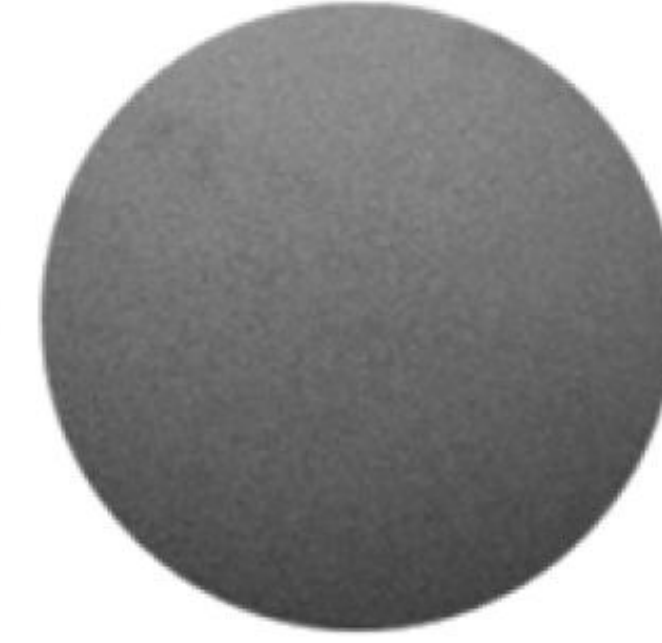
0.05% Sc



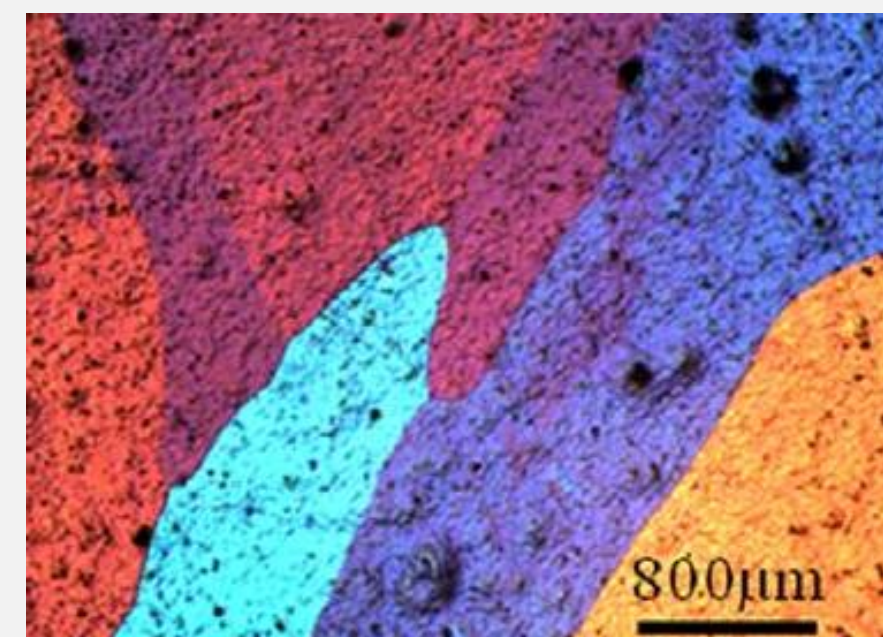
0.2% Sc



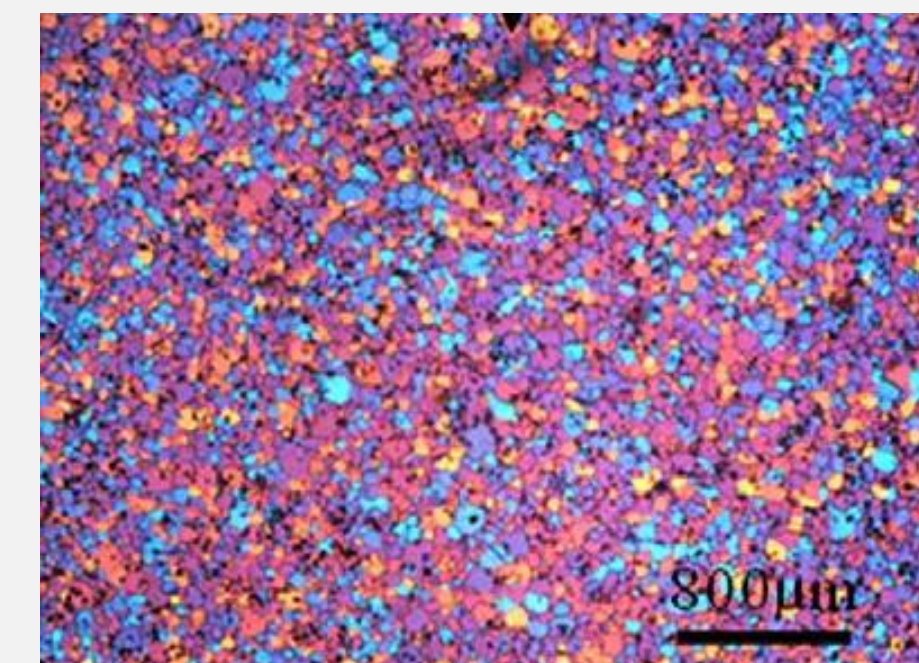
0.5% Sc



0.7% Sc



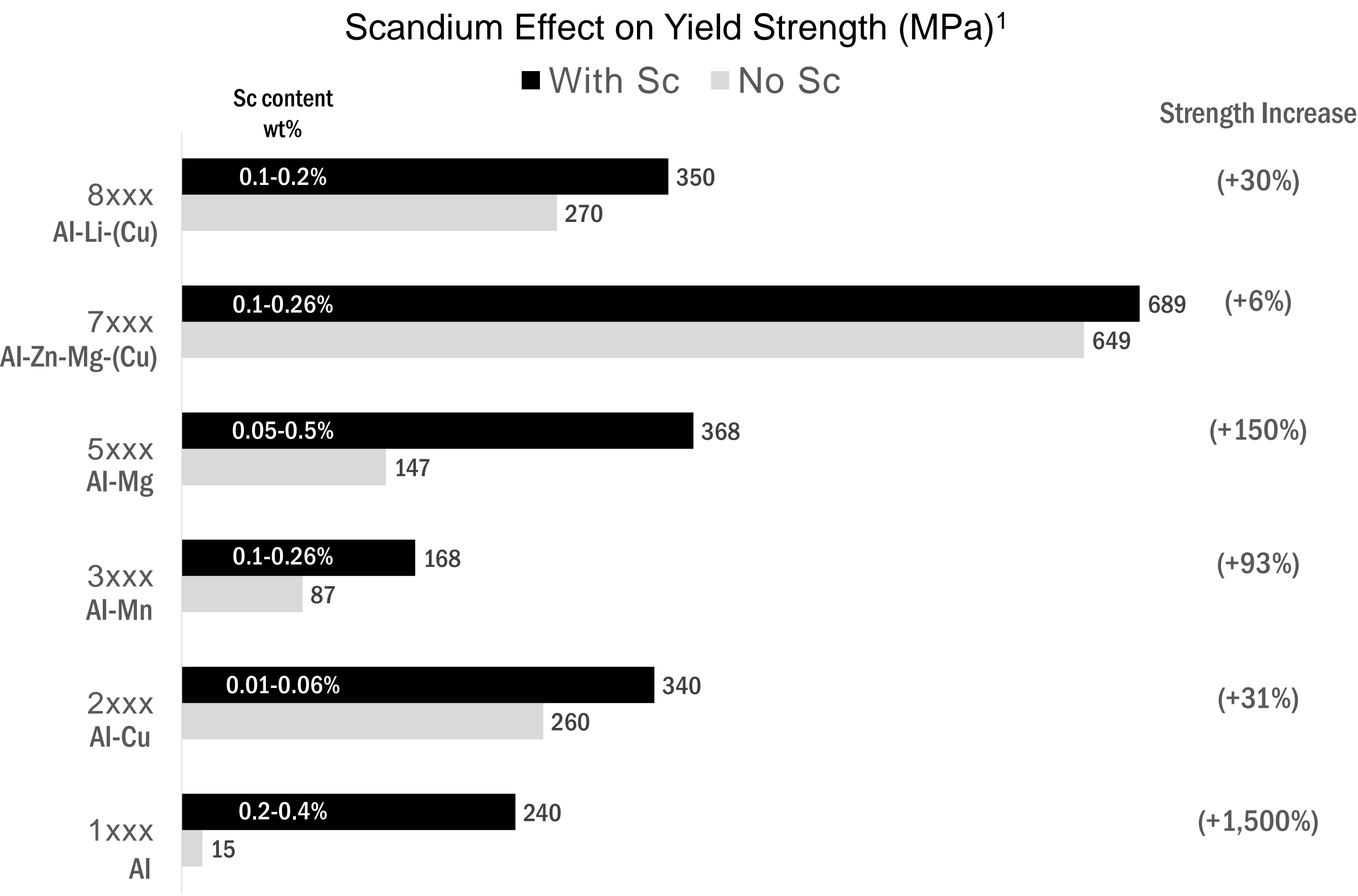
Effect of Sc Addition on Grain Refinement



STRENGTH WITH SCANDIUM ADDITION

“ Addition of scandium to aluminium gives the highest increase in strength (per atomic percent) of all alloying elements”

– K. Venkateswarlu, et al, High Strength Aluminum Alloys with Emphasis on Scandium Addition, 2008



AEROSPACE

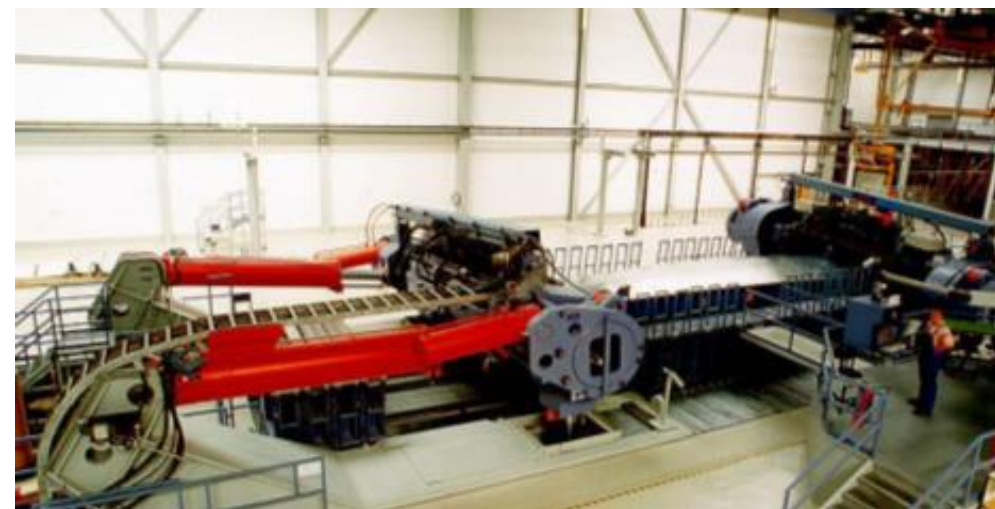


AISc ALLOYS: LOWER “BUY-TO-FLY” RATIO

AISc ALLOYS + NEW PRODUCTION PROCESSES = LOWER MANUFACTURING COST

Example: Fuselage
The functional benefits of AISc alloys allow the *creep forming* process to be applied, significantly reducing the number of manufacturing steps required.

Previous:
Conventional stretch forming and riveting:



22
Process
Steps

Future:
Creep forming +
AIScMg alloy :



9
Process
Steps



Potential Aerospace
Application of AlMgSc +
Creep Forming

MATERIAL AND FUEL SAVINGS

CASE STUDY: AIRBUS A380



A380 Material and Fuel Savings

Operating Empty Weight	280,000 kg
Aluminium content – 60% of OEW	168,000 kg
Al-Sc alloy weight savings ¹	4,956 kg
Fuels savings (US\$/pa) ²	~US\$4.5 million
Fuel savings (US\$/life of aircraft)	~US\$90 million

Airbus and Boeing Order Books ³	Airbus	Boeing
Order Pipeline (units)	6,430	5,689
Estimated Al requirement (tonnes)	234,000	212,000
Estimated weight savings with Al-Sc (tonnes)	6,900	6,200

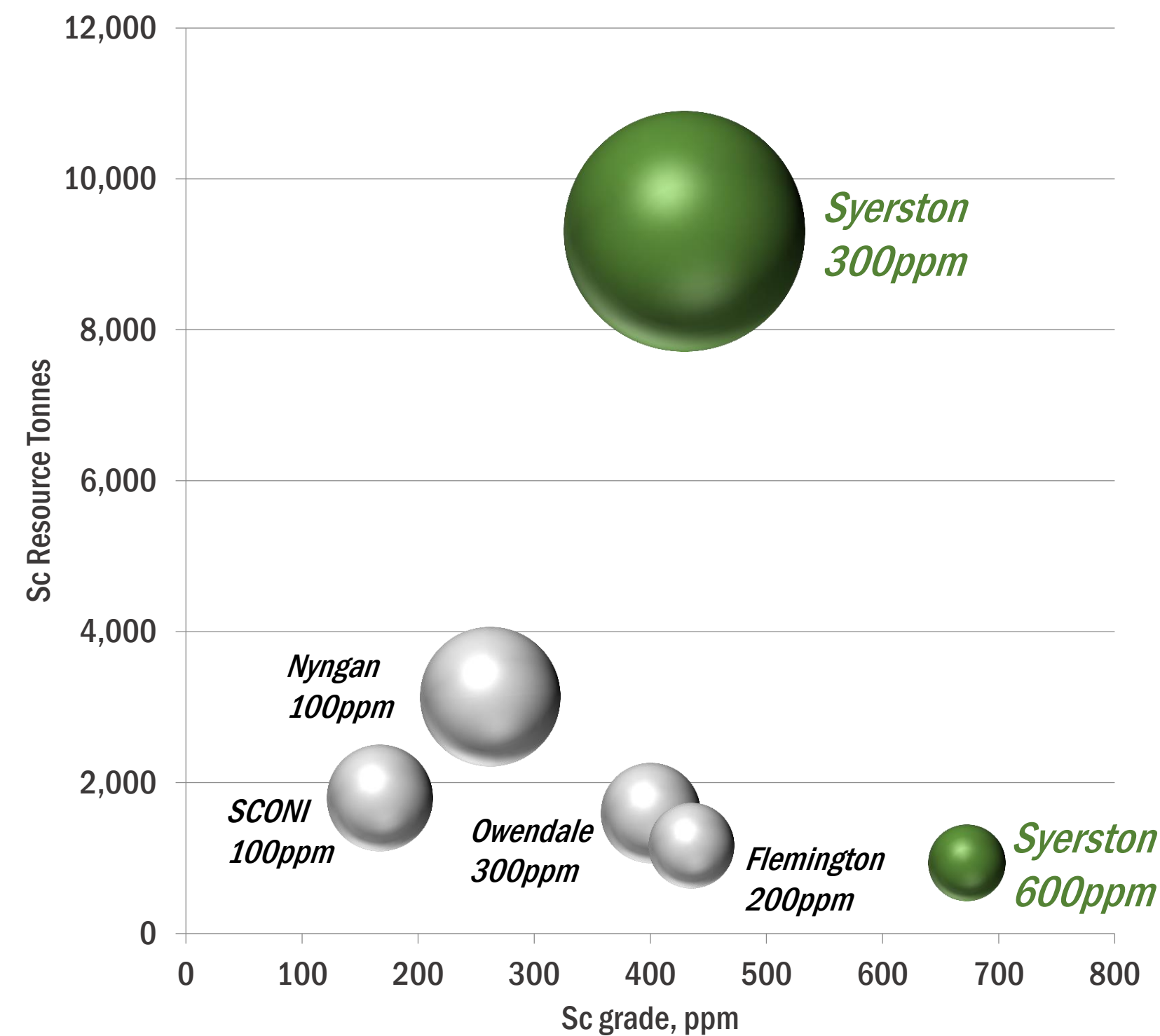
Fuels savings (US\$/pa)	US\$6.2B	US\$5.6B
Fuel savings (US\$/life of aircraft)	US\$124B	US\$112B

1. Assumes fuselage constitutes 65% of Al content with a 4% weight saving from use of Al-Sc alloy (source: Aleris and internal estimates). Remaining 35% of Al content is other parts, of which Al-Sc alloy enables a 1% weight reduction.
2. Fuel savings calculated as 45,000lt/kg over 20 year aircraft life (source: Roland Berger, 2013). Jet fuel cost estimated as long-run average of US\$0.40/lt (source: IATA)
3. As at 30 June 2015. Adopts identical assumptions as per 1 and 2 above, but adjusted by individual aircraft model and specific aluminium content.

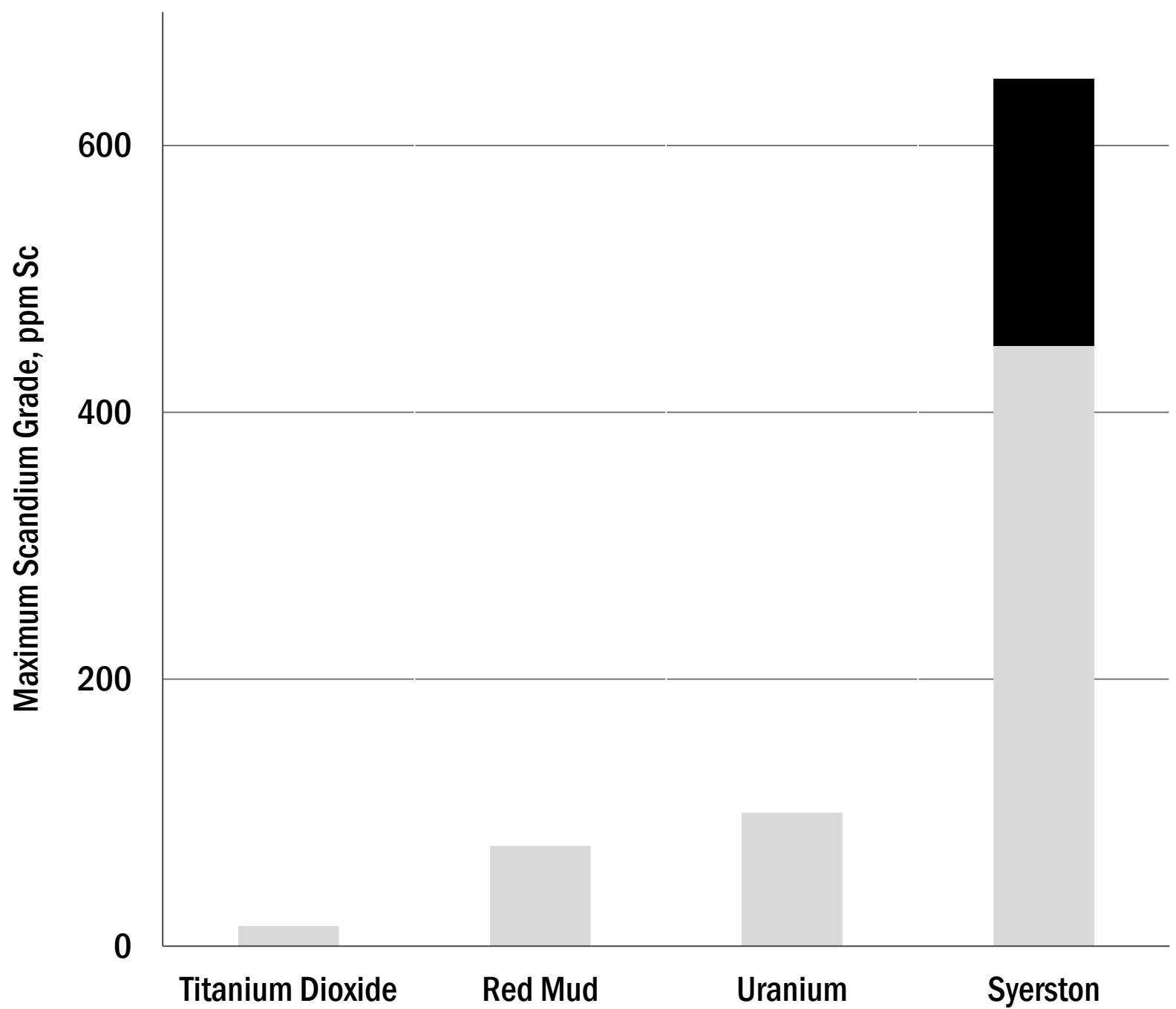
HIGH SCANDIUM GRADE

SYERSTON IS POTENTIALLY THE HIGHEST GRADE SCANDIUM SOURCE GLOBALLY

Australian Scandium Mine Comparison¹:



Grade Estimates for Other Scandium Sources²:



¹ Measured and indicated JORC resources shown at stated Sc cut-off.

² Based on internal estimates



CLEAN-iX[®] PILOT PLANT

WESTERN AUSTRALIA

Clean TeQ has a large scale pilot plant located in Perth, Western Australia to simulate the entire leaching and RIP extraction process at scale.

Recent operation included processing of 12 tonnes of Syerston ore to produce scandium samples for offtake partners.

CONTACT



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AUSTRALIA

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