

ENERGY BANK FOR THE FUTURE



THE ALUMINIUM STORY

ASI AGM WEEK

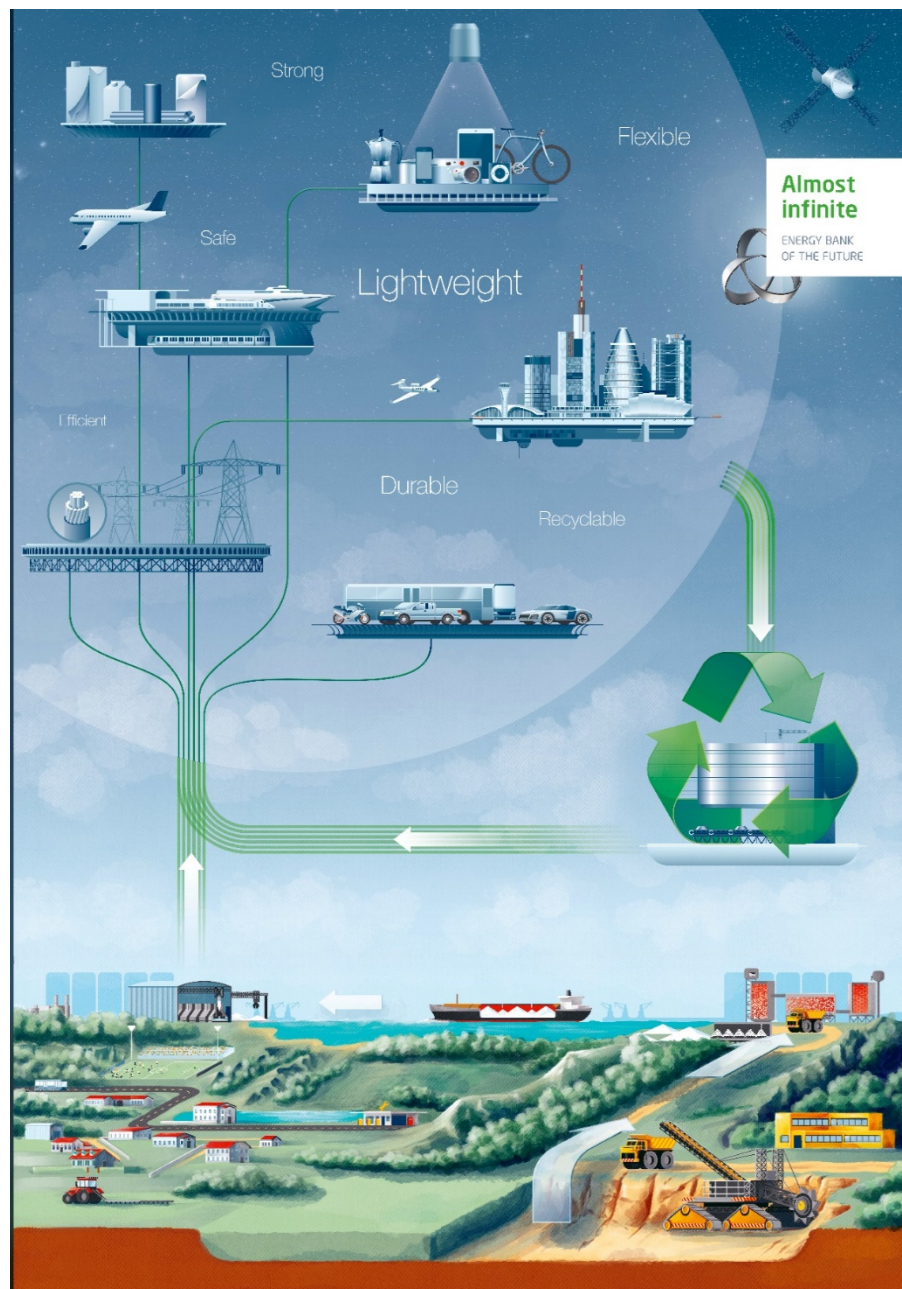
Molde, Norway

4th June 2019

www.thealuminiumstory.com



WORLD ALUMINIUM



Overview



Global context



Growth in aluminium demand



Risk management

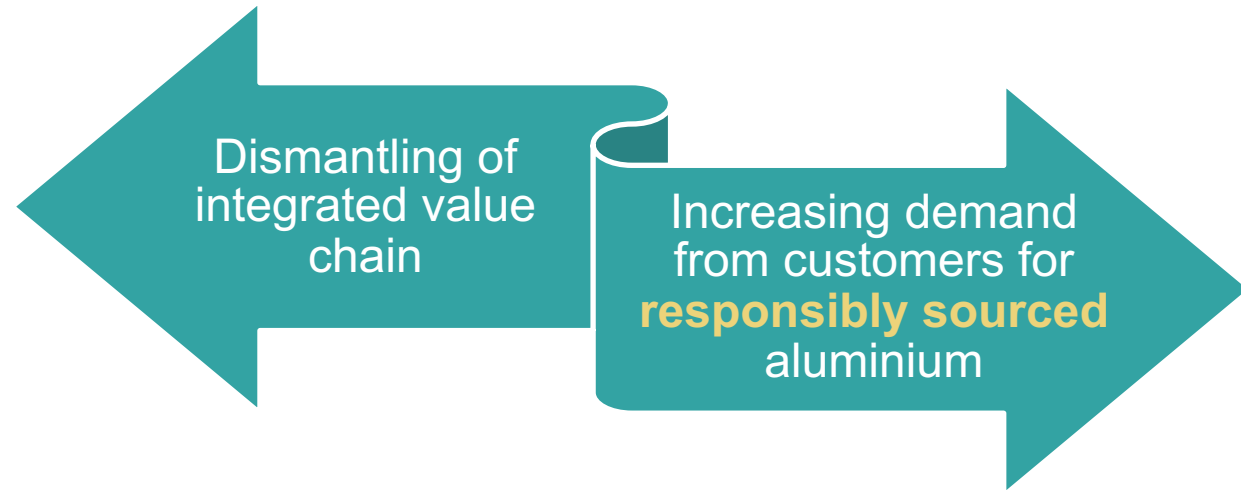


Conclusions

Global Context

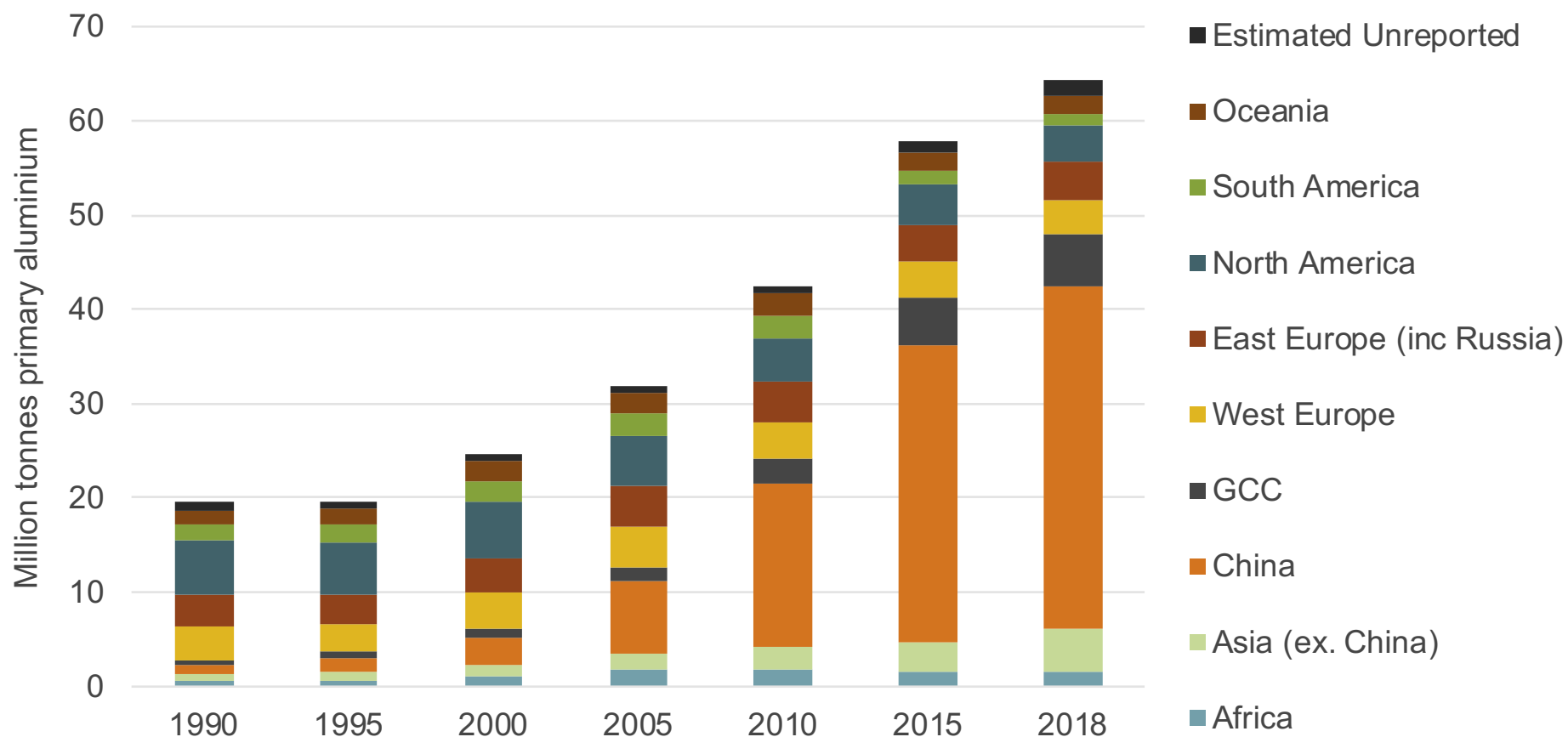


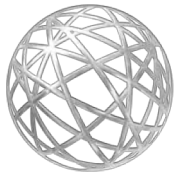
The industry must demonstrate...



1. **It produces responsibly** by mitigating environmental impacts and positively impacting the communities in which it operates;
2. **Its products bring a net benefit to society** in reduced environmental impact; improved quality of life, health, safety & wellness and economic growth;
3. **The value of the metal** and at end of life, energy and the resource inputs must be retained and realised through recycling or energy recovery.

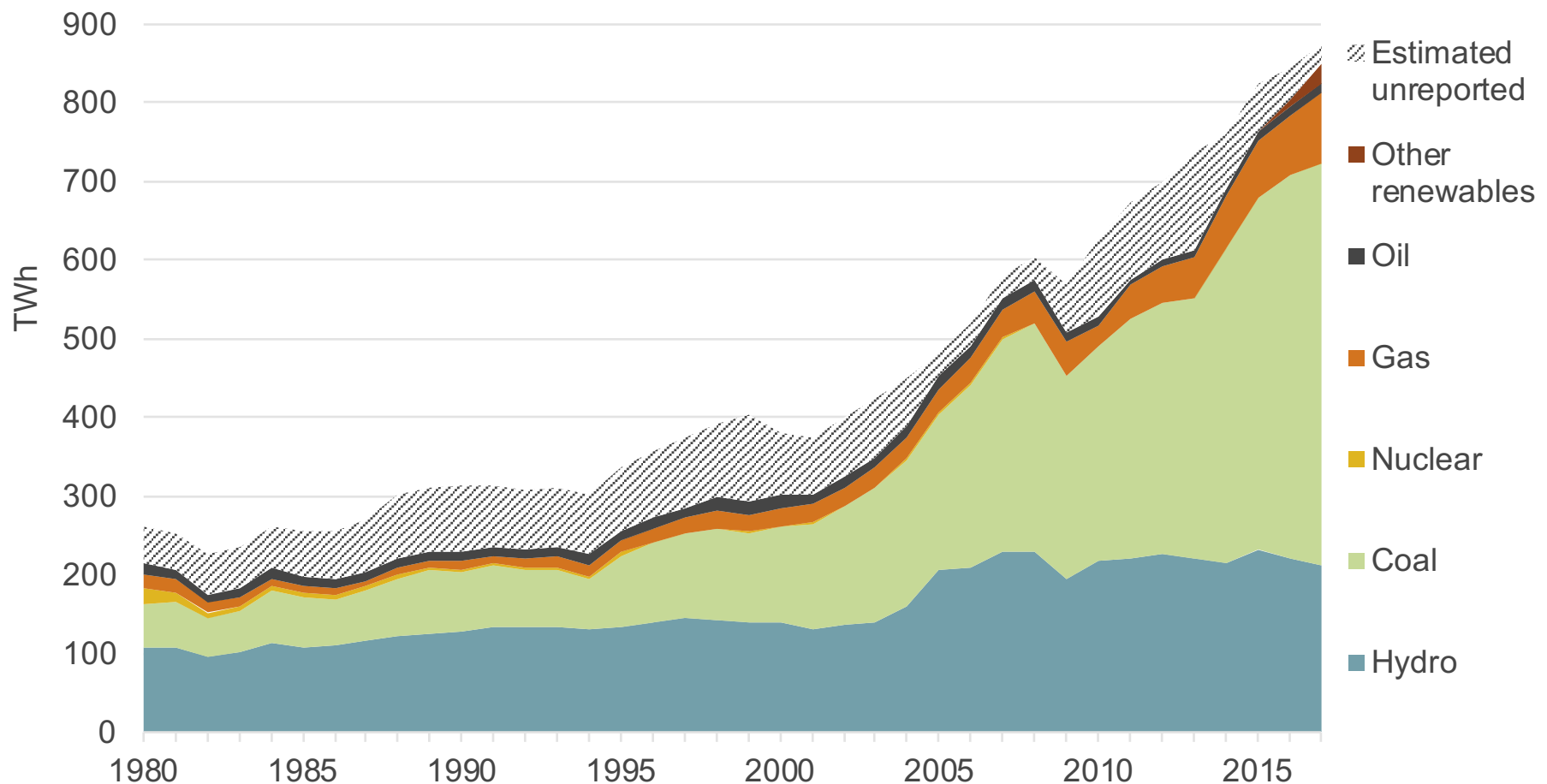
Growth of primary production

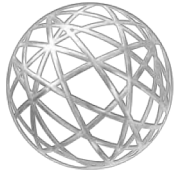




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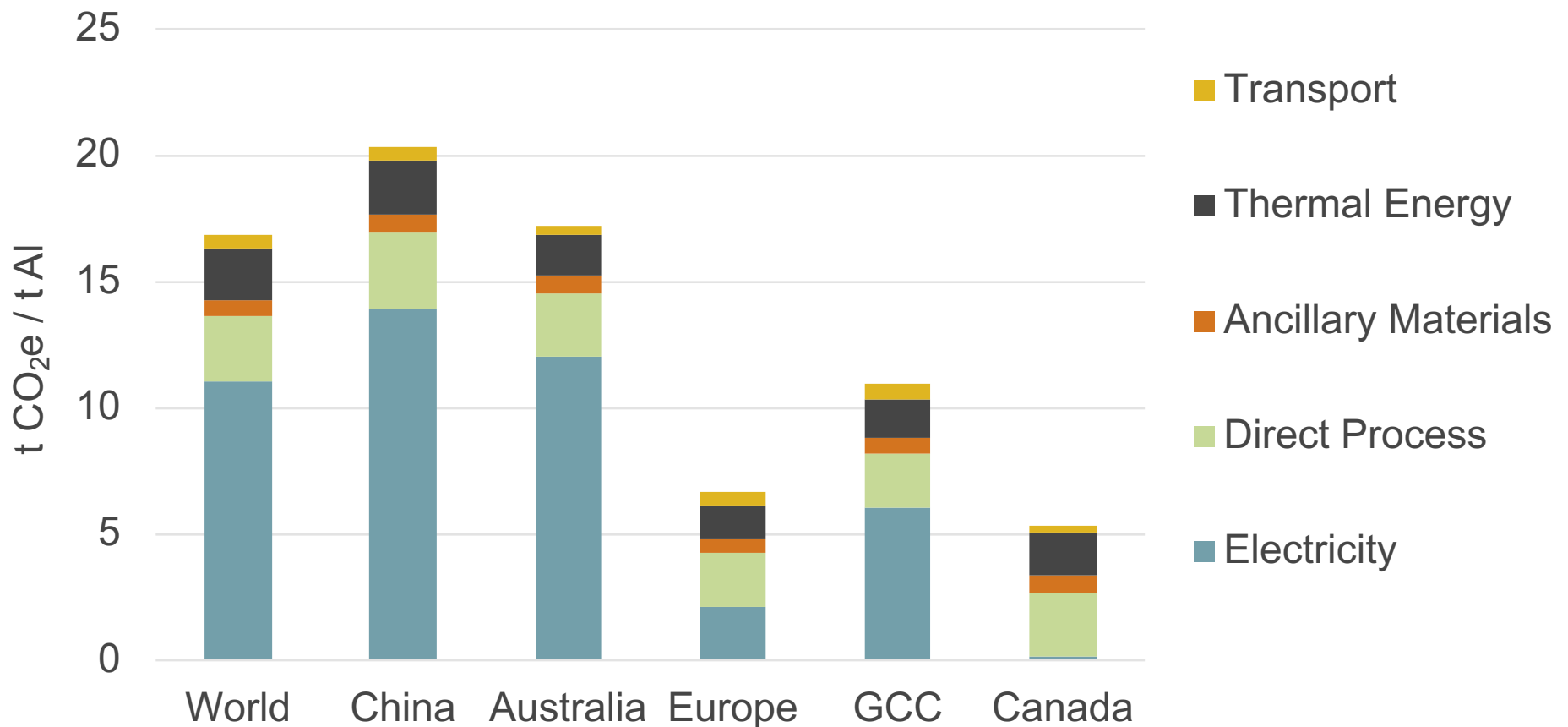
Smelter power is now 60% coal-fired



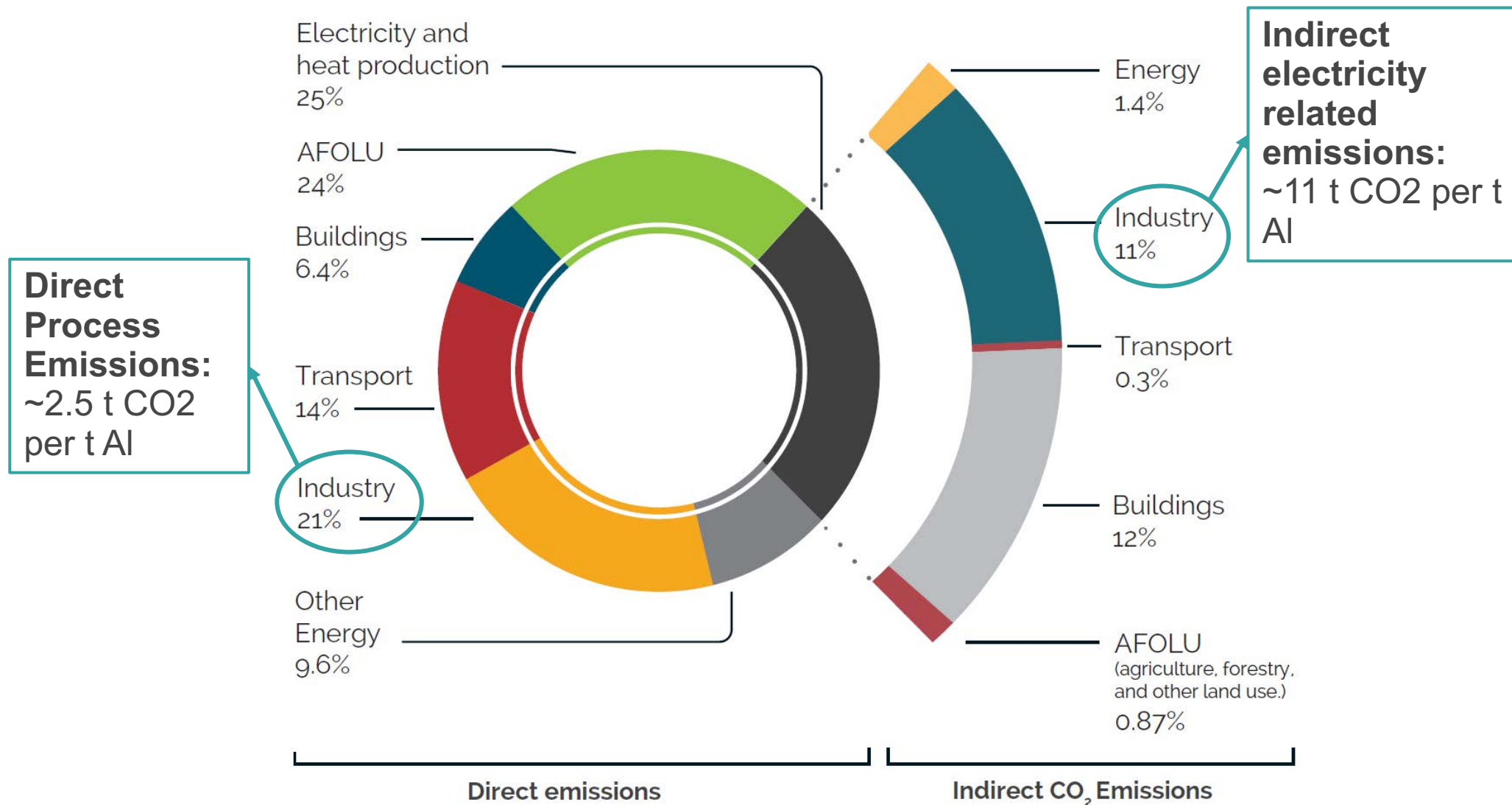


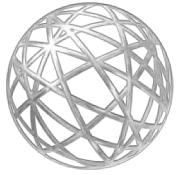
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Carbon footprint primary aluminium cradle-to-gate



The industry emits 1-2% of anthropogenic global CO₂ emissions





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The use of aluminium can bring a net benefit

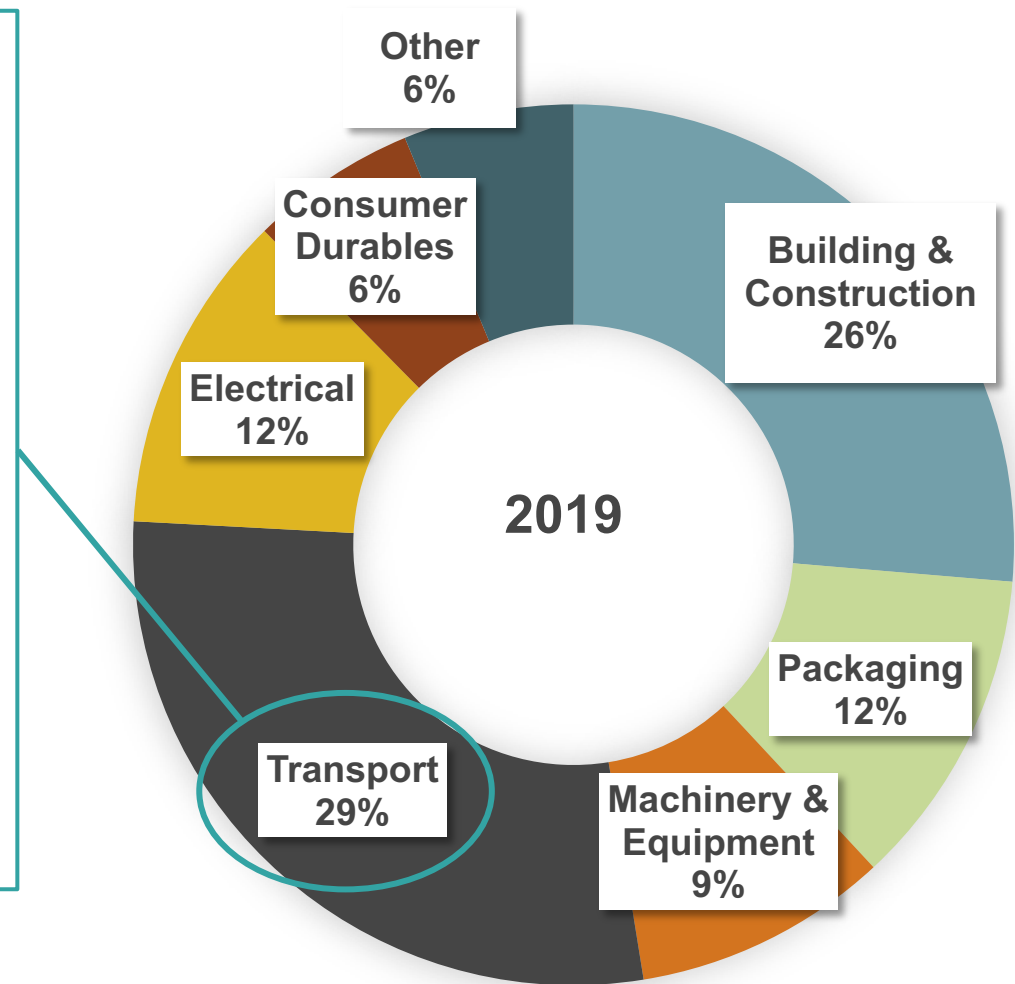
Transport Sector

Light-weighting:

1kg of aluminium replacing heavier materials can save:

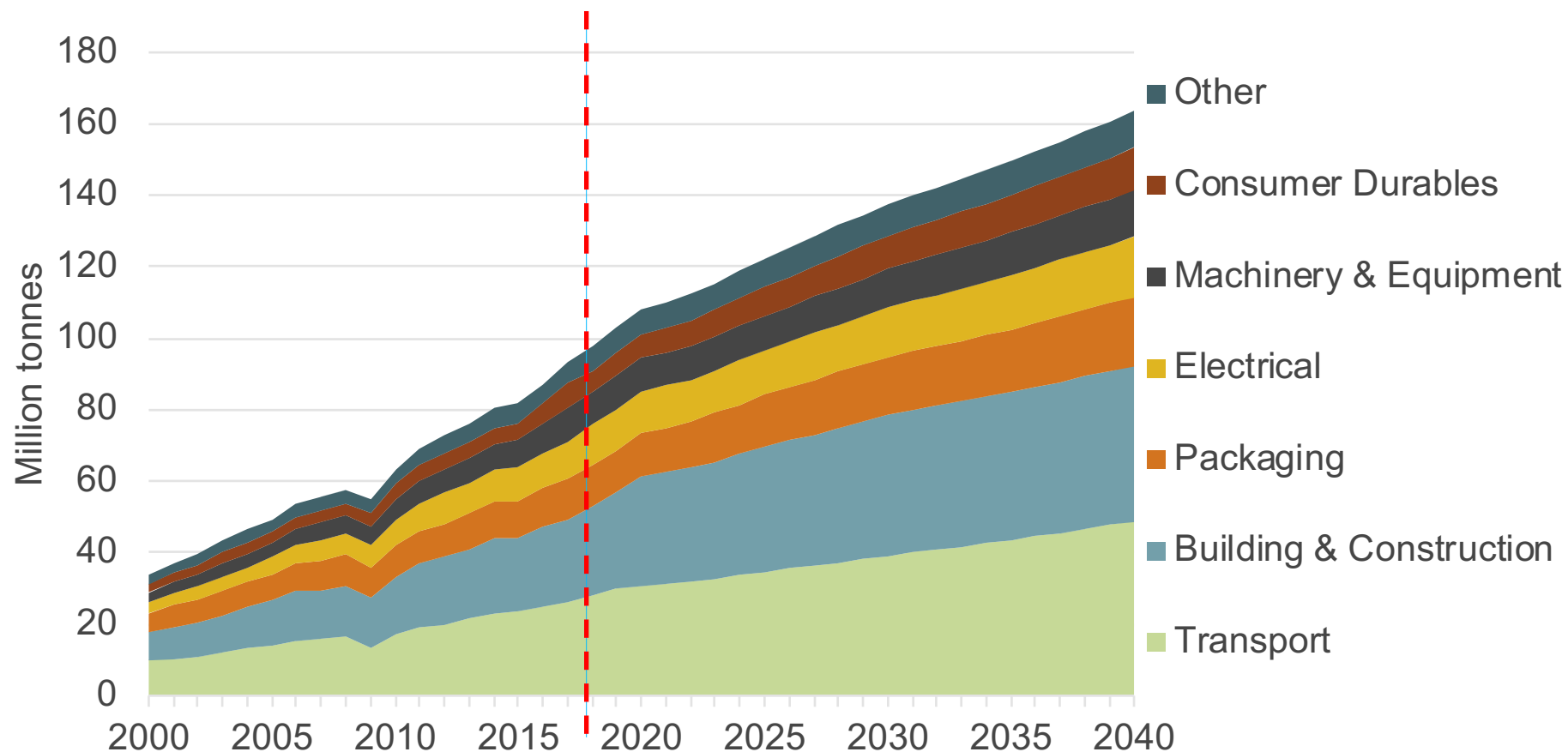
- **20kg** of CO₂ in a car
- **80kg** of CO₂ in a train

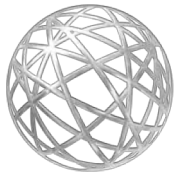
The aluminium shipped to the transport sector each year could save ~ **500 million tonnes of CO₂**



Growth in demand

Growing demand for light, strong, conductive, protective aluminium





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Durability and Recycling

1.3

billion tonnes
produced since 1888

1

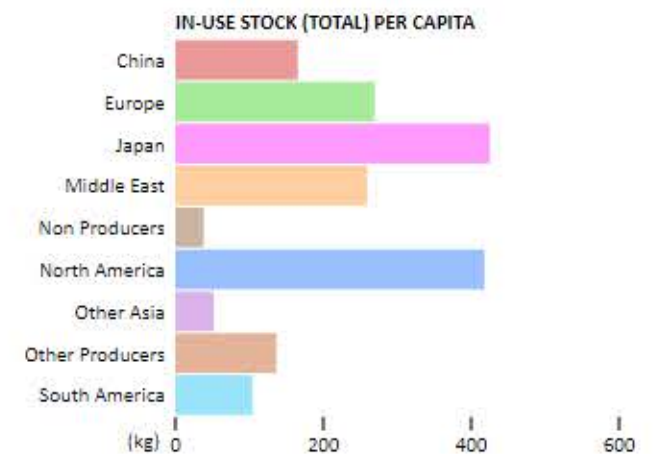
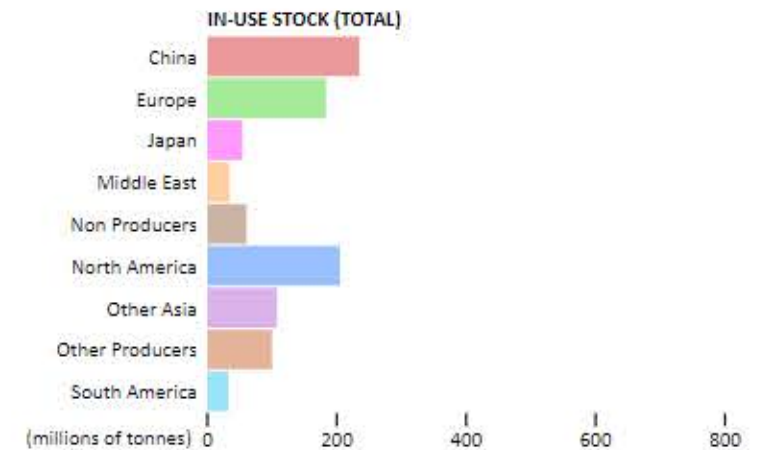
billion tonnes still in use in
transport, buildings and products

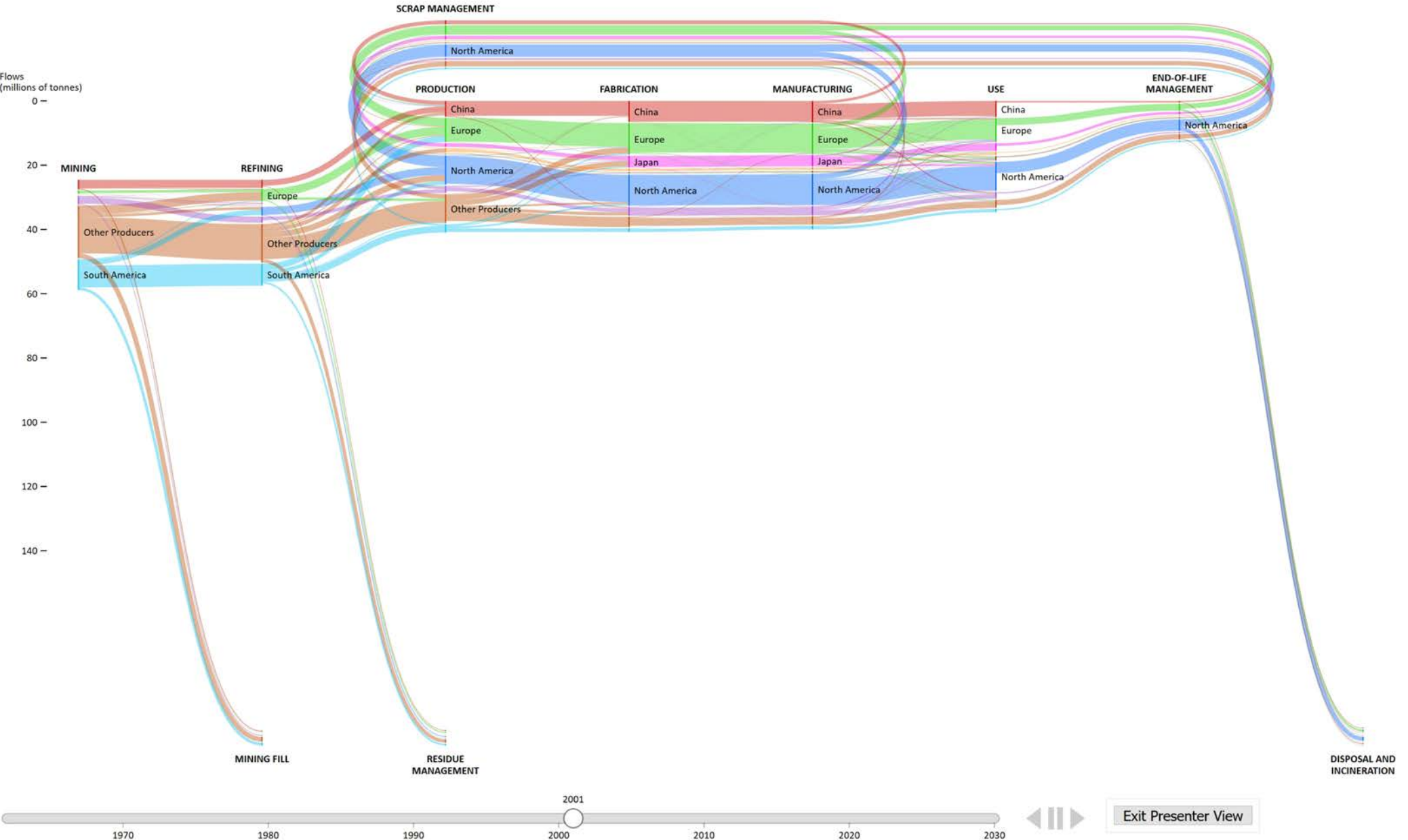
800

million tonnes produced
since 2000

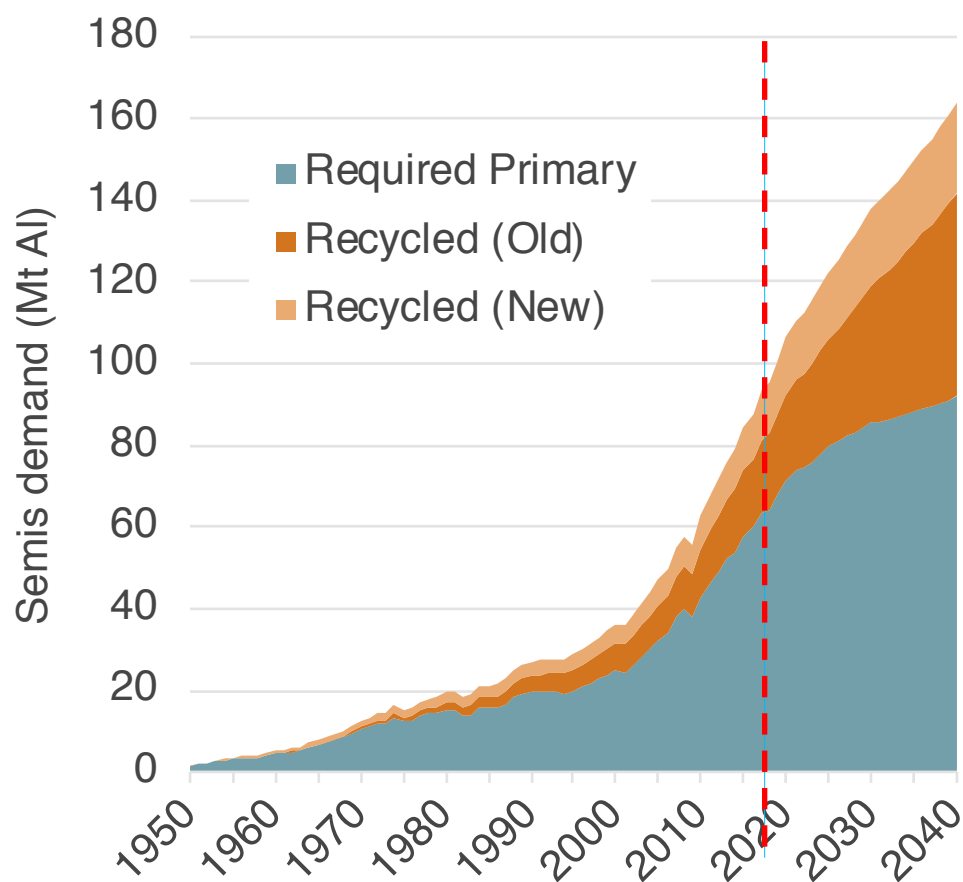
>75%

of all aluminium ever produced is
still in productive use



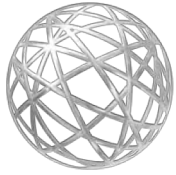


Primary continues to dominate supply



Million tonnes	2000	2018	2040
Semis demand	35	95	160
Final product demand	30	80	140
Recycled aluminium	12	31	70
...of which "old"	7	18	50
...of which "new"	5	13	20
Primary required	25	64	90

Risk Management



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Increased production to meet growing demand brings challenges



Raw materials:
Bauxite Mining

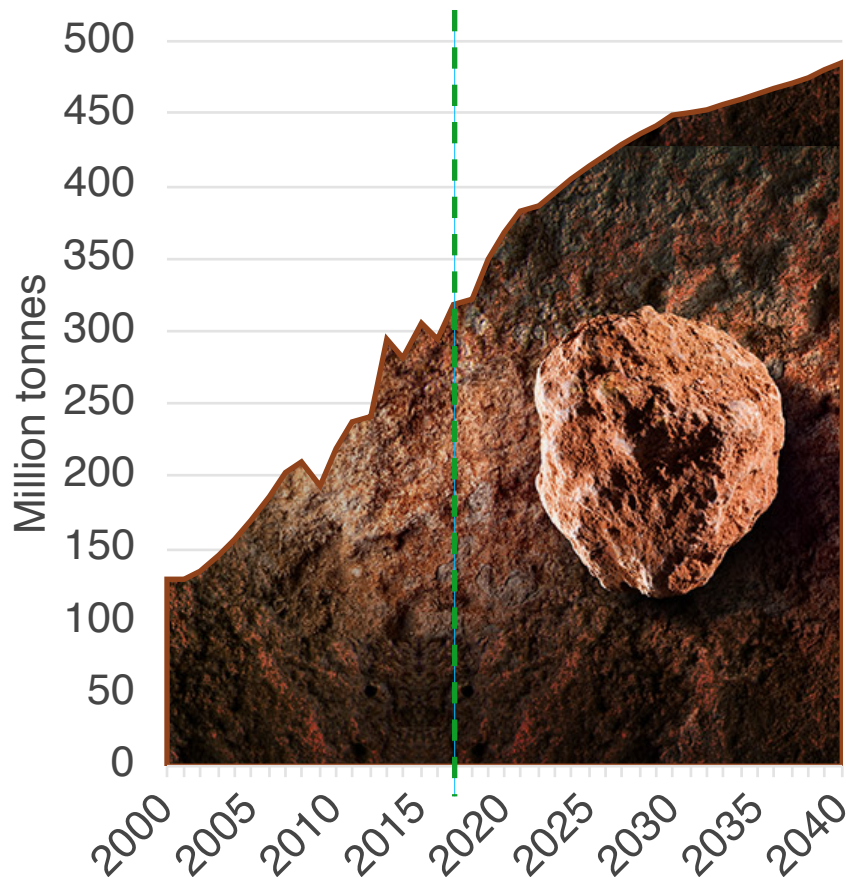


Waste Management
Bauxite Residue and Spent Pot Lining



Energy and Emissions:
Efficiency and GHGs

Raw Materials: 150 Mt more bauxite needed by 2040



- China ratio 60:40 domestic to imported to reverse (40:60);
- Fast growing regions of supply bring risks:
 - supply,
 - political,
 - environmental,
 - reputational.

Industry guidance and risk management



Sustainable mining practices



Governance



Community assessment & contribution



Health & safety



Environmental assessment & performance

Sustainable Bauxite
Mining Guidelines

Sustainable Bauxite
Mining Guidelines

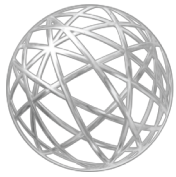
可持续铝土矿开采指南

Panduan Penambangan
Bauksit Berkelanjutan

Edisi Pertama
Maret 2018



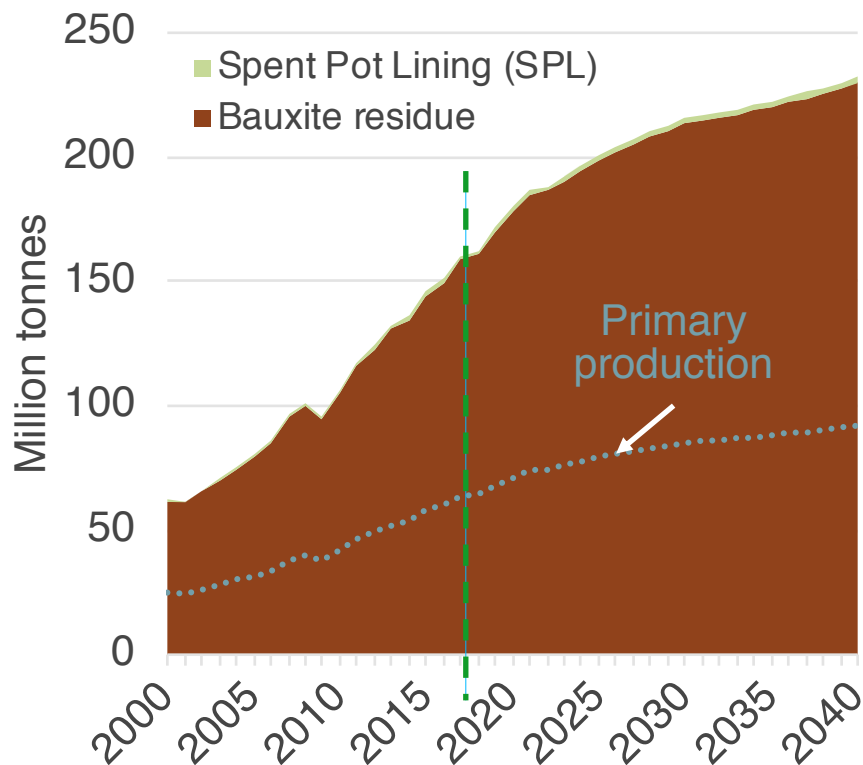
abai ASSOCIATION
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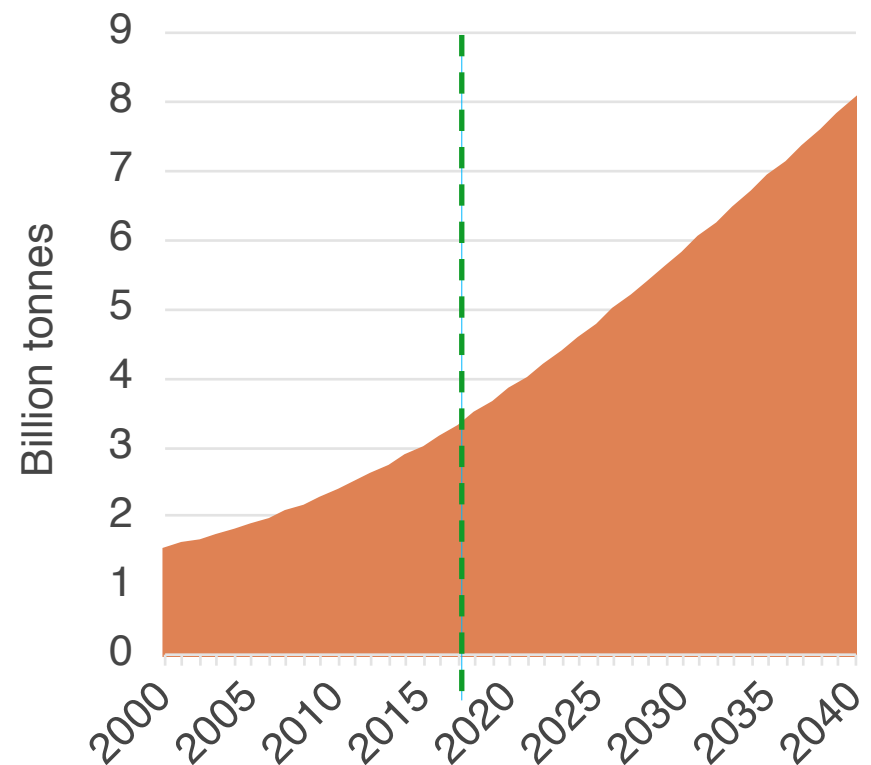
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Waste management: SPL and bauxite residue

Annual generation



Cumulative bauxite residue



Not 'one-size fits all'



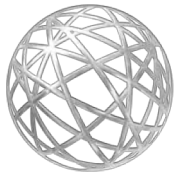
**Bauxite Residue
Management:
Best Practice**

铝土矿赤泥管理：
最佳方案

**Manajemen
Residu Bauksit:
Pelaksanaan
Tindakan Yang
Terbaik**

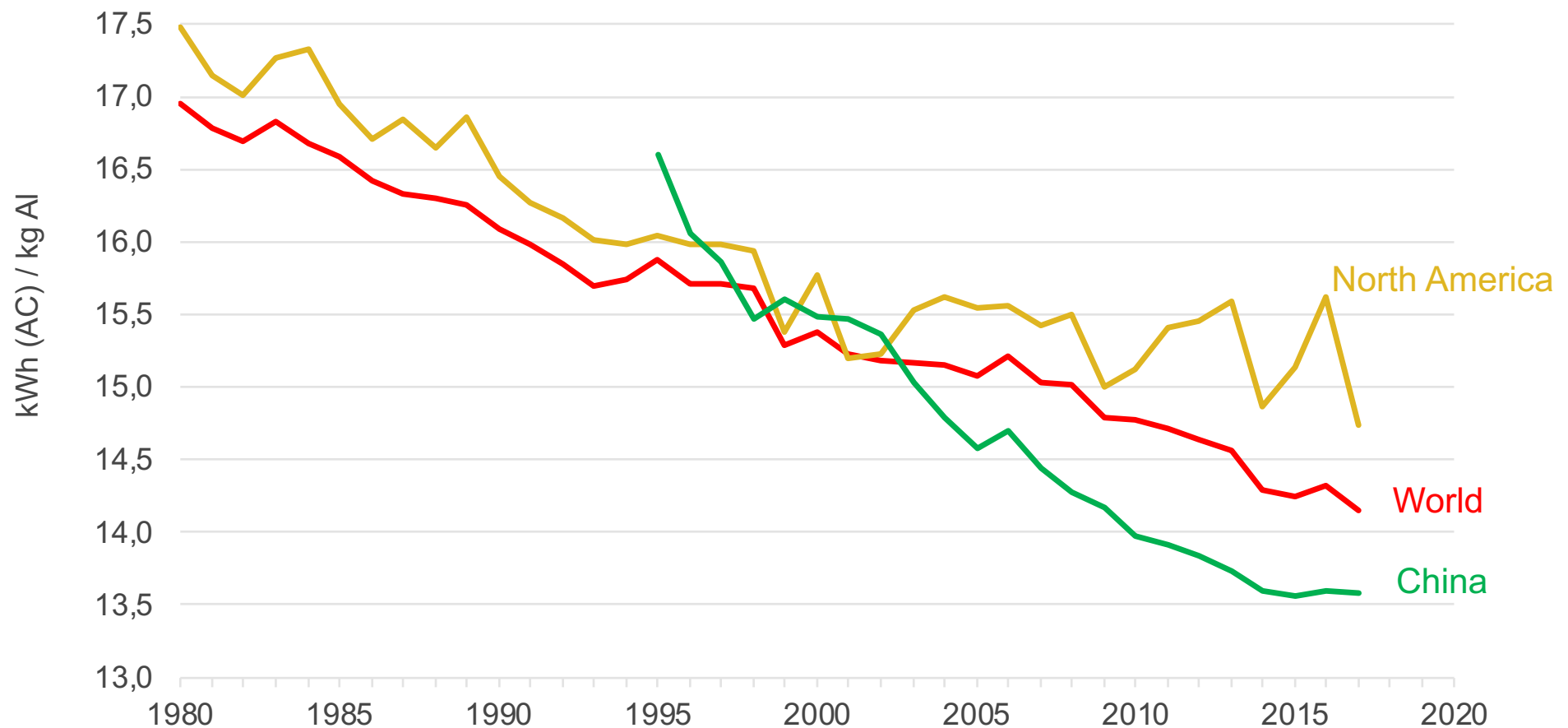
2015

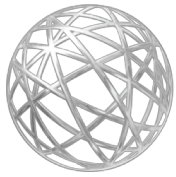




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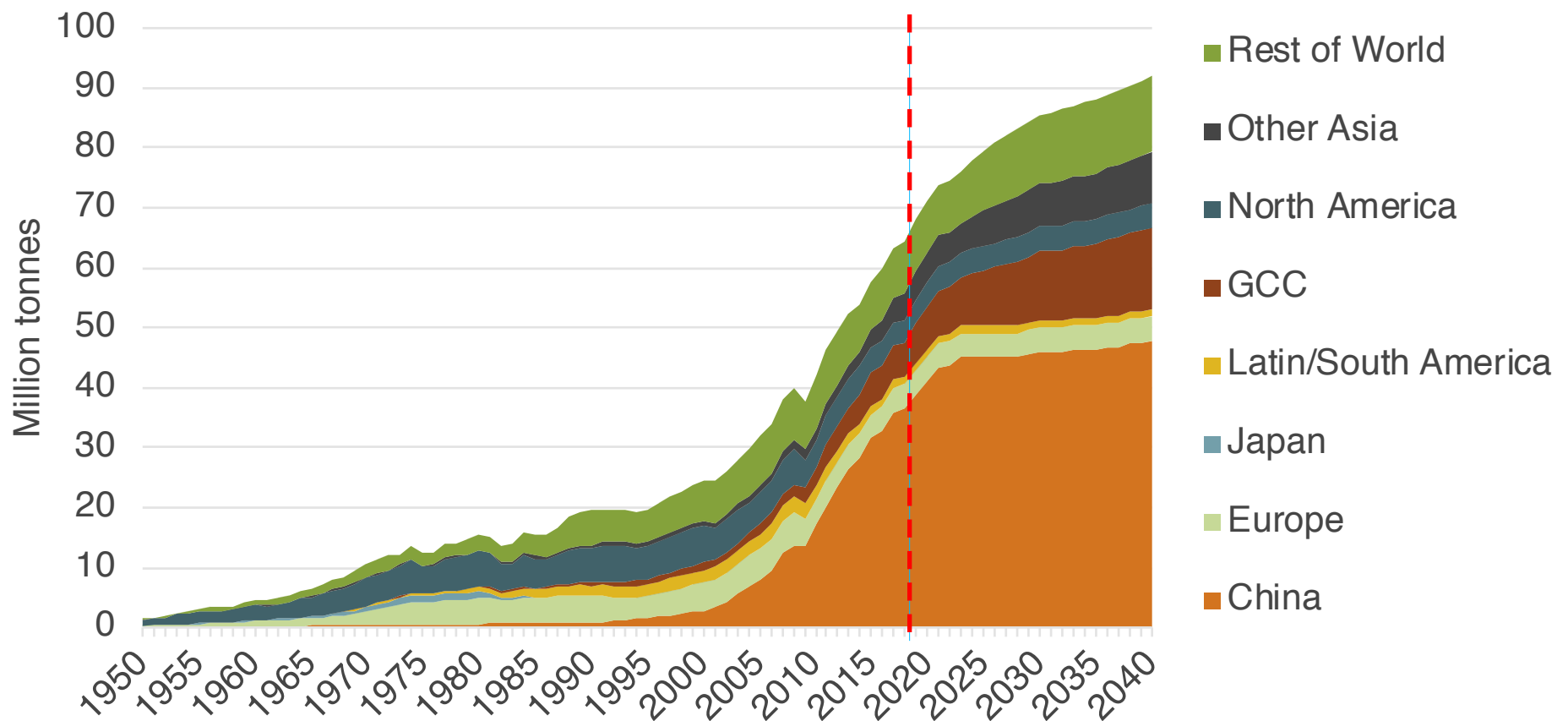
Energy: Intensity reduced by >15% since 1980





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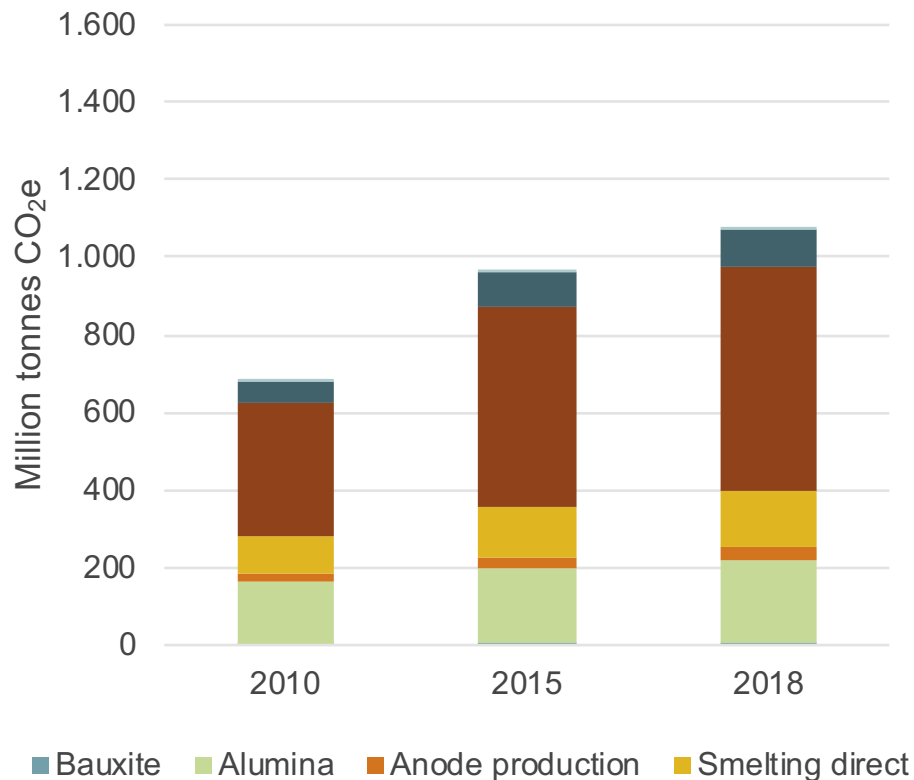
Primary production 2040 scenario



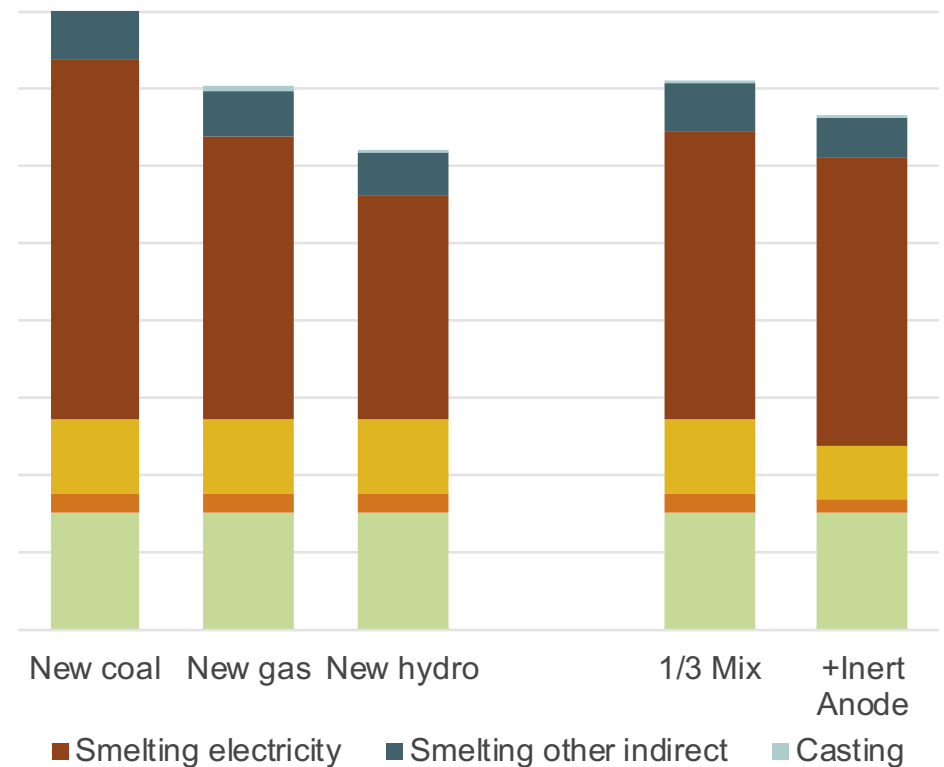
Emissions:

Total production emissions will increase

Historic



2040 Scenarios (90 Mt Al)





Low CO₂ Market Offerings

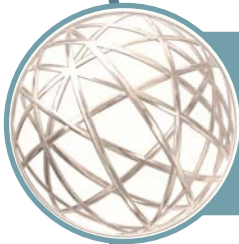


CONCLUSIONS

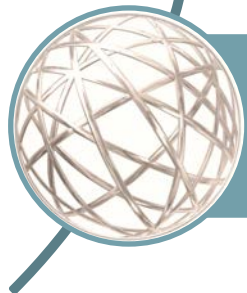
Conclusions



Primary aluminium will continue to meet the bulk of metal demand as long life products limit recycling potential



By 2040, 90Mt of primary aluminium will be required to meet demand



With growth in primary production, there are increased risks with raw materials supply, waste management, energy and GHG emissions



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Pernelle Nunez

Manager- Sustainability

nunez@world-aluminium.org

www.thealuminiumstory.com

