

Carbon Clarity

En+ leading the way to
the low carbon economy

ALUMINIUM IS CENTRAL TO A LOW CARBON ECONOMY



Aluminium's lightweight properties make it ideal for the bodywork of modern vehicles, which require the lightest possible components for energy efficiency



Aluminium is already a popular packaging solution given its impermeable and ductile properties. However, its ability to be recycled almost endlessly means it is well-positioned as the packaging solution for a low-waste future



Aluminium's ductile characteristics, durability and lightweight empower architects to build higher and with freer forms. At the same time, its superior ability to reflect infrared heat rays from the sun dramatically improves the energy efficiency of buildings

HOWEVER, A LOW CARBON ECONOMY DEMANDS LOW CARBON ALUMINIUM

ALUMINIUM IS AT CROSSROADS: EMBRACE A LOW-CARBON FUTURE AS METAL OF TOMORROW OR REMAIN STUCK IN PAST ON WRONG SIDE OF HISTORY

- The industry alone is responsible for **over 3 % of global carbon emissions**¹
- In 1990, the industry produced 350 million tonnes of CO₂ — **now it is responsible for 1.2 billion tonnes of CO₂** This is equivalent to **all of the emissions produced by Japan** in a year or equal to **400 million cars** driving each 20,000 kilometres²
- Aluminium smelters consume **4% of the world's annual electrical power output**.³ However, 74% of global primary aluminium is produced with non-renewable energy⁴
- Making 100% of aluminium produced by 2050 low carbon will allow us to **reduce emissions by 62%** of the current level, bringing the industry into alignment with the Paris Agreement⁵

WE'RE COMMITTED TO A LOW CARBON FUTURE

WHERE WE ARE

En+ is the world's largest producer of low carbon aluminium

- >95% of our aluminium is made using renewable hydropower
- We are responsible for 25% of the hydropower-produced aluminium worldwide
- We produce 2.6 tonnes of CO₂ per tonne of aluminium (scope 1&2 – smelters only) – 4 times lower than the industry average
- We reduced our greenhouse gas emissions by 7.5% in 2018 versus our 2014 baseline
- We've invested \$525 million in environmental initiatives over the past 5 years

WHERE WE AIM TO BE

We have committed to the United Nations Business Ambition for 1.5°C and recognize we need to make major changes to the way we operate. By 2025, we aim to:

- Reduce specific direct and indirect energy-related greenhouse gas emissions from reduction processes at our aluminium smelters to less than 2.7 tonnes of CO₂ per tonne of aluminium
- Produce at least 95% of our aluminium using renewable hydropower
- Reduce direct specific greenhouse gas emissions from our smelters by 15% compared to a 2014 baseline
- Reduce direct specific greenhouse gas emissions from our alumina refineries by 10% compared to a 2014 baseline
- Reduce specific aluminium smelter power consumption by 7% compared to a 2011 baseline

We are also planning to invest more than \$400 million to improve the environmental performance of our alumina refineries over the next 5 years and are aiming to use 100% recycled and reused water for our main production processes by 2022.

A COLLABORATIVE APPROACH TO TRANSFORMATIVE CHANGE

OUR INDUSTRY OBJECTIVES

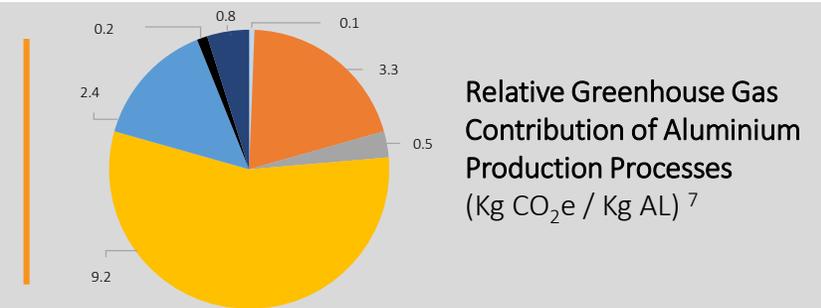
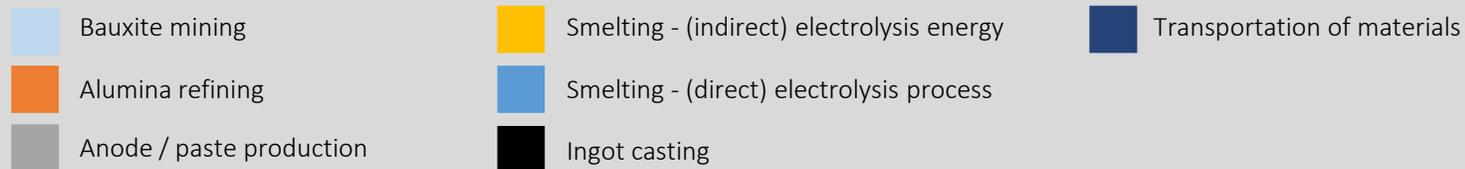
The climate crisis demands an urgent response from everyone involved in the aluminium industry. We will work with all stakeholders — from Bauxite miners to the purchasers of aluminium products — to achieve these key objectives:

- Gather a coalition of stakeholders from all stages of the aluminium supply chain to agree a meaningful and measurable roadmap for decarbonisation
- Agree international standards of carbon disclosure for the industry, giving customers full transparency of how their aluminium is made
- Identify and resolve the reasons businesses may be holding back from switching their aluminium purchasing to low carbon options
- Develop and maintain an internationally agreed definition of low carbon aluminium, allowing customers to purchase sustainable products with confidence

WHY TRANSPARENCY MATTERS

At present, just 20 companies are responsible for 100% of global greenhouse gas emissions disclosure. This needs to change if we are to transform the industry.⁶

Producing aluminium is a multi-stage process. To understand the impact of the material customers need full sight of every step



Not all aluminium is created equal. There is huge discrepancy between the cleanest and highest polluting producers

Over 75% of the energy used for European aluminium is renewable⁸
Leading brands average less than 4 tonnes of CO₂ per tonne of metal⁹

In China, 90% of aluminium production is powered with coal¹⁰
Higher emitting producers create closer to 20 tonnes of CO₂ per tonne of metal¹¹

There is increasing demand for low carbon aluminium. If customers are able to confidently discern the most sustainable materials they can use purchasing power to fuel an industry-wide transformation

- At present, less than 20% of aluminium could be classified as low carbon¹²
- Growing use of life-cycle analysis for carbon reduction in the auto and consumer goods industries is set to drive demand for low carbon aluminium
- Customers can only help drive change if they can target their purchasing at materials that are verifiably low carbon

CONSUMERS ARE DEMANDING CHANGE

En+ partnered with YouGov on a consumer survey¹³ to understand:

- What public appetite exists for low carbon products
- How much consumers currently understand about the carbon footprint of the products they buy
- The demand from consumers for more information on the emissions produced in the manufacture of their products

OUR KEY FINDINGS

7/10

UK consumers believe companies should be obliged to share the carbon footprints of their products

60%

of UK consumers care about buying products with a low carbon footprint

**Nearly
7 in 10**

UK consumers would be more likely to purchase lower carbon products if information on their carbon footprint were easily accessible

**Almost
70%**

of UK consumers who had checked the carbon content of the products they buy were not satisfied with the availability of information

**Over
45%**

of UK consumers said they would start looking for information on the carbon content of the products they buy

AUTOMOTIVE

Aluminium's lightweight properties make it ideal for producing energy efficient vehicles

- Using aluminium instead of steel can reduce a car's energy consumption by 17%¹⁴
- Total aluminium use in cars is projected to increase from 2,989 KT in 2019 to 3,635 KT in 2025¹⁵

Lightweight materials are particularly important for electric vehicles, which need to counterbalance the weight of their large batteries

- Sales of electric cars in the UK grew 158% from July 2018 to July 2019 and were up 63% globally last year¹⁶
- The global electric vehicle fleet has potential to grow from 5.1 million to 250 million by 2030¹⁷

Low carbon materials are essential if electric vehicles are to be considered a truly sustainable option

- Materials and manufacturing represent 60% of the total life cycle emissions for an electric vehicle¹⁸

OUR KEY FINDINGS

6/10

UK consumers would be likely to choose a car manufactured with a lower carbon footprint

Over
25%

of UK consumers would be very likely to choose a car manufactured with a lower carbon footprint

Nearly
1 in 3

UK consumers would be willing to pay at least a 5% premium for a lower carbon car

15%

of UK consumers would be willing to pay at least a 10% premium for a lower carbon car

CONSUMER GOODS

Aluminium's recyclability gives it an important role in the circular economy and can help reduce carbon emissions

- Recycling aluminium requires 5% of the energy needed to make new material¹⁹
- Over 75% of all aluminium ever produced is still in circulation²⁰
- 113,200 aluminium cans are recycled every minute and it can take as little as 60 days for a can to be used and recycled into a new product²¹
- A recycled drinks can will save enough energy to run your television for up to three hours²²

Concerns about waste have increased aluminium demand but consumers also need to consider how products are made

- Our YouGov results show consumers care about what happens to their products after they use them but are less conscious of the impact these items have before reaching the shelves
- Concern about plastic waste has meant sales of canned water have increased fivefold in the past year. However, the environmental benefit of switching from plastic, is wiped out if the material you replace it with is made using coal

OUR KEY FINDINGS

1/3

of UK consumers would be willing to pay at least a 5% premium for lower carbon household products

1 in 6

UK consumers would be willing to pay at least a 10% premium for lower carbon household products

Over half

of UK respondents believe carbon footprint is an important factor when buying drinks on the go, compared to 39% who said the brand is important

2X

as many UK consumers consider recyclability a very important factor when purchasing a drink on the go compared to those who consider the carbon footprint very important

CONSTRUCTION

Aluminium is the second most commonly used construction material in the world

- Aluminium alloys can reach comparable strength to steel with 1/3 the density — ideal for ambitious projects²³
- The facade of the Burj Khalifa, the highest building in the world, is made from aluminium and only weighs the equivalent of five Airbus A380s (approximately 1375 tonnes)²⁴

Aluminium is a major component of infrastructure around the world, meaning decarbonisation can have a widespread impact

- Metals make up approximately 60% of raw materials purchased for some international cable providers²⁵

OUR KEY FINDINGS

70%

of UK residents said the government should deny new building requests for projects with higher carbon footprints

Respondents in other countries were less supportive of government intervention...

4/10

in the U.S. were in favour of denying new building requests for higher carbon projects

5/10

in Germany said they supported the same proposition

80%

of UK respondents said they don't feel well informed about which building materials have a low carbon footprint

A CALL TO ACTION

En+ is calling on the London Metal Exchange to implement mandatory reporting on carbon emissions. Here's why:

A global precedent

As a global exchange, the LME can set an important precedent for carbon disclosure and encourage others such as the Shanghai Futures Exchange to follow suit

An example for contracts across the industry

At present, carbon disclosure by aluminium producers occurs voluntarily and on a contract-by-contract basis. By setting a clear example for the industry, a low carbon asset class on the LME would increase pressure for systematic carbon reporting not just on the exchange but also in private contacts

A credible standard for low carbon

LME disclosure rules and definitions for low carbon would provide a clear standard for the aluminium producers to meet, allowing producers to better target their decarbonisation plans and helping customers select the most sustainable materials

WHAT YOU CAN DO

En+ encourages both producers and customers of aluminium to drive transparency in the industry through a number of steps.

PRODUCERS



Write to the London Metal Exchange notifying them that you support greater carbon disclosure and are willing to join meetings to agree new rules



Join the World Economic Forum's 'Aluminium for Climate' initiative, which is seeking to bring producers and customers together to develop a roadmap for aluminium's low carbon transition

CUSTOMERS



Make your voice heard. Publicly discuss your support for greater carbon disclosure and join talks on through the 'Aluminium for Climate' initiative



Demand transparency on carbon emissions from your direct suppliers. Many aluminium contracts include some degree of carbon disclosure, but making this a principle of negotiation can drive standards across the industry

INVESTORS



Integrate carbon disclosure into investment criteria



Engage with businesses to clarify the standard of disclosure required for investment and support companies on the path to meeting those standards with examples of best practice

CONSUMERS



Take time to understand how the products you regularly buy are made and where they come from



When information is not available, engage with brands through social media to seek greater disclosure

DISCLOSING OUR OWN CARBON FOOTPRINT

En+ Group is working continually to reduce the carbon footprint of its operations as part of the commitment to the shift towards a low carbon economy.

Approximately 75% of carbon emissions from aluminium production come from the smelting process, of which 60% result from generating energy to power the smelters.²⁶ These are called Level 1 emissions.²⁷ Unlike Level 2 emissions, which include direct emissions from bauxite mining and alumina refining, plus emissions from electricity and heat production and fuel combustion for these processes, these can be measured by [all [major] aluminium producers], including those with a low level of vertical integration.

2.5 tCO ₂ /tAl	Average Level 1 carbon emissions for En+ ALLOW aluminium (c.80% of the Group's aluminium)
2.6 tCO ₂ /tAl	The average emissions for all En+ aluminium for all sources related to producing aluminium from alumina at smelters (Level 1 carbon emissions)
12.6 tCO ₂ /tAl	Average Level 1 carbon emissions for world aluminium ²⁸
16.2 tCO ₂ /tAl	Average Level 1 carbon emissions for Chinese aluminium ²⁹

NOTES

1. Using the global average of 16.4 ton CO₂/ton primary aluminium (18 ton CO₂/ton primary but excluding scope 3 emissions) and 30% of demand met with recycled aluminium, total CO₂ emissions from the aluminium industry can be estimated at 1.2bn tons per year (World Economic Forum, “Shaping the agenda for net-zero aluminium”, 3 Sep 2019). Expressed as a proportion of global CO₂ emissions for 2018, which were 37.1bn (Nature, Jeff Tollefson, “Global industrial carbon emissions to reach all-time high in 2018, 7 Dec 2018, <https://www.nature.com/articles/d41586-018-07666-6>), this accounts for 3.2% of the total
2. World Economic Forum, “Shaping the agenda for net-zero aluminium”, 3 Sep 2019
3. World Aluminium reported 867,210 GWh of power consumption from primary aluminium smelting in 2018, (“Primary aluminium smelting power consumption”, 31 Jul 2019, <http://www.world-aluminium.org/statistics/primary-aluminium-smelting-power-consumption/>). IEA reported 26,672 TWh of electricity generation in 2018 (“Global Energy & CO₂ Status Report”, p.25 https://webstore.iea.org/download/direct/2461?fileName=Global_Energy_and_CO2_Status_Report_2018.pdf)
4. CRU, RUSAL
5. CRU, RUSAL
6. Abbvie, Adidas, Aviva, Beni Stabili, Cofinimmo, Deutsche Bank, Equinor, Fiat Chrysler, Henkel, IRPC, KGHM, Microsoft, Norske Skog, Northern Trust, Royal Dutch Shell, Safestore Holdings, Saipem, Tokio Marine, Unibail-Rodamco, Verisk Analytics
7. IAI, “Environmental Metrics Report”, September 2014, p.15
8. Reuters, Andy Home, “Sustainability the new battleground for aluminium producers”, 22 Oct 2019, <https://af.reuters.com/article/metalsNews/idAFL5N27748U>
9. Norsk Hydro (“Annual Report 2018”, p.47 <https://www.hydro.com/Document/Index?name=2018%20Annual%20report.pdf&id=8525>), Rio Tinto (“Our Approach to Climate Change 2018, p.9, https://www.riotinto.com/documents/RT_Our_approach_to_climate_change_2018.pdf), Alcoa (“2018 Sustainability Report”, p.25, <https://www.alcoa.com/sustainability/en/pdf/2018-Sustainability-Report.pdf>), En+ Group (“Sustainability Report 2018”, p.86, <https://www.enplusgroup.com/upload/iblock/4c5/En+%20Group%202018%20Sustainability%20Report.pdf>). Also see Carbon Trust, “International Carbon Flows: Aluminium”, May 2011, p.10, https://www.carbontrust.com/media/38366/ctc790-international-carbon-flows_-aluminium.pdf
10. AluWatch, “China Consumes Too Much Coal to Produce Aluminium”, 28 Oct 2019, <http://www.aluwatch.org/china-consumes-too-much-coal-to-produce-aluminium/>
11. Carbon Trust, “International Carbon Flows: Aluminium”, May 2011, p.10, https://www.carbontrust.com/media/38366/ctc790-international-carbon-flows_-aluminium.pdf
12. SBT (WRI, 2019), CRU
13. This survey covered the UK, United States and Germany. It used a combined sample of 5,611 people, including: 2,054 from the UK, 1,332 from the US, and 2,225 from Germany

NOTES

14. Drive Aluminium, "Aluminium Advantages: Sustainability", Jan 2015, <https://www.drivealuminum.org/aluminum-advantages/sustainability/>
15. Ducker Frontier, "Aluminium Content in European Passenger Cars", 10 October 2019, pp.9-10
16. Driving Electric, "Electric car sales UK: electric car sales up over 150% year-on-year", 5 Aug 2019, <https://www.drivingelectric.com/news/678/electric-car-sales-uk-2019-stars-110-jump>
17. International Energy Agency, "Global EV Outlook 2019", May 2019, p.4, https://webstore.iea.org/download/direct/2807?fileName=Global_EV_Outlook_2019.pdf
18. Evan Petkov, "The Impact of Low CO2 Footprint Aluminium on Lifecycle Emissions", 2017
19. The Economist, "The Price of Virtue", 7 June 2007, <https://www.economist.com/leaders/2007/06/07/the-price-of-virtue>
20. Aluminium.org, "Facts at a Glance", <https://www.aluminum.org/aluminum-advantage/facts-glance>
21. Recycle More, "Aluminium Facts", <https://www.recycle-more.co.uk/household-zone/top-facts>
22. Amgen Cymru, "Recycling facts", http://www.amgen-cymru.com/recycling_facts.php
23. ASM International, "Aluminium and Aluminium Alloys", 2001, <https://materialsdata.nist.gov/bitstream/handle/11115/173/Aluminum%20and%20Aluminum%20Alloys%20Davis.pdf?sequence=3&isAllowed=y>
24. Burj Khalifa, "Fact Sheet", <https://www.burjkhalifa.ae/en/assets/FACT-SHEET.pdf>
25. Prysman Group, "2018 Sustainability Report", p.96, https://www.prysmiangroup.com/sites/default/files/atoms/files/Prysmian_%20DNF%202018_ENG_DEFINITIVA_CLEAN.pdf
26. IAI 2018
27. As defined in the IAI Aluminium Carbon Footprint Technical Support Document - Level 1: Emissions from aluminium electrolysis, aluminium ingot casting, anode/paste production, as well as emissions from electricity generation & heat production associate with these processes
28. IAI 2018
29. RUSAL