NET-ZERO INDUSTRY ACT

PUBLIC CONSULTATION ON THE DELEGATED ACT ON PRIMARILY USED COMPONENTS

European Aluminium Response

18 February 2025

Introduction

European Aluminium welcomes the opportunity to contribute to the European Commission’s consultation on the delegated act on primarily used components under the Net-Zero Industry Act (NZIA). We strongly support the NZIA’s objective of strengthening Europe’s net-zero technology manufacturing capabilities by streamlining permitting processes and ensuring regulatory predictability.

Aluminium is a strategic enabler of the green transition. Its lightweight, durable, and infinitely recyclable properties make it essential for multiple net-zero technologies, including solar panels, wind turbines, batteries, hydrogen infrastructure, heat pumps, carbon capture systems and more. Ensuring that key aluminium components are *explicitly* recognised in the delegated act will reinforce Europe’s clean technology leadership, reduce supply chain vulnerabilities, and strengthen industrial resilience. However, we note that several critical aluminium components are not yet included. To address this, we provide a structured rationale for their inclusion, based on the four assessment criteria outlined in the Commission’s Staff Working Document.

Missing Aluminium Components & Justification

To support the Commission’s assessment, we are including below a detailed mapping of primarily used aluminium components that we have prepared. This mapping outlines the key components made of aluminium that play a critical role in net-zero technologies.

While we believe that all aluminium components included in our mapping meet the primarily used criteria, we would like to provide further justification for certain components to ensure their explicit recognition.

Aluminium frames and support structures (photovoltaic (PV) technologies): Aluminium frames and support structures are crucial for photovoltaic (PV) technologies, ensuring structural integrity, corrosion resistance, and long-term durability in outdoor conditions. These components are widely produced and traded by European manufacturers, supporting both domestic and global solar markets. Designed exclusively for PV applications, they provide mounting stability and alignment, optimizing

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energy capture. Aluminium is essential in this context, as no other material offers the same combination of strength, lightweight properties, recyclability, and resistance to weathering, all of which are vital for the efficiency and longevity of PV installations.

Aluminium frames and support structures (onshore wind and offshore renewable technologies): Aluminium frames and support structures play a critical role in onshore wind and offshore renewable technologies, particularly in nacelle enclosures, turbine support structures, and offshore floating platforms, where weight reduction and corrosion resistance are crucial. These components are manufactured at scale within the EU and globally, ensuring robust supply chains to meet the growing demand for renewable energy infrastructure. Designed specifically for wind turbines, including new-generation floating wind structures, aluminium is an essential material due to its lightweight properties and corrosion resistance. Alternatives, such as steel, increase weight and reduce efficiency, making aluminium indispensable for reducing material loads and improving transport and installation feasibility in wind energy projects.

Aluminium frames and structures (battery technologies and storage systems): Aluminium is a key component in battery technologies and storage systems, used in enclosures, module periphery, and structural frames to provide lightweight strength, durability, and thermal stability. These aluminium-based structures are mass-produced by European suppliers to meet the demand of energy storage and battery applications. Aluminium constitutes nearly 30% of an EV battery, playing an essential role in cell housing, cooling systems, and cathode materials, while enhancing durability, thermal management, and energy efficiency. No alternative material offers the same combination of strength, conductivity, weight reduction, and recyclability, making it indispensable for the performance, safety, and efficiency of modern battery systems.

Aluminium heat exchangers (Heat pump technologies): Aluminium heat exchangers are essential for optimizing energy efficiency, heat transfer, and system durability in heat pump technologies. Widely manufactured by European suppliers, these components ensure a reliable and scalable supply chain. Specifically designed for heat pumps, they play a crucial role in improving system performance and longevity. Aluminium offers a unique balance of lightweight strength, thermal conductivity, and corrosion resistance, making it indispensable for effective heat pump operation in both residential and industrial applications. No alternative material can provide the same combination of properties for reliable heat pump performance.

Aluminium pipes and tubes (Hydrogen technologies): Aluminium pipes and tubes are specifically designed for the safe and efficient transportation of hydrogen in infrastructure systems. These components are widely manufactured and traded across the EU and engineered specifically for hydrogen technologies. Aluminium's unique properties, such as strength, lightness, and corrosion resistance, make it indispensable for safely transporting hydrogen over long distances, preventing leaks, and maintaining system integrity.

Aluminium frames (Hydrogen Technologies): Aluminium frames are integral to various hydrogen electrolyser technologies, including PEM, SOEC, and AEM electrolysers. They are widely manufactured and traded across Europe and provide essential structural support for electrolysers, ensuring the stability and efficiency of these hydrogen production systems. The material's lightweight strength and corrosion resistance make it crucial for maintaining the performance and longevity of hydrogen technologies, ensuring efficient operation in hydrogen production processes.

Lightweight Hull and Structural Materials (Wind and electric propulsion technologies for transport – Maritime & Transport Applications): Aluminium is used as a lightweight hull and structural material in wind and electric propulsion technologies for vessels. These components are specifically designed to reduce the overall weight of the vessel, reducing emissions in maritime transport. Its unique combination of lightweight properties, corrosion resistance, and recyclability makes aluminium essential for improving the environmental footprint and operational efficiency of wind and electric-propelled vessels.

Aluminium Components (Carbon Capture technologies): Aluminium components play a critical role in carbon capture technologies, forming an essential part of the green technology value chain. The material's unique combination of lightness, strength, corrosion resistance, durability, and formability makes it ideal for applications in heat exchanger systems and energy transfer solutions. Aluminium's excellent conductivity and formability, combined with its strength, ensure efficient heat exchange and energy transfer, which are vital for carbon capture and other green technologies. As the demand for decarbonisation solutions grows, aluminium's properties make it indispensable for the efficient operation and long-term durability of carbon capture systems, supporting the transition to a more sustainable energy landscape.

Aluminium pipes and tubing for CO_2 and biogas transport (Sustainable biogas and biomethane technologies): Aluminium pipes and tubing are essential for the transportation of CO_2 and biogas in sustainable biogas and biomethane technologies. The material's strength, lightweight properties, and resistance to corrosion make it the ideal choice for maintaining the integrity of transport systems under challenging conditions. Aluminium's durability ensures long-lasting, efficient performance in the movement of biogas and CO_2, which are key components in decarbonising energy systems and enabling a circular economy through biogas production.

Aluminium pipes for heat distribution networks (Energy system-related energy efficiency technologies): Aluminium pipes are crucial for energy systems related to energy efficiency technologies, particularly in district heating and industrial heat transfer applications. The material's lightweight strength, corrosion resistance, and thermal conductivity make it indispensable in heat distribution networks. Aluminium ensures that energy is transferred effectively across large-scale systems, reducing energy losses and contributing to the overall sustainability and efficiency of heating solutions.

Further Considerations

The NZIA establishes an ambitious Union-wide target of 50 million tonnes of yearly CO_2 injection capacity by 2030. To meet this target, it is essential to coordinate investments, ensure financing, and create a clear regulatory framework that enables the rapid development of storage capacity. Achieving this goal requires a comprehensive approach to the entire CCS value chain, which includes not only the capturing and liquefaction of off-gases, but also the transportation infrastructure and storage solutions necessary for carbon capture to play a significant role in decarbonizing sectors such as aluminium production and other hard-to-abate energy-intensive industries. It is crucial that these key technologies are adequately reflected in the final list of components under the delegated act.

Aluminium smelting requires substantial investments in CO_2 capture, transport, and permanent storage solutions, yet these enabling technologies remain underrepresented in the current draft of the delegated act. As outlined in the Commission's Industrial Carbon Management Strategy, CCS will be pivotal in reducing emissions across Europe's industrial sectors. It is critical to develop a business case for CCS now, to meet both Europe's GHG reduction targets and its goal of increasing self-sufficiency in energy and industry.

However, uncertainty regarding regulatory conditions, market mechanisms, and financial returns remains a major obstacle to investing in decarbonization technologies, including CCS solutions. Additionally, the EU and national funding landscape is complex and difficult to navigate, with lengthy timelines and intricate application procedures. More importantly, the financial support available is far from sufficient to cover the full scope of CCS needs, including both CAPEX and OPEX. It is vital to ensure that short- and long-term funding is adequately addressed. To bridge these gaps, policy measures must complement the inclusion of key components in the delegated act. We propose the following actions:

1. Establish a robust regulatory framework for CO_2 transport: one that reduces risks for providers, streamlines permitting procedures for CCS and CCU project development, and sets harmonized CO_2 specification standards across Europe.
2. Guarantee sufficient and equitable access to CO_2 transport solutions and storage infrastructure for industries across Europe, ensuring geographic balance in available capacity.
3. Create an EU Industrial Carbon Management Alliance to bring together stakeholders from across the value chain, fostering collaboration and accelerating deployment of CCS technologies.
4. Ensure adequate financial support mechanisms, including grants, subsidies, and tax incentives, to strengthen the business case for private-sector investment in early-stage CCS infrastructure.

Proposed aluminium components to ANNEX:

ANNEX

List of final products and specific components considered to be primarily used for the production of net-zero technologies

<table>
<tr><th></th><th>Sub-categories within net-zero technologies</th><th>Components that are primarily used for net-zero technologies</th></tr>
<tr><td rowspan="4">Solar technologies</td><td>PV technologies</td><td>Solar panel frame
Inverters
Aluminium mounting system
Electric wiring
Frames/base (extrusions)</td></tr>
<tr><td>Solar thermal electric technologies</td><td>Frames/base (extrusions)</td></tr>
<tr><td>Solar thermal technologies</td><td rowspan="2">Frames/base (extrusions)
Flexible Solar Panels</td></tr>
<tr><td>Other solar technologies</td></tr>
<tr><td>Onshore wind and offshore renewable technologies</td><td>Onshore wind technologies</td><td>Aluminium blades
Tower platform
Tower ladders and handrails
Lift systems
Cable mounting systems
Fall protection
Tower external entry platform
Stairs
Handrails
Walkways
Walkways
Cable mounting systems
Component mounting systems
Aluminium rotor components</td></tr>
</table>

		Internal access plates Nacelles
	Offshore renewable technologies	Aluminium blades Aluminium Nacelle Tower platform Tower ladders and handrails Lift systems Cable mounting systems Fall protection Tower external entry platform Stairs Handrails Walkways Walkways Cable mounting systems Component mounting systems Aluminium rotor components Internal access plates
Battery and energy storage technologies	Battery technologies	Aluminium foils for batteries Battery cells (foil) Lightweight Battery Cases (replacing Steel with Aluminium) Battery internal layers (plates) Aluminium air batteries Trails and frames for batteries for EVs Aluminium slugs (used for manufacturing battery cell housings from slugs)
	Energy storage technologies	
Heat pumps and geothermal energy technologies	Heat pump technologies	Aluminium piping & heat exchangers (residential and industrial use) Multilayer tubes

	Geothermal energy technologies	**Multilayer tubes**
Hydrogen technologies	Electrolysers	
	Hydrogen fuel cells	
	Other hydrogen technologies	**Pipes, tubes and tanks for transportation and storage**
Sustainable biogas and biomethane technologies	Sustainable biogas technologies	
	Sustainable bio-methane technologies	
CCS technologies	Carbon capture technologies	
	Carbon storage technologies	
Electricity grid technologies	Electricity grid technologies	**Aluminium electric wires and cables** **Tower Pilons** **Electrical power rails (conductor rails for railway lines)** **Seamless tubes (tubes through which the power lines are routed; with thinner walls than for the nuclear sector)**
	Electric charging technologies for transport	**Aluminium electric wires and cables** **Tower Pilons** **Bus ducts/plates**
	Technologies to digitalise the grid	**Bus ducts/plates** **Wires**
	Other electricity grid technologies	
Nuclear fission energy technologies	Nuclear fission energy technologies	**Nuclear waste bins**
	Nuclear fuel cycle technologies	**Nuclear waste bins**
Sustainable alternative fuels technologies	Sustainable alternative fuels technologies	

Hydropower technologies	Hydropower technologies	
Other renewable energy technologies	Osmotic energy technologies	
	Ambient energy technologies, other than heat pumps	
	Biomass technologies	
	Landfill gas technologies	
	Sewage treatment plant gas technologies	
	Other renewable energy technologies	
Energy system-related energy efficiency technologies	Energy system-related energy efficiency technologies	
	Heat grid technologies	**Heat distribution pipes and components**
	Other energy system-related energy efficiency technologies	
Renewable fuels of non-biological origin	Renewable fuels of non-biological origin technologies	
Biotech climate and energy solutions	Biotech climate and energy solutions	
Transformative industrial technologies for decarbonisation	Transformative industrial technologies for decarbonisation	***SEE SEPARATE MAPPING DOCUMENT:*** ***"TRANSFORMATIVE INDUSTRIAL DECARBONISATION TECHNOLOGIES IN THE EUROPEAN ALUMINIUM INDUSTRY", 16 July 2024.V1***
CO_2 transport and utilisation technologies	CO_2 transport technologies	
	CO_2 utilisation technologies	
Wind and electric propulsion technologies for transport	Wind propulsion technologies	
	Electric propulsion technologies	**Aluminium hull for vessels and vehicles**

Other nuclear technologies	Other nuclear technologies	**Seamless tubes, (seamless tubes which are produced by extrusion)**

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