MPP Aluminium Sector Transition Strategy FAQ

- What is MPP?

    - **The Mission Possible Partnership (MPP) is an alliance of climate leaders** focused on supercharging the decarbonisation of seven global industries representing 30% of emissions: aviation, shipping, trucking, steel, aluminium, cement/concrete, and chemicals. Without immediate action, these sectors alone are projected to exceed the world's remaining 1.5°C carbon budget by 2030 in a Business-As-Usual scenario.
    - **MPP comprises four core partners**: the Energy Transitions Commission, RMI, We Mean Business Coalition and the World Economic Forum.
    - **MPP brings together the world's most influential leaders across finance, policy, industry and business.** MPP is focused on activating the entire ecosystem of stakeholders across the entire value chain required to move global industries to net-zero.
    - **MPP is funded by** the Bezos Earth Fund, Bloomberg Philantropies, Breakthrough Energy, the Climateworks Foundation, the European Climate Foundation, and the Joseph and Marie Field Family Environmental Foundation.

- What does MPP try to achieve with its Sector Transition Strategies?
    - The objectives of the MPP Sector Transition Strategies are:
        1. **To demonstrate industry-backed, 1.5°C-compliant pathways to net zero**, focusing on in-sector decarbonisation and galvanising industry buy-in across the value chain.
        2. **To be action-oriented with clear 2030 milestones**: By quantifying critical milestones for each sector in terms of its required final energy demand, upstream feedstock resources, and capital investments, MPP wants to lay the foundation for tangible, quantitative recommendations of ways to reach these milestones through collaboration among industry, policymakers, investors, and customers.
        3. **To be transparent and open**: MPP's long-term goal is to fully lay open the internal machinery of the Sector Transition Strategies, that is, to make its Python models open source and all data inputs open access. In addition, MPP is developing online web interfaces that bring the Sector Transition Strategy reports to life: individual users will be able to explore the results of the reports and to customize model input assumptions, study the impact of individual levers, and dive deeper into regional insights.
        4. **To break free from siloed thinking:** The transition of a sector to net zero cannot be planned in isolation since it involves interactions with the broader energy system, for instance, via competing demands for resources from multiple sectors. All MPP Sector Transition Strategies are based on similar assumptions about the availability and costs of technologies and resources like electricity, hydrogen, or sustainable biomass. By providing a harmonized, cross-sectoral perspective, we intend to inform decision makers with a fair, comparable assessment of transition strategies for all seven sectors.

- How is net-zero defined?
    - The world needs to get to net-zero GHG emissions by 2050 to avoid the most harmful effects of climate change. Thereby, **"net zero" means priority in-sector decarbonisation, complemented by carbon dioxide removals (CDR).**
        - About **90%–95% of current emissions in each sector need to be reduced by in-sector measures.** This is in line with the Science Based Targets initiative, which prescribes "long-term deep decarbonization of 90%–95% across all scopes before 2050" as the single most important target for a net-zero world.
        - **The remaining 5%–10% of residual emissions that** cannot be reduced by in-sector decarbonisation **need to be neutralised by CDR**.

- How did MPP define the carbon budget for Aluminium?
    - The Intergovernmental Panel on Climate Change (IPCC) estimates the global **carbon budget to limit global warming to 1.5°C** above preindustrial levels with a probability of 50% to **about 500 Gt CO2** from the beginning of 2020.
    - Hard-to-abate sectors are limited in their decarbonisation speed, whereas other sectors like the power or automotive sector could switch to low-carbon technologies more quickly. In a preliminary assessment by the MPP, **roughly 50% of the 450 Gt CO2 has been allocated to the seven MPP sectors** (see more details in the main report).
    - Following this methodology, **the aluminum sector has a 1.5°C carbon budget of about 15 Gt CO2** from 2020 to 2050.
    - Given the variety of other potential sectoral allocation methods, this value should not be taken as the absolute truth but rather as an indicative figure for a 1.5°C carbon budget for global aluminum.

- Why is power decarbonisation so important and what power technologies should be used to decarbonise aluminium production?
    - Emissions from power represent **two thirds of emissions** from aluminum production. Tackling these emissions first represents a critical step to aluminum decarbonization.
    - The best power decarbonization options for a individual site will **depend on their local circumstances, geography and commercial circumstances** of individual companies. In the STS **we consider illustrative power pathways**, with decarbonising existing power assets with CCS, or delivering Small Modular Nuclear reactors when available – or connections to rapidly decarbonising grids.
    - This analysis should not be seen as identifying a preferred power decarbonisation pathway, instead it **shows multiple pathways can deliver a roughly similar outcomes**.

- Do different regions have different trajectories for decarbonization?
    - The pathway for each refinery or smelter will depend on their **local circumstances and critically their current technology base**, so geography is key, but not the only determinant of speed of decarbonization.
    - For example those who currently use coal to deliver power for their smelters must delver significant decarbonization action by 2035. These are concentrated in regions such as China. We additionally recognize that local electricity grids will decarbonize at different paces, so local Indian and Chinese grids decarbonizing more gradually than European or North American grids.
    - However for each of the regions we do expect roll out to be dependent on locally available technology. For example early adopters of low carbon anodes are clusters in European and

North American regions, we would expect these to move first, with technology dissemination from there to all regions over time. These trends are beyond the scope of our modelling at this stage, but they are important contextual factors which need further consideration over the coming years.

- Is new technology required to deliver these ambitions?
    - While much of the **power technology to decarbonize exists**, technology for decarbonizing the remainder of emissions from **refineries** and other emissions from **smelters** are either at an **early stage of development** or have not been widely deployed.
    - Key technologies are likely to be low carbon anodes (for example new inert anodes or carbon anodes with carbon capture) and Mechanical vapor Recompression and Hydrogen or electric boilers for refineries.
    - Critical in the development of new technology is giving a clear path to market, though a **market for low carbon aluminium**, but also ensuring that these technologies can **spread effectively across the industry and across countries**.

How can these ambitions be delivered?

- The ambition set out in the Aluminium STS can be delivered through the Aluminium value chain and policy makers working effectively together. There are a number of milestones which are critical to the realization of this:
    - **Power decarbonization** is a critical first step for decarbonisation, given the lead times involved in delivering successful projects, smelters should begin to develop their own plans now, enabling these projects to be completed by 2035.
    - **Research & Development** for new anode technology and new low carbon refinery technologies is critical, ensuring these technologies are commercialised and can roll out at scale from 2030 can keep the sector on track. Options need to be widely available through multiple options and/or licencing.
    - **Recycling and material efficiency** through product redesign, new technology and increasing the share of recycled aluminium by 10 percentage points by 2030 will ensure that aluminium is used where needed and recycled effectively.
    - **Securing a business model for low carbon aluminium** will mean that power decarbonisation projects and new technology have a clear investment case and that low carbon projects can compete effectively. This will roll out gradually, but needs to start at scale from the late 2020s.