

23 NOVEMBER 2022

Roadmap for Australia to be global leader in net zero alumina refining

Australia's alumina refining industry has a credible pathway to achieving net zero emissions by 2050, outlined in an industry roadmap report published by the Australian Renewable Energy Agency (ARENA) today.

The report titled 'A Roadmap for Decarbonising Australian Alumina Refining' (Roadmap) was commissioned by ARENA and prepared by Deloitte in consultation with Australia's three major alumina producers: Alcoa, Rio Tinto and South32.

The [Roadmap](#) provides a framework for future policy and investment decisions and serves as a call to action for public and private sectors to collaboratively transition this 'hard-to-abate' sector into an industry at the forefront of the transition to net zero.

Australia is the largest exporter of alumina globally, which is expected to contribute \$7.5 billion of exports to the Australian economy in 2022. Australia also has an abundance of low-cost renewable energy resources and significant local expertise, both of which are necessary for this sector to achieve its net zero ambitions.

Alumina is the precursor to aluminium and alumina refining is an energy and emissions intensive step in the aluminium value chain. The industry contributes 3 per cent of Australia's total emissions and consumes more than 221 petajoules of energy each year, more than the total energy consumption of Tasmania or the Northern Territory. Approximately 95% of emissions are from the onsite consumption of fossil fuels for process heating.

Compared to bauxite production and aluminium smelting, the abatement pathway for alumina refining in Australia is less clear. Alumina refining is a 'hard-to-abate' industry because there is a lack of low emissions alternatives that are technically mature and commercially feasible. Targeted intervention and transformational change will be needed to reduce emissions from this sector.

The Roadmap identifies four key decarbonisation technologies that could transform the way refineries consume and use energy by enabling the uptake of renewable energy and removing the use of fossil fuels. The technologies are mechanical vapour recompression (MVR), electric boilers, electric calcination, and hydrogen calcination. In combination, these four technologies have the potential to reduce emissions from Australia's six alumina refineries by up to 98 per cent.

These technologies are at varying stages of technological and commercial maturity and require significant investment to support development and implementation. The Roadmap identifies that there is no one-size-fits-all approach and different refineries will require different combinations of technologies to achieve net zero due to the specific barriers and opportunities of individual refineries.

The Roadmap highlights early deployment of electric boilers and MVR could result in emissions reductions from 2027, while hydrogen and electric calcination technologies are anticipated to be deployed from the mid 2030s.

The Roadmap also highlights critical challenges ahead. These technologies require broader ecosystem development to enable uptake including 3-5 GW of new firming renewable generation, new transmission infrastructure, large scale renewable hydrogen supply chains and market and regulatory frameworks that support decarbonisation. Coordinated investment will be required from governments and industry to support this transition.

ARENA CEO Darren Miller said the Roadmap provides a clear vision for decarbonising one of Australia's most emissions intensive industries.

"Alumina refining has always been considered a hard-to-abate sector with significant barriers to reducing emissions.

Now, we have Australia's biggest alumina producers coming together with ARENA to develop a clear and credible pathway to reducing emissions in the industry.

The pathway to net zero for Australian alumina will require close collaboration between government and industry

and this Roadmap is an important call to action,” Mr Miller said.

“Decarbonising the alumina refining sector can further improve Australia’s international competitiveness, strengthen its position as a leading producer of low emissions alumina and aluminium and secure the jobs and economic benefits from the sector.

With just four key decarbonisation technologies currently in development to reduce nearly all emissions from Australian alumina refineries, what we need now is coordinated investment to accelerate the commercialisation of these technologies,” he said.

ARENA has previously supported Australia’s alumina industry to explore several of the key technologies contained in the Roadmap. This includes funding for Alcoa to separately trial MVR and electric calcination at its refineries in Western Australia and for Rio Tinto to conduct a feasibility study into integrating hydrogen calciners at its Yarwun refinery in Queensland.

To read the Roadmap and find out more about ARENA’s low emissions metals portfolio, visit [ARENA’s website](#).

ARENA media contacts:
0410 724 227
media@arena.gov.au

**For more
information**
arena.gov.au