

## The Alumina Technology Roadmap 4.0

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### Abstract



The Alumina Technology Roadmap (ATR) approaches its 20<sup>th</sup> year of contribution to our industry. The initial Roadmap was a strategic plan that contained the R&D agenda needed to address the industry’s technical challenges over the next 20 years. Australia was the base for the Roadmap activities. With a common agenda, numerous collaborative partnerships were established between producers and research establishments. Productive research was carried out in areas such as solid liquor separation, air emissions, and residue. A challenge to any Roadmap is to ensure the strategy remains relevant and the goals are realistic. Since the first Roadmap, our industry has grown by 2.5 times with 90 % of the growth in China. Designing an engagement model for these new entrants will improve the global representation of the Roadmap. With these new players, we all are united with the recent and worsening climate change outlook. Not unrelated to climate change are the recent tailings failures which were not perceived 20 years ago to the same level of risk. With progress, we have entered the Industrial 4.0 Revolution which creates new efficiency opportunities. Behavioral safety continues to strengthen our safety culture. This paper summarizes the most recent 2018 ATR update and confirms we are working in the right areas. Engaging with all our global producers and creating compelling entrepreneurial business cases for the critical few initiatives are proposed next steps.

**Keywords:** Roadmap, Energy, Residue, Process, Digital.

### 1. Introduction

This paper summarizes the Alumina Technology Roadmap. From its origins as a US led Energy and Waste Reduction activity for Primary Aluminium, it has transitioned to a living guide for Alumina Industry Technology. At the time, Australia was the largest producer and exporter of alumina, and the Roadmap has been largely developed in Australia [1].

Today, the Alumina Technology Roadmap (ATR) is an initiative of the Alumina Technical Panel (ATP) sponsored by the International Aluminium Institute (IAI) through its advisory committee, the Bauxite and Alumina Committee (BAC). The Roadmap purpose and function were recently refreshed at the ATR 4.0 Workshop held in Gladstone in Sept 2018 [1]:

“The purpose of the Roadmap is to guide producers, suppliers and research providers in developing pre-competitive research programs aligned to the industries priorities. At its core the Roadmap holds the collective vision of the industry’s future, an agreed set of the common goals and priorities, and a list of development infrastructure needs. An on-line forum for discussion is in progress. The function of the Roadmap is to provide inspiration and motivation for technology developers, and to leverage funding and collaborative efforts towards achievements and benefits beyond the resources of individual players. Through this process the Roadmap aims to improve the targeting and funding of research to maximise the rate of implementation of innovations, by helping bridge the “Innovation Chasm of Death” to allow research developments to come to fruition as beneficial new technologies”.

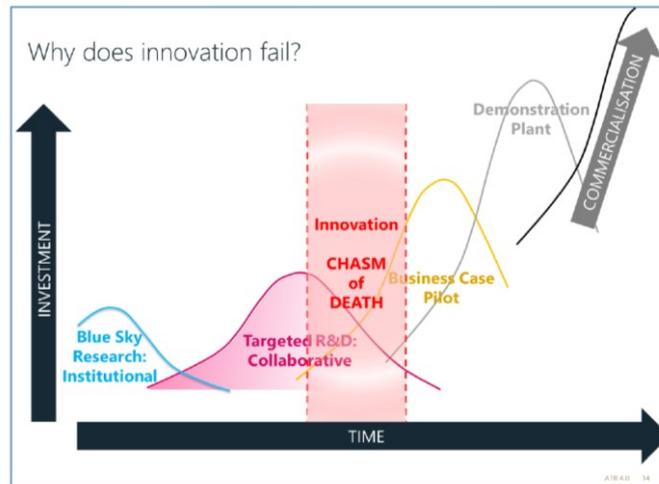


Figure 114. Innovation Timeline and the 'Innovation Chasm of Death' slide from [2].

As we approach the 20 year horizon set in in 2001, a timeline of Roadmap recaps the journey to date in Table .

Table 1: History of the Alumina Technology Roadmap.

Date	Intent	Activity
Oct-1996	Develop a vision for the future and a roadmap to achieve the vision. Specific focus was to 'Increase energy efficiency and reduce wastes in the production of aluminium'	US Dept Energy and Aluminium Association signed an "Industry of the Future' agreement for industry led, Gov't supported pre-competitive research and development
May-2001	Enhance the long term competitiveness of the Alumina industry by establishing strategic goals for 2020	First Alumina Technology Roadmap developed by a steering committee for the framework for long term research and development plan deemed most significant in addressing the strategic goals [1]
2005	Broad industry membership with links to the board of the IAI	International Aluminium Institute (IAI) established a Bauxite and Alumina Committee (BAC) and sponsors Roadmap
2005	Clearer path forward for promoting and implementing the collaborative research and technology developments.	Alumina Technical Panel (ATP) comprising of R&D managers from 5+ of the major Alumina Producers reinvigorated. ATP serves to advise, project manage, and contribute technically to the BAC.
2006	Refresh the Vision	Minor Roadmap Update
April 2010	Extend the Roadmap to include the input of the Chinese Alumina community given the recent significant production increases and the unique bauxites in China	Updated Roadmap through with Collaboration with 21 of the 34 Chinese alumina refineries [1]
Sep-18	Envisage the Ideal Future and how to get there in targeted themes. These themes were Energy, Residue, Process & Technology, Industry 4.0 Digital, and Market Risks and Responses	ATR 4.0 Workshop with 100 delegates Workshopped the Roadmap within current 2018 context [2]

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