

The Alumina Technology Roadmap - An Update on Progress

Gladstone, Australian Light Metals Conference

October 2002

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Up to the Roadmap Workshop

- Technology Roadmap Concept
- Alumina Technology Roadmap Workshop
- Alumina Technology Roadmap Strategic Goals
- Roadmap Workshop Outcomes/Themes

Since the Roadmap Workshop

Focus of this presentation

- Outcomes of Implementation Committee meetings
- Summary of Questionnaire to the industry
- New Concept – Industry Representative
- Current Status – Sept, 2002

Technology Roadmap Concept

- An industry develops a vision of its future (business-based). The technology roadmap is the technology path to achieve that vision.
- It is a goal-based research and development agenda.
- Generally, it is pre-competitive collaborative partnerships between companies, research organisations, government agencies and where applicable, suppliers.
- This methodology has been used extensively by the US Department of Energy, Office of Industrial Technologies (DOE/OIT) for a number of energy- intensive industries.
- Very successfully used by the aluminium industry in US.

Alumina Technology Roadmap Workshop

- Steering Committee formed - March 2001
- Strategic Goals issued - April 2001
- Workshop was held in Fremantle, Western Australia in May 2001
- Participants were senior alumina industry people, researchers, government and industry associations (both US and Australian)
- Workshop was coordinated by AMIRA International, the minerals industry research association
- The workshop process was facilitated by Energetics Inc., USA

Strategic Goals - 2020

- Reducing operating costs of existing plants by 3% per annum
- Improve energy efficiency - reduce energy consumption to 25% below current bauxite- specific best practice
- Capital costs of new plants at <US\$500/annual tonne. Major expansion at <US\$350/at, before tax ROI >18%
- Contribute to improvement of overall performance on environment, health and safety to world's best practice and consistent with global sustainable development principles
- Produce a product that meets all of our customers' current and future needs

Roadmap Workshop Outcomes/Themes

Major Roadmap Themes

- Bayer Process chemistry and alternatives
- Resource utilisation
- Energy efficiency
- Process Knowledge and management
- Residue treatment and re-use
- Safety/Human exposure

The 12 Highest priority technology needs were identified by the participants. Also identified were:

- R&D response to these needs
- Technical and economic risk
- Potential pay off
- Potential impacts of the technology

Since the Roadmap Workshop

November 2001 “Alumina Technology Roadmap” booklet published

November 15 - 1st Alumina Technology Implementation Committee meeting teleconference held

Actions

- Committee members to “sell” the Roadmap concept to their senior executives
- A questionnaire to be sent out to:
 - prioritise R&D needs
 - seek feedback on optimal representation and specific projects implementation process

Summary of Questionnaire

Of the 12 highest R&D priorities areas:

Priority

1. Almost all saw as important:

- | | |
|---|---|
| 1.1 Scale management | 3 |
| 1.2 Technical solutions for refinery releases | 2 |
| 1.3 Bauxite & Liquor Impurity Removal | 1 |

2. Rated high by some and low by others:

- | | |
|--|---|
| 2.1 Alternative methods to accelerate precipitation rates | 4 |
| 2.1 Bauxite residue - cost effective inerting and alternative uses | 5 |
| 2.3 Conversion of monohydrate bauxite to a more beneficial state | |
| 2.4 Major reduction in caustic consumption | |

3. Some interest:

- 3.1 Knowledge management & best practice benchmarking
- 3.2 Waste heat recovery

4. Little interest

- 4.1 Direct reduction of bauxite or other aluminium materials
- 4.2 Full automation/improved control strategies

Second Meeting Outcomes

held on 7 February 2002 - Videoconference Perth - London

1. Role of the Steering Committee

- Concept of a Board was discussed
- Recommendation is that a flat structure be adopted - no Board
- Overviews which projects are in the best interests of the industry and review progress
- Ensures that the Roadmap Vision is followed & maintains a business overview
- Nominates and provides an industry representative for each specific project
- Sets goals for each project & is the sponsor for all projects

2. Composition of Committee

- Industry Representatives (9) - Alcan, Alcoa, Aluminium Pechiney, BHP Billiton, Comalco, Glencore, Hindalco, Hydro, Kaiser
- Industry Bodies (2) - Australian Aluminium Council; Aluminum Association Inc.
- Facilitator - AMIRA International

Second Meeting Outcomes cont...

held on 7 February 2002 - Videoconference Perth - London

3. Project Management and Composition

- Each project/research topic to be managed using Project Management methodology
- Each project to have a Research Leader (RL) and a specific Industry Representative (IR)
- Projects are managed jointly by the IR and RL
- Industry Representative is the overall project leader - has good project management skills and reports to the Steering Committee on progress. IR's time and costs will be borne by the specific project
- Project Team may include representation from vendors and consultants as well as the researcher (universities and other institutions)
- Research Leader will coordinate all research activities and ensure that the research direction is maintained according to the Mission given by the Steering Committee

Second Meeting Outcomes cont...

held on 7 February 2002 - Videoconference Perth - London

4. Project Selection and Definition Mechanism

Other Templates developed:

- Scale Management – Prototype template = AMIRA (T. Bagshaw)
- Refinery releases - Leadership role = Alcoa
- Impurity removal - Leadership role = BHP Billiton/Worsley
- Accelerated Precipitation - Leadership role = Glencore/Aughinish
- Bauxite residue - Leadership role = Hydro

Each leadership role company to enlist the input of 1 or 2 industry “experts” in that specific area

Teleconference on progress - Held in early June

Third Meeting

Implementation Committee face-to-face meeting held at the Alumina Quality Workshop, 8,9,10 &12 September 2002 at Brisbane, Australia.

Main Points Agreed to:

- Collaborative areas to pursue initially:
 - Residue treatment/inerting
 - Dustiness of alumina product

- To be progressed utilising informal network:
 - Plant emissions to air/odours

- High industry importance areas not to be pursued first up:
 - Hydrate precipitation
 - Liquor impurities

Third Meeting (cont.)

Main Points Agreed to:

- Role of the 'Industrial Representative' is key:
 - Definition of the problem
 - Scoping of the project
 - Selection of the research team

This could be a person-year of effort

- It is doubtful that companies will be willing to 'volunteer' one of their key people
- We are looking at key people (with credibility) outside of the companies e.g. consultants recently retired
- We are starting that process currently
- IR to be paid by those companies in the collaborative activity
- AMIRA role is on administration & supply of information to relevant research groups

Once the project starts the role of ‘Technical Manager’ is key:

- Will require a nominated Technical Manager (similar to Technical Monitor but at a higher level – equivalent to a Research Manager).
- T.M’s time and expenses to be funded from the project.
- Partners in the collaborative project will have to accept the role and importance of the T.M. in the management of the project.

In summary of current status

- Industry to select & define project areas & then choose research team – not the other way round!
- This will be achieved using a focus resource before the project starts through an ‘Industrial Representative’ and during the project through a ‘Technical Manager’.
- Both roles will be funded by the project.
- AMIRA’s role is administration, act as a facilitator – to bring a degree of independence to the overall process.
- Each company has agreed to contribute A\$10K so that AMIRA can continue the facilitation role.

In summary of current status (cont)

- Future committee meetings by teleconference three times per year.
- Collaborative areas to be pursued initially:
 - Residue treatment/Inerting
 - Dustiness of alumina product
- During AQW week the objectives were defined for the two projects. Scope to be defined by the end of 2002.
- Finding new areas of collaborative research in the alumina industry has not been easy.
- Utilising the Road Map process is allowing the alumina industry to communicate its longer term technology needs.

Speaker details

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The Alumina Technology Roadmap website:

<http://www.aluminium.org.au/Downloads/OtherPubs/AluminaRoadmap.pdf>