

Sustainability and Alumina Refinery Design

Peter-Hans ter Weer

Director

TWS Services and Advice, Bauxite and Alumina Consultancy, Huizen, The Netherlands

Corresponding author: twsservices@tiscali.nl

Abstract



Sustainability appears to be gaining more importance in the Bauxite and Alumina industry. Unfortunately, the relationship between sustainability criteria and their applicability to our industry may not always be obvious. In addition to some it may seem that implementing sustainability criteria would negatively affect economics. Sustainability in the Bauxite & Alumina industry in more general terms, including reporting guidelines, sustainable development goals, and corporate sustainability targets have been addressed in papers presented at the TMS Light Metals 2014 and 2015 conferences. This paper provides an overview of the subject and further explores the relationship between sustainability and some key design criteria for alumina refineries in the context of applicable Global Reporting Initiative (GRI) sustainability performance indicators.

Keywords: Alumina, alumina technology, sustainability, alumina refinery design.

1. Sustainability Reporting Guidelines – Mining & Metals Sector Supplement

Sustainability in the Bauxite & Alumina industry in more general terms, including reporting guidelines, sustainable development goals, and corporate sustainability targets have been addressed in papers presented at the TMS Light Metals 2014 and 2015 conferences [1, 2].

The GRI Reporting Guidelines are intended to serve as a generally accepted framework for reporting on an organization's economic, environmental, and social performance [3]. They are used by many aluminium industry majors as standard for sustainability reporting although they are applicable to organizations of any size, type, sector, or geographic region.

Members of the International Council on Mining and Metals (ICMM)¹ are committed to reporting against the Mining and Metals Sector Supplement (MMSS). The mining and metals sector in this context includes exploration, mining, and primary metal processing (including refining, smelting, recycling and basic fabrication) and covers the project life cycle from development through operational lifetime to closure and post-closure.

The GRI Reporting Guidelines consist of Reporting Principles and Guidance, and Standard Disclosures (incl. Performance Indicators) which are broken down as follows:

Part 1. Reporting Principles and Guidance with three main elements of the reporting process:

- *Defining Report Content;*
- *Reporting Principles for Defining Quality;* and
- *Reporting Guidance for Boundary Setting.*

Part 2. Standard Disclosures specifying the base content that should appear in a sustainability report with disclosures on the following topics:

- *Strategy and Profile* setting the overall context for understanding organizational performance such as strategy, profile, and governance;

¹ Prompted by the Global Mining Initiative (GMI), the board of the metals industry's representative organization, the International Council on Metals and the Environment agreed in 2001 to broaden its mandate and transform itself into the International Council on Mining and Metals (ICMM).

- *Management Approach* covering how an organization addresses a given set of topics to provide context for understanding performance in a specific area;
- *Performance Indicators* providing comparable information on the economic, environmental, and social performance of the organization.

The sections on Management Approach and Performance Indicators are organized by the categories social (“People”), environmental (“Planet”), and economic (“Profit”). Many of the major companies in the Bauxite and Alumina industry such as Rio Tinto, UC Rusal, Alcoa, Norsk Hydro and BHP Billiton report on their sustainability performance applying GRI reporting guidelines. Figure 1 shows the main subjects for each of the report sections.



Figure 1. Global Reporting Initiative Overview.

Disclosures on Management Approach and Performance Indicators cover the following aspects:

- **Social:** *Labor Practices; Human Rights; Society; and Product Responsibility.*
- **Environmental:** *Materials; Energy; Water; Biodiversity; Emissions, effluents, and waste; Transport; Products and Services; Compliance; and Overall.*
- **Economic:** *Economic performance; Market presence; and Indirect economic impacts.*

Figure 2 shows the GRI Sustainability performance indicators broken down into major sub-indicators for a Bauxite Mine & Alumina Refinery project. See reference [3] for more details.

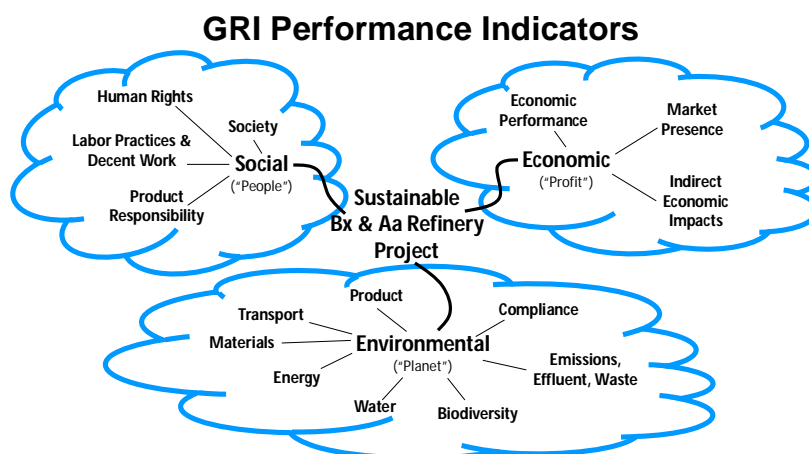


Figure 2. Global Reporting Initiative Performance Indicators.

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