



## Resourcing the future: Using foresight in resource governance

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### ABSTRACT

Australia is a major supplier of minerals globally, but the country's ability to meet both projections for future demand and sustainability goals is hampered by a range of environmental and social issues associated with traditional modes of minerals production. At a time when society's expectations for the environmental and social performance of companies are becoming more stringent, mineral production in Australia has become more difficult and expensive – issues that are often disguised by (and overlooked as a result of) high resource prices and an outwardly buoyant economy. Difficulty and expense are characterised not by the absence of resources, but by declining ore grades, substantially increasing mine waste, rising energy consumption, and falling multi-factor productivity. Together, social changes and production challenges are reinforcing the recognition that business as usual cannot deliver on the sustainability imperative. Technological development has been an important focus in seeking to address many of the challenges facing the Australian minerals industry, but this alone has not been adequate, and may not be the panacea of the future. Research exploring the future of minerals production and its implications for society and the economy must be accompanied by foresight into the long-term strategic challenges, future scenarios, social, economic and regional contexts where these implications will play out.

This paper documents how foresight methods were used to facilitate a conversation between mining industry stakeholders and experts on the future of the industry in Australia, and to develop a shared vision of the future and recommendations for how to achieve a sustainable mining industry and one which contributes to a sustainable Australian economy. We articulate the implications of sustainability for the mining sector in Australia with respect to a vision to 2040, and discuss mechanisms to secure long-term national benefit for Australia from its finite mineral resources. We demonstrate that realising benefits from a mineral endowment over several decades requires considered and forward-looking resource governance, including a National Minerals Strategy. It should be characterised by innovative policy decisions and business models that engage communities, government and the private sector in not only the rhetoric, but also the business of sustainability.

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### 1. Introduction

Australia is known globally as a significant mineral producing country. Indeed, Australia's economic demonstrated resources (EDRs) – known resources that are economically retrievable – of nickel, silver, uranium, zinc, lead and brown coal, rank as the world's largest, with EDRs of iron ore, copper and gold the second largest globally (Geoscience Australia, 2009). Australia has actively embraced the development of this vast mineral endowment, and resource and energy sectors contributed around AUD 160 billion in export earnings (56% of total exports) to the Australian economy in 2009 (ABARE, 2009), or 7.7% of total GDP. Coal and iron ore

represent Australia's largest export earners, delivering AUD 39.4 billion and AUD 30 billion respectively to the economy in 2009 (ABARE, 2009). These statistics place Australia firmly within the United Nation's criteria for a mineral-dependent economy (Eggert, 2003; Maxwell and Guj, 2006).

Australian economic dependence on mineral production and export has developed as a result of strong global demand, historically cheap production, and comparatively low international transport costs. These factors have fostered a comparative advantage in primary production and export of large quantities of varyingly processed ores. By contrast, because labour is expensive in Australia and the relative cost of energy is high, little secondary processing, or manufacture of finished and semi-finished metal products occurs in the country (Maxwell and Guj, 2006). Rapidly industrialising countries in the Asia-Pacific region have purchased large quantities of Australia's minerals, and Australia's relatively

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painless experience of the global economic crisis has been attributed particularly to a Chinese wave of investment and resource purchases (Mining Australia, 2009).

However, the conditions that have fostered the Australian dependence on mineral exports are gradually changing for the worse. Although production is increasing year on year (Mudd, 2010), in response to projections of growing international demand (Access Economics, 2008), productivity is falling as a result of declines in the quality and quantity of resources, expensive labour, as well as rising energy and capital costs (Prior et al., in press; Topp et al., 2008). These changes, coupled with their associated social and environmental consequences, raise questions about the long-term viability and sustainability of the mining industry in Australia. Such questions become very important if benefit generated to date is insufficient to support a smooth transition to other sources of economic development in the future.

This paper reports on the outcomes of a deliberative, multi-stakeholder foresight process to establish a vision for the future of the mining industry in Australia.<sup>1</sup> It documents how foresight methods were used to facilitate a conversation between mining industry stakeholders and experts on the future of the industry in Australia. Using the results of these consultations we detail a shared vision of the future and recommendations for how to achieve a sustainable mining industry in Australia by the year 2040.

Specifically, the research has explored *why* the mining industry and governments in Australia should look to the long-term in order to assess the role that it might play in a more sustainable future Australian economy, and *how* this might be operationalised in the future. The paper begins with a brief description of the industry, and outlines the challenges that currently characterise the industry's operations, reflecting on what these challenges may mean in the Asia-Pacific context, given that this is where much of Australia's mineral wealth is distributed. An overview is then provided of the foresight techniques applied, and the results obtained, before describing the major policy-relevant components of a vision for the future of the mining industry in Australia leading up to 2040. The paper concludes by revisiting the challenges identified, suggesting ways that results of the Vision 2040 foresight process might inform innovative policy making to begin to redress these challenges – in particular through the development of a national minerals strategy.

### 1.1. Challenges for the mining industry in Australia

Minerals play a major role in Australia's capacity to participate in international trade and contribute to the strength of the Australian dollar (Maxwell and Guj, 2006). Dependence on mineral export earnings has shaped, and continues to shape the relationships that the mining industry has with governments in Australia (both the Australian Government and State Governments),<sup>2</sup> and wider Australian society. However, minerals are non-renewable resources, and once extracted, the task of drawing long-term prosperity from the sale of such resources requires close and considered management. Careful management is particularly important as the terms of production become less advantageous as the variety and nature of the challenges currently facing the mining industry in

<sup>1</sup> The 'mining industry in Australia' is used here to refer to those companies engaged in mining operations in Australia. This phrasing includes both the majority-owned Australian mining companies (e.g. Fortescue Metals Group Ltd., Newcrest Mining Ltd.) and exploration-focused junior mining companies, along with the diversified major multinational mining companies (e.g. BHP Billiton, Xstrata, Rio Tinto).

<sup>2</sup> Ownership of onshore mineral resources usually rests with individual States (e.g. Queensland, Western Australia, New South Wales, etc.), rather than the Australian Government. National legislation made by the Australian Government also affects mineral development such as the recently introduced Mineral Resource Rent Tax.

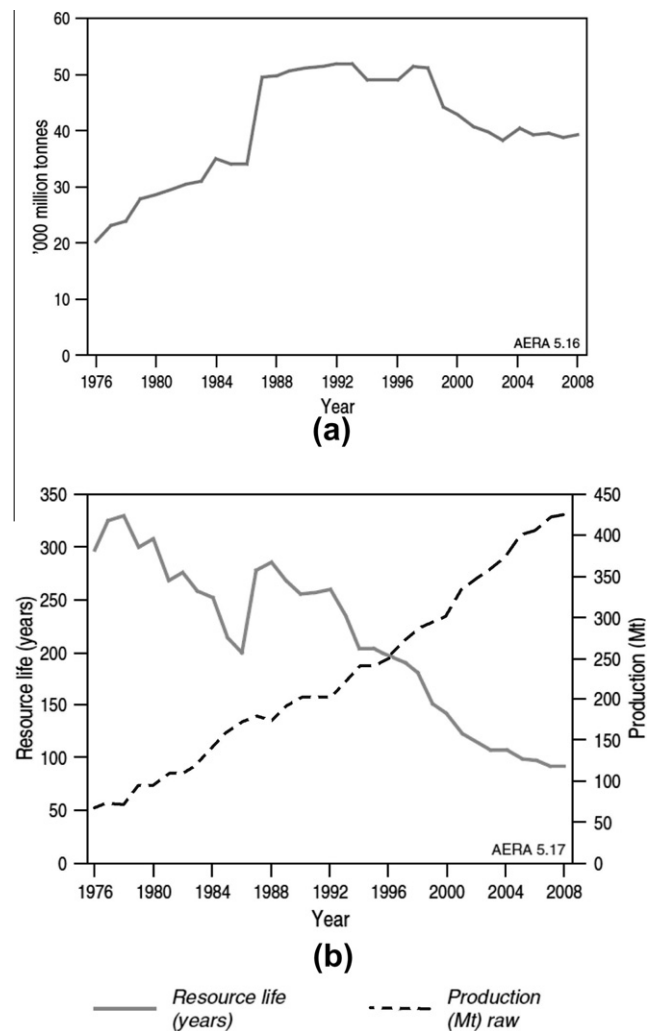


Fig. 1. Economic demonstrated resources (a) and projected resource life (b) for coal in Australia (Geoscience Australia and ABARE, 2010).

Australia demonstrate (see Prior et al., in press, for a more detailed examination of these challenges). Cooper and Giurco (2011, p. 4) suggest these challenges involve “interactions across social, technological, ecological, governance and economic domains.” Four key challenges facing the industry include: the potential for future production constraints due to social, environmental and economic constraints; falling productivity in an expanding sector; interventions aimed at staving off the macro-economic consequences of resource dependence (Dutch Disease and the Resource Curse); and lastly, the need to operate in an *increasingly* sustainable manner.

#### 1.1.1. Peak minerals and life of resource thinking

The ‘peak minerals’ metaphor (Giurco et al., 2010; Mason et al., 2011a; May et al., 2012) is used to illustrate the changing terms of production over the life of a resource, where production is cheap and easy (socially, technically) in the early stages of resource development, and becomes progressively more expensive and difficult (socially, environmentally, technically) with time. These authors argue that changes in physical factors, like falling ore quality (see Mudd, 2010; Mudd and Ward, 2008) are accompanied by rising social and environmental costs and impacts, and furthermore, that technical advancements do not necessarily lead to a reduced environmental impact over time from mining (Mearns et al., 2012). In addition, as outlined by Lambert (2010) the

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