



Original research article

## Stranded assets, externalities and carbon risk in the Australian coal industry: The case for contraction in a carbon-constrained world



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## ABSTRACT

Plans to triple or even quadruple Australian black coal production on 2010 levels by 2030 continue to inform the policy goals of Australian state and federal governments. However, only three years after many of these plans were either formally or informally approved, a number of them are no longer financially viable, and face mounting domestic and international opposition based on three main arguments: (a) the aggregated costs of subsidies, externalities and foreign-ownership in the Australian coal industry suggest that the economic benefits to Australia are not as great as the industry and its political backers claim; (b) although Australian black coal production is not likely to peak until the 2040s or later, world coal production is likely to peak around 2030, indicating that a transition to low or zero carbon energy sources in those countries currently dependent on coal is becoming an increasingly high priority from an energy security perspective; (c) because coal is one of the main contributors to anthropogenic climate change and Australia has some of the largest untapped reserves, most of that resource constitutes 'unburnable carbon'. These three arguments provide a compelling case for the contraction of the Australian coal industry over the next twenty years.

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Over the last fifty years, Australia has positioned itself to become one of the world's leading coal producers. With large deposits of high quality coal situated relatively close to coastal infrastructure, it has one of the most efficient and profitable coal mining industries in the world. Over the five year period to 2011–12, the industry generated almost \$210 billion in export revenue [48] (21),<sup>1</sup> and was employing a historic record of more than 63,000 people at the peak of the mining boom in 2012 [48] (25). This compares with export revenues of around \$87 billion over the five year period to 2006–07, and an average of 27,680 people employed in the industry over the same period [48] (21, 25). The industry's recent increases in revenues and employment were driven primarily by exponentially growing demand for Australian metallurgical coal from India and China, as well as for thermal coal from South Korea, China and Taiwan [47,48]. However, that demand has not been sustained for a number of reasons, and a major shakeup of the Australian coal industry is currently underway, a shakeup which will have major

repercussions for the future of the industry, not just in Australia, but throughout the world.

Between 2008 and 2013, the Australian coal industry's surge in prosperity led to a significant increase in public and private investment in new coal ventures, based on the assumption that the boom would continue indefinitely. Those projects that were publicly announced indicated a tripling of production on 2010 levels by 2030 [1,61,3,144,95,115,73].<sup>2</sup> However, as we will see below, only three years after many of these plans were either formally or informally approved by state and federal governments, a number of them are no longer financially viable and have therefore been indefinitely delayed or cancelled. Perhaps more significantly for the long-term future of the industry, it faces mounting domestic and international opposition based on three main arguments:

- a) Current levels of direct and indirect subsidies, combined with the social and environmental externalities of coal production and use, and the predominantly foreign-owned composition of the

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<sup>1</sup> Unless otherwise stated, all dollar figures cited are in Australian dollars. From early 2011 to late 2013, the Australian dollar was roughly at parity with the US dollar.

<sup>2</sup> There is no central source for these data, which have had to be pieced together by academics, journalists and activists over the last several years. Past project announcements for Queensland alone would triple 2010 production levels by 2020 if realized, suggesting that plans for expanded production in New South Wales and Western Australia would quadruple total production as soon as 2020.

main companies which profit from its production, suggest that the economic gains to Australia from the coal industry are not as great as the industry and its political backers claim.

- b) Although the Australian black coal industry is not likely to peak until the 2040s or later based on current production levels, world coal production is likely to peak between the mid-2020s and mid-2030s, indicating that a transition to low or zero carbon sources for electricity, heating and steel production in those countries currently dependent on coal is becoming an increasingly high priority for those same countries from an energy security perspective.
- c) Because coal is one of the main contributors to anthropogenic climate change,<sup>3</sup> most of the world's remaining coal resources will have to remain in the ground if humanity wishes to maintain average global surface temperatures at no more than 2 °C above preindustrial levels by 2050. As one of the world's leading coal producers with extensive economically recoverable coal resources, Australia has a responsibility to the international community to curb that production over the next twenty years.

Despite the growing body of empirical evidence supporting these arguments, the Australian coal industry's now somewhat less ambitious plans for expansion continue to enjoy the bipartisan support of Australia's major political parties. While the prospect of any significant change in policy direction on this score seems unlikely within the foreseeable future, this paper marshals the aforementioned arguments in an attempt to demonstrate that there are legitimate grounds for calling for a contraction, rather than expansion, of the Australian coal industry over the next twenty years. Such a move would not only be consistent with the notion of contraction and convergence currently endorsed by the United Nations Framework Convention on Climate Change (UNFCCC), but demonstrate Australia's genuine commitment to the internationally agreed principles which that convention enshrines.

The paper begins by drawing on official government statistics to examine coal mining's contribution to the Australian economy over the last fifty years, followed by a summary of its recent plans for expansion over the next ten to fifteen years, and the extent to which these plans have had to be revised as the price of thermal and metallurgical coal has slumped. In order to gain a better idea of the actual value to Australia of coal mining in a single financial year (2005–6), this analysis is followed by a comparison of official statistics on total income and expenditure for the industry with the work of several independent researchers who have attempted to quantify the environmental and public health impacts of Australian coal production and use, as well as those costs imposed on the Australian economy by the fossil fuel industry in the form of carbon emissions and government subsidies. A number of recent studies examining world coal production are then analysed to determine whether current production rates will indeed lead to a global peak by the mid-2030s. Finally, Australian coal's contribution to domestic and international greenhouse gas (GHG) emissions over the last twenty years will be examined in detail. While the relative merits of these arguments may arguably prove redundant in the wake of 'market forces', such forces have themselves been shaped by the physical realities which inform my arguments, and therefore

<sup>3</sup> Coal contributed 40% of global fossil fuel CO<sub>2</sub> emissions in 2008 (Le Quéré et al. [92b] 831), which in turn contributed to 46.3% of global CO<sub>2</sub> emissions in 2007 [54] (1331). It is difficult to find directly comparable figures for successive years, but the IPCC indicates that in 2004, fossil fuel CO<sub>2</sub> emissions constituted 57% of total global GHG emissions, with the CO<sub>2</sub> from deforestation and decay of biomass, etc., contributing another 17%, while methane contributed 14% and nitrous oxide, 8% ([82]: Ch. 1, Sn. 1.3.1). If these figures are taken as representative, coal contributed around 23% of total global emissions in 2008, indicating that it is indeed one of the single largest sources of anthropogenic GHGs, if not the largest.

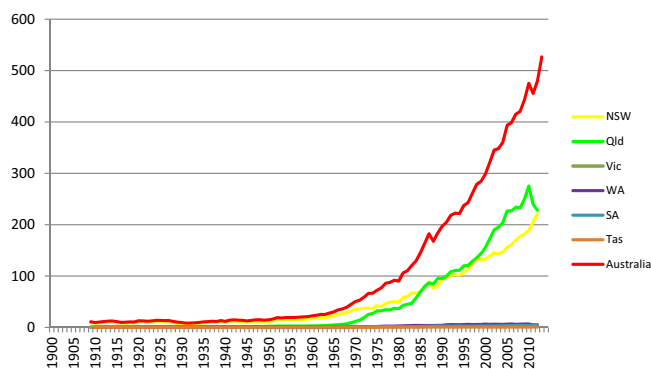


Fig. 1. Australian Black Coal Production, 1910–2013. (Millions of tonnes of raw coal).

Sources: Joint Coal Board/Qld Coal Board/Coal Services PL/Bureau of Resources & Energy Economics.

remain a credible basis for further research by policy-makers, business people, activists and academics concerned about the need to reassess coal's place in a carbon-constrained world.

It should be noted as a preamble to this analysis that the author is a historian and sociologist. The methods used, therefore, are not those of an economist. With respect to the comparison of the Australian coal industry's economic benefits to the government subsidies it receives and the negative externalities for which it is responsible, the author concedes in advance that a far more in-depth and rigorous study is required than that undertaken here. Nevertheless, the findings outlined here clearly warrant further investigation. Any offers of research collaboration to produce a more rigorous analysis are therefore welcomed.

## 1. Australian black coal production in an international context

It is widely acknowledged that a major factor in the Australian coal industry's success during the post-War period has been its strategic focus on developing export markets in Asia with the financial and diplomatic support of state and federal governments. Controlling between a quarter and a third of the global coal export trade since the late 1980s [84,65], the Australian black coal industry has generally managed to maintain the same high levels of growth since the 1960s. Despite fluctuations in coal prices and demand from individual countries, black coal production grew at around 8% per annum from 1960 to 1990, and at around 4.5% per annum from 1990 to 2010 (Figs. 1 and 2).<sup>4</sup> As a result of major investments in increased production for export over the last six years, the 2013–14 financial year saw a 22% increase in metallurgical coal exports by volume over the previous financial year, and an 18% increase in thermal coal exports (Fig. 2). In this case, however, increased export volumes failed to offset significant earning reductions from lower coal prices (Fig. 3). It would nevertheless appear that until very recently, major industry players were convinced that these growth figures could be sustained for the rest of the decade.

Since the early 1970s, Australia's expanded coal export ambitions have been focused on its trade with Asia. This has proven to be a lucrative strategy: compared to the volatility of its trade with Europe, Asia has, on the whole, been the source of steady and reliable custom: more than 80% of Australia's coal exports were directed to Asia between 1970 and 2010. Almost half of that trade went to Japan, and another 20% to South Korea and Taiwan. Only

<sup>4</sup> The compound average growth rate for global coal demand was 4.6% for the ten-year period from 2003 to 2013 [80] (14).

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