Rodney Maxwell Buckton, B.A., M.M.E.E.
30212316
Macquarie University

Policy, Politics and Place: The Transformation of the New South Wales Coal Industry After 1980

Supervisor: Dr. Mark Hearn

This thesis is presented as a partial fulfilment to the requirements for the

Degree of Master of Research,

Department of Modern History, Politics and International Relations,

Macquarie University

10th October 2016

Table of Contents

List of Figures

Abstract

This thesis undertakes an economic and social history of the NSW Coal industry since 1980 – a significant research gap - taking a deductive and multidisciplinary approach combining a systematic quantitative and qualitative economic history with spatial and policy history. The thesis has twin aims. The first aim is to historicise how Government resource policy and governance, have been the hand-maiden of development, shaping and steering adaptive but reactive policy, towards corporate and transnational interests and complicity with regional sectoral interests. A consequence has been a 'muting' of energy and planning policies, bringing the coal industry into conflict with place – people, communities, environment - through permitting a spatially expanding coal industry.

The second aim to provide an update economic history of the industry, which quantitatively charts both the expansion in production and the resulting enlarged spatial footprint and higher visibility of the industry. In this period, the industry underwent its greatest expansion. Its mode of governance and the high levels of scrutiny - using my theoretical setting of Foucauldian Governmentality – in resource allocation, approvals and mode of operation, was manifestly a historically significant reconfiguration of the power relationships and alignments between the State, labour, mine operators and community.

These are relationships shaped by the State's accommodation of an export industry operating under the neo-liberal globalisation narrative, and a continuance of the mentalities of Government, labour and capital, formed by developments during the war and post-war period.

Declaration

I declare that this thesis is my own account of my research and contains as its main content work which has not previously been submitted for a degree at any tertiary educational institution.

Signed: ……

Date: ……....

Acknowledgment

I wish to thank my supervisor, Dr. Mark Hearn, for his thoughtful and erudite guidance through the thesis process, invaluable to me to move closer to the core of the argument. Thanks also to the Department of Modern History staff whose scholarship and guidance through the coursework component has been revelatory and important.

I wish also to thank my wife Amanda, for supporting this endeavor and keeping me grounded. Thanks to our daughters Jess and Liv, for their forbearance of a sometimes-distracted father.

To my cohort of students, a debt of gratitude for their friendly and cheerful support and assistance.

Abbreviations

ABS	Australian Bureau of Statistics
ACTU	Australian Council of Trade Unions
ASX	Australian Stock Exchange
Bt	Billion tonnes
CCB	Coal Compensation Board
CIF	Cargo, Insurance, Freight – the landed coal price at a destination
COAG	Council of Australian Governments
CS	Coal Services Pty Ltd
DMR	Department of Mineral Resources
DPI	Department of Primary Industries
CFMEU	Construction, Forestry, Mining
FOR	Free on Rail (Coal price at mine site loaded excluding freight and shipping)
FOB	Free on Board (Port price including transport to port but not shipping)
GFC	Global Financial Crisis
Ha	Hectare
ICAC	Independent Commission Against Corruption
IPE	International Political Economy
JCB	Joint Coal Board
JFY	Japanese Financial Year (1 April to 31 March)
Kt	Thousand tonnes
Mt	Million tonnes
Mtpa	Million tonnes per annum
NCAT	Civil and Administrative Appeals Tribunal of New South Wales
RBA	Reserve Bank of Australia
SEPP	State Environmental Planning Policy
TNC	Transnational Corporation
Km^2	Square Kilometre (100 hectares)
t	tonne
US$	United States dollar

A Note on Statistical Sources and Units

The statistics used for the construction of graphs, charts and maps, have been compiled by myself from a plethora of paper and some digital sources, into spreadsheets for manipulation. I have converted imperial units into metric and all graphs, maps and diagrams are my own work, including any errors in transcription or manipulation. The large number of graphics used avoids the excessive quoting of statistics in support of my argument. The trends rather than the numbers, as impressive or otherwise as they may be, are the critical thing here.

In the graphs, I have used both Australian financial years (1st July-30th June) and calendar years in time series data. These data sets vary slightly but do not significantly change the meaning or trend. I simply chose the most consistent data set for the period for the parameter in question. The various sources for this data have, over time, changed their basis for presenting data, and it was important to have a consistent set.

I have used unit abbreviations which I have listed in the previous abbreviations page. All monetary values are in Australian dollars unless otherwise indicated. Hence, 'fifteen million tonnes' becomes 15Mt.

and, '20 square kilometres' becomes $20km^2$

Ten million dollars becomes $10 million, etc.

Global Coal prices are in US dollars and these are designated as US$, all other $ signs denote Australian dollars.

Figure 1, Scale and visibility, underground (top) & open cut (bottom)[1]

Figure 1 removed due to copyright.

Myuna Colliery, Wangi Wangi, near Lake Macquarie, Newcastle – A colliery owned and operated by Centennial Coal producing up to 2 Mtpa of thermal coal, (Wangi Power Station in the top left of the picture is decommissioned)

Figure 1 removed due to copyright.

Bengalla Mine, near Muswellbrook in the Hunter Valley, In production since 1999 supplying over 10 Mtpa of thermal coal to the domestic and export markets
.

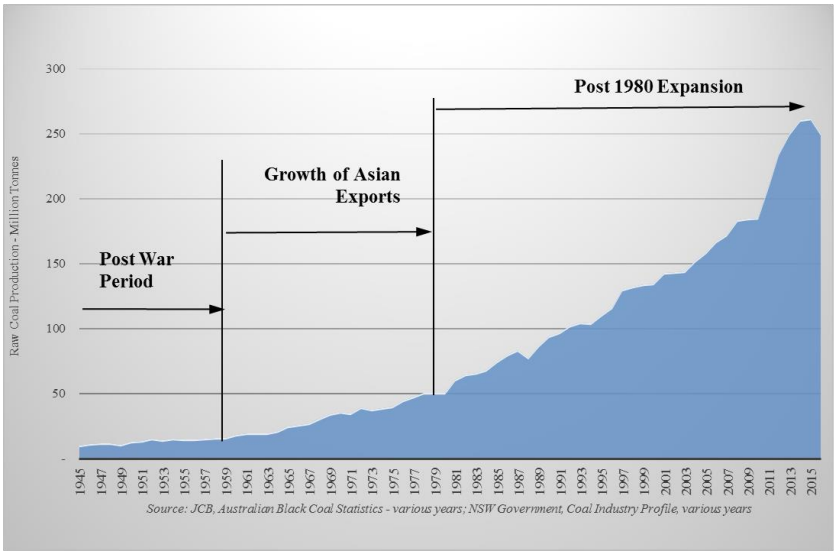
[1] Photos Myuna, www.coalfacemagazine.com.au/myuna-colliery-in-focus,2014; Bengalla, http://www.bengalla.com.au/wp-content/uploads/2016/01/whoweare.jpg

1.0 SITUATING THE THESIS

1.1 Subject and Theme

This thesis examines the recent history of an old industry. The New South Wales (NSW) coal industry, extant since 1797, was largely invisible and unremarkable until the advent of large scale open-cut mining, despite its critical importance for underwriting state and national economic development. The period after 1980 saw an acceleration in coal production (Figure 2) and a transformation in the orientation of the industry from the domestic a global markets focus. This was concurrent with deregulation of the financial sector, industry and labour, and globally, the rediscovery of the market in an emerging post-Keynesian world.[2]

Figure 2, Post-war increase in NSW coal production



Both the reforms to improve Australia's economic competitiveness, and the expansion of coal exports, were a turning away from protectionist nationalist economics to embrace the emergent globalisation and rapid expansion of commodities and capital markets. Australia became a critical player in the growth in demand for mineral commodities from

[2] Rodgers, Daniel, T., Age of Fracture, (The Belknap Press, Cambridge, 2011), pp. 75-76

north-eastern Asia, centred on trade with Japan, the nation which had first stimulated larger scale NSW coal exports in the 1950s.

In the period under study, the coal industry lost its invisibility – the discreet collieries,[3] (see Figure 1 for importance of scale) mostly serving a domestic market protected by a tariff wall, were rapidly replaced by large scale open-cut and longwall underground export operations. Historical linkages were disturbed by change - labour conflict was replaced by labour acquiescence, the expanding geographical footprint of mining embraced regions with little or no coal mining history, and the burgeoning licence fees, royalty and revenue streams flowing from an ever-expanding industry, reinforced the 'jobs and growth' mantra of succeeding Governments, increasingly responsive to the forces of globalisation.

I will argue that state[4] policy and governance of this industry, became increasingly reactive and ad-hoc, as the intensification of globalising forces through trade, large transnational companies and unfettered capital flows, moved governance beyond their direct control. Mine expansion in the growth regions of the Hunter Valley and Gunnedah Basin, created both development and conflict, and unquantified future exposures and costs. In March 2012, winemaker Andrew Margan said winemaking has blended in with the (Hunter) region's historic coal industry since the nineteenth Century,

"*Because coal mining has not been intrusive to the wine industry. I mean, we have coal mining within three k's from here and you can't even see it, you don't even know it's going on. The wine tourists don't know it's happening. It doesn't affect what we're doing and it*

[3] Colliery is the correct name for an underground coal mining operation, whereas open cut operations are usually simply termed 'mines'. The generic term 'mines' will be used generally for both underground and open cut mining operations in this thesis, and 'colliery' will be used specifically when referred in a source document.

[4] I have used 'state', to refer to either NSW Government or the Federal Government, as the legislative and governing body.

doesn't have any environmental effects on what we're doing either - but coal seam gas is different."[5]

The state's search for new revenue streams has propagated the growth of the coal and gas industries with both industries conflated in the public view. Among affected communities, this sense of loss of identity in landscape and place, is inexorably linked to broader concerns over climate change and sustainability.

1.2 The aims of the thesis

I will undertake a thesis with two related aims. The primary aim is to historicise how Government resource policy and governance have overseen the acceleration of coal production, and the transformation of the relationships between the state, labour and capital, historical linkages disturbed by global change. Further, how the State has responded to communities - the intersection of politics, policy and place.

The second aim is to produce a brief economic history of the New South Wales coal industry from 1980 to the present which quantitatively charts both the five-fold expansion in production, and the resulting enlarged spatial footprint of the industry. I believe it impossible to characterise this period without reference to the modernising post-war industry from 1946-1979, of critical economic importance to the domestic economy, operating under the scrutiny of an interventionist state.

The interdisciplinary nature of the thesis lies in the policy and institutional dimensions of sustainability, where environment, society and economy meet. Issues of long-run[6]

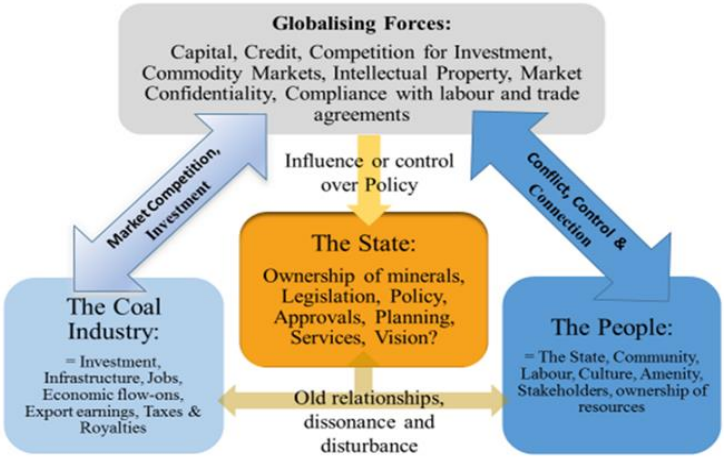
[5] Quoted on ABC Landline, Anxious Harvest, Reporter Sean Murphy, 4th March 2012, 1:38:56 PM, http://www.abc.net.au/landline/content/2012/s3445186.htm

[6] Lloyd, Christopher, 'Can Economic History be the core of social science? Why the Discipline must open and integrate to ensure the survival of Long Run Economic Analysis', in, Australian Economic History Review, Vol. 37, No. 3, (1997), p. 259

sustainability have a deep past in classical economics,[7] inviting an historical explanation of an agenda that struggles to gain purchase in policy. Steve Dovers said, 'I have balanced environmental history and policy... critiquing 'policy ad hocery and amnesia', worrying about the lack of purchase of history on policy and vice versa.'[8] Recovering policy 'memory' is one aspect of my research, where a causative human agency is apparent, but with little of the reasoning informing policy decisions explicit.

These aims are to further the conversation on three embedded research questions. The first, is whether the state's exercise of power - Foucault's 'mode of action upon the actions of others'[9] - in resource allocation and governance, was a historically significant disturbance of the relationships and alignments between the state, unions and the mine owners. I contend that this was a transformation shaped in part, by the State's search for economic security through an export industry operating under the 1980s globalisation narrative, while exposed to global market forces through deregulation. These broader relationships and conflictual pathways are described in Figure 3.

Figure 3, Relationships and conflict pathways



[7] Mulder, Peter, and, Van Den Bergh, Jeroen, C., J., M., Evolutionary Economic Theories of Sustainable Development, Growth and Change, Vol. 32, (Winter 2001), pp. 110
[8] Dovers, S, 'Can environmental history engage with policy?', History Australia, vol. 5, no. 1, (2008), p. 03.4
[9] Foucault, Michel, 'The Subject and Power', in, Dreyfus, Hubert, L., and Rabinow, Paul, Michel Foucault: Beyond Structuralism and Hermeneutic, 2nd ed., (The University of Chicago Press, Chicago, 1983), pp. 221

The second question is how has the pre-1980 history of industry formation coloured and defined the current power alignments. My contention is that the high levels of industry scrutiny and involvement by the State, is a continuance of the mentalities formed by developments during the war and post-war periods. Issues such as poor war-time productivity, cold war fears of communist influence in the unions,[10] the Chifley Government's strike-breaking interventions, all helped propagate the poisonous industrial relations culture and general mistrust, which persisted despite later relative industrial calm. This history of Government scrutiny and intervention, flags the special position coal occupied in the political psyche of successive New South Wales Governments.

A third question concerns the transformation from a largely domesticated industry to a global export orientation, resulting in an industry less embedded in the local through its geographic expansion, but now in competition with other land uses. A powerful catalyst for industry expansion since 1980 has been the growth in export markets, and capital deepening under state neo-liberal policies, shaping and steering policy to new alignments with transnational corporate interests (TNCs). Also, how have these changes muted energy and environmental policies under an evolving, but negative, climate change outlook.

While the research topic is inter-disciplinary, it is bound by a common interest in documenting human affairs over time and through a historical consciousness, to contribute to the national story in the service of understanding and explaining the recent past. In this way, my thesis has relevance as the major issues are still being played out, but against the

[10] Sheridan, Tom, Division of Labour, Industrial relations in the Chifley Years, 1945-1949, (Oxford University Press, South Melbourne, 1989), pp. 165-166, Primarily through the activities of the Communist Party of Australia (CPA)

headwinds of more difficult global and national economic conditions. By historicising industry change, and the state policy shifts and decisions, this thesis will, I believe, provide an outline of a more informed social-economic history of the coal industries' transformation.

1.3 Methodology & Theoretical Setting

In developing this thesis, I have an ambition to go beyond some earlier (but not all) approaches of identifying and quantifying the industry in purely economic and technological terms of resource endowment, investment, production, value and ownership. I have taken a deductive approach combining a systematic quantitative and qualitative economic overview with spatial and policy history. The brevity of the thesis means containment to a few issues: the policy shifts; the effects of the historically forged mutual suspicion between labour and the state; and the increasingly globalised capital and political influence underwriting the industry expansion. Also, there is an aim to evoke the changing industry spatiality in a broader socio-economic setting, as a site of environmental disturbance and social conflict, and as a reconfigured place of work.

A methodological problem to avoid is the ontological rigidity of positing state, society, labour as static categories obscuring their historicity and fluidity over time.[11] Also, I am mindful of the advice of Gallop and Patmore, that government-business relationships need to be both particular and empirical, beyond their theoretical setting.[12] In this thesis, the methodologies and data typologies of resource economics, human geography and multi-disciplinary spatial studies provide the basic methodological framework to advance a history situated within a broad social/economic/environmental historiographic setting.

[11] Walters, William, Governmentality: Critical Encounters, (Routledge, London, 2012), p. 41
[12] Gallop, Geoff, & Patmore, Greg, Social Democratic Governments and Business, Labour History, Number 98, May 2010, p. 6

Theory-testing the applicability of a framework of Foucauldian Governmentality will help organise both the methods of interrogating the archive and the type of evidence collected. I was attracted to International political economy (IPE) as a diverse and relevant set of critical and problem solving theories[13] adaptable to different scales of enquiry. These theories from Mercantilism through Marxism to Feminism and Neo-liberalism, are based on rational observation of the transformative processes of the re-structuring of the world, with differential outcomes for people and places.[14] As a synthesis of the effects of political authority on markets and conversely of market forces on states,[15] IPE attempts to overcome the artificial distinctions between the economic-political and the domestic-international,[16] central to this thesis. However, using a critical theory of IPE to interrogate a problem-solving theory, neo-liberalism - the dominant paradigm of Australian Governments since the 1980s - would require a methodology heavily biased towards exogenous factors and archive.

A framework of Governmentality, on the other hand, provides a theoretical surface without formal depictions of systems of power,[17] which provides the 'analytics' of the decisions and effects of State apparatus and institutions. These endogenous factors are an important theme, without the thesis being subsumed by the weight of issues of broader global governance. Of particular relevance, I expect to use archival and methodological practices that seek to recover forgotten or erased struggles and make use of 'subjugated knowledges'[18] such as the industrial relations and resource policy history.

[13] O'Brien, Robert, & Williams, Marc, Global political Economy, 4th Edition, (Palgrave Macmillan, London, 2013) – A detailed introduction to the many approaches and theories of IPE from the medieval period to the present
[14] Larner, Wendy & Walters, William, Globalization as Governmentality, Alternatives: Global, Local, Political, Vol. 29, No. 5, Governing Society Today, (Nov-Dec. 2004), pp. 495-514
[15] Strange, Susan, States and Markets, 2nd ed. (London: Pinter, 1994), pp. 13-14
[16] Hettne, Bjorn, "Introduction: The International Political Economy of Transformation" in Hettne, B and Cox, R., International political economy: understanding global disorder, London: Zed Books, 1995, p. 2
[17] Walters, (2012), op. cit., p. 40
[18] Walters, (2012), op. cit., p. 132

Walters' survey of studies in Governmentality notes the current focus on political analysis of contemporary, rather than historical societies as presented in Foucault's original framework.[19] This dealt with the progressive governmentalisation of power relations under State Institutions,[20] from the mid-nineteenth century to the 1970s.[21] By surveillance and control over the whole economy, and a population unaware of its manipulation by the state,[22] this invention allowed State survival within contemporary power relations.[23] This theory attempts to draw on the contingent histories of the problems around which political formations coalesce, and the degree to which these problems are shaped by previous historical state strategies.[24] The state operates through the alignments of its objectives with the projects and aspirations of organisations, groups and individuals. Foucault warned against 'overvaluing the importance of the state,'[25] less of its public ownership and control of society, than in the increasing reach of its authority - the 'governmentalization of the state.'[26]

Walters, asks whether Governmentality merits the title of a 'new cartography of power,'[27] using mapping as a metaphor. This question perhaps can be partly answered by using cartographic techniques as a methodology to present space and change as a consequence of Government power and action. Cartography is not neutral, and any thematic map used in this thesis will consciously exclude other relevant information which also inform on the power/knowledge relations under scrutiny. However, this approach is widely used by

[19] Foucault, Michel, Power/Knowledge: Selected Interviews and Other Writings, 1972-77, ed., C. Gordon, (Brighton, Harvester, 1980)
[20] McNaly, Lois, Foucault, A Critical Introduction, (Polity Press, Cambridge, 1994), p. 116
[21] Burchell, G., Gordon, C., Miller, P., (eds.), The Foucault Effect: Studies in Governmentality, (Harvester Wheatsheaf, Hemel Hempstead), p. 101
[22] Foucault, Michel, (1980), op. cit., p. 224
[23] Rose, Nikolas, Powers of Freedom, (Cambridge University Press, Cambridge, 1999), p. 18
[24] Rose, (1999), op. cit., p. 21
[25] Foucault, Michel, 'Governmentality', in, Burchell, Graham, Gordon, Colin, Miller, Peter, (eds.), The Foucault Effect: Studies in Governmentality, with Two Lectures by and an Interview with Michel Foucault, (Harvester Wheatsheaf, London, 1991), p. 103
[26] Ibid.
[27] Walters, (2012), op. cit., p. 141

geographers and economists, and is appropriate for this thesis for showing large-scale aggregated data and spatial change over time, despite the risk of acting as 'an instrument of demarcations and enclosure.'[28]

This theoretical framework of Governmentality captures the flavour of NSW policy formation on resource endowments and allocations, where environment and community were ignored in often ad-hoc and secretive decision making. Examples cited include, the revenue windfalls from competitive tenders for exploration licences, and the Government's attempt, after exiting mine ownership to develop the Cobbora mine[29] to ensure coal supply for its power generators.[30] The former a liberal economic policy, and the latter a belated return to economic nationalism.

The methodology synthesises the effects of Government decision making over time, in these cases in the context of historical approaches to resource allocation, and highlight how these actions represent a shift in thinking, but gaining outcomes which moved policy away from the more structured approaches of the past. A discussion revived by Hay,[31] who provides an overview of the conflict of liberalism and nationalist perspectives in Australian energy policy. It is through exploring such examples of policy implementation that public responses can be measured. The historical truth of public opposition cannot truly be verified, but the weight and effects of media and community response, can be synthesised partly through the media campaigns and regional ethnographies. Here there are methodological problems in that these sources are not focused on my topic, running the risk of a-historical arguments and discussions.

[28] Walters, (2012), op. cit., p. 142
[29] Cobbora Coal Project Overview, http://cobbora.com.au/Project/Overview.aspx
[30] Campbell, Rod, Cobbora coal project: Submission to planning and assessment commission, The Australia Institute, March 2014, p. 2, http://www.tai.org.au/sites/defualt/files/TAI%202014%20Cobbora%20PAC%20submission%20FINAL.pdf
[31] Hay, James, L., Challenges to liberalism: The case of Australian energy policy, Resources Policy, 34, 3, (2009)

The Historiographical 'spatial turn' informs this thesis, as part of a broader ethical response representing a shift to an ethical materialism concerned with environment and sustainability of the planet.[32] In this, it is also situated within economic history. The idea of spatiality to be explored has two elements. The first is the broad and, I think, uncontroversial idea of spatiality, that the past took place at ground level, as Jerram[33] said, rather than being people, events and movements detached and unanchored in space and time. I am inspired by the multi-disciplinarity of the Annales school, focused on the relationship between communities and their natural environment,[34] Eley's, *'...*sovereign causalities of economics, population and environment.'[35]

The 21st Century mining industry has received little attention from historians,[36] with work largely done by practitioners, scientists, social and business historians. Here environmental history and the notional Anthropocene stratum are acknowledged. It is within this surface stratum of human activity that intensive coal mining activity occurs, and which is represented as both historical legacy and an evolving shaper of the physical and human landscapes.

The second idea of spatiality is in the context of the changing power relationships between state and labour in regions under globalisation. In particular, the Foucauldian idea of 'governable spaces', as proposed by Rose,[37] and the strategies of national economic management emanating from the mid-20th century, that are highly reliant upon statistical quantification, which have yielded under the globalisation narrative to new economic formations

[32] Livett, Kate, Review, *Southerly*, vol. 72, no. 1, (2012), p. 229
[33] Jerram, Leif, Space: A Useless Category for Historical Analysis? History and Theory, 52 (October 2013), pp. 400-419
[34] The Annales was concerned with much longer historical durations (the Longue durée) than this thesis attempts, however, the multi-disciplinarity of their work is evoked here.
[35] Eley, Geoff, A Crooked Line; From Cultural History to the History of Society, (The University of Michigan Press, Ann Arbor, 2005), p. 37
[36] Barton, Gregory, & Bennett, Brett, 'The Environment', in, Ville, Simon, & Withers, Glenn (eds.), The Cambridge Economic History of Australia, (Cambridge University Press, Port Melbourne, 2003), p. 463
[37] Rose, (1999), op. cit., p. 31

of political space.[38] Of these liberalism, particularly from the 1970s reframed the connections between regional economic activity, populations and the global economy but also embedded 'enclaves of power', whether government, trade unions or expert autonomous professional groups.[39] Ellem's analysis of the Pilbara,[40] as a remote resource space of national and global significance, provides a powerful lens for examining changing power relationships over time, with policy agendas under liberalism formed in the peripheries exercising influence over the national. I believe the coal 'spaces' of New South Wales, while not remotely isolated geographically from the metropole, have similarly formed a 'periphery,' physically but certainly psychosocially, having a somewhat similar history of change in labour relations as companies' manage remote sites.

The quantitative approach provides the means to encapsulate complexity using tables, graphs and thematic maps, to represent change in scale of development, trends and spatial diffusion. This quantitative tool will draw upon economic, legislative, spatial and demographic data drawn from primary sources to support both secondary qualitative and quantitative analyses.

1.4 Thesis Chapters and Literature Review

Chapter 2 - The economic history

This chapter presents an economic history. Reflecting on the transformation since 1980, I thought it a history without foundational or formative circumstances, lacking even its own creation myth. I chose 1980 because it commenced a period of significant financial reforms

[38] Rose, (1999), op. cit., p. 40
[39] Rose, (1999), op. cit., p. 147
[40] Ellem, Resource Peripheries and Neoliberalism: The Pilbara and the remaking of industrial relations in Australia, Australian Geographer, 2015 Vol. 46, No. 3, p. 323–337

through globalising forces and the rapidly developing seaborne coal trade after the 1970s oil-shocks. Clearly the enablers for this rapid growth were the resource endowments, industry knowledge, the skilled mining workforce and State industry policy and governance - all formed in earlier epochs, particularly in the post-war period. Therefore, the chapter will be divided into two sections describing the distinctive industry setting, economic, and market orientations of the 1945-1980 and post 1980 periods.

The coal industry and coal communities have a large historical literature tracing the NSW industry since coal discovery in 1791 and the commencement of mining in 1801.[41] There are many histories of individual mining operations and communities by local historians such as Ed Tonks[42] and academic histories of early coal industry formation, particularly Turner,[43] and Branagan,[44] provide vital understandings of the genesis of the coal industry at the smaller scale of the nineteenth Century.

It is extraordinary to think that Blainey would exclude coal from his 'Rush that never ended,'[45] claiming it was '…less speculative than metal mining, had no metallurgical problems; its industrial tensions differed, its markets differed, and it was not such a dynamo of Australia's growth.'[46] Coal gleams, not glitters. Less a dynamo, and more the structural underpinnings of nation building, its industrial tensions, radical politics aside, mostly simmered around workplace conditions, pay and safety, as Gollan[47] and Ross[48] attest, but it became an

[41] Turner, J. W., Coal mining in Newcastle, 1801–1900, Newcastle Region Public Library, Newcastle, (1982), p. 15
[42] Tonks, Ed, Northumberland - Newstan, 1887–1987: 100 years of coal mining, (Elcom Collieries, Cardiff, NSW, 1987) – This is cited as an example of the genre. Ed Tonks is a local historian with significant experience, and these often-commissioned histories are generally detailed and valuable.
[43] Turner, J. W, (1982), op. cit., – Turner was an academic who wrote widely on the more condensed and localised industry centred on Newcastle.
[44] Branagan, D., F., Geology and Coal Mining in the Hunter Valley 1791-1861, (Newcastle Public Library, Newcastle, 1972)
[45] Blainey, Geoffrey, The Rush That Never Ended, 3rd Edition, (Melbourne University press, Carlton, 1978)
[46] ibid., p. V
[47] Gollan, R., The Coalminers of New South Wales: A History of the Union, 1860 - 1960, (Melbourne University Press, Carlton, 1963); also, Chapter 1, The Miners Heritage, in, Deery, Phillip, (ed.), Labour in Conflict: The 1949 Coal Strike, (Australian Society for the Study of Labour History, Canberra, 1978)
[48] Ross, Edgar, A History of the Miner's Federation of Australia, (Halstead Press, Sydney, 1970)

important globalised business, with a veritable 'coal rush' after 2007 during a-historically high coal prices. Its critical role in underwriting local industrialisation through the establishment of a steel industry,[49] by fuelling a railway network,[50] and manufacturing industries, while providing cheap electricity until recently, cannot be understated.

However, the coal industry still defies scrutiny by academic historians. The special mining edition of the AEHR[51] in 2005 contained no reference to Australian coal mining. There is a paucity of mining history work on the post-war period. A historical survey in 1952,[52] Dingsdag on restructuring in 1988,[53] Branigan's 1990 survey,[54] and Martin, et. al.[55] in 1993, shows the intermittent nature of interest in this subject. The few monographs covering the more recent history, say Martin, et. al., provide economically positivist narratives from an industry perspective with a close focus on technological advance. Waring, et. al.,[56] on industry transformation under the globalisation narrative, is insightful on 'push-back' by oppositional forces to coal mining.

Problematically, the State Records archive at the Kingswood repository[57] does not have a strong coal bias, with many documents for the post 1980 period embargoed.[58] However, the history of legislative review and change is well documented. The econometric data

[49] Jack, R., Ian, and Cremin, Aedeen, Australia's Age of Iron, (Oxford University Press, Sydney University Press, Sydney, 1994)
[50] Gunn, John, Along parallel lines: a history of the railways of New South Wales 1850-1986, (Melbourne University Press, Carlton, 1989)
[51] Australian Economic History Review, July 2005, Vol. 45, Issue 2, July 2005
[52] Anon., 'The N.S.W. coalfields — a historical survey', in The Coal Miner, Sydney, The New South Wales' Combined Colliery Proprietors Association, March 1953, pp. 14–17
[53] Dingsdag, Donald Pierre, The restructuring of the NSW coalmining industry, 1903-1982, Doctor of Philosophy thesis, (Department of History and Politics, University of Wollongong, 1988)
[54] Branagan, David F., 'A History of New South Wales Coal Mining', in Coal in Australia, the Third Edgeworth David Day Symposium, The University of Sydney, 1990
[55] Martin, C., H., et. al., History of Coal Mining in Australia, Monograph Series No. 21, (Australian Institute of Mining and Metallurgy, Parkville, 1993) - Provides a very industry focussed view of the coal industries operation and expansion from beginnings to the 1980s.
[56] Waring, Peter, Macdonald, Duncan, & Burgess, John, Globalization and Confrontation: The Transformation of the Australian Coal Industry, Asia Pacific Business Review, 7:1, (2000), pp. 21-45
[57] State Records, NRS 9987 Mines Special files, 1851-1986 – contains detailed, intermittent but incomplete reports. Few files relating to policy formation survive.
[58] Authors Note: Having worked in resource policy, I have observed many documents of significance have been unfairly embargoed, and key documents destroyed.

was researched and compiled primarily from Coal Services Pty Ltd,[59] the successor organisation to the Joint Coal Board, also NSW Resources and Energy and the Australian Bureau of Statistics. As state bodies, these are the repositories of the most comprehensive and consistent information. Data sourced and analysed included, annual mine-by-mine and aggregate production, capital expenditure, exports, coal prices, domestic coal consumption, employment, wages, productivity, industrial relations and safety data for the years 1945-2014. This data is a primary source, but lacks any critical policy perspective. The unavailability of economic quantification and analysis of returns to the state from coal, is one significant gap in the historical literature. The Reserve Bank provides significant data on exchange rates, mining investment, exchange rates and the national economy, the most cohesive time-series available.

The quantitative data presented in graphs and tables provides the 'how, where and how much,' and critically the overall trends, but it does not tell us 'why', without interpretation or reference to other sources. Here, qualitative methods using a range of primary and secondary archival sources will be used to interpret, qualify, summarise and illustrate the broader economic, political and social changes over time. A point of departure will be to avoid the path of mining historians with a focus on heritage or technological change and innovation,[60] although this will be acknowledged. There is little in the historical literature on these subjects, with the journal and monographs of the AusIMM[61] a useful but episodic

[59] See, Coal Services Pty Limited, http://www.coalservices.com.au/statisticsreportsnsw.aspx, for examples of the data collated.
[60] Martin, C., H., et. al., (1993), op. cit., - Provides a very industry focussed view of the coal industries operation and expansion from beginnings to the 1980s.
[61] Australasian Institute of Mining and Metallurgy - https://www.ausimmbulletin.com/

resource. Commercial data on the coal industry is sometimes more transparent than Government sources, through obligatory Company and statutory reporting requirements,[62] but as with royalty returns, these often remain confidential.

Economists have not entirely abandoned the global macro-economic dimension of this subject, but the paucity of papers is illustrated by the economic appraisal of the coal industry by Folie and McColl[63] reviewing the period 1960-1980, which only referenced two earlier works, published in 1929 and 1947. Bowden explores the success of the Australian oligopoly on coking coal exports after 2000, a key factor driving the recent industry expansion and higher prices.[64]

The social histories of coal communities rarely deal with the recent period, but often draw a strong correlation between technological progress in the mines with social progress in the lives of miners, an example being Browns' 1989 local history of the Western Coalfields.[65]

Chapter 3 - Policy, Politics and Place

This chapter is a discussion of changing power relationships between the state, labour and capital and the broader communities representing place. The state here is presented as a central protagonist, driven by a jobs-growth paradigm and a constant grab for resource rents, through ad-hoc policy formation which often exacerbates tension with communities. I am mindful that the State is charged with the duty to maximise returns to the State from natural

[62] Hill, Elizabeth, (ed.), New South Wales Coal Industry Profile 2013, New South Wales Department of Trade and Investment, Sydney, (2013) – An annual from 1985.
[63] Folie, Michael, and McColl, Gregory, The Australian Coal Industry: An Economic Appraisal, Resource Policy March 1980
[64] Bowden, Bradley, A History of the Pan-Pacific Coal Trade from the 1950s to 2011: Exploring the Long-Term Effects of a Buying Cartel, Australian Economic History Review, Vol. 52, No. 1 March 2012
[65] Brown, Jim, W., Bent backs: an illustrated social and technological history of the Western Coalfields, (Lithgow, N.S.W: Industrial Printing Co., 1989)

resources and its role is governance. This chapter examines Governmentality in policy formation and legislation underpinning resource allocation under intensification of trade. The chapter has three Sections covering growth, labour relations and policy formation.

The broad thesis of economic change summarised by Walter,[66] saw a changing of the old guard in the 1980s whose formative experience in the war years and Keynesian model of State intervention had failed to maintain economic growth. A new guard influenced by the big ideas of the 1960s and 1970s – feminism, identity politics, environmentalism – evoked direct action to influence and steer policy direction.[67] This rejection of 'Deakinite ameliorative liberalism' and caution against repeating the mistakes of the Whitlam Government, were seminal movements away from the core values of the Liberal and Labor parties towards the core tenets of neo-liberalism.[68]

McLean[69] points to Australia's resource endowments as underpinning economic success from the mid-19th century, but with emphasis on the spectacular increase in minerals and energy exports since the 1970s. Globalisation and deregulation, intensifying after 1980, brought nation-wide productivity increases through capital deepening (the greatest contributor), technological advance and labour deregulation,[70] with improved terms of trade but with increases in total hours worked and significant increases in foreign debt.[71] Cox, sees the internationalisation of the state as a global process where local policies and practices

[66] Walter, James, 'Growth resumed 1983-2000', in, Ville, Simon, & Withers, Glenn (eds.), The Cambridge Economic History of Australia, (Cambridge University Press, Port Melbourne, 2003), p. 165
[67] Walter, (2003), Op. cit., p. 174
[68] Walter, (2003), Op. cit., p. 166
[69] McLean, W., Ian, Why Australia Prospered: The Shifting Sources of Economic Growth, (Princeton University Press, Princeton and Oxford, 2013), p. 228
[70] McLean, (2013), op. cit., p. 236
[71] McLean, (2013), op. cit., p. 243

have been adjusted to the exigencies of the global economy.[72] Ellem in constructing his 'geo-history,'[73] shows how the Pilbara as a peripheral region of global economic importance has been a site of accentuated employer power, and therefore influencing, or remaking, national policy regimes.[74] These themes will be explored in the context of an emergent NSW coal periphery.

Keating[75] points to the emphasis by business on tax reform and workforce relations, now the most amended areas of legislation since Federation. These are contentious reforms as they represent ideological differences in the political divide between labour and capital.[76] Productivity, still obsessively pursued by Governments, has slowed after growth in the 1990s responding to the micro-economic reforms of the Hawke Government in the 1980s.[77] Fraser and Keating discuss recent policy on nation building and infrastructure development, pointing to little work on the economic justification for public expenditure where returns are negligible or non-existent,[78] and the absence of proper scrutiny on uneconomic investment,[79] prevalent in the present coal industry, currently with significant over-capacity.

This chapter historicises changes in State-labour relations from the hostile post-war industrial relations setting to the more acquiescent, corporatised mining workforce, where unions have become mine operators. Labour history has a significant and rich literature. Insight into the development of the industry can be gained from labour histories of Phillip

[72] Cox, Robert, W., Production, Power and World Order: Social Forces in the Making of History, (New York, Columbia University Press, 1987), p. 253
[73] Ellem, Bradon, Resource Peripheries and Neoliberalism: The Pilbara and the remaking of industrial relations in Australia, Australian Geographer, 46:3, (2015), p. 323-337
[74] Ellem, Bradon, (2015), op. cit., pp. 324
[75] Keating, Michael, 'Improved productivity', in, Menadue, John & Keating, Michael, (eds.), Fairness, Opportunity and Security: Filling the Policy Vacuum, (ATF Press, Adelaide, 2015)
[76] Keating, (2015), op. cit., p. 143
[77] ibid.
[78] Fraser, Luke, & Keating, Michael, 'Infrastructure: Improvement or Impoverishment?', in, Menadue, John & Keating, Michael, (eds.), Fairness, Opportunity and Security: Filling the Policy Vacuum, (ATF Press, Adelaide, 2015), p. 161
[79] Fraser, Luke, & Keating, Michael, (2015), op. cit., p. 167

Deery[80] and Tom Sheridan,[81] of the politically divisive strike and employer-coal union[82] confrontations in 1949. The idea of mentalities and dissonance from this period being transmitted through time is garnered from the work of such labour historians as Beaumont's survey of coal labour conflicts;[83] and more recent doctoral theses such as Donald Dingsdags' 1988 survey.[84] Cooper and Ellem point to how employment and work relations have been reshaped since 1996 by interventionist neo-liberal Governments.[85] Perhaps this is a consequence of increased spatial diffusion and the changes in coal labour relations under the globalisation political narrative, as argued by Sadler & Fagan,[86] which has rendered the industrial relations history of the coal industry relatively politically invisible. Sheridan spoke of the isolation of miners in small coal-dominated communities with a close focus on work related issues, undiluted by the interface with people in larger urban areas with a more diverse occupational structure.[87] Barry and Michelotti[88]analyse collective bargaining outcomes, and Hearn McKinnon traces company deunionisation (anti-collective) strategies in the 1990s, aimed at individualisation of workers.[89]

[80] Deery, Phillip, (ed.), Labour in Conflict: The 1949 Coal Strike, (Australian Society for the Study of Labour History, Canberra, 1978)
[81] Sheridan, Tom, (1989), op. cit.
[82] Australasian Coal and Shale Employee's Federation (ACSEF) (78% of coal miners in 1949); plus, five craft unions - AEU, Federated Engine Drivers and Fireman's Association (FEDFA), Deputies and Shotfirers Association (DSA), Federated Mining Mechanic's Association (FMMA), Blacksmiths' Society of Australasia (BSA).
[83] Beaumont, P., B., 'Conflict in coal: the NSW experience', in, Journal of Industrial Relations, vol. 17, March (1975), pp. 44–59
[84] Dingsdag, Donald Pierre, (1988), op. cit.
[85] Cooper, Rae, & Ellem, Bradon, 'Less Than Zero': Union Recognition and bargaining rights in Australia 1996-2007, Labor History, Vol. 52, No. 1, (2011) p. 49
[86] Sadler, David and Fagan, Bob, Australian Trade Unions and the Politics of Scale: Reconstructing the Spatiality of Industrial Relations, Economic Geography, Vol. 80, No. 1 (Jan., 2004), pp. 23-43
[87] Sheridan, Tom, (1989), op. cit., p. 250
[88] Barry, Michael & Michelotti, Marco, Market Power Constrained: Union and Non-Union Collective Bargaining Outcomes, The Australia Resources Sector, Labour & Industry: a journal of the social and economic relations of work, 20:1, (2009), pp. 25-44
[89] Hearn McKinnon, B., CRA/Rio Tinto in the 1990s: A Decade of Deunionisation, Labour History, No. 97 (Nov., 2009), pp. 75-96

Spatiality in the coal industry does not have an extensive specific literature, but geographers provide theoretical settings and case studies of relevance to my thesis. The, discussion on integration of coal industry and industrial relations research by Mcgrath-champ,[90] and social responses to economic restructuring examined by Yapp,[91] chart the relationships of spatial contiguity and the traditions of place-bound groups. The geographical diffusion of coal work places having diluted the sense of class and group solidarity (and perhaps union power) that stemmed from common work and community practices that characterised say, Newcastle in earlier epochs. Coal industry spatiality is explored through thematic mapping with some data drawn from the NSW Department of Industry on-line databases such as DIGS, Common Ground and MinView.[92]

The critical primary source on development remains Federal and New South Wales legislation,[93] particularly the legislative changes governing land access for mining and exploration purposes. Documents detailing the reasoning for policy decisions are not accessible, though policy papers summarise changes in environmental benchmarking and reporting. The use of legislation and embedded powers of office by politicians to circumvent court decisions will also be examined. At present, there is a renewal of interest in the regional scale as a focus for various national policy initiatives covering resources, work, economic development and environmental planning, through the work of O'Neill and Fagan[94] and Dore and Woodhill[95] amongst others.

[90] McGrath-Champ, Susan, Integrating industrial geography and industrial relations research, Tijdschrift Economische en Sociale Geograjie - 1994, Vol. 85, No. 3, pp. 195-208
[91] Yapp, Kiri, Cultures of Coal and Climate Change in Helensburgh, New South Wales, Thesis, Faculty of Science, Medicine & Health (University of Wollongong, 2011)
[92] http://www.resourcesandenergy.nsw.gov.au/miners-and-explorers - various online databases arranged by theme and content
[93] Key Documents such as, NSW Mining Act 1992; NSW Coal Mines Health and Safety Act 2002, etc.
[94] O'Neill, P., and Fagan, R., 'The new regional policy: what chance of success?', Australian Quarterly, 67, (2), (1995), pp. 55-68.
[95] Dore, J., and Woodhill, J., Sustainable regional development, (Canberra: Greening Australia, 1999)

Chapter 4 - Impacts and Resistance

Few historians have written on the impacts of 20th century mining on the environment,[96] and mining historians, centred on ideas of industrial and economic progress, are yet to break free from the heritage paradigm afforded by the rich legacy of 19th and early 20th century mining sites and artefacts.[97] Environmental scientist, Ken McQueen, acknowledges the community view that mining is seen at worst, as 'rape and pillage' of the land and at best an necessary evil, …'tolerable if it was in remote, unseen regions.'[98] McQueen sees the balance now towards environmental restoration over heritage preservation.[99] Important 'bottom up' insights from anthropology on social conflict and resistance are providing ethnographies of sociocultural change, local resistance, and changing understandings of anthropogenic climate change, globalisation, and coal and gas activism in the Hunter Valley, a key area of conflict.[100] Connor et. al., have charted the shifting grounds of environmental knowledge and oppositional practices by coal-affected residents. The movement of concern from the political fringe to the mainstream population has economic and political dimensions[101] as well as social, transnational and moral dimensions. In particular, the cultures of coal and climate change examined by Kiri Yapp highlight the 'us' and 'them' dichotomy of 'economic good' and 'environmental bad'.[102]

My literature review shows that the coal industry as a subject of historical enquiry is somewhat neglected. Economic historians have not provided a significant literature for the

[96] The Cambridge History of Australia, Bashford, Alison, & Macintyre, Stuart (ed.), Chapter 19 - The environment pp. 452-471 (Cambridge University Press, Melbourne, 2003), p. 463
[97] Pearson, M., and McGowan, B., Mining Sites in NSW: History and Heritage—With Guidelines for Assessing Heritage Values and for Taking Actions on Mining Heritage Places, 209–246. (Maitland: Industry and Investment NSW, 2009)
[98] McQueen, Ken, The Importance and Future of Mining History: An Australian Perspective, in, 'Symposium on Mining History' in Earth Sciences History, Vol 31, 2, (2012), pp. 316-320, (1)
[99] Ibid.
[100] Connor, L., Higginbotham, N. and Freeman, S. "Not Just a Coalmine: Shifting Grounds of Community Opposition to Coalmining in South-eastern Australia". Ethnos, 74(4), (2009), pp. 490-513.
[101] Ibid., p. 491
[102] Yapp, (2011), op. cit., P. 54

most recent period of the coal industries' greatest expansion, though economists are, as expected, monitoring the field as part of broader macroeconomic analysis. Social histories with a clear coal industry and community focus remain episodic and rely on the work of local historians and local histories. It is impossible in my thesis to do justice to this topic beyond examples illustrating the major themes and some preliminary answers to my research questions, but on the economic and spatial history, there are gaps which can be addressed. Government policy formation relating to the coal industry remains in the archival shadows, and this thesis hopes to sign-post the way forward to recovering memory after a long period of Government social and resource policy amnesia.

2.0 AN ECONOMIC HISTORY

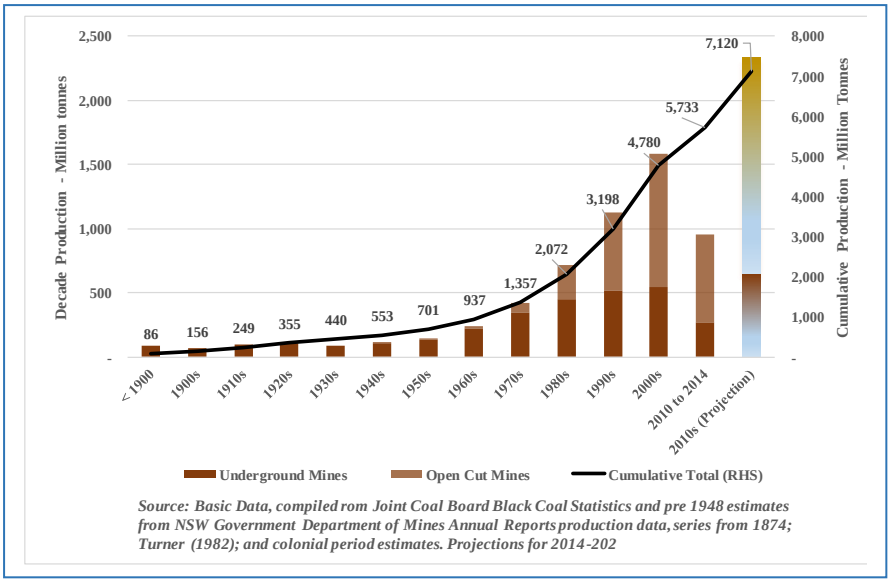
2.1 Introduction

The lucky situation of settlement within the high-quality Sydney Coal Basin with outcropping coal on the coast, fueled the industrialising impetus, and allowing rapid expansion of the colonies. For NSW, and Australia, industrialisation began with coal mining in 1801[103] and the first steam engines in 1815.[104] From discovery in 1791[105] until the 1980s, the principal coal producing centres remained Newcastle,[106] Lithgow[107] and Wollongong,[108] with the coal industry subsequently less significant to these centres as the loci of production moves further away. These districts produce low ash and sulphur bituminous thermal and soft coking coals for both domestic and export markets, with the south coast producing high quality hard coking coals.

The coal resources of NSW are extensive but elusive, in terms of marketable resources. After 215 years of operation and some 6 billion tonnes of coal mined to date, 60% of that total since 1980, (Figure 4) much of the shallow high quality resources are either mined or sterilised due to past mining practices. For a sobering global perspective, the total historical production of NSW since 1801 still amounts to less than the total coal output of China within the past two years.[109]

[103] Turner, J., W., (1982), op. cit., p. 16 – Turner discusses arguments for earlier dates for shipment of Hunter river coal.
[104] Turner, J., W., (1982), op. cit., p. 20
[105] Branagan, D., F., (1972), op. cit., p. 11 – The Journals of Bligh and Tobin recording the (non-extant) journal of discovers William and Mary Bryant. Shortland discovered coal on the Hunter River in 1797 with systematic mining commencing in 1801.
[106] including Maitland, Cessnock and Lake Macquarie areas
[107] including Lithgow, Portland, Kandos/Clandulla and Ulan-Wilpinjong areas
[108] including Bulli, Wollongong and the Burragorang Valley
[109] BP Statistical Review of World Energy June 2016, Workbook, Coal Production, http://www.bp.com/statisticalreview - China produced 3873.9 Mt in 2014, 3747.0 Mt in 2015, falling by perhaps 15% in 2016.

Figure 4, Cumulative coal production showing output by decades (Mt)



Companies now dig deeper, with more overburden removal, produce more washery waste, and mines occupy a larger spatial imprint. Geographic expansion means longer rail haulage distances to port for some producers. In scale, the Australian industry with 2015 production of 484.5 Mt, ranks behind China, USA, and India in output, currently producing about 6.2% of global production, up from 3.2% in 1980.[110] NSW produces around 260 Mt, or about 3.2% of global coal output, with the largest mining operation in NSW, BHP Billiton's Mount Arthur Operations near Muswellbrook, producing roughly twice as much coal as the whole NSW coal industry in wartime 1945.[111]

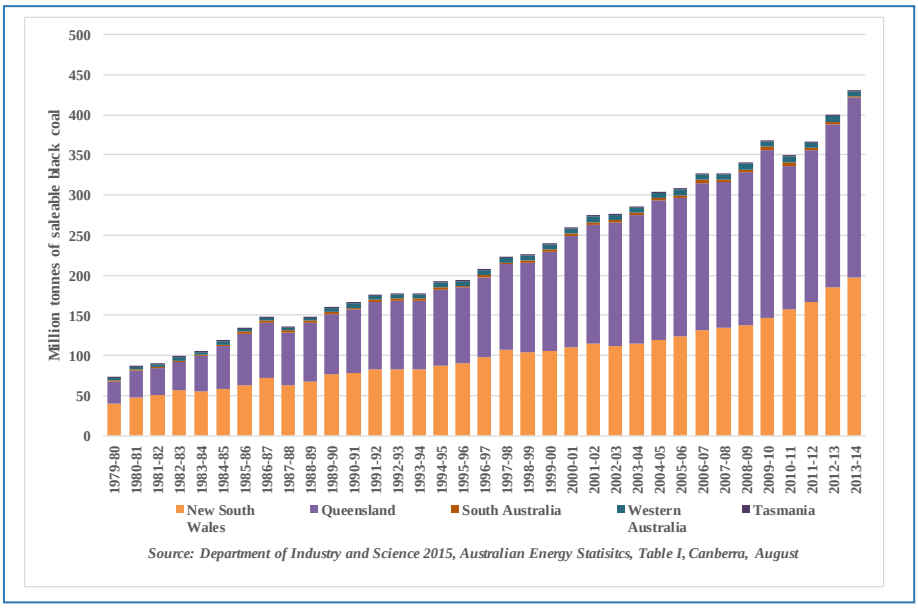
2.2 The Post-War Coal Industry 1946-1980

Despite Government approbation, the war years 1939-1945, saw production increase from the doldrums of the 1930s depression years, and annual war time output, although uneven, was not exceeded again until 1950. (Figure 5) New South Wales dominated Australian production until Queensland commenced its own great acceleration in the late 1960s based on

[110] BP Review of Energy Statistics, 2015 & 2016
[111] NSW Government, Department of Trade & Investment, Division of Resources and Energy, New South Wales Coal Industry Profile 2014, Volume 1, (NSW Government, Maitland, 2015), p. 15; Joint Coal Board, Fifth Annual Report 1951-52, (A.H. Pettifer, Government Printer, Sydney, 1952), p. 86

exports of premium hard coking coals, a global market it would continue to dominate until the present.

Figure 5, Australian saleable coal production by State, 1939-1980 (Mt)



Coal was critical to the economy, in steel and town gas production, power generation, manufacturing and steam railways. The latter consumed more coal than the steel industry in 1946 when NSW dominated, producing 81% of Australian black coal.[112] The period from 1945-1960 is characterised by many smaller mines serving domestic markets, with limited exports to the Pacific region. A peak of 172 mining operations in 1951 declined to 107 in 1960 through closures and mergers,[113] but with a doubling in average output. (Refer Figures 6 & 7) Perhaps the most salient feature of the mining industry between 1945 and 1980 was its invisibility, mostly underground mines blended into suburban settings and dispersed rural locations. (Figure 6)

[112] Elford, Harold, S., & McKeown, Maurice, R., Coal Mining in Australia, (Tait Publishing Company Pty Ltd, Melbourne and Sydney, 1947), pp. 3-4
[113] Martin, C., H., et. al., History of Coal Mining in Australia, Monograph Series No. 21, (Australian Institute of Mining and Metallurgy, Parkville, 1993), p. 90

Figure 6, Heat map - volume of raw coal production by location, 1949/50[114]

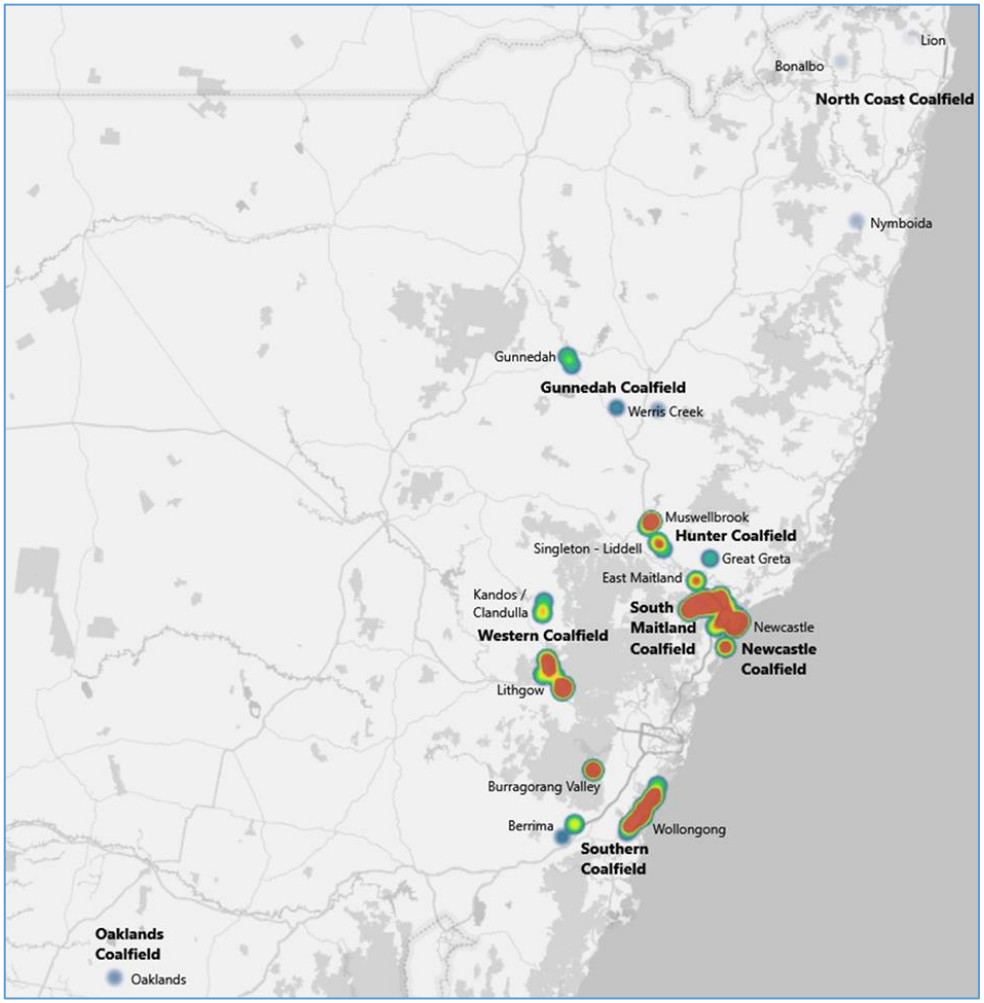
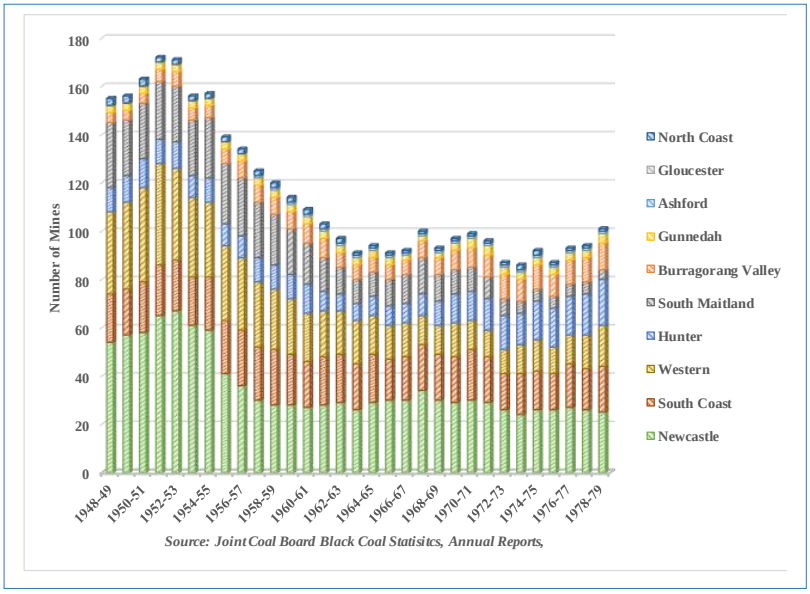


Figure 7, Number of mines and distribution, 1949-50



[114] Joint Coal Board, Third Annual Report 1949-50, 1950-51, (A.H. Pettifer, Government Printer, Sydney, 1951), - Mine-by-mine data was not published at this time, and most of this data was obtained directly from the Coal Service Pty Ltd archive

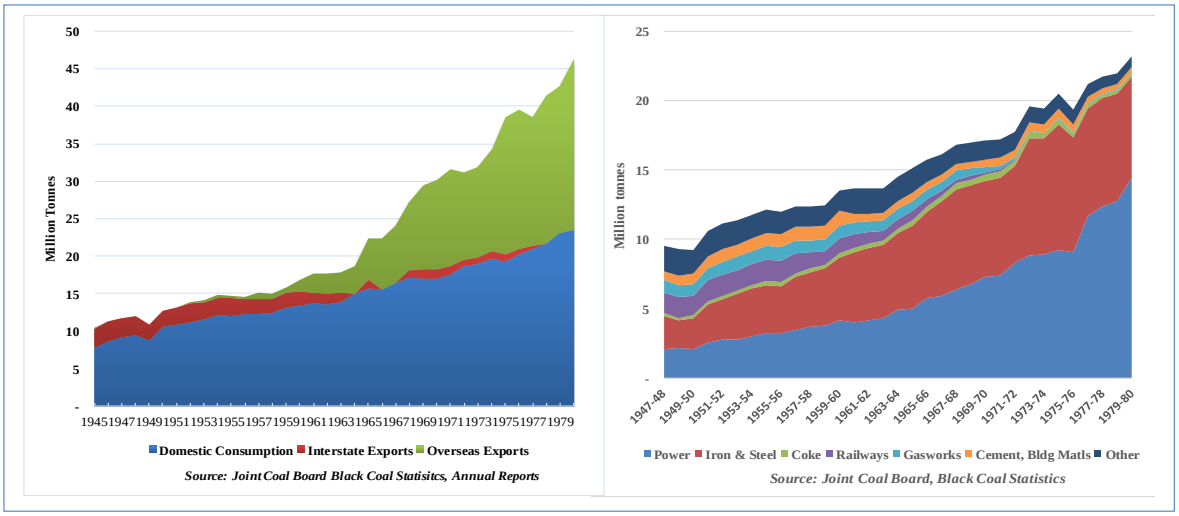
The industry in 1960 still offered poor underground working conditions where 87% of production was derived[115], despite the progressive introduction of bathhouses, protective clothing dust suppression and disease control. Manual coal cutting and loading under the contract system, in place since the convict mines, was finally concluded in the 1960s[116] and pit horses finally withdrawn in 1972.[117] The high visibility clothing worn by the contemporary coal mining workforce is a useful metaphor, sharply contrasting to the shorts, singlet, boots, belt, rescuer, hard hat and light[118] typical of underground miners into the 1970s before occupational health and safety became the dominant legislative setting for both unions and bosses after 1980.

Open cut mining had achieved prominence in the war years, and particularly during the 1949 strike, when the mines were briefly operated by the army, accounting for 17% of production in 1951-52 before declining to insignificance by 1959.[119] The 10-year post-war growth spurt sustained domestic consumption, but structural changes in domestic demand were shaped by lower railway, gas and industrial demand, offset by growing domestic iron and steel and electricity production representing 90% of consumption by 1980 (Figure 8R). Coal fired railways and town gas production, were mostly phased out by the early 1970s, the former in favour of electrification and diesel powered locomotives[120]and the later replaced by natural gas between 1976 and 1985.[121] State power generation capacity was centralised

[115] Joint Coal Board, Twenty-First Annual Report 1967-68, (V. C. N. Blight, Government Printer, Sydney, 1968), p. 24
[116] Martin, C., H., et. al., (1993), op. cit., p. 80
[117] Martin, C., H., et. al., (1993), op. cit., p. 115
[118] Martin, C., H., et. al., (1993), op. cit., p. 73, The hard hat was compulsory from 1941
[119] Joint Coal Board, Black Coal in Australia 1982-83, (Joint Coal Board, Sydney, 1983), p. 22-23
[120] Wilkinson, John, Coal production in New South Wales, Briefing Paper No 10/95, NSW Parliamentary Library Research Service, Sydney, 1995, p. 12 - 550 steam locomotives were withdrawn from service between 1956-1964
[121] The Moomba to Sydney Pipeline constructed between 1974-1993, consists of approximately 2029 kilometres of gas transmission network in the state of New South Wales. https://www.aer.gov.au/networks-pipelines/service-providers-assets/moomba-to-sydney-pipeline. The last town gas plant was decommissioned in 1985. http://www.environment.nsw.gov.au/resources/clm/gasworks05237.pdf

in State control in 1950.[122] Coal for electricity rapidly expanded domestic coal demand from the captive mines run by Elcom,[123] with electricity output quadrupling from 1960 to 1980.[124] From this point until the present, the fortunes of the domestic coal market was tied to electricity production. Coal washeries at minesites proliferated in the 1950s to meet the changing market specifications of consumers as the export orientation took hold,[125] and interstate exports declined. (Figure 8L)

Figure 8, NSW Growth of Exports (L), Domestic coal consumption (R)

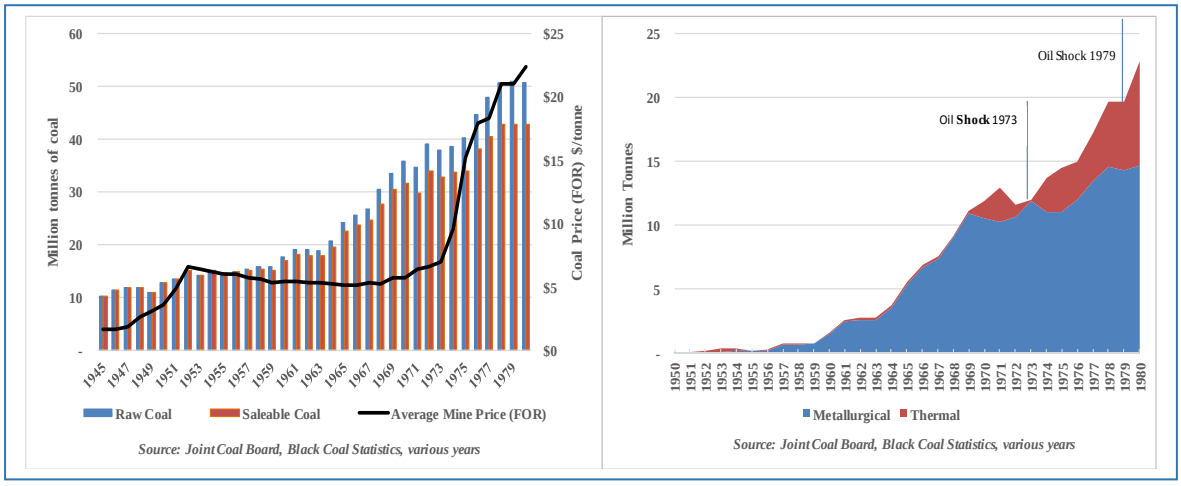


Coal prices were set by domestic consumers, with the small export volumes having little effect on price. From 1952 coal prices remained flat through to the oil shock of 1973, with sustained price recovery after 1975. (Figure 9L) This increase in coal prices had two dimensions - the inflationary period of the early 1970s with a high Australian dollar, and the sustained global increase in demand for thermal coal, (Figure 9R) Nations reliant on energy imports, adjusted their energy policies and fuel mix after the 1973 oil shock in view of the large oil price increases and threats to supply. Japan lifted its embargo on thermal coal in

[122] The State Electricity Commission of New South Wales (Elcom) was established on 22 May 1950 by the Electricity Commission Act 1950, taking control of the power generation and distribution assets from the County Councils and the New South Wales Government Railways. The Electricity Commission adopted the trading name, Pacific Power, in 1992.
[123] Elcom - State Electricity Commission of New South Wales
[124] New power stations at Tallawarra (1954), Wangi Wangi (1956), Wallerawang (1957), Vales Point (1963), Munmorah (1967), Liddell (1971), and Eraring (1977)
[125] Martin, C., H., et. al., (1993), op. cit., p. 92, Coal washeries are also called coal preparation plants

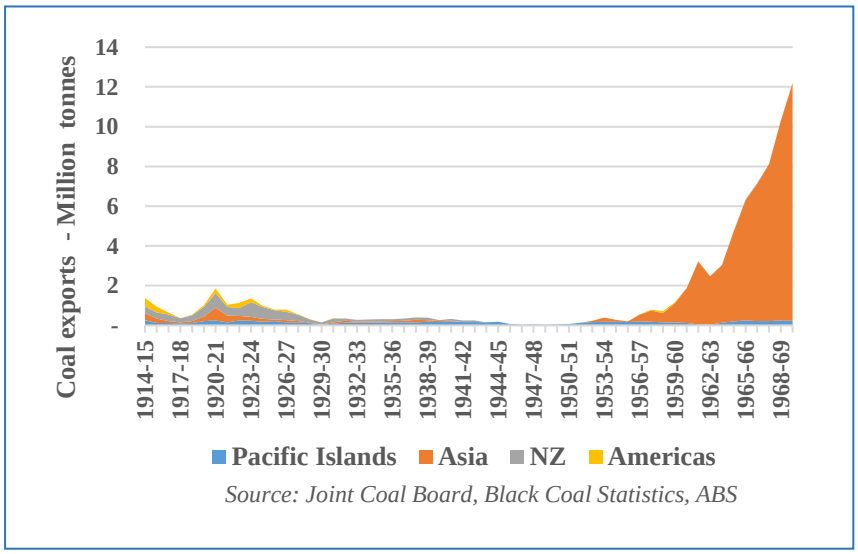
1974, overturning its own domestic coal procurement policy against strong local union opposition.[126]

Figure 9, NSW Coal production and coal price (L), Exports by coal type (R)



Prior to this development, the pan-pacific coal trade has had a long history with NSW coal exports to the Pacific Islands, New Zealand, Asia and the Americas of important prior to the Great Depression. (Figure 10) NSW was the only pacific-rim exporter for most of this period.

Figure 10, Pan-Pacific coal trade, NSW exports 1914-15 to 1968-69



[126] Sklarew, Jennifer, F., Shock to the system: how catastrophic events and institutional relationships impact Japanese energy policymaking, resilience, and innovation, PhD Dissertation, George Mason University, Fairfax, VA, 2015, p. 98, - Another measure promoting thermal coal use was the 1974 Electric Power Resources Development Promotion Tax that provided subsidies to communities hosting nuclear power plants also funded subsidies to localities hosting coal-fired power plants, p. 64

The export trade to Japan from 1956, was initially stimulated by demand for coking coal from Japanese steel mills in the period 1960-1973, as the Japanese Steel Mills (JSM) looked to diversify supply and break the US control over the pacific coking coal trade and pricing.[127] The impetus for acceleration in the export sector came in 1960, initially from Thiess Brothers' pioneering large-scale Moura open cut mine in Queensland, which attracted Japanese and American partners and a term contract with the JSM.[128] Local capital and infrastructure restraints were overcome by the entry of US Companies Utah Construction and Kaiser Resources, pioneering similar large scale, high capital, open cut mines[129] and proving to the Japanese the potential of Australia as a supplier of high volumes of coking coal. Other factors were the reduction in real ocean freight rates[130] for bulk materials, accompanying the rising economic importance of Japan.

For NSW, coking coal supply increased significantly but was constrained by the small number of south coast mines captive to domestic steel mills with little surplus capacity. NSW exports to Japan rose significantly from 9,000 tonnes in 1955–1956 to 10.9 million tonnes in 1969–1970.[131] Overseas exports, only 8.8% of production in 1960, climbed to 33% in 1970 and 45% of total production by 1980, with export volumes exceeding domestic demand in 1977 and cementing the key dynamic of the industry to the present – an industry, export oriented and outward looking, with its eyes on Asia. Exports in the 1970s accounted for only 45% of total coal production but were 80% of total coal value.[132] The orientation towards exports would dominate future industry expansion as domestic markets, beyond power and steel, offered little in volume or price incentives. The surge in exports from the

[127] Bowden, (2012), op. cit., p. 6
[128] Bowden, (2012), op. cit., p. 7
[129] Bowden, (2012), op. cit., p. 2
[130] Manners, Gerald, Unresolved Conflicts in Australian Mineral and Energy Resource Policies, The Geographical Journal, Volume 158, Part 2, July 1992, p. 131
[131] Joint Coal Board, 23rd Annual Report 1969-70, (V. C. N. Blight, Government Printer, Sydney, 1969), p. 251
[132] Derived from Joint Coal Board, Black Coal Statistics, various years

1960s prompted an increase in the State's unit royalty rate, then 10c per tonne, rising to 25c in 1970-71 and $1.00 in 1974-75, during this inflationary period.

Despite an industry characterised by labour rigidities, conflicts and political interventions, the progressive introduction of mechanisation, eliminating hand working, was mostly achieved by 1970 under the gaze of the JCB.[133] The introduction of 5-day, 24-hour production in 1970-71[134] in exchange for a 35-hour week, freed up the utilisation of high capital equipment, making longwall mining installations viable, a move which would maintain the competitiveness of underground mining into the future. The first modern self-advancing longwall was introduced (initially unsuccessfully) at Coal Cliff Colliery in 1970,[135] but wide ranging acceptance by unions and adaptation to local conditions by producers would wait another decade.

Open cut mining gained impetus in the 1970s with labour reforms allowing 24-hour production, also hastening the move to 24-hour longwall mining, as owners used capital to achieve lower unit production costs and increased production. While the industry underwent consolidation of ownership, it maintained a historical continuity characterised by industrial unrest, a contained geography, with many underground mines, largely owned and operated by local companies including a still domesticated BHP. Consolidation of ownership saw closures of some of the great mines of the pre-war period.[136] In 1960, JABAS merged with Caledonian Collieries Limited, to form Coal & Allied Industries Limited, the latest in a series

[133] Joint Coal Board, 22nd Annual Report 1968-69, op. cit., p. 46 - By mechanisation, I mean the elimination of hand working of coal with all production won by continuous miners or conventional drilling and blasting and mechanical coal loading.
[134] Martin, C., H., et. al., (1993), op. cit., p. 134
[135] Martin, C., H., et. al., (1993), op. cit., p. 134
[136] Examples abound, but Hebburn No. 2 and Richmond Main were large underground operations for their time.

of amalgamations of these old Australian firms commencing in 1922.[137] Newcastle-Wallsend Coal Company had merged with Peko Mines in 1958 and R.W. Miller would fall to Howard Smith in 1979.[138] The entry of oil companies, seeking diversification after the oil shocks, soon followed, with BP acquiring Clutha Development Pty Ltd[139] between 1976-79, and Shell acquiring a stake in Austen and Butta in 1977 and Bellambi Coal in 1979.[140] Fuel substitution away from oil and the developing seaborne trade with Asia had elevated coal as a large scale internationally traded commodity similar to oil, but the consolidation of ownership within large transnational corporations and the real acceleration in exports occurred after 1980.

2.3 The Great Transformation After 1980

Situating the Industry

The coal industry in 1980 could be characterised as modernised, mechanised, consolidated in ownership, large scale with high capital intensity. The 1960s had grown the coking coal business, and the 1970s saw green shoots in thermal coal exports, ultimately to become the key export commodity and foreign exchange earner for NSW. Labour relations, pay and conditions had undergone significant change from the 1960s with relative industrial relations calm. This arguably, was due to the less arduous working conditions and skill set of open cut workers in the emerging coal periphery, compared to the rigours, craft and solidarity of underground miners forged in the historic centres of Newcastle, Wollongong and Lithgow.

[137] Abermain and Seaham Collieries HAD merged Wickham & Bullock Island Coal Mining Co. in 1922, also J & A Brown acquired East Greta Coal Mining Co in the same year; In 1931 - J & A Brown and Abermain Seaham Collieries Limited merged to form JABAS. Caledonian

[138] Following a prolonged takeover battle, Howard Smith Ltd, Ampol Petroleum Ltd and Bulkships Ltd emerged in 1973 as the major shareholders in R. W. Miller. In 1979 the firm became a subsidiary of Howard Smith. http://adb.anu.edu.au/biography/miller-sir-roderick-william-11126

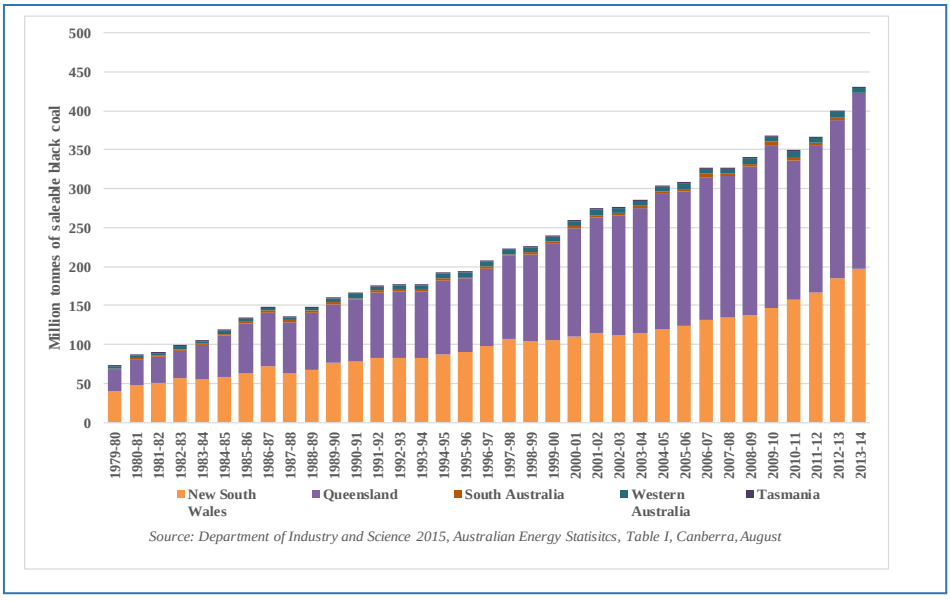
[139] BP Australia Holdings Ltd, Annual Report 1989, pp. 12-13

[140] Historic Hansard, 1979, Australian Coal Industry, Discussion of Matter of Public Importance, Mr Keating, http://historichansard.net/hofreps/1979/19791114_reps_31_hor116/

The former was the birthplace of the coal union in 1860,[141]marking the commencement of the long fight for better pay and conditions, or simply a better life, as Gollan attests.[142] The new accord accompanied the period of deregulation of the financial sector introduced by the Hawke Government after 1983, were responses to the exogenous changes to the world economy transitioning to a post-Keynesian globalisation agenda.

Metallurgical coal had dominated NSW exports until the 1980s, but growth in demand for thermal coal for power generation and industry from Japan, Korea and Taiwan, established the dominance of export thermal coal after 1983. NSW had world class endowments of thermal coal close to ports, with the Newcastle specification thermal coal becoming the global de-facto standard specification.[143] Metallurgical coals from the South Coast also fed into export markets, but the rapidly expanding Queensland coal industry, which has the world's finest coking coal endowments, dominated this market from the 1980s and showed the greatest expansion in production. (Figure 11)

Figure 11, Australian Coal production by State, 1979-80 to 2013-14



[141] Gollan, R., (1963), op, cit., p. 33
[142] Gollan, R., (1963), op. cit., p. vii
[143] New South Wales Government, New South Wales Coal Strategy 1981, Strategic Plan, Report Prepared for the New South Wales Government by the Coal Resources Development Committee, NSW Department of Mineral Resources, (D. West, Government Printer, 1981)

Between 1976 and 1982, 13 underground and 6 open cut mines commenced production, the export coal price more than doubled to $49.63/t, and capital expenditure rose from $198 million in 1979-80 to $822 million in 1981-82.[144] The 1983 Strategic Plan,[145] a response to the 30% increase in exports that year, was a 'ways and means' document to diversify NSW export markets, then facing '…poor demand for coking coal and diminished growth in demand for steaming coal,'[146] in view of existing mine production over-capacity, and growth in competition from Queensland and Indonesia. The strong export growth in the 1970s, the long lead times for investment in new mine or port capacity, and the vagaries of markets, creating a misalignment of markets and investment.

The base case outlook forecast World economic growth to 2000 as averaging 2.5% annually, with slow growth in steel production, and moderate growth in export and domestic demand[147] - a very different scenario than materialised. China had not yet emerged as a global resource sponge following the reforms of Deng Xiaoping in 1978,[148] but the crucial markets would remain Japan, South Korea and Taiwan representing 65% of total coal export value. The 1983 report reviewed allocation policies in favour of large scale operations with growth only in the north and west, those areas amenable to large scale open cut mining. Amalgamations of unions was encouraged,[149] with closer ties with Federal trade bodies. The plan promoted employment, regional development, adequate domestic coal supply and minimisation of land use conflicts. The Strategy plans were a regular part of State oversight and

[144] Coal Services Limited, The New South Wales Coal Industry 1953-1982 http://www.coalservices.com.au/saboutus.aspx//History.aspx
[145] New South Wales Government, New South Wales Coal Strategy 1983, Volume 1: Strategic Plan, Report Prepared for the New South Wales Government by the Coal Resources Development Committee, NSW Department of Mineral Resources, (D. West, Government Printer, September 1983)
[146] New South Wales Government, New South Wales Coal Strategy, (1983), Volume 1, op. cit., p. vii
[147] New South Wales Government, New South Wales Coal Strategy, (1983), Volume 1, op. cit., p. 15
[148] At the pivotal Third Plenum of the 11th CCP Congress, opened on 22 December 1978, the leadership adopted economic reform policies known as the Four Modernizations.
[149] New South Wales Government, New South Wales Coal Strategy 1983, Volume 1, Op. Cit., p. x

governance, but the 1983 report, I will show, was the blueprint influencing industry development until very recently.

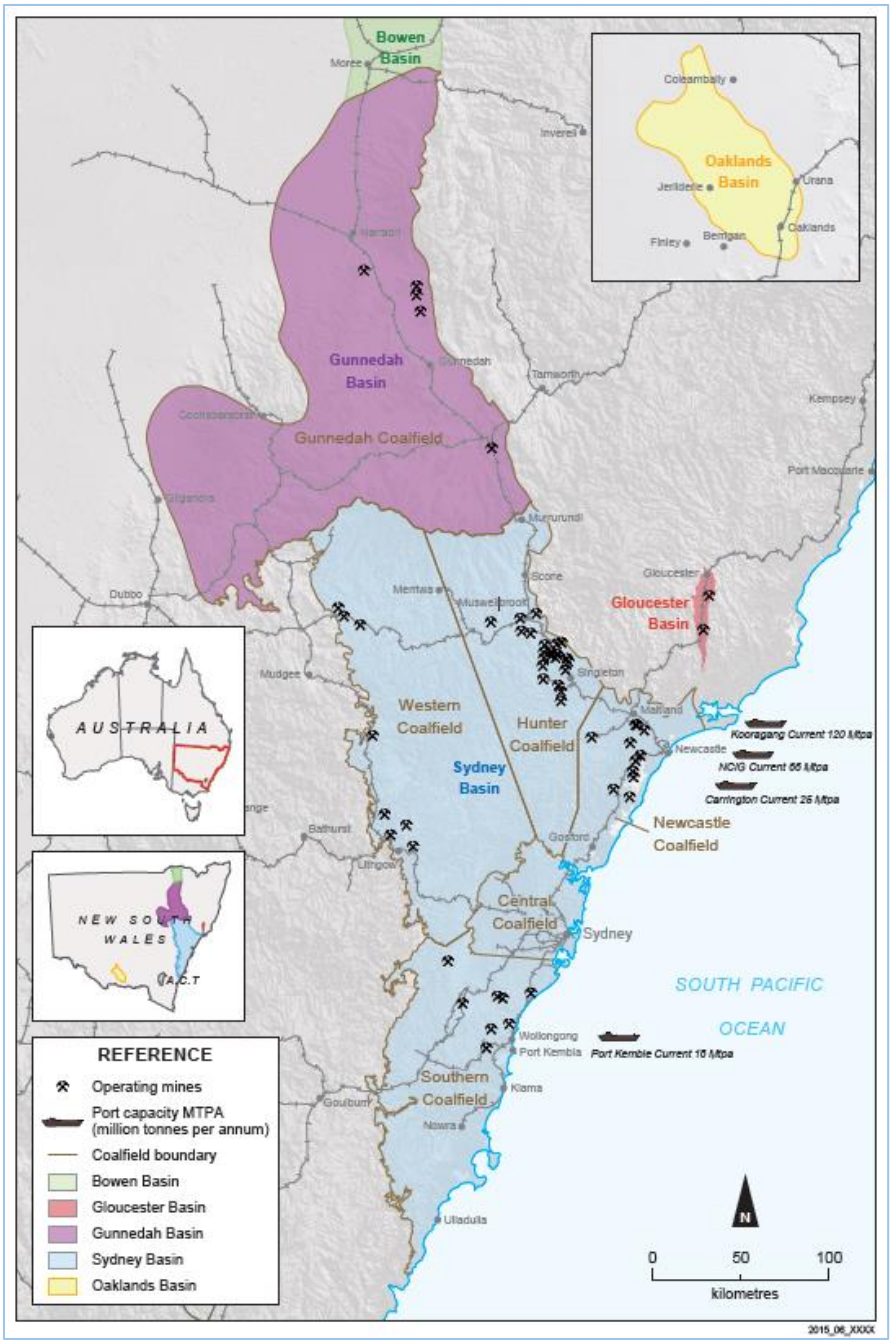
The coal resources endowments of New South Wales are very large, estimated at perhaps half a trillion tonnes of inventory coal[150][151] without applying the limitations of geology, markets, and land access. With most of this coal inventory conjectural, but rationally based on the extents and stratigraphy of the coal basins, the quantification of coal resources became highly political when used in development decisions and energy policy, discussed in chapter 3. Economically, the Permian Sydney Basin coals (Figure 12)[152] has historically produced most coal and contains the highest quality remaining resources, the estimation of which, is a powerful policy tool.

[150] Joint Coal Board, Black Coal in Australia 1982-83, (Joint Coal Board, Sydney, 1983), p. 119

[151] Joint Ore Reserves Committee, Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code, 2012, Prepared by the Joint Ore Reserves Committee of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia (JORC), p. 22 - "Because of its impact on planning and land use, governments may require estimates of inventory coal that are not constrained by short- to medium-term economic considerations, i.e. non-JORC estimates. Also, 'Australian Guidelines for Estimating and Reporting of Inventory Coal, Coal Resources and Coal Reserves'…any occurrence of coal in the ground that can be estimated and reported without necessarily being constrained by economic potential, geological or other modifying factors.

[152] Hutton, A. C. (2009). Geological Setting of Australasian Coal Deposits, In, R. Kininmonth & E. Baafi (Eds.), Monograph 12, *Australasian Coal Mining Practice*, (The Australasian Institute of Mining and Metallurgy, Carlton, 2009), p. 42 - Part of the contiguous Sydney-Gunnedah-Bowen Basin.

Figure 12, NSW coal basins- mines, rail & ports 2016[153]



Following the Seam - Resources and Production

Since 1999, the JORC code[154] has provided a single framework for assigning resource probability at various levels of geological confidence, unlike the multiple approaches previously

[153] Map from NSW Government, Department of Industry, Resources & Energy, http://www.resourcesandenergy.nsw.gov.au/investors/investment-opportunities/coal/coal
[154] Joint Ore Reserves Committee, (2012), op. cit., p. 22

used. This had ramifications both for valuing companies and state policy. The Review in 2014 has since moderated the basis upon which resources can be viewed as economical.[155]

A reserves-to-production ratio (R/P) of 1000 years in 1947 might evoke the limitless possibilities of the industry, and the 38.3 billion tonnes of JORC code compliant resources reported within current mining tenements[156] represents 147 years of mining at current rates of around 260 million tonnes per annum. (Figure 13)

Figure 13, JORC compliant reserves and resources 30th June 2014 (Mt)[157]

Coalfield	Proved	Probable	Total	Marketable Reserves	Measured	Indicated	Inferred	Total
Newcastle	256.5	353.0	609.5	516.5	1,488.2	2,102.3	192.1	3,782.6
Hunter	2,286.2	1,348.0	3,634.2	2,645.9	5,338.9	6,623.3	7,315.6	19,277.7
Gunnedah	429.4	633.0	1,062.4	963.1	1,229.8	1,318.7	841.1	3,389.6
Southern	119.4	332.2	451.6	386.3	1,109.6	1,983.5	1,915.0	5,008.1
Western	555.1	343.1	898.2	750.0	1,655.0	2,355.9	2,520.6	6,531.5
Ashford	-	-	-	-	-	8.0	5.0	13.0
Gloucester	3.9	60.0	63.9	34.6	16.9	180.0	120.0	316.9
TOTAL	3,650.5	3,069.3	6,719.8	5,296.4	10,838.4	14,571.7	12,909.4	38,319.4

More critically, the 5.3 billion tonnes of marketable coal reserves[158] represent 20 years of operation to say, 2034, with a high probability of future resource conversion to reserves.[159] The question comes down to markets, price, and production costs, the variables subject to escalation and volatility since 2005. While most of NSW inventory coal will never be mined, the existence of vast resource endowments serves a policy purpose. While their

[155] Australian Guidelines for The Estimation and Classification of Coal Resources, 2014 Edition, Prepared by the Guidelines Review Committee on behalf of the Coalfields Geology Council of New South Wales and the Queensland Resources Council, 2014
[156] Position at June 2014 – Compiled from, New South Wales Coal Industry Profile, Volume 2, 2014, Mine Dossiers, pp. 1-100
[157] Compiled from NSW Coal Industry Annual 2014, Volume 2, Mine Dossier, resources statements
[158] JORC Code 2012 - 'Marketable Coal Reserves', representing beneficiated or otherwise enhanced coal product where modifications due to mining, dilution and processing have been considered, must be publicly reported in conjunction with, but not instead of, reports of Coal Reserves.
[159] Typically, further infill drilling will raise the confidence level and allow Measured and Indicated resources to be converted to Proven and Probable Reserves. Most production, but not all, is mined from reserves.

geological existence is undoubted, the economic resource endowments - the measured quantity and value - require quantification as part of land use and mining development decisions, discussed in Chapter 3. Large 'accessible' resource bases have fired the imaginations of Governments pursuing growth models through 'Big Data' and resource quantification, and have had a strong hold on a Government bureaucracy charged with policy formation.

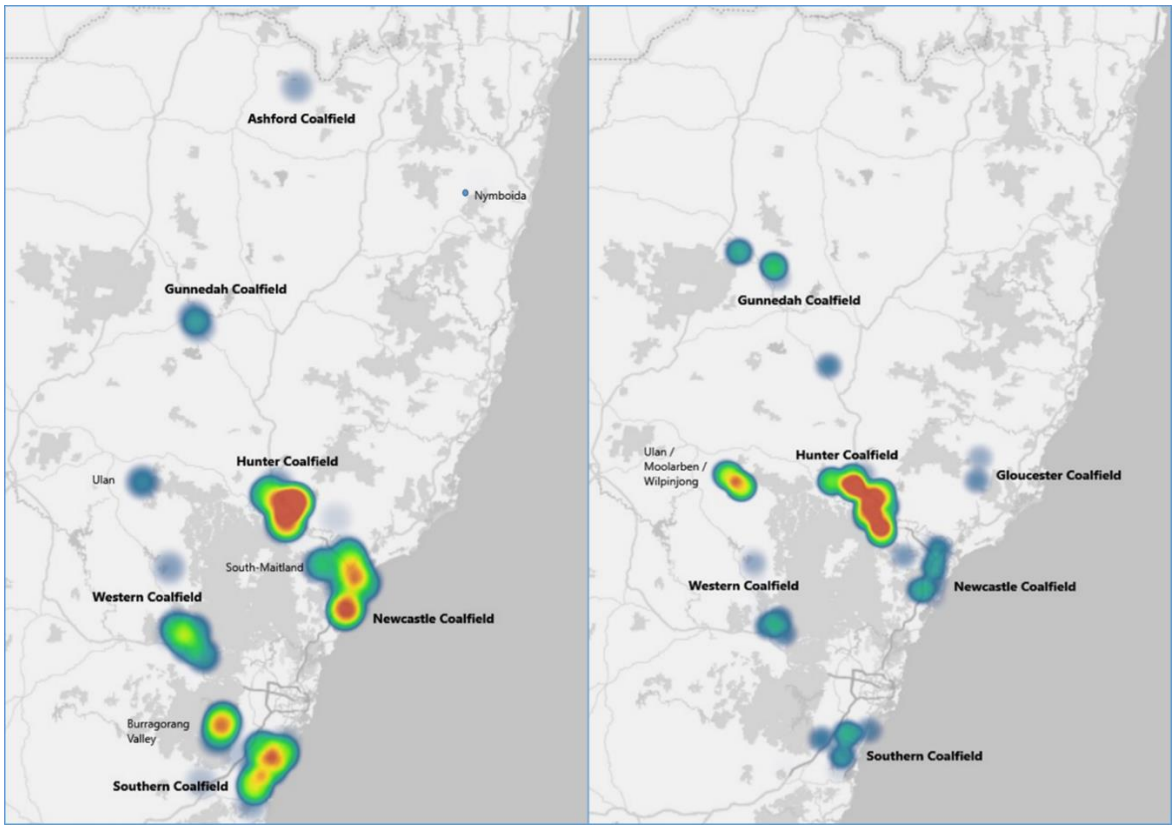
Production – Location defines scale

The response to growing demand was to develop new areas as set out in the 1983 Coal Strategy Plan, with the Upper Hunter Valley and Gunnedah Basin, were defined as the areas with the potential for high cash margin open cut operations at scale.[160] This State sanctioned need to lift production, saw a spatial expansion beyond the mature, now highly urbanised mining centres, to brownfield[161] and greenfield sites in the Hunter, Gloucester and Gunnedah Coalfields. (Figure 14) After 1980, the Hunter and the periphery get hotter, with the old coastal mining centres around Newcastle and Wollongong, cooling off in production.

The Hunter increased production share from 30% of total output in 1980, over 50% in 1993[162] and 62% in 2014,[163] becoming the locus for production and policy formation. An emerging periphery appeared, with the Ulan area now a significant producer, and the first large scale operations appearing in the Gunnedah Basin northwards to Boggabri and Narrabri, areas with little or no prior history of coal mining.

[160] New South Wales Government, New South Wales Coal Strategy 1983, Volume 1: Strategic Plan, (1983), op. cit., p. 46-47
[161] Brownfield is an area which has previously had some mining activity. Often just small scale shallow underground or open cut operations.
[162] New South Wales Department of Mineral Resources, New South Wales Coal Industry Profile (Department of Mineral Resources, St Leonards, 1995), p. 194
[163] NSW Government, Department of Trade & Investment, Division of Resources and Energy, New South Wales Coal Industry Profile 2014, Volume 2, (NSW Government, Maitland, 2015), Hunter Coalfield, Mine Dossiers, p. 5

Figure 14, Heat map - raw coal production, 1979/80 (L) and 2013/14 (R)[164]



The Southern Coalfields, exclusively underground operations, were once the most productive, but have declined in importance and have become export focused through lack of market access, the limitations of terrain, and the decline of the domestic steel industry. The highly productive mines of the Burragorang Valley, mined since the 1920s and producing 11% of State output in 1980, Tahmoor excepted,[165] were mostly depleted and had ceased production by 1988.[166]This decline was echoed in the once mighty South Maitland Coalfields in the 1960s, as the shallower Greta coal seam was depleted and producers were required to mine at much greater depths with attending ground support problems. The sole

[164] Compiled from, Joint Coal Board, Black Coal in Australia 1980-81, (Joint Coal Board, Sydney, 1982), pp.-25; NSW Department of Trade and Investment, Resources & Energy, Coal Industry Profile 2014, Volume 2, op. cit., p. 5, 35, 53, 67, 87

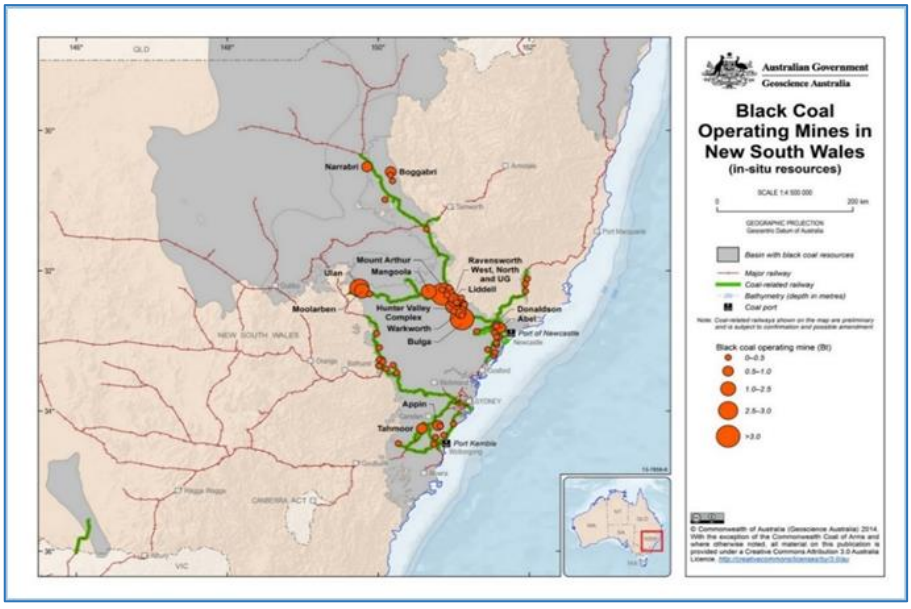
[165] Arguably not in the valley, but included in that areas' statistics in the past. Current operators, Glencore have announced Tahmoor will close in 2017.

[166] Joint Coal Board, Black Coal in Australia 1987-88, (Joint Coal Board, Sydney, 1989); Joint Coal Board/Queensland Coal Board, Australian Black Coal Statistics, 1989

remaining operation, Austar, near Cessnock, is mining at depths of cover between 400-760 metres[167] with difficult mining conditions causing recent fatalities in 2014, due to high stress in the strata.[168] Mining at depth has become an expensive and technically difficult proposition, perhaps nearing its limits, and the attraction of open cut mining in greenfield areas - despite the high capital cost of establishing mine and rail infrastructure, overburden removal, and assembling a workforce - came to dominate industry thinking and shape Government response.

With the removal of the coal export levy in 1992 and the GATT agreement promising greater access to European markets, Government support for expansion was implicit.[169] Consolidation of ownership and mine amalgamations have seen fewer operations developed over time, with larger resource endowments, enabling flexible, larger scale operations. (Figure 15)

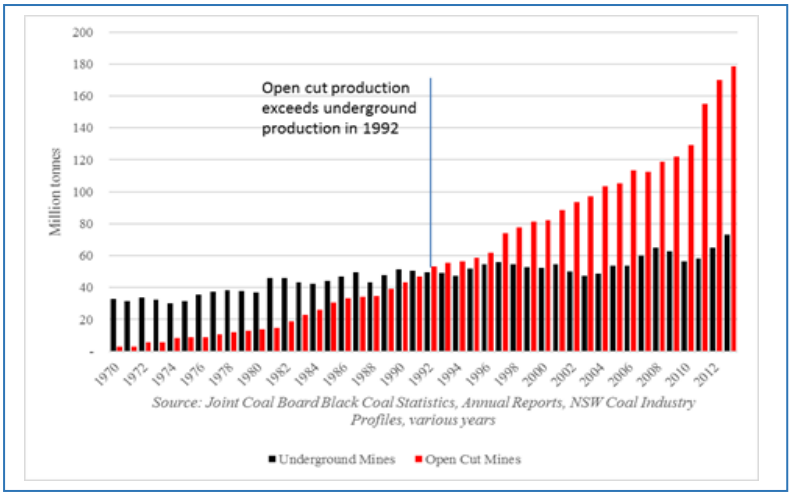
Figure 15, Operating mines in NSW, by resource size 2014170



[167] Austar Coal Mine, http://www.austarcoalmine.com.au/AboutUs/MiningOperation/tabid/109/Default.aspx
[168] NSW Resources & Energy, Report http://www.resourcesandenergy.nsw.gov.au/_data/assets/pdffile/0006/583125/Investigation-Report- Austar.pdf; also, Tragedy at Depth: Austar Coal Mine double fatality, AMSJ, May 6, 2016, http://www.amsj.com.au/news/tragedy-at-depth/
[169] Kellow, Aynsley, & Simms, Marian, Policy Change and Industry Associability: The Australian Mining Sector, Australian Journal of Public Administration, vol. 72, no. 1, 2013, pp. 44
[170] Geoscience Australia, http://www.ga.gov.au/scientific-topics/minerals/mineral-resources/black-coal

Open cut production, only 2.86 Mt or 8% of output in 1970, expanded to 13.97 Mt in 1980, and overtook underground production as the primary mining method in 1992. (Figure 16) Thereafter, open cut expansion dominated gross production with underground operations only seeing moderate increases, currently represent around 31% of output of 265 Million tonnes in 2013-14.

Figure 16, Raw coal production by mode, 1970-2014



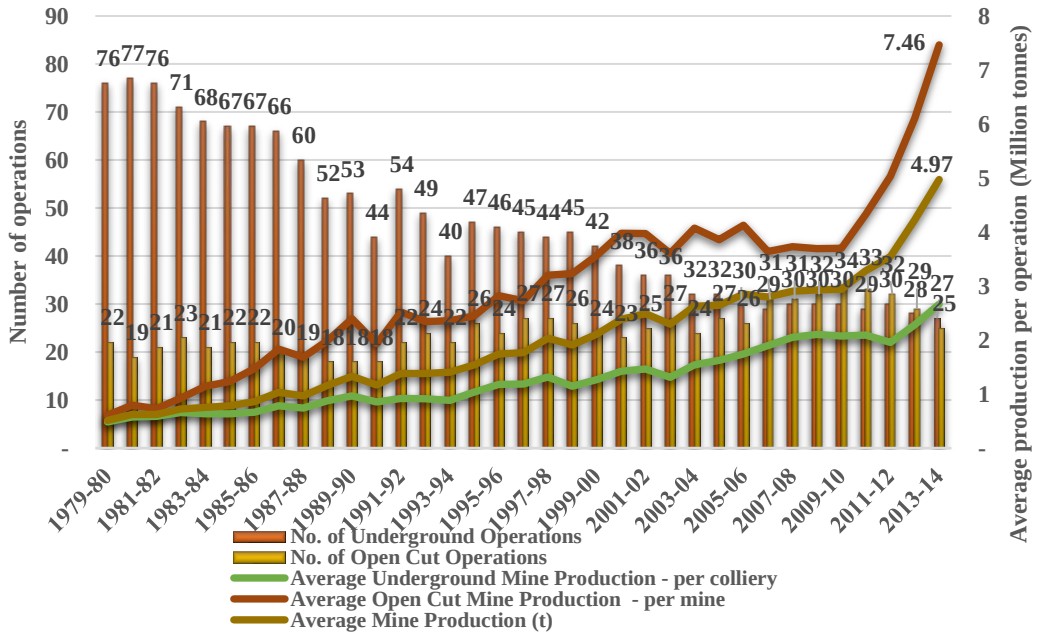
The scale change in mine size is illustrated in Figure 17, where with one exception, taking a snapshot of three years 30-35 years apart, none of the top 20 mines of the earlier years would make the subsequent list - generational scale change written large. Since 1980 the number of mining operations has decreased from 96 to 52 in 2014, with large increases in average output, from under 1 Mtpa in 1980 to nearly 5Mtpa in 2014. (Figure 18) Gross coal production quadrupled between 1979-80 and 2014-15, from 48.7 Mt to 253.2 Mt, with 69.4% currently from open cut operations. (Figure 19) As mines reached for deeper and lower quality coal seams, more overburden removal and higher washery rejects and tailings were an inevitable consequence of depletion of the highest quality resources.

Figure 17, Top 20 coal operations, 1949-50, 1979-80,2013-14, raw coal ('000t)[171]

1949/50					1979/80					2013/14				
Burwood	UG	BP	Newcastle	539.5	Ravensworth No 2	OC	DL	Hunter	4,359.2	Mount Arthur Operations	OC	DL	Hunter	25,144.4
John Darling	UG	BP	Newcastle	376.2	Coal Cliff	UG	BP	South Coast	1,705.9	Mount Thorley Warkworth	OC	DL	Hunter	18,755.1
Muswellbrook No 3	OC	T&S	Hunter	366.2	Howick	OC	DL	Hunter	1,664.3	Hunter Valley Operations	OC	DL	Hunter	17,648.1
Richmond Main	UG	BP	Newcastle	251.6	Buchanan Lemington	OC	DL	Hunter	1,565.6	Wilpinjong	OC	DL	Western	17,332.7
Bellbird	UG	BP	Newcastle	251.0	South Bulli	UG	LW	South Coast	1,522.8	Mount Owen	OC	TLS	Hunter	15,062.6
Aberdare	UG	BP	Newcastle	236.8	Swamp Creek	OC	T&S	Gunnedah	1,122.5	Mangoola	OC	DL	Hunter	11,262.1
Lithgow State	UG	BP	Western	232.2	West Cliff	UG	LW	South Coast	1,121.2	Bengalla	OC	DL	Hunter	10,692.0
Abermain No 1 Shaft	UG	BP	Newcastle	226.8	Hunter Valley No 1	OC	DL	Hunter	1,111.4	Bulga	OC	DL	Hunter	9,418.0
Pelaw Main	UG	BP	Newcastle	219.1	Wyee State	UG	BP	Newcastle	1,107.9	Moolarben	OC	DL	Western	8,533.9
Mount Keira	UG	BP	South Coast	212.6	Munmorah State	UG	BP	Newcastle	1,038.0	Ravensworth North	OC	DL	Hunter	8,100.9
Wongawilli	UG	BP	South Coast	201.6	Bayswater No 2	UG	BP	Hunter	1,009.0	Bulga	UG	LW	Hunter	8,055.8
Wallarah	UG	BP	Newcastle	196.1	Bloomfield	OC	BP	Newcastle	970.7	Liddell	OC	DL	Hunter	6,924.9
Ben Bullen	OC	T&S	Western	191.0	Brimstone No 1	UG	BP	South Coast	945.6	Narrabri	UG	LW	Gunnedah	5,658.9
Stanford Main No 2	UG	BP	Newcastle	190.5	Nattai North No 1	UG	BP	South Coast	855.5	Boggabri	OC	T&S	Gunnedah	5,295.5
Lambton	UG	BP	Newcastle	185.0	Bayswater No 2	OC	DL	Hunter	844.3	Drayton	OC	DL	Hunter	5,208.9
Nebo	UG	BP	South Coast	181.8	Huntley	UG	BP	South Coast	840.0	Wambo	UG	LW	Hunter	5,013.0
Wollondilly Extended	UG	BP	South Coast	181.3	Brimstone No 2	UG	BP	South Coast	801.8	Mandalong	UG	LW	Newcastle	4,985.1
Abermain No 2	UG	BP	Newcastle	178.3	Buchanan Lemington	UG	LW	Hunter	795.0	Wambo	OC	DL	Hunter	4,894.9
Aberdare Extended	UG	BP	Newcastle	164.7	Angus Place	UG	LW	Western	794.6	Ulan	UG	LW	Western	4,394.2
Minmi	OC	TLS	Newcastle	158.8	Chain Valley	UG	LW	Newcastle	767.8	Dendrobium	UG	LW	South Coast	3,823.7
Open Cut Mines	2			716		7			11,638		14			164,274
Underground Mines	18			4,025		13			13,305		6			31,931

Key: UG = Undegrround, OC = Open Cut; BP = Board & Pillar; LW = Longwall; T&S = Truck & Shovel; DL = Dragline; TLS = Truck, Loader &Shovel

Figure 18, Number of coal mines & average production 1979-80 to 2013-14



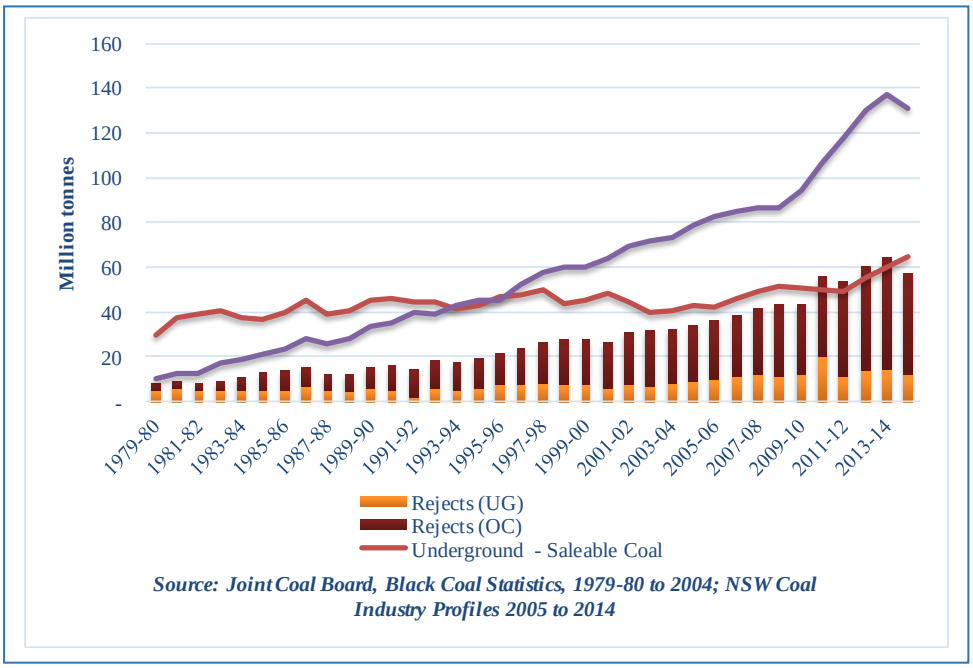
Source: JCB Annual Reports, various years, NSW Government, Coal Industry Profiles 1980 to 2014

Of the approximately 4.7 billion tonnes of raw coal mined in the 36 years to 2013-14, 991.8 million tonnes of washery rejects were created. (Figure 19) The overburden ratio has been typically over 4 cubic metres per tonne of coal, representing 841 million cubic metres of

[171] Compiled from, Joint Coal Board Black Coal Statistics 1950 & 1980, DPI Coal Industry Profile Volume 1, 2014, p. 22-23

material removed in 2013-14,[172] to be used to fill mining voids or shaped into landforms, as part of future rehabilitation.

Figure 19, Coal production and waste, 1979-80 to 2014-15



Not all the coal sold was washed, with domestic power station feedstock usually a high ash run-of-mine coal resulting in ash ponds and significant tailings dams. With some underground operations now mining below 700m depth, and open cut multi-seam operations such as at Mt Owen operating at depths to 270m,[173] there are also imminent spatial and economic limits in some coalfields where mining costs or overburden placement are prohibitive.

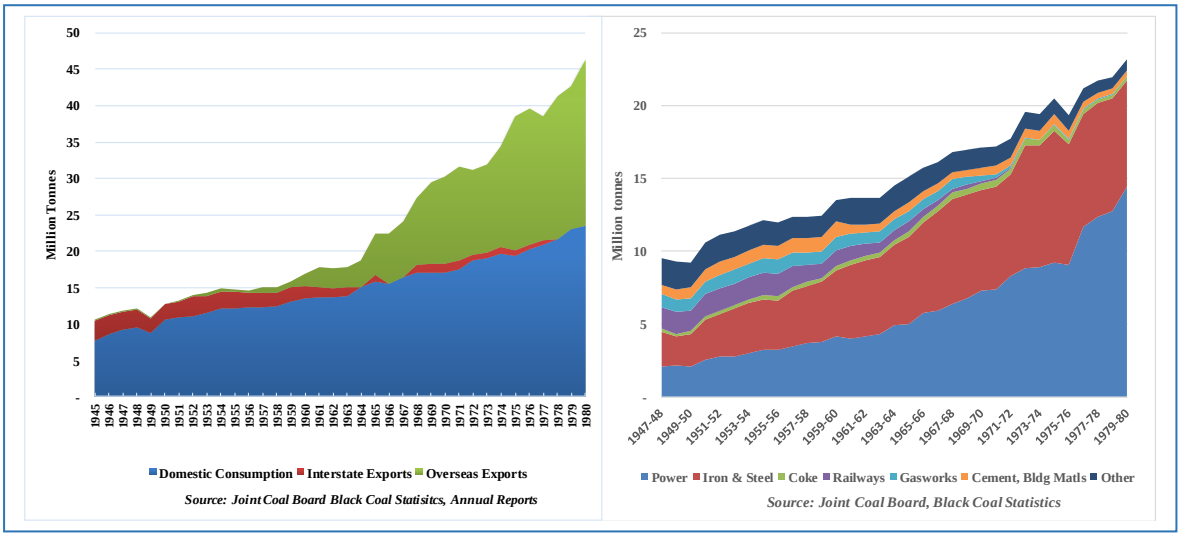
Reconnecting with the World: the changing nature of coal demand

The structural changes in demand between 1945 and 1980 discussed earlier, were such that growth in electricity generation has sustained domestic coal demand reaching an historical

[172] NSW Coal Industry Profile, (2014), Volume 1, op. cit., p. 85
[173] From Mine operators, Thiess website - https://www.thiess.com/projects/mt-owen-complex/detail - accessed 28/7/16

domestic peak power station consumption of 35.3Mt in 2007,[174] now unlikely to be challenged in the future. (Figure 20)

Figure 20, Coal disposals (L), Domestic coal consumption by end-use (R)



Growth in electricity demand was aided by the rise of new industries such as aluminum smelting in Australia, viewed by the Federal Government as a means of adding value to the nation's natural resources,[175] - a commodity dubbed 'solid electricity,'[176] - with smelters established at Kurri Kurri in 1970 and Tomago in 1983.[177] These smelters relied upon long-term low priced power contracts with the utilities, often at lower or subsidised prices.[178] The lower steel output, the structural shift to renewable energy, cross-border electricity imports, but mostly the shift to natural gas for power generation, has seen a 22% decrease in power station coal from the peak of 2007/08 to 2013/14.[179]

[174] NSW Department of Trade & Investment, Resources & Energy, New South Wales Coal Industry Profile 2013, p. 253
[175] Brady, Frank, (ed.,), Contribution on Australia, Prepared for the Australian National committee of CIGRE, A Dictionary on Electricity, A Joint project of CIGRE and AHEF, (IEEE, 1996), p. 8
[176] Japan dismantled its aluminium smelting and refining industry because of its power demand, to become an importer from countries such as Canada, Norway and Australia, all with available cheap power at the time.
[177] Alcan, now Capral's Kurri Kurri smelter in 1970 and Pechiney' Tomago smelter in 1983
[178] Hamilton, Clive, & Turton, Hal, Subsidies to the Aluminium Industry and Climate Change, Submission to Senate Environment References Committee Inquiry into Australia's Response to Global Warming, November 1999, Background Paper No. 21, (The Australia Institute, Canberra, 1999), p. 13
[179] NSW Department of Trade & Investment, Resources & Energy, New South Wales Coal Industry Profile 2013, p. 253

One important factor in demand has been domestic availability, coal price and quality. The State had ownership of a network of mines serving State utilities since 1922.[180] After 1981 the Elcom mines were authorised to not only to use the coal for power generation, but to sell it for profit.[181] Coal is only one input into the cost structure of power generation, and Australia had declining electricity prices from the 1950s to 1994,[182] primarily from State-owned power utilities fueled from these captive mines. The policy of successive governments since Carr in 1995[183] has been to privatise the power generators, whose ageing plants, average over 30 years of service.[184] The Carr Government valued the generators at $22 billion in 1995, which dwindled to $3 billion in 2012 under the O'Farrell Government.[185] Despite declining power prices, Federally driven electricity supply competition policy, adopted by COAG[186] in 1993, agreed that price reductions would be best achieved by creating a competitive market model in place of the natural monopolies of state-owned utilities, and overseen by a national body, NEMMCO.[187] The disaggregation of the vertically integrated state industries in NSW in 1996, did not occur as it had in Victoria through privatisation, but moved to industry separation and corporatisation into three state-owned generators and six power distributors.[188] Elcom was renamed Pacific Power, before splitting its generation assets between Macquarie Generation and Delta Electricity.[189] Its coal subsidiary, renamed

[180] These mines, Lithgow (1964), Awaba, Huntley, Werris Creek, Oakdale and others - were geographically diffuse and provided coal to both railways and power stations.
[181] The Electricity Commission (Amendment) Act 1981 (Act No. 128, 1981)
[182] Brady, Frank, (1996), op. cit., p. 11
[183] Electricity privatisation has proved politically contentious in New South Wales, with former Premier Bob Carr abandoning privatisation plans in 1997 and Morris Iemma effectively losing his job over the issue in 2008.
[184] GHD, NSW Infrastructure Capability Assessment, Energy Baseline Report, April 2012 p. 22
[185] ABC, 15 November 2012, 12:24pm, NSW Government to privatise electricity generators, http://www.abc.net.au/news/2012-11-15/nsw-government-to-privatise-electricity-generators/4372858
[186] Council of Australian Governments
[187] Brady, Frank, (1996), op. cit., p. 12 – NEMMCO – National
[188] ibid.
[189] A Brief History of the Electrical utilities in NSW, P. 11

Powercoal from 1994, operated mostly mine-mouth (see Figure 1, Myuna Colliery) operations - was sold to Centennial Coal in 2002 for $331[190] at the end of a phase of sustained low coal prices.

The Government estimated that mine ownership had saved $1,745 million to electricity customers between 1995, when electricity industry reform commenced, and 2002.[191][192] Mine privatisation further exposed the power utilities to market forces, although still protected by state control over coal resource allocations. The power stations have not consumed the highest quality coals, but have used endogenously priced run-of-mine coal from captive coalmines, or have settled contracts with a wide range of privately owned suppliers at ex-mine prices, (Figure 21) or at barely marginal cost prices when part of the conditions of grant for a new project.

Figure 21, Macquarie Generation, Supplier contracts, 1996/97 to 2002/03

Mine	1996/1997		1997/1998		1998/1999		1999/2000		2000/2001		2001/2002		2002/2003	
	Tonnes	$/t	Tonnes	$/t	Tonnes	$/t	Tonnes	$/t	Tonnes	$/t	Tonnes	$/t	Tonnes	$/t
Narama	2,060,477	29.56	2,059,534	29.08	2,060,000	29.59	2,060,089	29.58	2,360,000	29.32	2,060,000	30.50	2,060,000	31.66
Ravensworth South	4,043,513	30.72	3,855,687	30.18	3,817,645	30.32	3,891,045	30.37	1,199,182	29.07				
Ravensworth East									1,055,058	18.29	2,453,135	18.00	2,439,174	19.34
Nardell									9,669	17.74	38,020	20.34	15,912	21.93
Bengalla							530,735	18.21	1,716,741	19.37	1,809,340	19.63	1,934,268	19.60
Warkworth							131,847	20.01	418,981	20.44	630,502	21.48	398,869	20.50
Donaldson									114,252	13.98	347,055	14.80	335,533	15.95
Stratford							71,282	15.66	418,444	15.43	432,070	14.62	543,929	14.49
Liddell Coal							23,864	24.01	49,715	23.48	202,338	38.01		
Ulan									84,549	18.94	95,421	46.93		
Mt Owen							601,024	25.10	153,197	56.47				
Bayswater Colliery	455,818	34.14	953,667	25.20	584,682	24.63	852,709	23.77	1,069,463	20.94	1,379,956	20.22		
Mt Arthur													2,605,515	13.86
Drayton	1,160,673	36.41	1,560,392	28.09	1,751,145	26.06	2,373,821	23.30	2,312,496	22.80	2,371,653	23.25	1,620,435	22.65
Howick	2,020,242	33.24	2,467,199	28.77	1,987,286	30.95	573,993	24.76	92,496	20.69				
Cumnock									27,257	64.68				
Muswellbrook	399783	35.35	399827	31.91	403,684	30.32	396,350	31.49	539,395	29.49	440,939	26.01	398,078	27.22
Average		31.97		29.02		29.28		26.98		24.05		22.43		20.70

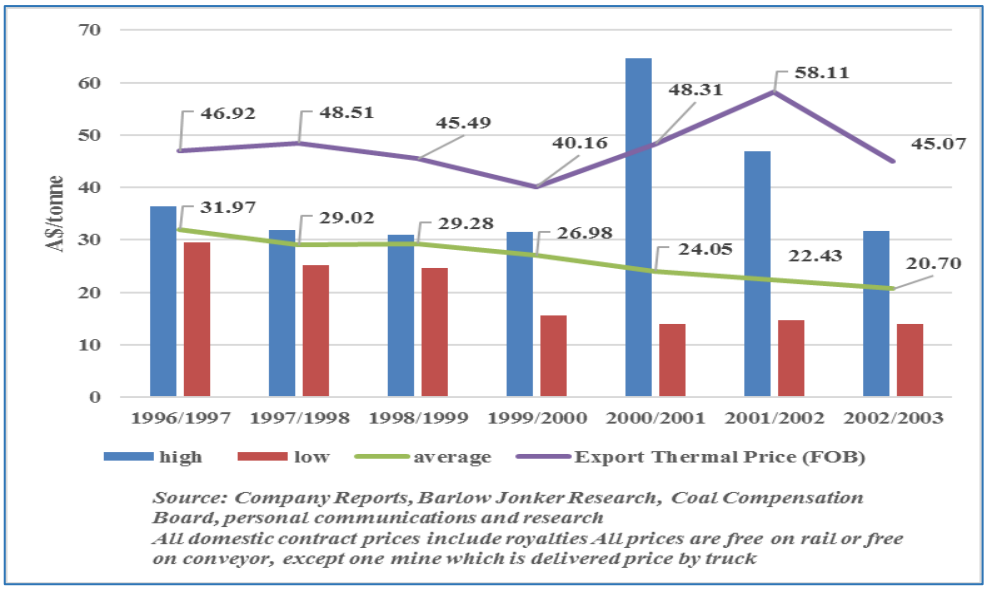
Source: Company Reports, Barlow Jonker Research, Coal Compensation Board, personal communications and research

We see a downward trend in the post-Powercoal period, coinciding with a period of sustained low export prices, where contract prices to Macquarie generation in this example,

[190] Powercoal Pty Ltd formerly Elcom Collieries Pty Limited was sold to Centennial Coal Co. Ltd in August 7, 2002 for $331m, http://www.smh.com.au/articles/2002/07/29/1027926853849.html
[191] Pacific Power (Dissolution) Bill 2002
[192] https://www.parliament.nsw.gov.au/bills/DBAssets/bills/SecondReadSpeechLA/272/A1703.pdf

(Figure 22) were initially in line with export prices, but with increasing price range and volatility.

Figure 22, Macquarie Generation, Coal contract prices 1996/97 to 2002/03

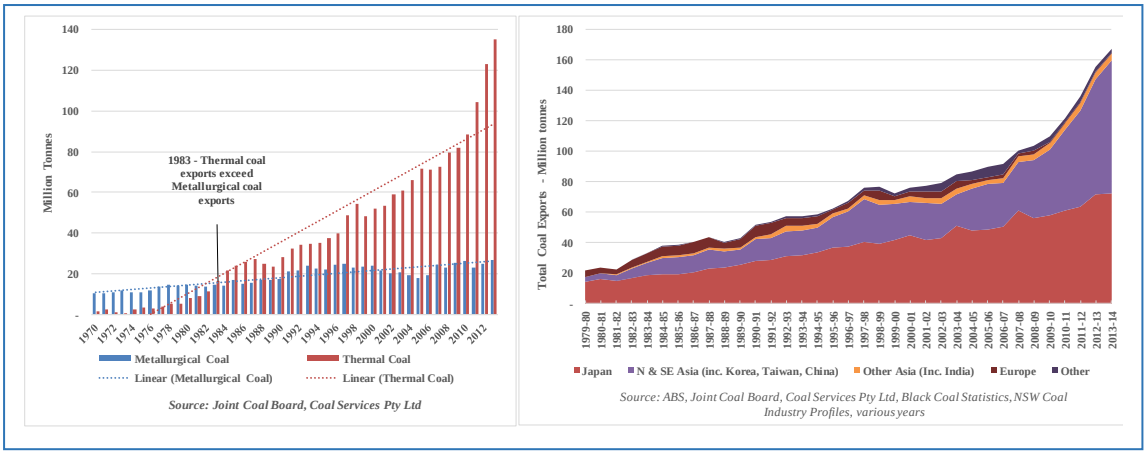


However, new project approvals provided leverage for the state. The approvals for BHP Billiton's massive Mount Arthur Operation in 1998, now the largest coal operation in Australia, included a contract to supply of 15Mt of coal for delivery between 2003 and 2007 under a fix price contract as a condition of grant.[193] The contracted minimum energy requirement of 310 million gigajoules (GJ) at $0.295/GJ or $6.10 per tonne at the mine excluding A royalty of $2.20/t, was a sweet deal for the state. At 12% moisture and 32% ash, relatively high sulphur at 0.9%,[194] this was not export quality coal and unwashed coal places the environmental problem of residues with the consumers. Coal producers seeking revenues and higher margins, did not want to be saddled with low-margin domestic contracts, but the lower product specification, mine proximity and the ability to deal with unwanted coal stockpiles, ensured supply to the generators at lower prices during a period of low export prices.

[193] Sparke Helmore Solicitors, Contract between Macquarie Generation and Coal Operations Australia Limited, 30 June 1998, Contract for Supply of Coal from Mount Arthur North, Schedule MAN COAL Supply Contract, (Newcastle, 30 June 1998), p. 29
[194] ibid. - These are the maximum allowable in the coal specification

The sustained increase in export prices after 2005 put pressure on domestic pricing, with a turn towards nationalist economic decision-making inherent in the Cobbera Project discussed in chapter 3.

Figure 23, NSW coal exports, Coal type (L) and Export Destination(R)

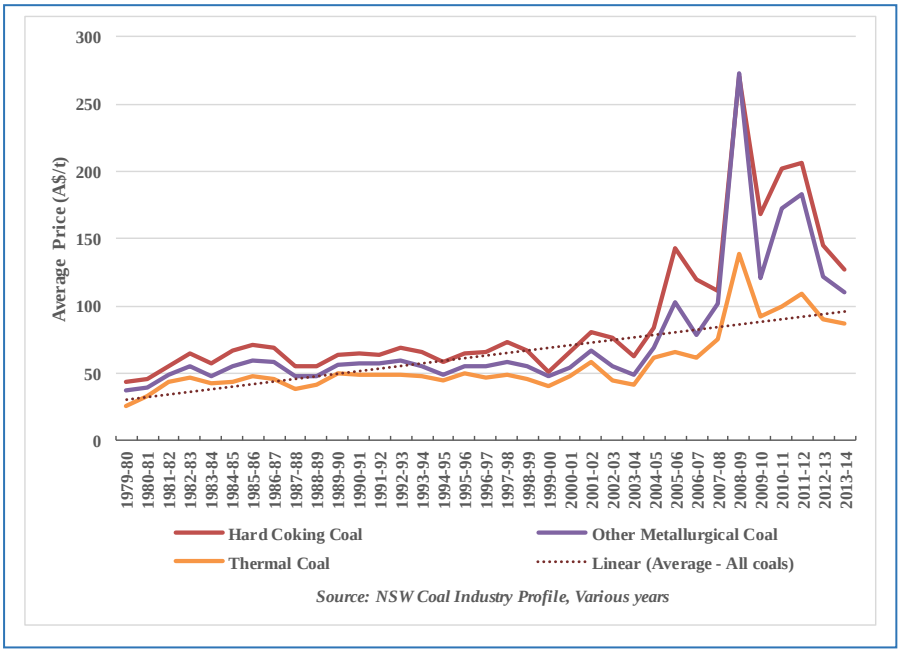


It is clear from Figure 23R, that subsequent export growth has been underpinned by the special trade relationship with Japan, supported by sustained trade volumes with South Korea and Taiwan. East Asian.[195] The benchmark thermal coal price, the Newcastle export specification, is set each year by negotiation with Asian power utilities,[196] but the market is composed of many coal specifications and contracts with a range of price and price adjustments beyond 'benchmark' pricing. Historically the JSM have had the power in setting coking coal prices adhered to by Korean and Taiwanese mills, but this conformance has dissipated in recent years. Exports had grown in the 1970s by offering lower prices than the USA, under the protection of long term contracts.[197] The introduction by the Whitlam Government of export price controls in 1973, reserved the power to block sales of export coal sold at sub-

[195] Japan, South Korea, Taiwan, China
[196] Japan fiscal 2016-17 thermal coal price settles lower at US$61.60/t FOB Newcastle basis 6,322 kcal/kg - http://www.platts.com/latest-news/coal/perth/japan-fiscal-2016-17-thermal-coal-price-settles-27471294
[197] Bowden, (2012), op. cit., p. 2

market prices.[198] This measure was removed in 1997 after below-cost export sales responding to overcapacity and sustained low prices, and despite opposition by the unions, which preferred a moratorium on new projects.[199]

Figure 24, NSW export coal prices, by product, 1979-80 to 2013-14



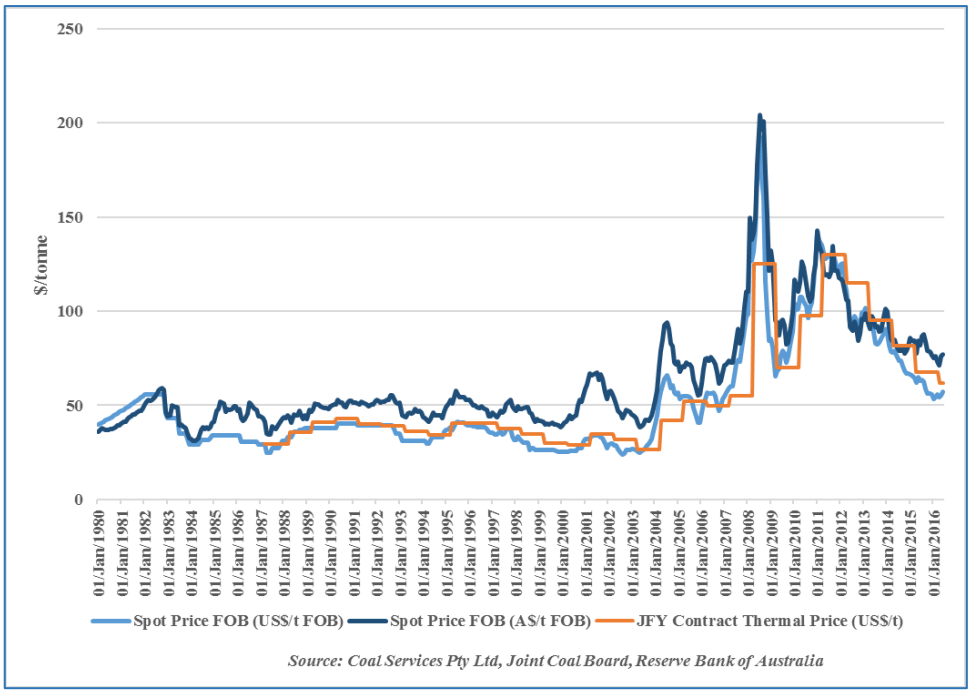
From 1980 to 2004, coking and thermal coal products traded in a narrow price band (Figure 24) but the subsequent decade saw unprecedented rise in demand for all coal types, price and product differentiation and volatility. With export prices set in US dollars, the exchange rate has mostly favoured exporters during this sustained period of lower prices. (Figure 25)

In 2004, prices had reached a nadir of around A$40/t but a dramatic turnaround to A$70/t by June with a growing differential price between metallurgical and thermal coals. With increased profitability, producers increased the proportion of soft coking coals at the expense of thermal coals. Although port bottlenecks limited the production, a new record at 159 Mt in 2005.[200] The low coal prices for 2000-2004 cemented the Hunter Valley as the

[198] Waring, Peter, Macdonald, Duncan, & Burgess, John, (2000), op. cit., p. 26-27
[199] ibid.
[200] NSW Trade and Investment, Resources and Energy, NSW Coal Industry Profile 2013, p. 227

primary focus for low-cost open cut operations with its primarily thermal coal export orientation, and the catalyst for the opening of the Gunnedah Basin.

Figure 25, NSW thermal coal spot price & JFY201 contract price



Global demand for coal is less easily predicted, resulting in price volatility in periods of excess capacity and shocks to supply. In 2008, with the supply gap closing, flooding in Queensland and mine closures in Europe, created panic buying and a new record spot price for NSW thermal coal in July 2008 of $204.38/t, and an annual average for 2008 of US$126.20,[202] well above the prevailing record JFY contract price of US$124/t. (Figure 25) This is noteworthy in that it was the zenith in the structural shift to a seller's market of the previous five years, after the period of sustained overcapacity and low prices 1997-2004, and heralding a period of ahistorically higher prices and relentless industry expansion. Global supply outstripped demand in 2012/13, and prices have been in decline to the present, without any obvious catalyst for a long-term recovery. The buyers had now reasserted the

[201] JFY = Japanese Financial Year, 1 April to 31 March – Thermal coal prices were set annually by negotiations between a key power utility and a large Australian exporter, currently (2016) Tohoku Electric and Glencore respectively.
[202] Miyamto, Yasuhisa, (ed.), Coal Manual, 2011 Edition, (The Tex Report Pty Limited, Tokyo, 2011), p. 64

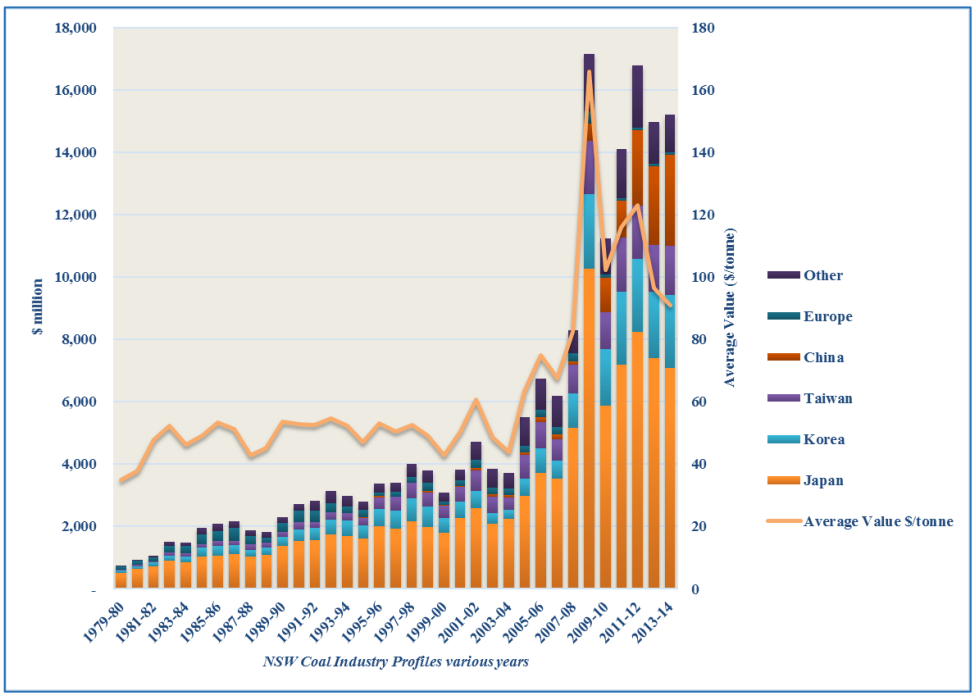
control relinquished in 2004,[203] with shorter contracts, and a burgeoning spot market, which traditionally was only a small percentage of coal sales.

Revenues and Profitability

NSW coal revenues grew from $790 million to $17.3 billion between 1979-80 and 2008-09, the peak revenue year with subsequent easing through lower prices. (Figure 26) Revenues and profit margins have been eroded through falling prices, not coal demand, during a period of sustained high capital and operating costs. Substitution by natural gas for base-load power generation is reducing domestic thermal coal and reductions in steel output and substitution by lower quality coals, have lowered metallurgical coal demand.

The period 1983-1988 commenced with optimism about the growth of the export trade, but was soon in oversupply after the recent new capacity developments, with the industry losing $400 million in the period.[204]

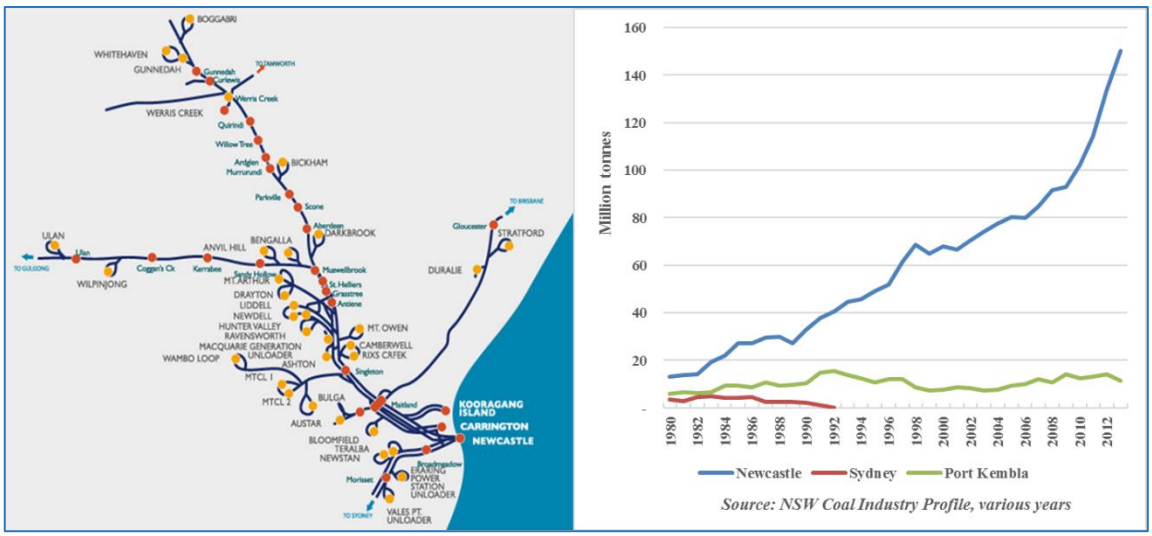
Figure 26, Value of coal exports by destination & value ($/t)



[203] Bowden, (2012,), op. cit., p. 2
[204] Coal Services Pty Ltd, The NSW Coal Mining Industry 1983-1991, http://www.coalservices.com.au/saboutus.aspx//History.aspx

It was the move to seven days a week operation with more flexible rostering in 1988, a decision taken by the Coal Industry Tribunal, [205] which unlocked scale increases in production. Throughout, there has been intermittent expansion in state rail and port infrastructure playing catch-up to the burgeoning export coal demand. The three ports of Newcastle, Port Kembla and Sydney had shipped only 1.6 Mt of coal in 1960 rising to 22.9 Mt in 1980.[206] With some Gunnedah coal producers 320km from port, rail is a critical infrastructure. Currently the coal is moved on state rail infrastructure leased in 2004 for 60 years to the Commonwealth owned, Australian Rail and Track Corporation[207] (ARTC) and the 1,050km NSW coal rail system operated 'above rail' by, operators including Pacific National.[208] (Figure 27)

Figure 27, Hunter Valley Coal Chain (LHS) Exports by Port (RHS)



Source: Port Waratah Coal Services, ://pwcs.com.au/media/1232/6709a_pwcs_website_infographic_chain960x560_jan15.jpg1

[205] ibid., A landmark decision by the Coal Industry Tribunal which allowed seven days a week operation, the abolition of the Christmas shutdown and flexible rostering and shift hours.
[206] Joint Coal Board Annual Reports, Black Coal Statistics, various years
[207] ARTC formed in 1998 is owned by the Commonwealth and is a joint venture between the Federal and State Governments operating Australia wide and responsible for rail freight over a 10,500 km system. https://www.artc.com.au/about/network/
[208] Barber, Elizabeth, Transportation issues of Australian Coal and Iron Ore, in, Finch, Nigel, (ed.), Contemporary issues in Mining: Leading Practice in Australia, (Palgrave Macmillan, Basingstoke, 2012), p. 51

An application to the ACCC[209] in 2010 to relieve 'bottlenecks' through better alignment of rail capacity with the expanding port infrastructure at Newcastle was rejected, through fears that the ARTC would then control both capacity and access charges,[210] in a return to a state monopoly. The port expansions at Newcastle created the largest export coal port fed by a complex rail network serving the mines, and accelerated exports from 13.3Mt in 1980 to 150Mt in 2013, The capacity increases have been progressive and largely funded by coal operators[211] seeking quotas for their export coal.

The slump in industry profits in the past five years has resulted in sustained losses by the marginal operations. In response, operators have reduced production costs, and reduced discretionary spending on exploration and community. Beyond the volatility in global coal price and demand, are the endogenous cost factors of rail and port charges. The 10 year 'take-or-pay' contracts with rail[212] and port providers forged in the 2008-12 period of ahistorical high prices and infrastructure bottlenecks, locked in long-term export volumes not required by the market, at considerable financial penalties to the producers for non-delivery.[213] Here, a company such as Yancoal accrued a $61 million liability in 2014, forcing them to keep loss making mines in operation as the lesser financial cost.[214] The effects have been felt more strongly on thermal coal operations rather than metallurgical coal, as natural gas and LNG[215] displace coal in some key markets. Maintaining a seat at the export table is

[209] ACCC – Australian Competition and Consumer Commission
[210] Barber, (2012), op. cit., p. 54
[211] i.e., NCIG Group, in 2004, six companies joined to form NCIG with the objective of increasing the export capacity of the Port of Newcastle to cater to growth in demand for coal exports. The members of NCIG include group entities of Banpu Public Company Limited, BHP Billiton Group, Peabody Energy Corporation, Whitehaven Coal Limited and Yanzhou Coal Mining Co. Ltd., http://www.ncig.com.au/
[212] ARTC, Our Customers, https://www.artc.com.au/about/customers/
[213] http://www.theherald.com.au/story/3944788/hunter-mines-tied-to-us-bankruptcy-proceedings-photos/
[214] SMH, April 14, 2014, Yancoal suffering under 'take or pay' Contracts, Peter, Ker, http://www.smh.com.au/business/mining-and-resources/yancoal-suffering-under-take-or-pay-contracts-20140414-36ncx.html
[215] LNG – Liquefied Natural Gas

critical here, despite the inflexibility of state owned businesses to deal with market fluctuations.

Much of the recent mine investment is from foreign firms such as Yancoal capturing supply for their own integrated businesses. It is only since 2010 that China has become a significant customer for NSW coal taking advantage of lower prices and excess capacity. (Figure 26) Contracts are now written for shorter durations typically three months with increased price volatility and the growing importance of the spot market.

The coincidence of the GFC and the 2008 price spike, in an unprecedented commodities boom, attracted the scrutiny of Government – climate change, coal emissions, environmental impacts and questions of ownership and exploitation of resource endowments - became an electorally important issue, particularly the question of state revenues from mining, already subject to royalties and Federal corporate tax. The short-lived tax on industry profit, the Minerals Resource Rent Tax, was introduced in July 2012 and abolished in September 2014, having little effect on industry profits coinciding with falling coal prices. Likewise, the Carbon Tax introduced in 2012 and repealed in July 2014, was largely offset by industry assistance packages provided to ease the transition. These Federal Government ad-hoc policies, like the state corporations such as ARTC, were rent seeking, assuming excess profits in an industry where after 2010, revenue, capital cost escalation and coal price volatility had become the normal operating conditions. The public backlash against the unfettered rise in coal production in line with the environmental and climate change agenda, has accelerated these critical, but ineffectual, policy shifts, discussed in Chapter 3.

Ownership and Employment

The close relationship between the mostly locally owned coal companies and the Government was transformed by the rise of big capital through the increasing foreign ownership of coal assets by large multinational companies pioneered in the 1960s, the divestment of state

coal assets and the transformation of BHP from a national company to a global resources giant. The ownership position in 1980 following the amalgamations and takeovers in the 1970s was that the NSW Government was the largest coal miner, with British companies dominating private ownership, but with the presence of BHP assuring a high percentage of Australian ownership. (Figure 28)

Figure 28, Ownership of production 1980 and 2014

Major Shareholder	Country of Major Shareholder	Production ('000t)	% State Total	Major Shareholder	Country of Major Shareholder	Production ('000t)	% State Total
NSW State Government	Australia	8,338	16.67%	Glencore	Switzerland	72,290	27.70%
BP	UK	7,496	14.99%	Rio Tinto	UK	36,403	13.95%
BHP	Australia	5,952	11.90%	BHP Billiton	Australia /UK	35,022	13.42%
Rio Tinto	UK	4,987	9.97%	Peabody	USA	29,269	11.21%
Costain	UK	4,359	8.72%	Yancoal	China	17,145	6.57%
Shell	Netherlands / UK	3,794	7.59%	Banpu	Thailand	10,806	4.14%
Howard Smith	Australia	2,984	5.97%	Whitehaven	Australia	9,217	3.53%
Buchanan Borehole	Australia	2,671	5.34%	Idemitsu	Japan	6,686	2.56%
Caltex	USA	1,853	3.71%	Anglo American	UK	4,593	1.76%
Peko-Wallsend	Australia	1,626	3.25%	New Hope Corp	Australia	4,277	1.64%
Australian Ownership			43.13%	Australian Ownership			11.88%
Top 10 Companies as percentage of toal NSW output			88.10%	Top 10 Companies as percentage of toal NSW output			86.48%

Source: Joint Coal Board, Black Coal in Australia, 1979-80, 1980-81; NSW Coal Industry Profile 2014; ASX Company listings and profiles

In 2014, through takeover and the entrance of minority shareholdings, particularly by Japanese and Korean companies, the major coal producers are diversified global resource companies, led by Glencore, RioTinto and BHP Billiton, accounting for 50% of output. (Figure 28) These companies are highly influential in the global minerals and energy scene, with the ability to switch supply between national sites of production as the economics allows. The coal rush since 2005 has seen new capital formations with many small speculative companies enter the coal business securing ground and accumulating assets, with a diaspora of Australian interests to Africa, Asia and the Americas, seeking entry into the burgeoning coal trade. Yancoal's $3.3 billion takeover of Felix Resources in 2009,[216] typified the large stakes and high levels of Board ownership of Australian coal companies. Takeovers created great

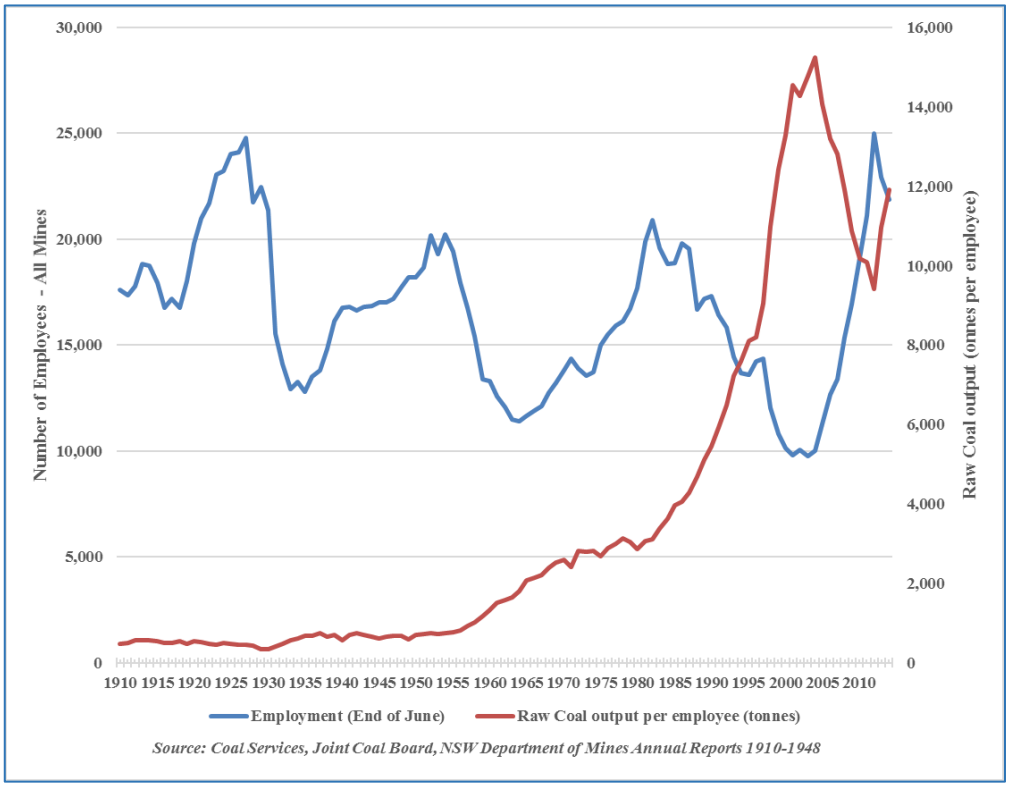
[216] Pearse, G., McKnight, D., Burton, Bob, Coal: Australia's Dirtiest Habit, (New South, Sydney, 2013), p. 82

wealth for a small cohort of entrepreneurial coal industry figures often in private companies, some, including directors of Felix, would later figure in Independent Commission Against Corruption (ICAC) investigations.[217] At the height of the coal boom in 2011, excluding the coal majors, some 80 companies with Australian and overseas coal interests were ASX listed, but with few active in NSW exploration due perhaps to its primarily thermal coal endowments rather than coking coal and the problem of asset acquisition and market access.[218] Finally, a spark of speculative energy, though short-lived.

The levels of employment in the coal industry respond to such speculation in resources by industry insiders, but more directly to coal demand, price, and changes in organisation and technology. Since 1900, employment in the range 10,000 to 25,000 employees[219] was broadly aligned with the commodity and economic cycles. (Figure 29)

[217] ibid.
[218] I took a snapshot at 30 June 2011 from ASX stock listings and company reports
[219] Direct mine employees. The use of contractors can distort these numbers but not significantly affecting the overall trend at this scale of enquiry.

Figure 29, Long run coal industry employment and productivity 1910-2015

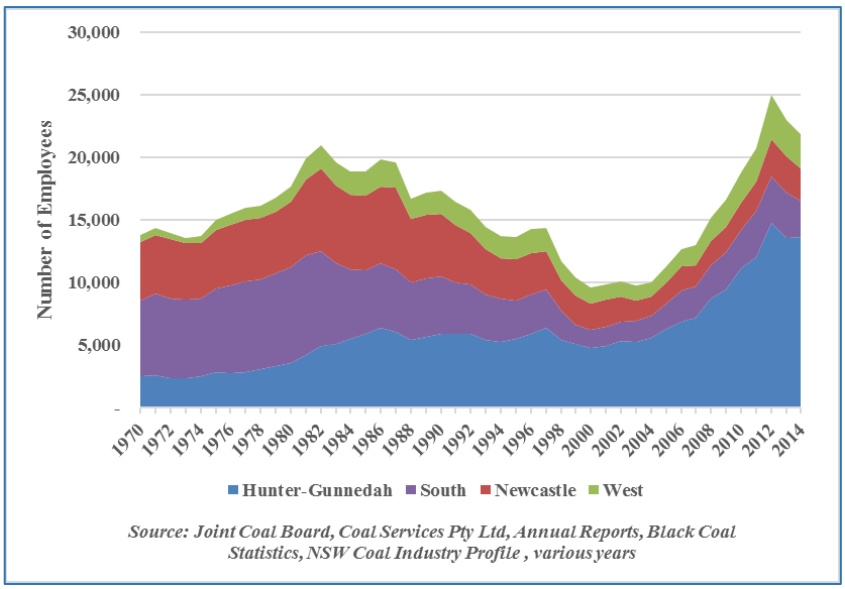


In 2012 employment exceeded the previous peak year of 1927, with both peaks followed by significant falls due to economic circumstances - the Great Depression from 1929, and the post GFC global downturn from 2008. Levels of employment respond to market conditions with the restructuring of the Steel industry in the 1980s critical to mine employment in the Newcastle and Southern coalfields. The decline in regional coal employment (Figure 29) with the closures of steel capacity at Port Kembla in 1982,[220] and at Port Kembla and Newcastle in 1987, created industrial unrest with Government attempts to freeze mine closures and job losses. The burden fell upon steel workers but with significant reductions in mine employment in the south with over 2000 jobs lost before some recovery in the 1990s through a reorientation to exports. Employment reached the nadir in 2000 with no significant improvement until recovery in price and demand in 2005 and the start of the greatest surge

[220] Donaldson, M., and Donaldson, T., The Crisis in the Steel Industry, Journal of Australian Political Economy, 14, 1983, p. 1 - May 7, 1982 BHP's wholly-owned subsidiary, Australian Iron and Steel announced that 2500 jobs would be lost at the Port Kembla steelworks

in production with total employment rising from 9,583 in 2005 to the historical peak of 24,972 in 2012, with falling coal prices and subsequent.[221] (Figure 30)

Figure 30, Coal industry employment by coalfield 1970-2014



Changes in Mining Method and Productivity

The first significant productivity increases occurred with progressive mechanisation from the 1950s but the rise of large scale open-cut mining after 1980, provided the steepest rise in output per employee. (see Figure 29) Underground mining was still dominant in 1980, with mostly bord and pillar operations with partial pillar extraction the dominant method, typically mining up to 60% of the coal seam. Mechanisation in the 1950s allowed the introduction of the first shortwall at Burwood Colliery in 1959 aimed at higher productivity and conservation of timber, by using moveable hydraulically operated supports.[222] Shortwall mining could achieve around 70% seam extraction, but fully mechanised longwall operations mining up to 90% of the seam, first introduced by BHP at West Cliff Colliery in 1970 were not initially successful.[223] The grant of five day 24 hour production in 1971 and 365

[221] NSW Coal Industry Profile, (2013), p. 2 60, (2014, Volume 1), op. cit., p. 123 – Figures are for end of June, not average employment, but there is little numeric difference and the trend is the same.
[222] Martin, C., H., et. al., (1993), op. cit., p. 130
[223] Martin, C., H., et. al., (1993), op. cit., p. 134

day, 24 hour operations from 1988,[224] allowed fuller utilisation of equipment, with longwall installations producing over 50% of underground production by 1991.[225] Despite the shift to high capital, high productivity open cuts, the resources available to this method are small compared to those available to underground mining. The depth of cover is significant in terms of decision making, and coal quality and value, are less critical in lower operating cost open cut operations.

The Future History

Histories of the recent past describe the prevailing conditions which have an uncertain trajectory into the future. But perhaps not for the coal industry, with decline in domestic markets and the rise of renewable energy sources, having exposed the producers to softer world prices and keen competition, who respond with vigilance on matters of efficiency, productivity and the development of new export markets. Production in 2015-16 is down 5.4% over the peak production in 2013-14, with export value down nearly $4 billion from the 2008-09 peak.[226] The expansions and new mines planned and constructed under more favourable price signals have continued to maintain production, but older operations are now starting to falter with declining resources, revenue and margins and adverse regional effects, particularly in the Hunter Valley.

External events play a significant role. Despite the current price recovery - a response perhaps to Chinese pruning of domestic capacity - it is the ratification of COP21 by China

[224] Coal Services Pty Ltd, The New South Wales Coal Mining Industry 1983-1991, http://www.coalservices.com.au/saboutus.aspx//History.aspx
[225] Martin, C., H., et. al., (1993), op. cit., p. 134
[226] NSW Department of Industry, Resources & Energy, Coal in NSW, accessed 5/10/2016,

and the USA in September 2016,[227] a move to limit atmospheric temperature rise to 2º Celsius, which is forecast to reduce the seaborne thermal coal trade by 40% to 2035 with falling prices, forecasting a 75Mt reduction in Australian thermal exports.[228]

This would impact heavily on NSW; however, coal will not disappear quickly, with over 8 billion tonnes still consumed globally every year,[229] and NSW offering a significant comparative quality advantage in reliable thermal coal production and exports. Perhaps as discussed in the next chapter, Government policies, and the people, will decide its future.

[227] COP21, http://www.france24.com/en/20160903-china-ratifies-climate-agreement-ahead-g20-summit
[228] Institute for Energy Economics and Financial Analysis, http://ieefa.org/wood-mackenzie-top-industry-consultant-sees-40-drop-seaborne-coal-trade/
[229] BP Ltd, BP Statistical Review of World Energy, June 2016, Statistical Workbook, Coal, http://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html

3.0 POLITICS, POLICY AND PLACE

3.1 Fateful Intersections

The intersections of power relations between state, Labour and Capital, have been rethought and reconfigured during the post 1980s period of globalisation of capital flows seeking market advantage, and labour subject to '*…the neo-liberal notions of flexibility, innovation, productivity and competitiveness.* '[230] The state has been reactive, interventionist, but mostly a less-than-innocent bystander to a coal industry, largely foreign owned and expanding through its engagement with global trade. The mentalities towards labour forged in the long history of industrial unrest defined an uneasy relationship with the unions until the present, despite relative industrial calm after 1980, as globalisation redefined work and capital-labour relations.

Unlike Queensland with its world class high quality coking coal assets, NSW has only a comparative advantage in its primary export, thermal coal. Its advantage in the post-war period was in the large high quality resource base, a skilled workforce representing a long history of continuity in mining craft, experience and innovation, tardy, but developing rail and port infrastructure capacity, and state governance which is reactive, but relatively free of corruption. This remains much the same setting in 2016, except the resource base has grown, production is more spatially diffused and immensely larger, the workforce is flexible but overall is perhaps less autonomous and skilled, with the high capital and operating cost base the largest threat to competitiveness. The conduct of Government, although subject to some overt corruption, is more subject to criticism for its failure to balance resource policy

[230] Hearn, Mark & Michelson, Grant, (eds.), Going to a New Place: Rethinking Work in the 21st Century, in, Rethinking Work: Time, Space and Discourse, (Cambridge University Press, Port Melbourne, 2006), p. 3

with other local and global concerns. This chapter examines the change in relationships of the triad, the broader economic policy shifts, and the intersections with work and place.

3.2 The Quest for Growth – The State and Capital

The post-war 'labourist-protectionism'[231] appropriate to post-war domestic economic development held until the 1970s. As discussed in Chapter 2, oil shocks and oil company diversification into coal, promoted consolidation of foreign ownership of coal businesses, and Japan's liberalisation of coal importation had stimulated the export trade in, and profitability of thermal coal.

After unfettered investment in mining and foreign control of resources, first McMahon in 1972[232] and Whitlam in 1974, introduced controls with the 'buy back the farm' catchcry.[233] Nationalist economics protecting manufacturing could not withstand the minerals boom from 1968, (Dutch disease?) nor the transformation of the regulatory regime after 1983 from protectionism to a globalising regime,[234] which facilitated the first phase of coal industry expansion. The broader mining industry had become a hotspot reflected in Australian exploration expenditure rising from $22 million in 1965 to $576 million in 1981-82.[235]

Various economic shocks - the recession of 1982-83 with high inflation and unemployment, the Keating threat of an emerging 'Banana Republic' in 1986 and the stock market crash in 1987 - were catalyst and roadblocks on this road to reform aimed at raising growth through liberalising domestic market efficiency and productivity, by increased exposure to international competition.[236]

---

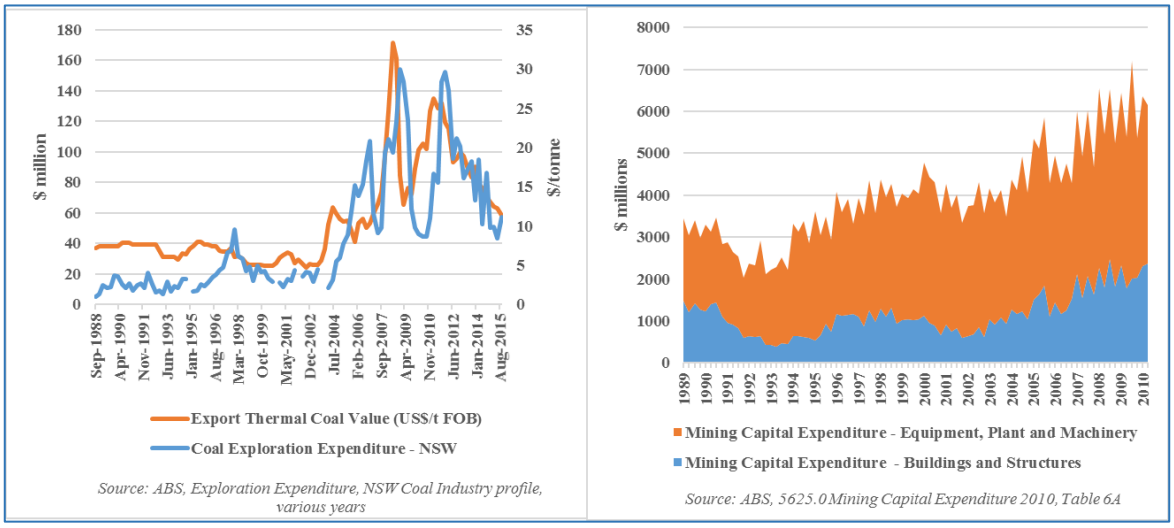
[231] Lloyd, Christopher, "Regime change in Australian capitalism: towards an historical political economy of regulation", Australian Economic History Review ,42 (3), 2002, p. 247
[232] Companies (Foreign Takeovers) Act 1972 (Commonwealth) – Cleared the Senate 25 October 1972 just minutes before Parliament was dissolved before the December 1972 election, won by Whitlam's' Labor Party
[233] Hay, James, L., (2009), op. cit., 144
[234] Lloyd, Christopher, (2002), op. cit., pp. 247-248
[235] Australian Mining Industry, 1998-99, ABS Catalogue No. 8414.0) – All minerals including coal
[236] McLean, (2013), op. cit., p. 220

Lauber, in defence of liberalism, had argued that the imperative for economic growth came from the pursuit of power by elites and by limiting their power, liberal principles could be put to good use.[237] Since 1980, world governance organisations including the World Bank, IMF, have actively financed the resource extractive industries in many countries promoting private-public partnerships between trans-national corporations and states,[238] and through 'resources nationalism'[239] promulgating and enlarging the global availability and trade in minerals and energy commodities.

The reforms of the Hawke Government after 1983 reflected a heightened consciousness of this emerging global resource marketplace. This was a reformation of the structure of Australian life and work through the dismantling of trade barriers, deregulation of labour and financial flows after a period of stagnation through the 1970s and rising unemployment through 1981-1984.[240] The term globalisation was first heard following Levitt's influential article in 1983,[241] then meaning reduced barriers to trade and capital flows between nations. This market re-orientation in search of economic growth was achieved through quieting industrial unrest through a series of accords with the Union movement discussed in the next section. The recession of 1992-93 disavowed the population towards further labour reform, but marked the start of a long boom unimpeded until the onset of the global financial crisis (GFC) in 2006, including the re-emergence in spirit, if not the ruthless actions of King Coal.[242]

[237] Lauber, Volkmar, 'Ecology Politics and Liberal Democracy', Government and Opposition, Vol. 13, (1978), pp. 199-217
[238] Sawyer, Susan, Gomez, Edmund, Terence, (eds.), The Politics of Resource Extraction: Indigenous Peoples, Multinational Corporations and the State, (Palgrave Macmillan, Basingstoke, 2012), p. 1
[239] Hay, James, L., (2009), op. cit., p. 143
[240] Walter, James, (2003), op. cit., p. 164 – Between 1981-82 and 1983-84 unemployment rose from 6.2% to 9.6%.
[241] Levitt, Theodore, 'The Globalization of Markets', Harvard Business Review, 61, 3, (1983), pp. 92-102
[242] Adams, S., P., "Promotion, Competition, Captivity: The Political Economy of Coal", The Journal of Policy History, 18(1), (2006), pp. 84-85; Freese, Susan, Coal: A Human History, (Arrow Books, London, 2006), p. 131

Figure 31, Exploration Expenditure (L), Mining Capital Expenditure (R)



The genie was out of the bottle for coal producers, with stagnant domestic demand and concurrent low margins, future survival depended on the seaborne trade for growth in production and revenues. Exploration expenditure grew in line with price improvement (Figure 31L) and total NSW mining capital expenditure, say 70% in coal, was $317 billion in the 20 years to the height of the coal boom in December 2009. (Figure 31R)

The transformation of institutional structures and the rise of the 'new economy based on Information and Communications Technologies in the early 1990s[243] - the new regulatory state capitalism - defined the new relationship between state and capital compounded by investment into mining. The coal producers, once small, became aggregated, large, transnational, and increasingly captive to other national agendas.

NSW coal export revenues quadruple to $2.8 billion in the decade to 1992, with the long resources boom after 1990 providing Governments with increased revenues from resource rents and corporate tax offsetting in part, the concurrent decline in the manufacturing

[243] Lloyd, Christopher, "Australian capitalism since 1992: a new regime of accumulation?" Journal of Australian political economy, 61, 2008, p. 31

sector. Asian industrialisation, despite the 1997 'tigers' crisis, grew the coal trade and Australia's real GDP through 'resource based prosperity',[244] with more Asian nations now turning towards coal as a fuel for power generation. The increase in terms of trade, a doubling between 2002-2011[245] and the mining investment response[246] have ensured record coal exports in the post GFC period, against declining prices.

The effects on the currency were profound, with high commodity prices priced in US dollars leading to a strong Australian dollar. The average since deregulation in 1983 has been 77c but traded at 110c in July 2011.[247] A high dollar has proven to be difficult for non-commodity and manufactured exports with declining capital investment in manufacturing and the services sector.[248] However, the large, long term resource base and high levels of mining investment (Figure 27) and the shifts to services in the broader economy, offsetting the worst effects of 'Dutch disease.'[249]

Energy and mining accounted for 55% of Australia's export earnings in 2010, but still contributed only 8.4% of GDP even at the height of the boom.[250] While it generates only a small percentage of total employment in Australia (1.7% in 2010),[251,252] it has multiplier

[244] McLean, (2013), op. cit., p. 228
[245] Sheehan, Peter, & Gregory, Bob, The Resources Boom and Economic Policy in the Longer Run, The Australian National University Centre for Economic Policy Research, Discussion Paper No. 683, Australian National University, March 2013, p. 12
[246] Sheehan, Peter, & Gregory, Bob, (2013), op. cit., p. 8-9
[247] Hartcher, 2011, p. 234
[248] Hartcher, 2011, p. 235
[249] Auty, Richard, M., Sustaining Development in Mineral Economies: The resource Curse Thesis, (Routledge, Oxford, 2001), pp. 16-17
[250] Goot, Murray, The New Millennium', in, Ville, Simon, & Withers, Glenn (eds.), The Cambridge Economic History of Australia, (Cambridge University Press, Port Melbourne, 2003), p. 189
[251] Goot, (2003), Op. cit., p. 189
[252] Hartcher, Peter, The Sweet Spot: How Australia Made Its Own Luck – And Could Throw It All Away, (Black Inc., Collingwood, 2011), p. 7

effects[253] (largely unquantified), with a domestic services and manufacturing sector supporting the industry[254] feeding uncritical jobs and growth assumptions and policies. Employment in Coal in NSW peaked in 2012, but productivity peaked in 2009 (Figure 26) leading the question of whether labour reforms or state investment in infrastructure was more critical for continued industry expansion.[255] Coal became the largest export commodity with the Government playing 'catch-up' in industry governance, welcoming foreign investment while procrastinating on infrastructure, abandoning policy consistency and relying on trend extrapolations forecasting largely unfettered growth in coal demand, as discussed later.

In the Australian long-run, commodities are rarely in supply and demand balance for long periods leading to a boom-bust cycles such as in 1968-1975 of high commodity prices and investment in mine expansions and new capacity leading to oversupply, diminishing prices and often closures, retrenchments, mirrored in the coal industry since 2012. The NSW Government acquiescence to capital inflows and resource rents from mining, have been reactive and policy distorting, but its attitude to labour was always proactive

3.3 State and corporate responses to labour: 'finding new ammunition to fight old battles'

The quote above from Tim Lyons[256]was a response to the Abbott Governments' announcement of another Royal Commission into Trade Unions, including the primary coal mining

[253] Davidson, Sinclair and de Silva, Ashton, The Australian Coal Industry – Adding value to the Australian Economy, April 2013, p. 7 - http://www.minerals.org.au/file_upload/files/reports/Att_8-2__2013-04-24_Coal_Economy_report-Sinclair_Davidson_report.pdf

[254] ibid., - Davidson suggests a 3.2 jobs created for every one million dollars of output in coal mining which seems too high.

[255] Sheehan, Peter, & Gregory, Bob, (2013), op. cit., p. 34

[256] Tim Lyons, Crippling Unions: Abbott's anti-worker agenda, Chifley Research Centre, October 29, 2014, http://www.chifley.org.au/crippling-unions-abbotts-anti-worker-agenda/

union, the CFMEU, [257] though not specifically the coal sector.[258] It is a useful analogy for the history of antagonisms in coal industry industrial relations. Coal mining has been a subject of many enquiries, and after 150 years of conflict[259] perhaps the co-dependence had made unions and employers resistant to change.

New South Wales coal miners have not been fictionalised as their gold seeking cousins with literary responses more critical of the damage inflicted on the landscape, than miners lives, culture and work, or '…the organic village life of the nineteenth-century underground pit culture, a phenomenon that persisted until the last quarter of the twentieth century.'[260] In their paper on Miner's holidays, McDougal and Croft counted just two novels[261] but no *Germinal*[262] or *Matewan*,[263] enduring prose and movie fictionalisations of working conditions, strikes and ruthless labour relations. There was an abundance of local raw material. The onerous working conditions of miners, and their constant striving for a better deal created solidarities, not easily broken by a complacent state or laissez-faire capitalism. Gollan noted that coal miners were a political community, 'removed one step to the left of the rest...',

[257] The Union was first federally registered in 1915 as the Australasian Coal & Shale Employees Federation (ACSEF). A series of amalgamations in the 1990s, including with the Federated Mine Mechanics Association (FMMA) and the Federated Engine Drivers & Firemens Association (FEDFA), the United Mineworkers Federation. In 1991, a further series of amalgamations with the Building Workers Industrial Union and the Forestry Workers Union to complete the CFMEU. The miners became known as the Mining & Energy Division of the CFMEU. http://cfmeu.com.au/your-union/role-and-achievement

[258] Commonwealth of Australia, Royal Commission into Trade Union Governance and Corruption, Royal Commission into Trade Union Governance and Corruption Final Report: Volume 3, December 2015, https://www.tradeunionroyalcommission.gov.au/reports/Documents/Final-Report/Volume-3/Final-Report-Volume-3.pdf

[259] Gollan, R., (1963), op. cit., p. 33 – The formation of the union 24 May 1860, thirty years after 'privatisation' of the industry, does not preclude earlier conflict in what was an industry founded with convict labour.

[260] McDougall, Russell and Croft, Julian, Industrial Pastoral: Lake Macquarie Coal Miners' Holidays, Transnational Literature, Vol. 3 no. 1, November 2010, p. 12

[261] ibid., Howard Wells, The Earth Cries Out, (1950) and Greg Boegarts, Black Diamonds and Dust (Melbourne: Vulgar Press, 2005)

[262] Zola, Emile, Germinal / Trans. by Colin Smethurst, (Edward Arnold, London, 1974); Germinal, most recent film version, Germinal (1993), directed Claude Berri, http://www.imdb.com/title/tt0107002/?ref_=fn_al_tt_1

[263] Film, Matewan, directed John Sayles (1987), set in the 1920s West Virginia, USA, coal war, http://www.imdb.com/title/tt0093509/?ref_=nv_sr_1

exclusively working class politics where, '…the Labor party was the conservative and the Communist, the radical party.'[264]

The post-war coal industry was a period of initial unrest as miners pressed for reform by using their market power. Coal was the critical fuel for a functioning nation during the post war reconstruction. There was a sense of barely contained anger by the wartime Government over productivity and reliability of supply, particularly in 1945 with record days lost,[265] and the view that the coal miners had not stepped up in support of the war effort. Though the miners as Sheridan attests, were not fighting the war to preserve the status quo,[266] but to seek redress against the 'singleminded foe - the greedy and provocative coal owners'.[267] The NSW Government with its direct ownership of mines and its close relationship with the local Australian owned coal companies (i.e., BHP, J & A Brown, Abermain, & Seaham, J. W. Miller etc.[268]) treated the industry as a series of fiefdoms overseeing a 'bonded' workforce.

Butlin's discussion of the wartime economy[269] and the 'mystery' of low coal mine productivity was not aided by the broad aversion to mechanisation by either mine owners or union, and in fact, the wartime unavailability of suitable equipment.[270] Nor has sufficient attention been given to rapid growth in wartime demand outstripping the means of supply.[271] The 1938 Miners Federation ban on mechanical extraction of coal pillars was followed by

[264] Gollan, R., (1963), op. cit., p. 221
[265] Butlin, S., J., & Schedvin, C., B., *Official Histories – Second World War, Volume IV – War Economy, 1942–1945*, (Canberra, 1st edition, 1977), p. 445
[266] Sheridan, Tom, Division of Labour, Industrial relations in the Chifley Years, 1945-1949, (Oxford University Press, South Melbourne, 1989), p. 253
[267] ibid.
[268] These include, BHP (still domesticated in this period), 1922 - Abermain and Seaham Collieries merged Wickham & Bullock Island Coal Mining Co.; J & A Brown acquired East Greta Coal Mining Co; 1931 - J & A Brown & Abermain Seaham Collieries Limited (JABAS) merged.
[269] Australia in the War of 1939–1945, Series 4 – Butlin, S., Volume III – War Economy, 1939–1942 (1st edition, 1955), Ch. 12, Transport and Coal, pp. 408-425
[270] Butlin, S., J., & Schedvin, C., B., (1977), op. cit., p. 550
[271] Butlin, S., J., & Schedvin, C., B., (1977), op. cit., p. 446

the Government gazetting a new rule in 1941 prohibiting the use of machines for pillar extraction,[272] despite the critical war-time coal shortages. These rigidities by state and labour are significant, and had resonance until full mechanisation was achieved in the 1970s.

Chifley was obdurate in his resistance to union claims and concessions ostensibly to protect the national economy from disruption during the post-war reconstruction.[273] Labor policy on the miners, was that there be no major redistribution of income from profits to wages,[274] despite the rising expectations of workers.[275] The reforms of the 1946 Davidson Inquiry[276] established the Joint Coal Board (JCB)[277] in 1947 with a wide range of powers and charged with ensuring adequate supply of coal for domestic and trade purposes.[278] The JCB, '...appointed in order to rehabilitate and stabilise an industry which for a variety of reasons has failed the community...'[279] and acknowledged the '*bitterness and antagonism between owners and men which derives from its ruthless history...'*.[280] The imminent demise of the Australian car industry by 2018, has not evoked from Government the label of failure that the JCB so casually evoked about the coal industry in its first report of 1948. Perhaps what has changed since 1980, is that unlike the war-time mentality of national security, the neo-liberal notion of business success or failure lacks a community, and is now viewed as a consequence of risks and uncontrollable circumstance, perhaps a form of Dean's new prudentialism.[281]

[272] Martin, C., H., et. al., History of Coal Mining in Australia, Monograph Series No. 21, (Australian Institute of Mining and Metallurgy, Parkville, 1993), p. 121 – Gazetted by the Minister for Mines in August 1941
[273] Sheridan, Tom, Division of Labour, Industrial relations in the Chifley Years, 1945-1949, (Oxford University Press, South Melbourne, 1989), p. 248
[274] Sheridan, Tom, (1989), op. cit., p. 320
[275] Patmore, Greg, Australian Labour History, (Longman Cheshire, Melbourne, 1991), p. 89
[276] Commonwealth Board of Inquiry into the Coal Mining Industry, 1945-46.
[277] The Joint Coal Board was a joint Commonwealth and New South Wales Government enterprise
[278] Martin, C., H., et. al., History of Coal Mining in Australia, Monograph Series No. 21, (Australian Institute of Mining and Metallurgy, Parkville, 1993), P. 126
[279] Joint Coal Board, First Annual Report 1947-48, (A.H. Pettifer, Government Printer, Sydney, 1948), p. 6
[280] Joint Coal Board, (1948), op. cit., p. 7
[281] Dean, Mitchell, Governmentality: Power and Rule in Modern Society, (Sage Publications, London, 1999), p. 166

The JCB would oversee the reforms of the Davidson Report in 1947,[282] recommending increased mechanisation and additional shifts mostly to advantage the mine owners, with few concessions for the miners but some improvements in welfare. Wide disparities existed in wages and conditions. In 1947, mechanised teams were paid 35/2 per shift, but contract miners were making £3,[283] with paid public holidays only available to the Miners Federation not to the craft unions.[284] The JCB now had powers to take control of mines which Dingsdag argues, was a permanent extension of NSW and Federal Government control over the industry[285] beyond war-time measures. Its objectives were to provide sufficient coal to meet industry requirements within a framework of private ownership, to conserve and utilise coal resources to the best advantage, and maintain supply at the lowest cost.[286]

Overcoming the coal owners' antipathy to mechanisation was a hurdle,[287] and encouragement of open-cut mining, including the operation of JCB owned mines, was a significant departure from industry practice. However, useful in providing coal supply during the 1949 national coal strike[288] and Government intervention,[289] and subsequent mine floodings between February and June 1950.[290] A consequence was that open cuts were subsequently allowed to be worked continuously,[291] a concession ensuring the withdrawal of army

[282] Davidson, C., G., W., "Report on the Coal-Mining Industry ", Parliamentary Paper No. 51, Mar 1946
[283] Elford, Harold, S., & McKeown, Maurice, R., Coal Mining in Australia, (Tait Publishing Company Pty Ltd, Melbourne and Sydney, 1947), p. 240
[284] The Miners Federation received paid public holidays, but the craft unions did not receive this award
[285] Dingsdag, Donald Pierre, The restructuring of the NSW coalmining industry, 1903-1982, Doctor of Philosophy thesis, (Department of History and Politics, University of Wollongong, 1988), p. 268
[286] Joint Coal Board, (1948), op. cit., p. 5
[287] Dingsdag, (1988), op. cit., p. 286, Mechanisation commenced in the 1930s with the first coal loading machines in NSW in 1935. The first Continuous Miner was introduced by the JCB in 1950, which allowed much higher productivity and encouraged second workings or pillar extraction vastly improving resource recovery.
[288] Joint Coal Board, Third Annual Report 1949-50, (A.H. Pettifer, Government Printer, Sydney, 1951), p. 5 Strike lasted 27th June to 15th August 1949
[289] Commonwealth of Australia, National Emergency (Coal Strike) Act 1949 in force from 29th June 1949 – The Army worked some open cut mines for two weeks from 1-14 August 1949
[290] Joint Coal Board, Second Annual Report 1948-49, (A.H. Pettifer, Government Printer, Sydney, 1950), pp. 33
[291] Joint Coal Board, (1950), op. cit., p. 34 – This was first applied to the Muswellbrook open cuts worked by the army during the strike, and then it was adopted generally

labour. For the coal industry in post-war NSW there was to be no further tolerance of major disruptions to coal supply, with union power diffused[292] and Communist Party influence diluted.[293] A Labor Government, seeking to, 'starve the miners back to work, jailing their leaders and sending troops into the mines...' was indelibly printed on the psyche of the union movement.[294] However, the reforms following this state intervention allowed progressive mine modernisation and mechanisation, often traded for improvements in miners working conditions.

The high court rejected compulsory unionism in 1950 because it was deemed unconstitutional, but in 1953 the NSW Cahill Labor Government, passes compulsory unionism legislation, a law not enforceable but amended in 1959 to provide absolute preference for unionists. This state response now seem at odds with the exercise of Federal power in 1949 and perhaps reflecting the older, deeper relationship between Labor Governments and the unions reaching back to McGowen's first ALP Government in 1910.

Newstan Colliery opened in 1953 - the first of a new generation of showpiece state owned mines with modern surface facilities including bathhouse and fully mechanised operations.[295] These post-war improvements to the visual impact of surface facilities was complimented by the pit-top bathhouse, eliminating the pre-war sight of the coal-blackened miner walking home after a shift. Coal miners' hours were reduced under Federal awards to 37.5 hours a week in 1970 and further to 35 hours from June 30 1971, in exchange for the

[292] Deery, Phillip, (ed.), (1978), op. cit., p. 86 - Deery points out that perhaps there is less solidarity amongst open cut workers, than the more closely knit and inter-dependent underground miners. Also, he cites the industrial passivity of the northern miners who initially rejected the strike recommendation.
[293] Deery, Phillip, Chifley, The Army and the 1949 Coal Strike, Labour History, No. 68, 1995, p. 90-91
[294] Sheridan, Tom, (1989), op. cit., p. 248
[295] Martin, C., H., et. al., History of Coal Mining in Australia, Monograph Series No. 21, (Australian Institute of Mining and Metallurgy, Parkville, 1993), p.

24-hour operation required to increase productivity and output and unlock access to export markets through this period.[296]

Conditions were changing for the better, but job security remined an issue. The last union militancy was perhaps the sit-in at Nymboida Colliery in 1975[297] and union operation until 1979,[298] commencing during the last phase of the Lewis Liberal Government and overseen by Wran's ALP Government from May 1976. The 1984 Kemira Colliery 'sit-in' after the retrenchment of 189 miners due to the downturn in the steel market,[299] however failed to avert the job losses. Nymboida was not the last foray of the unions into mine operation, with the CFMEU taking a stake in Glencore's United Colliery in 1989.[300] Miners can be owners - an alignment of the interests of the worker and the enterprise in the emergent corporate culture of neo-liberalism,[301] which was later embedded in the 1999 OHS legislation. Perhaps Ellem points to the state's evocation of the 'enterprise worker' as transforming work and society and ending the traditional industrial relations.[302]

The new global labour arrangement through the commodification of labour[303] and industrial relations policy driven by economics,[304] manifested in Australia in the declining union membership, casualisation of the workforce, with higher participation of women accompanying the broader shifts from blue collar to white collar. Women entered the coal industry for the first time, without the support of the unions, and gender remains absent from

[296] Joint Coal Board, 25th Annual Report 1971-72, (V. C. N. Blight, Government Printer, Sydney, 1972), p. 18
[297] Thomas, Pete, The Nymboida Story: The work-ins that saved a coalmine, (Australian Coal & Shale Employees' Federation (Miners Federation), Sydney, 1975)
[298] Gollan, Robin, (1963), op. cit., The Guardian 9 February, 2005, http://www.cpa.org.au/z-archive/g2005/1214nymboida.html
[299] Spires, Robert, History of Kemira Colliery, 1857 – 1984, (1984) - http://www.illawarra-coal.com/kemira.htm
[300] Glencore, United Colliery, http://www.unitedcollieries.com.au/EN/Pages/default.aspx
[301] Hearn, Mark & Michelson, Grant, (eds.), Rethinking Work: Time, Space and Discourse, (Cambridge University Press, Port Melbourne, 2006), p. 213
[302] Ellem, Bradon, The making of industrial relations policy: Where are we now and how did we get here?, Labour and History, 21, 1, (August 2010), p. 361
[303] Ellem, Bradon, (2010), op. cit., p. 354
[304] Ellem, Bradon, (2010), op. cit., pp. 353-368

the key Government statistical data.[305] The restructuring of work, the more spatially dispersed workforce and a sustained assault by many employers supported by legislative change, posed spatial and strategic problems for union power.[306]

Larger workplaces in more concentrated locations such as the Hunter Valley were more organised to resist individualisation and challenge employer resistance to unionisation. [307]Shrinking workplaces, longer hours and geographically dispersed workplaces created difficulties in union organisation and representation.[308] Changes in the state-union relationship from 1987 resulted in a two-tier arbitration system tying wage increases to productivity,[309] with enterprise bargaining introduced from 1991.

The mentalities of Government had shifted from centralist nationalist thinking, obviously coloured by war-time expediency, to reform and mechanisation from the 1950s to 1970s, and later to a mind-set defined by globalisation. The attack on union workplace access and industrial action introduced by the Howard Government in 1996,[310] further eroded employer recognition of unions, ending the accord between the ACTU and the Hawke Government forged in 1983.[311]

This final piece of a deregulation process commenced in 1983, entrenched enterprise bargaining and non-union agreements, and abolished compulsory union membership.[312] The resource peripheries had become central to remaking of labour policy. A neoliberal industrial relations policy and practice around individually based regulation first manifested in the

[305] NSW Women in Mining: A snapshot, A survey by the NSW Minerals Council March 2014, p. 5, - MCA report 10% of the workforce in 2014 was female. http://www.nswmining.com.au/NSWMining/media/NSW-Mining/Publications/NSW-Women-in-Mining-A-snapshot.pdf
[306] Cooper, Rae, & Ellem, Bradon, Chapter Seven, 'Union Power: Space, Structure and Strategy', in, Hearn, Mark & Michelson, Grant, (eds.), Rethinking Work: Time, Space and Discourse, (Cambridge University Press, Port Melbourne, 2006), p. 139
[307] Hearn McKinnon, B., CRA/Rio Tinto in the 1990s: A Decade of Deunionisation, Labour History, No. 97 (Nov., 2009), pp. 75-96
[308] Cooper, Rae, & Ellem, Bradon, (2006), op. cit., p. 128
[309] Cooper, Rae, & Ellem, Bradon, (2006), op. cit., p. 129
[310] Cooper, Rae, & Ellem, Bradon, (2006), op. cit., p. 130, Commonwealth Workplace Relations Act 1996
[311] Cooper, Rae, & Ellem, Bradon, (2006), op. cit., p. 132
[312] Commonwealth of Australia, The Workplace relations and other Amendments Act, 1996

Pilbara resource periphery in 1986.[313] In 1991, the CFMEU, had consolidated union membership within the broader construction and natural resource sector, the sectors most associated with labour industrial unrest. This was in time for the first general strike in NSW for 65 years,[314] but the unions failed to avert the introduction the *Industrial Relations Act 1991*[315] ending the preference for unionists, outlawing closed shops, and providing an enterprise and workplace focus.

Hearn McKinnon charted CRA/Rio-Tinto's decade of systematic de-unionisation of its operations commencing in the Pilbara in 1993.[316] The iron ore majors, RioTinto and BHP, driving this labour reform, were also major coal companies in NSW. The Pilbara iron ore mining region is roughly commensurate with the NSW coal industry, both in size, level of unionisation, and in its ownership by multinationals and reliance upon export markets and foreign capital.[317] The mining companies, usually critical of state governance '…sought enhanced state power (and, later, nationally scaled state power) to seek local control through individual contracts with their workers.'[318] This attack on the conciliation and arbitration system came about despite the large improvements in productivity within the coal industry. (Figure 29)

The Kelman Report in 1991[319] refocussed the JCB, the state body overseeing the NSW coal industry, from industry development, employment and industrial relations, to occupational health and safety.[320] The functions of the Coal Industry Tribunal (CIT), a thorn

[313] Ellem, Bradon, (2015), op. cit., p. 329
[314] Thursday 24 October, 1991, the previous general strike was the Great Strike of 1917, of railway and coal employees https://www.records.nsw.gov.au/archives/general_strike_of_1917_12707.asp
[315] Fraser, Bryce, People of Australia, Key Events in Population, Society, The Environment, devised by Bryce Fraser, (The Macquarie Dictionary, Macquarie University, 1998), p. 267
[316] Hearn McKinnon, B., CRA/Rio Tinto in the 1990s: A Decade of Deunionisation, Labour History, No. 97 (Nov., 2009), pp. 75-96
[317] Ellem, Bradon, (2015), op. cit., p. 325
[318] Ellem, Bradon, (2015), op. cit., p. 330
[319] Kelman, Bryan, Review of the Joint Coal Board, February 1991
[320] NSW Coal Industry Amendment Bill 1992, The NSW Coal Mining Industry 1992-2001, http://www.coalservices.com.au/History.aspx

in the side of the mining Companies, were transferred to the Australian Industrial Relations Commission (IRCA) in 1993.[321] The abolishing of the geology and engineering departments severed its close scrutiny of the conduct of the operations of the industry. However, the Commonwealth or State Governments, retained the power to direct the JCB – a power born of critical coal shortages in 1947.[322]

These institutional changes moved coal industry industrial relations into the mainstream. Despite significant legislative changes and anti-union employer mobilisation, the CFMEU's 'war of attrition' against Rio Tinto had succeeded in resisting Rio Tinto's deunionisation campaign and maintained collective bargaining.[323] Cooper and Ellem speak of local traditions, and the 'overlap of workplace and community issues' underpinning union locations of work.[324] Mining expansion to the north-east with smaller dispersed operations, created a periphery initially exploited by Rio Tinto at the Vickery mine. The 50-week CFMEU strike in 1995-96 at Novacoal's Vickery mine[325] near Gunnedah, was about the trial introduction of 12 hour shifts ordered by the IRCA.[326] Riotinto relentlessly pursued its workplace agenda on this NSW coal periphery, and won. The arrest of pickets triggered wider action with strikes at all RioTinto mines. A six-week strike from June 1997 at RioTinto's Hunter Valley No. 1, about this lessening of union control and the new IR practices, initially rebuffed a corporate strategy aimed at increasing the productivity of capital equipment, without reference to social impacts or worker input into rosters. In its submission to the Productivity Commission later in 1997, RioTinto had pointed to its success in the Pilbara '…at improving performance by maximising the potential of its employees and capital assets.'[327]

[321] ibid.
[322] ibid.
[323] Hearn McKinnon, B., (2009), op. cit., p. 76
[324] Cooper, Rae, & Ellem, Bradon, (2006), op. cit., p. 138
[325] Owned by Conzinc RioTinto Australia, the local precursor of RioTinto
[326] The jurisdiction of the IRCA was transferred to the Federal Court of Australia in 1997, Industrial Court of Australia, Annual Report 1996-97, http://www.fedcourt.gov.au/about/courts-and-tribunals/irca/ircarep.pdf
[327] RioTinto Energy, Submission to the Industry Commission: The Australian Black Coal Industry, Killing the Goose, The Urgent Need for Reform in Australia's Black Coal Industry, 24 October 1997, Preface

Coal was different, '…because coal mining has developed separately to the general mining sector', and argued average labour productivity in NSW coal needed to increase by around 70-80% to match the performance of domestic hard rock mines (i.e., the Pilbara), and US and Asian coal mines, respectively.[328]

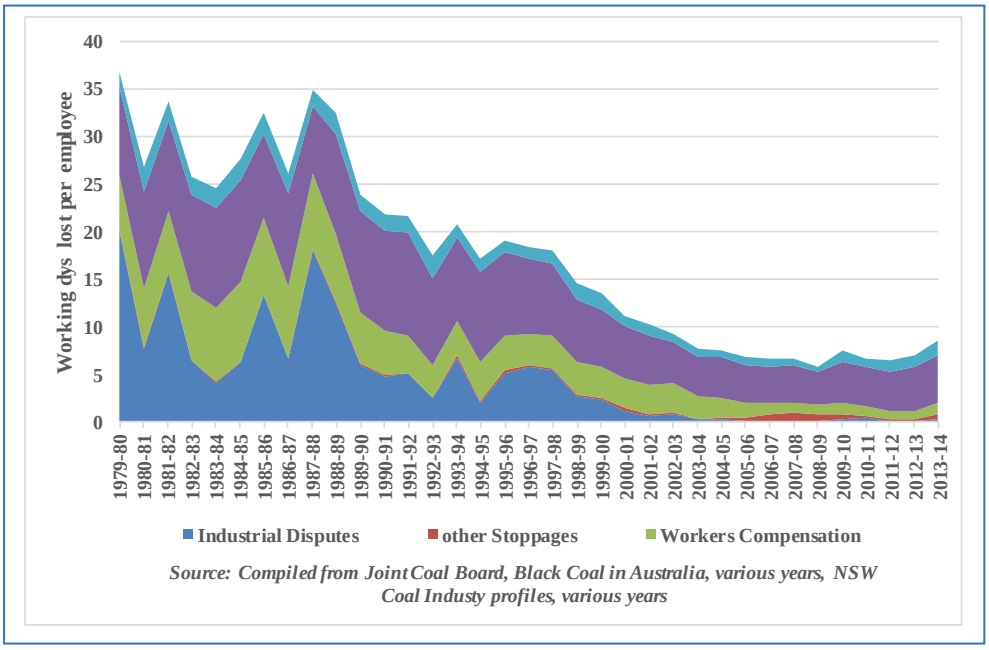
Hence, the benchmark productivity for Australian mines, which had coal quality and shipping advantages, was Asian (read Indonesian) and US mines, the former without the long-term resource endowments, and the latter a 'swing producer' and historically, not a significant competitor in the high-quality export industry. RioTinto was responding to the prevailing conditions with spot pricing and tenders eroding their contract system, and new competitors and electricity industry deregulation, putting pressure on profit margins. RioTinto called for coal reform, with leadership by the Federal Government, in view of the poor performance of the NSW industry,[329] and I might surmise, the NSW Government.

The company reduced its equipment fleet, sacked half the workforce in 1998 and rescheduled its operation to increase labour and equipment productivity.[330] The *Workplace Relations Act*, removed 'custom and practice', and seniority provisions, allowing employers to choose employees retained in a downturn. Another feature of this dispute was the litigation in the courts outside of the IRCA. In seeking reform, the company successfully appealed the IRCA decision in the High Court. The industrial relations setting was now broadened from the dedicated Warden Courts and Coal Tribunals of the early epoch, and was now firmly in the Federal sphere, with court decisions only temporary roadblocks to achieving labour reform. RioTinto's proposed increase in NSW productivity was nearly achieved in 2004, with

[328] ibid.
[329] RioTinto Energy, (1997), op. cit., Executive Summary, p. 3
[330] Davies, Allan, Union Privilege v. Workers' Rights; Coal Reform: The Hunter Valley No. 1 Story, HR Nicholls Society Inc.

a 68% overall increase in output per employee since 1997, but after a massive loss of employment through the 1980s. (Figure 29, p. 65) The 'old ammunition' afforded by the poor industrial relations narrative has been laid to rest, with negligible time lost through industrial disputes and improvements for all other absences over the period. (Figure 32)

Figure 32, Industrial Relations strikes and lost time, 1979-80 to 2013-14

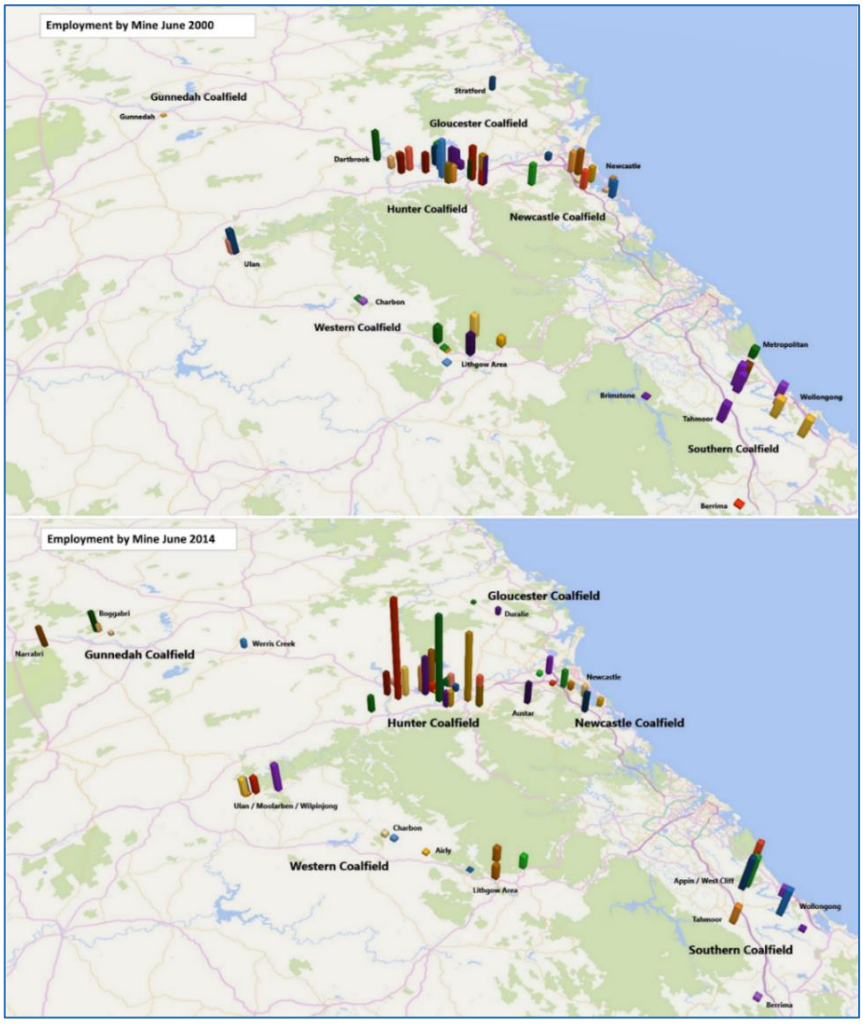


The productivity narrative had won, but the industrial relations history, not the reality, remained a stick with which to beat the unions. Union membership is in overall decline nationally due to structural changes work, falling from a historical peak of 62% in 1954[331] to 49.5% in 1982, 23% in 2003,[332] 19% in 2007[333] and 16% in 2015.[334] However, the NSW coal industry remains a highly unionised one[335] with the CFMEU a dominant force.[336] The NSW coal miners still resilient after 150 years of industrial strife.

[331] Fraser, Bryce, (1998), op. cit., p. 263
[332] Cooper, Rae, & Ellem, Bradon, (2006), op. cit., p. 127
[333] Cooper, Rae, & Ellem, Bradon, (2011), op. cit., p. 51
[334] ABS, http://www.smh.com.au/national/trade-union-membership-hits-record-low-20151027-gkjlpu.html
[335] Most coal workers are in the CFMEU, with other coal industry employee's members of the, Australian Manufacturing Workers Union (AMWU), the Communications, Electrical and Plumbing Union (CEPU), and the NSW Colliery Officials Association (Deputies) and the Association of Professional Engineers, Scientists and Managers Australia (APESMA)
[336] CFMEU Mining and Energy Division has 19,000 of its 22,000 members employed in the Australian coal industry - http://cfmeu.com.au/your-union

Under the new economic model of global connectedness, accompanied by significant privatisation of public assets and public sector reform,[337] coal sector employment in NSW remained precarious, falling from 20,911 in 1982 to a post-war nadir of 9,769 in 2003[338] before riding the commodities boom to a historic high in 2012, and subsequent recent decline. The latter period since 2000 showing a significant shift in location of employment. (Figure 33) Note the spread of employment to the north and west and less density around the old coal centres and higher concentration in the Hunter coalfield.

Figure 33, Employment by mine by area, 2000 and 2014[339]



[337] Walter, (2003), Op. cit., p. 173
[338] JCB Black Coal Statistics 1983, Coal Industry profile 2004
[339] NSW Government, Department of Mineral Resources, New South Wales Coal Industry Profile 2001, (NSW Government, St. Leonards, 2001); NSW Government, Department of Trade & Investment, Division of Resources and Energy, New South Wales Coal Industry Profile 2014, Volume 1, (2015), op. cit., pp. 119-120

A key tenet of Foucault's Governmentality was the rise of interest organisations influencing policy through alignment of interests. The management strategies against unionisation and collective bargaining were unified in ideology and organisational theory,[340] and aligned with the interests of Governments seeking increased economic growth. Hence, both industry and Government could influence resource policy, but particularly industrial relations policy.

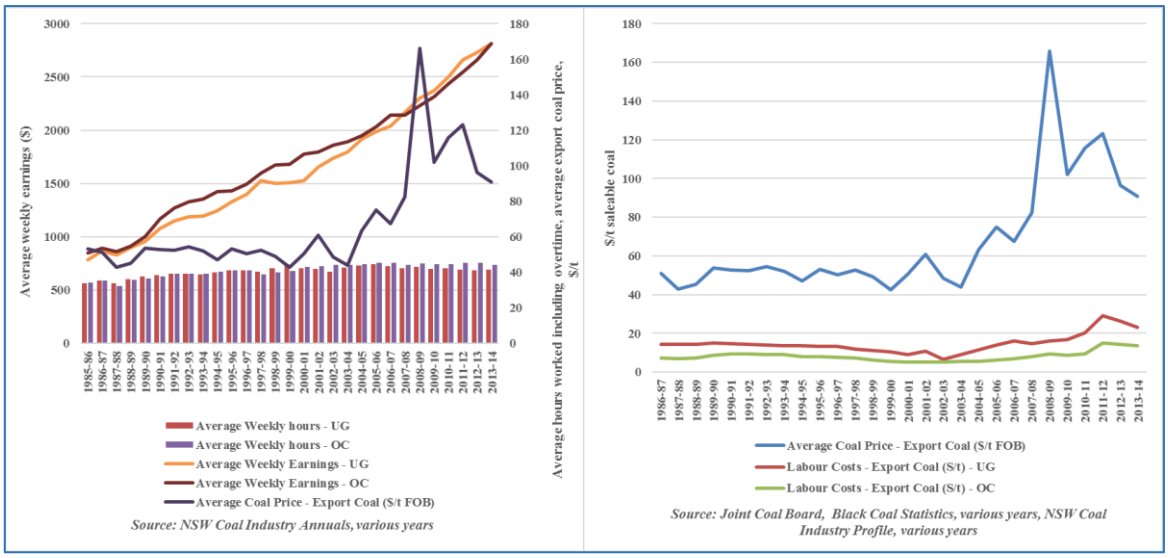
In 1994, The Australian Coal Industry Council (ACIC) industry study placed great emphasis on developing enterprise bargaining agreements.[341] Similarly, both the Productivity Commission[342] and the National Institute of Labour Studies (NILS) reports on labour productivity in 1999, had an emphasis on changes to industrial relations and work practices to improve competitiveness.[343]

Work Choices' in 2005 completed labour reform commenced in 1995, a policy maintained in principle by the succeeding Labor Governments, but relocating the policy within the 'Labor tradition'.[344] However, Labor's *Fair Work Act 2008*, did not restore arbitration, nor use union pay-rate claims for setting awards.[345] Peetz points to the higher turnover in labour despite the high incomes,[346] and the '…'reasonable additional hours' loophole created by WorkChoices, and expanded by the Fair Work Act',[347] due to increased working hours and fatigue. Wages have grown over the period since 1980 showing little sensitivity

[340] Hearn McKinnon, B., (2009), op. cit., p. 93
[341] Taylor, Rae, Study of the Queensland and New South Wales black coal industry: a report to the Australian Coal Industry Council, (Australian Coal Industry Council, Canberra, 1994)
[342] Commonwealth of Australia, The Australian Black Coal industry, Inquiry Report, Volumes 1 & 2, Report no. 1, 3 July 1998, (Productivity Commission, Canberra, 1998)
[343] Barry, Michael, & Waring, Peter, 'Shafted': Labour Productivity and Australian Coal Miners, Journal of Australian political economy, Vol. 44, Dec 1999, p. 89
[344] Ellem, Bradon, (2010), op. cit., pp. 356-357
[345] Cooper, Rae, & Ellem, Bradon, (2011), op. cit., p. 64
[346] Peetz, David, & Murray, Georgina, Involuntary Long Hours in Mining, (2010), p. 2-3, http://www98.griffith.edu.au/dspace/bitstream/handle/10072/34048/59710_1.pdf?sequence=1
[347] Peetz, David, & Murray, Georgina, (2010), op. cit., p. 10

to the coal price, with working hours rising across the period, and the cost of labour a relatively small cost component in a capital-intensive industry. (Figure 34)

Figure 34, Average wages, working hours, 1985-2014



Barry and Michelotti study on collective agreements in 2006-2007, found, 'the heavy-handed prescriptions contained in this regulatory framework prevented free collective bargaining from occurring, … exactly the type of protection employers sought to prevent union 'rent seeking behaviour'…' [348]

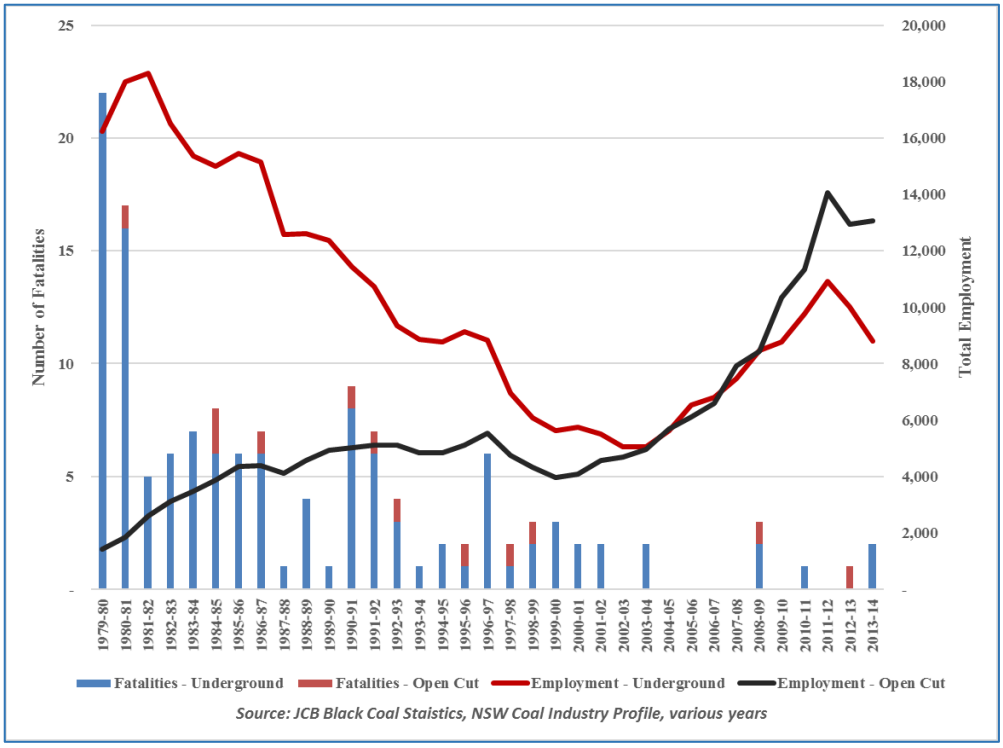
Collective bargaining became a tool of employers to extend labour flexibility and lessen union control. Also, occupational health and safety (OHS) legislation became highly influential in the industrial relations setting, through its ascendancy to become the pinnacle controlling legislation - with all mining safety laws currently harmonised with OHS legislation.[349] Mine safety regulation has had a painful history. While mine safety has improved throughout, (Figure 35), the disasters in the post-war period, Appin (1979), Gretley (1996),

[348] Barry, Michael & Michelotti, Marco, Market Power Constrained: Union and Non-Union Collective Bargaining Outcomes, The Australia Resources Sector, Labour & Industry: a journal of the social and economic relations of work, 20:1, (2009), p. 42

[349] The Work Health and Safety (Mines) Act 2013 No 54, integrated NSW mining industry safety laws into the harmonised work health and safety laws, established by the Work Health and Safety (Mines and Petroleum Sites) Act 2013, and Health and Safety (Mines and Petroleum Sites) Regulation 2014

and the three Moura-Kianga coal dust explosions in Queensland (1975,1986,1994) are a reminder of the dangers of working in inherently hostile or explosive atmospheres.

Figure 35, NSW coal industry fatalities and employment 1979-80 to 2013-14



The Gretley mine flooding in 1996 implicated the NSW Department of Mineral Resources, (which was not on trial) as keepers of the historical survey plans, whose usage was a primary cause of the disaster.[350] The company and staff were fined, but the Government escaped legal penalty, despite provision for its prosecution within the OHS legislation. The company had used incorrect state informational sources, the incorrectly labelled historical mine plans, '…the broad nature of the error,'[351] but had failed to minimise 'unknown' risks and the maintenance of a safe workplace - the primary requirements of the legislation.[352]

[350] Hopkins, A. Deterrence and risk-based OHS law, Journal of Occupational Health and Safety, Australia and New Zealand, Vol. 23, No. 5, Dec 2007: p. 435
[351] Court of Coal Mine Regulation, In the Matter of an investigation in pursuance of the Coal Mines Regulation Act 1982 into an accident which occurred at Gretley Colliery on 14 November 1996 and its causes and circumstances, Report of a Formal Investigation under Section 98 of the Coal Mines Regulation Act 1982, June 1998, Volume 1, p. 92
[352] Hopkins, A. (2007), op. cit., p. 436

The mining accidents previously mentioned,[353] had triggered a move in 2003[354] from prescriptive legislative compliance, to risk-based OHS legislation embodying 'duty of care' and workforce representation and involvement.[355] Now the unions and mine operators were locked in a two-step, with the state, due to its 'demonstrated serious shortcomings' in performance[356] in its mine record systems and knowledge base of the locations of past mining, no longer to be relied upon. The industry operators and employees were thus charged with verification and management of risks. The state after 2005 engaged in punitive action following fatalities with companies and officials prosecuted. The conflict between industry and state over these higher penalties[357] for '…fatalities involving recklessness and intent', was exacerbated by the union support of harsher penalties as a deterrent.[358] Gunningham points to the failure of the Mines Inspectorate to prosecute any of the 33 deaths in the seven years preceding Gretley, and the subsequent successful prosecutions due to the setting up - with political pressure from the CFMEU - of an independent Investigations Unit in 1998.[359]

The Mines Inspectorate, a group drawn from experienced industry mine managers, with wide ranging powers and high levels of access to mining operations, is an example of the autonomy and entrenched power of professional knowledge groups within Government, a key tenant of Governmentality. The unions, fighting strategies of deunionisation by mine owners,[360] were now embedded in the management of workplace safety issues, with mine operators unhappy with state punitive measures and the management of risk complexity,

[353] Kirsch, Philipp, Hine, Amelia, Maybury, Terry, A model for the implementation of industry-wide knowledge sharing to improve risk management practice, Safety Science, 80, (2015), p. 67
[354] New South Wales Coal Mine Health and Safety Act 2002
[355] ibid.
[356] Court of Coal Mine Regulation, (1998), op. cit., Volume 2, p. 711
[357] Occupational Health and Safety Amendment (Workplace Deaths) Act 2005
[358] Gunningham, Neil, Prosecution for OHS offences: Deterrent or Disincentive?, The Sydney Law Review, Vol. 29, No. 3, (Sept 2007), p. 360
[359] Gunningham, (2007), op. cit., p. 362
[360] Cooper, Rae and, Patmore, Greg, Private Detectives, Blacklists and Company Unions: Anti-Union Employer Strategy & Australian Labour History, Labour History, No. 97 (Nov., 2009), pp. 8-9

with the state now practically freed of the legal responsibilities of enforcing a strict compliance regime.

The driver of growth in NSW coal, Asian coal demand, has allowed coal workers to become 'enterprise workers', maintaining high and rising wages even against declining prices, despite job attrition, but with increasing economic and geographic isolated from the mainstream Australian urban working population. That one resource periphery has led the push to worker individualism in another on the other side of the country, intimates that the power and continuity of labour traditions is both spatially specific and ephemeral, subject to change and local adaptation. It also illustrates the compression of time and space in the operation of trans-national corporations under globalisation. The focus on labour outputs, not inputs, with worker accountability and explicit standards and measures of performance,[361] have replaced industrial relations conflict with managerialism, but retaining the old suspicions and mistrust of workers as '…a source of difficulty and disruption',[362] fixed in the collective psyches of both state and mine owners.

Other hallmarks of governmentality such as state policy, infrastructure and knowledge monopolies, have played a significant role in the control of corporate conduct, as RioTinto attested in its 1997 complaint to the Productivity Commission.[363] These are discussed in the next section.

3.4 State Mining Policy: Ad-hocery and Adaptation

The state had controlled the coal supply and coal price in the 1950s through regulation of new coal mines developments through the JCB, to balance supply and demand. Asian demand and Queensland expansion of production changed all of that, with unfettered increases

[361] Rose, (1999), op. cit., p. 150
[362] Hearn, Mark & Michelson, Grant, (eds.), (2006), op. cit., p. 213
[363] RioTinto Energy, (1997), op. cit., p. 28

in production only constrained by infrastructure capacity. The speculative energy attending the expansion and growth forecasts fed into competition for exploration rights and acquisition of coal assets. The windfall profits from sale of coal exploration rights such as the Caroona ($100m) and Watermark ($300m) exploration licenses', slanted Government policy towards unfettered industry development in support of the 'jobs and growth' mantra at the heart of the government–population–security triad, in modern governmentality.[364] This mindset of coal as a cash cow creating regional employment and subsidiary job creation, has suppressed other policies designed for environmental protection, stifled competing land use claims and muffled the development of a cohesive energy policy which addresses climate change and larger global issues of sustainability.

For the duration of this long commodities boom until the GFC,[365] there was a strong increase in state revenues from taxes and royalties, and broader economic benefits in employment, investment and infrastructure. The policy of 'provision for projected demand'[366] dominated Australian energy policy with the limited choice in end objectives often controlled by past practice and problems. Here, the dominant policy since the war is that higher availability of coal equals higher energy availability leading to better social and economic outcomes.[367] The alternative of promoting other energy sources, (despite the increase in gas and renewable usage) have had little purchase to date. The growth in exports has promoted a greater coal supply but as I will show, has not guaranteed greater availability of cheap coal to domestic markets.

[364] Higgins, Winton, How we are governed now: globalisation, neo-liberal governmentality and the nullification of substantive policy, Journal of Australian Political Economy, No 57, (2006), p. 14
[365] Global Financial Crisis usually regarded as creating strong economic effects from 2007
[366] Tapp, B., A., Watkins, J., R., Energy and Mineral Resource Systems: An Introduction, (Cambridge University Press, Cambridge, 1990), p. 55
[367] Tapp, B., A., Watkins, J., R., (1990), op. cit., p. 56

Coal Ownership, Royalties and Allocation

In the period from 1980, the state consolidated its ownership of coal resources to allow control over access and exploitation and to allow fees from exploration rights, taxation and royalties to flow to state revenues. The legislative setting in NSW coal mining had important historical antecedents which cause dissonance. In 1830, NSW reserved coal from land grants, with all mineral rights withdrawn from grants of Crown land.[368] The gold rushes from 1851, saw the progressive reversal of common law ownership of minerals in all colonies but without extinguishing existing private rights.[369] The management and control of land and natural resources was vested in the NSW state legislature with the enactment of the NSW Constitution in 1855, including all royalties, mines and minerals.[370] With Federation in 1901, most mineral rights were thus reserved to the Commonwealth although it was not until 1923 that the primacy of Commonwealth over state legislation was tested.[371] The Commonwealth retains ownership of most minerals and the States and Territories determined the legal regimes governing allocation, mineral exploration and production,[372] including collection of rents and royalties.

Premier Wran was to take a close interest in the coal industry, establishing the Coal Compensation Board (CCB), to gather state control over coal resources to enhance revenue streams to the state. The windfall profits from grant of leases and front-end payments for private coal owners in the Hunter Valley, frustrated the Wran Government which moved in

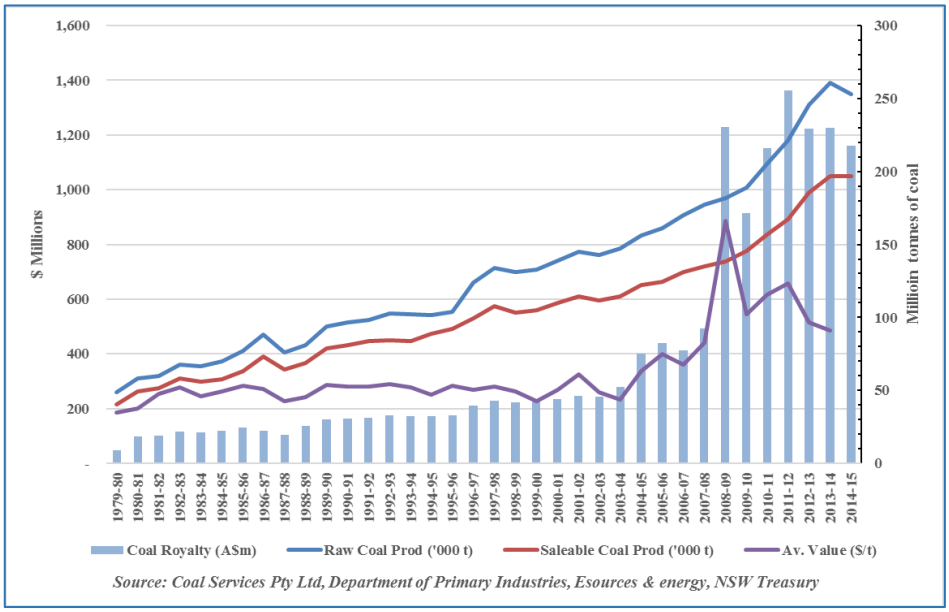
[368] Fitzgerald, Anne, Mining Agreements: Negotiated Frameworks in the Australian Mining Sector, (Prospect Media, Chatswood, 2010) p. 94
[369] Fitzgerald, Anne, (2010) op. cit., p. 95
[370] (New South Wales) Constitution Statute 1855 (18 & 19 Vict, C 54, Imp)
[371] Commonwealth v New South Wales [1923] HCA 34 (1923) 33 CLR 1(9 August 1923)
[372] (New South Wales) Mining Act 1992, repealed the previous legislation, the, Mining Act 1973 and the Coal Mining Act 1973, and

1981 to expropriate privately owned coal.[373] The coal owners demanded compensation, implemented from 1985 through the CCB, with rights of appeal.[374] A base rate of $0.50/t (increased to $0.90/t in 1990)[375] was deemed comparable to the prevailing royalty rate of $1.70/t on mined coal. The process of compensation was mostly completed in 2007, and has costed more than one billion dollars[376] to acquire coal resources estimated by the CCB at an in-ground value of $10 billion,[377] much of it in areas, or at depths, which will never be mined. However, it served an important function of allowing continuity for future expansion in areas such as the Hunter Valley, where mining companies often buy the land, now unimpeded by rights to coal held by oppositional landowners. Perhaps this a prompt for the 1990 legislation allowing for restoration of private ownership of coal by repaying the compensation received, or 'in circumstance determined by the Minister', but again without any right of appeal.[378]

State Royalty returns only achieved significant improvement when the unit rate was replaced by the 'ad valorem' royalty in 2003-04, based on coal value rather than tonnage.[379](Figure 36) The slow growth in royalties after 1980 suddenly becoming a windfall as export prices improved, peaking in 2011-12, with declining value of coal Certainly, only recently has the Baird Government adopted more realistic forecasts of coal royalty income, with the strong growth in output unlikely to eventuate.

[373] (New South Wales) Coal Compensation Act 1981
[374] (New South Wales) Coal Acquisition (Compensation) Arrangements 1985
[375] New South Wales Coal Compensation Board Annual Report 2005 - Legislative changes increased the base rate for calculation of compensation from $0.50/tonne to $0.90/tonne to reflect a rate which approximated the after-tax position of recipients of private royalty. Restitution of coal rights outside colliery holdings was offered as an alternative.
[376] Compiled from various New South Wales Coal Compensation Board Annual Reports statements of compensation paid. This is incomplete.
[377] New South Wales Coal Compensation Board Annual report 2005, p. 11 – Total aggregate compensation was $682m in 2005. This excludes the cost of running the CCB and subsequent payments which are unpublished but I estimate to amount to over $300m from published annual reports.
[378] (New South Wales) Coal Ownership (Restitution) Act 1990 http://pandora.nla.gov.au/pan/57615/20060404-0000/Annual_Report_2005.pdf
[379] Royalty set at 7% on open cut production, 5-6% on underground mines depending on depth of operation.

Figure 36, State coal royalty income 1979-80 to 2014-15



Coal Mining in NSW operates under a lease system without sale or transference of mineral rights. Here, resource rents in the form of fees for state exploration and exploitation rights and royalties on production, could be collected without relinquishing ownership of resource endowments. In this, Australia is at odds with the USA and Canada, both resource-rich nations which allow private ownership of minerals. It was argued that the system of 'work program bidding' for exploration and development rights is 'rent-seeking behaviour', responding to market forces, but leading to over-investment in exploration.[380]

The CRDC Report in 1994,[381] 'envisaged' a significant future supply gap and the need for 'protection of strategically significant coal resources' and multiple or sequential land use strategies for conservation areas. NSW coal demand then was conservatively forecast at 114 Mt in 2010 before declining to 109 Mt in 2020.[382] Production exceeded these forecasts in 2004, but this document set the policy direction of assessing the resources in areas subject to land use planning pressures with an aim to provide a level of protection to

[380] Cook, L. H., & Porter, M., G., (eds.), The Minerals Sector and the Australian Economy, (Allen & Unwin, Sydney, 1984), p. 179
[381] Coal Resources Development Committee, Effects of land use on Coal Resources, Report for NSW Minister for Mines, Department of Mineral Resources, Sydney, 1994), p. 63-64
[382] Coal Resources Development Committee, (1994), op. cit., p. 34

those resources deemed vital to the industry. This can be seen alternatively as favouring coal mining over other land uses, or simply allowing an old industry already heavily invested, to continue its expansion in line with market forces. The CRDC Report was referenced and supported by the CFMEU in 2006[383] in its policy and advocacy on resource sterilisation, to protect the future of the coal industry.

Around 50% of coal resources are under lands protected as National Parks,[384] Commonwealth lands,[385] and under dams and stored water bodies, although limited underground mining is still allowed. [386] There has been considerable exploration since 1994, with the greatest future potential for large scale open cut mining. under prime agricultural land in the Gunnedah and Hunter coalfields which are contested, and currently the loci of land use conflict. (Figure 37)

Figure 37, Estimate of resources under protected lands

(Million tonnes)	Total Resource	Resource Affected	National Parks	Prime Agricultural Land	Commowealth Land	Natural Features	Urban Development	Water Storage	Infrastructure
Newcastle	10,700	4,205	290	-	-	1,975	1,750	-	190
Hunter	61,100	25,940	18,700	3,500	3,200	25	245	85	185
Gunnedah	38,000	18,000	2,000	16,000	-	-	-	-	-
Southern	17,045	4,085	1,455	-	375	165	-	1,330	760
Western	29,963	22,640	22,640	-	-	-	-	-	-
TOTAL NSW	156,808	74,870	45,085	19,500	3,575	2,165	1,995	1,415	1,135

The initial grant of the Caroona Exploration License on the Liverpool Plains to BHP Billiton in 2006[387] for $100 million,[388] an unprecedented windfall profit for the Government

[383] White, G, Sterilisation of Coal Resources in the Southern NSW Coalfields: The CFMEU Perspective, in Aziz, N (ed.), Coal 2006: Coal Operators' Conference, University of Wollongong & the Australasian Institute of Mining and Metallurgy, 2006, p. 348
[384] Under the National Parks and Wildlife Act 1974
[385] Areas such as the military areas near Singleton and Holsworthy contain significant amenable coal resources, with the Commonwealth owning the land to the depth of 30 metres. Both areas contain unexploded ordnance which would need to be made safe prior to any change in land use status.
[386] The Act includes National Parks, Nature Reserves, Historic Sites, Aboriginal Areas, Wilderness Areas or Recreation Areas. Some mining has been permitted under the latter, where mining preceded the establishment of the area, i.e., Nattai National Park.
[387] http://www.bhpbilliton.com/investors/news/bhp-billiton-signs-caroona-exploration-licence
[388] ibid.

of the time, encouraged a policy of similar releases of land for exploration purposes hoping for similar windfalls, without reference to the public. The area to the south of Caroona was the next new coal area up for tender, for which Shenhua[389] paid $299.9 million in 2008,[390] three times the fee paid by BHP Billiton for Caroona two years earlier. In August 2016, the Government announced a $220 million Caroona buyback - the initial fee plus interest due to inflation.[391] Showing the skill of adaptive policies, the Government now cited pressures on agricultural land and unsustainability,[392] all clearly apparent to opponents when the project was first proposed.

The hierarchy of decision making on the Watermark proposal is informative. The project[393] proposed by China's Shenhua, represents the most recent manifestation of mining governance and regulation, having received environmental approval by the Federal Government in July 2015.[394] This mine, a captive non-market operation for Shenhua's Chinese power stations, plans to ship to China up to 10Mtpa of soft coking and high ash thermal coals[395] over 30 years, with net social benefits returned Australia estimated between $1,315-$1,396m.[396]

Such cost-benefit analyses rely upon the coal pricing and the project costing assumptions of the proponent, assuming environmental offsets proposed by mining companies are perfect substitutes for the assets damaged.[397] Ownership changes everything in value terms,

[389] China's State owned Shenhua Group is the world's largest coal miner
[390] China Shenhua Energy Company Limited Announcement in relation to Australia Watermark Exploration Area Exploration Licencehttp://www.jsda.or.jp/shiraberu/foreign/info3/kobetsu/1537(20081127).pdf
[391] http://www.abc.net.au/news/2016-08-11/nsw-government-buyback-caroona-mine-exploration-licence/7721936
[392] ibid., The Deputy Premier and Nationals leader Troy Grant said, "The answer is pretty simple: the stress, pressures and justifications for this project to continue on some of our richest agricultural land in the Liverpool Plains just wasn't sustainable."
[393] Exploration Licence EL7223 - The Department of Mines drilled this area in 1975 and conducted various exploration programs until 2006, when the area was put up for tender in 2006.
[394] Under the Environment Protection and Biodiversity Conservation (EPBC) Act 1999,
[395] Gillespie Economics, Watermark Coal Project Economic Impact Statement, prepared for Shenhua Watermark Coal Pty Ltd C/- Hansen Bailey Pty Limited, October 2012 - Current mineable resources include all coal to 40% ash
[396] Gillespie Economics, (2012), op. cit.
[397] ibid.

with Shenhua, as is the normal practice for coal mines, acquired the land to be mined or disturbed and forever changing its land-use status. The mine plan occupies some agricultural land but excludes the 900Mt of coal beneath the premium black soils area, but includes 867ha of Strategic Agricultural Land and woodlands, [398][399] with a planned 'green' offset of 1000ha of rehabilitated land suitable for agriculture. While such economic assessments by classical economists follow these well-worn paths, the primary coal resource valuation, assessed by both Government and the Company is accepted prima facie. Much has changed in the coal market between the EIS in 2012 and Federal approval in 2015. Despite Federal and NSW planning approval, Shenhua are yet to commit to the project by applying for a Mining Lease, a sign the project is stalled.[400] Such resource rent windfalls are now increasingly liabilities on the public purse.

Policy ad-hocery was present in the decision of the Government to develop the $1.5 billion Cobbora mine[401,402] near Dunedoo in 2010[403] to ensure a captive supply of coal for power generation.[404] A decision taken after failing to secure contracts with local producers at favourable rates for power generators and Origin Energy,[405] a belated return to a nationalist economic policy after privatisation of its coal mines in 1992. The project did not proceed and was abandoned in 2015 with the planned sale of the agricultural land.[406] The lesson

[398] BSAL – Biophysical Strategic Agricultural Land under the Strategic Regional Land Use Plan – New England North West (SRLUP) (DP & 1, September 2012)
[399] The Shenhua mine will destroy 771 hectares of endangered box and gum woodlands, home to declining species, such as the colourful swift parrot, regent honeyeater and koala.
[400] https://www.theguardian.com/environment/2016/feb/18/shenhua-applies-for-exploration-licence-extension-for-1bn-watermark-mine
[401] Cobbora Holding Company Pty Limited
[402] http://cobbora.com.au/Project/Overview.aspx
[403] On the western outcrop of the Sydney Basin near Dunedoo
[404] Campbell, Rod, Cobbora coal project: Submission to planning and assessment commission, The Australia Institute, March 2014, p. 2, The agreements with Origin Energy, Macquarie Generation and Delta Electricity to supply coal to four large coal-fired power stations in NSW were terminated in 2013. http://www.tai.org.au/sites/defualt/files/TAI%202014%20Cobbora%20PAC%20submission%20FINAL.pdf
[405] The Companies included Delta Energy, Eraring Energy, Macquarie Generation - all State-owned enterprises, plus Orion Energy, a private company.
[406] http://www.cobbora.com.au/Resources/Documents/Publications/2016-05-16---Cobbora-Fact-Sheet---Next-Stage-in-Land-Salev2.pdf

is that the state no longer has influence over market prices in a global trade and it forced to enter commercial contracts or use leverage through conditions of grant of development rights. Another interpretation, is that the state does not wish to return to coal production for aging power generation assets.

In May 2011, the NSW government imposed a 60-day moratorium on all new coal and coal seam gas projects, aimed to resolve the disputes between farmers and miners, until it could be proven that these operations would not damage land or water resources.[407] The Planning Assessment Committee (PAC) now adjudicates competing land use issues, with applications for exploration licences subject to similar public scrutiny as mining development applications. Previously, the industry could simply occupy ground, ostensibly for exploration, but often simply safeguarding resources for the future, without any obligation to develop. In September 2015, the State Environmental Planning Policy (SEPP) was amended[408] to remove the 'significance of the resource' provisions, after 98% of 2400 submissions supported its removal.[409] These amendments, were amid a raft of legislation[410] ensuring the competitive allocation of coal titles.[411] The state retains exploration rights to assess geology and resources to support assessment of coal areas for release, and to model regional geology, as it has done since 1874.[412]

[407] Australian Mining Journal, May 23, 2011, Jessica Burke, Ban on All New NSW Mining Operations, https://www.australianmining.com.au/news/ban-on-all-new-nsw-coal-mining-operations/
[408] State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) Amendment (Significance of Resource) 2015
[409] Mining SEPP Review Report September 2015, https://majorprojects.affinitylive.com/public/1fa7f083415e6d0568a99509ff5fbeac/Mining%20SEPP%20Review%20Report%202015.pdf
[410] Mining and Petroleum Legislation Amendment (Grant of Coal and Petroleum Prospecting Titles) Bill 2015; Mining and Petroleum Legislation Amendment (Land Access Arbitration) Bill 2015; Mining and Petroleum Legislation Amendment (Harmonisation) Bill 2015; Work Health and Safety (Mines and Petroleum) Legislation Amendment (Harmonisation) Bill 2015; Protection of The Environment Operations Amendment (Enforcement of Gas and Other Petroleum Legislation) Bill 2015.
[411] Mining and Petroleum Legislation Amendment (Grant of Coal and Petroleum Prospecting Titles) Bill 2015 https://www.parliament.nsw.gov.au/bills/DBAssets/bills/SecondReadSpeechLC/643/2R%20Mining%20and%20cognates.pdf, p. 2-3
[412] Adrian, Jeanette, History of the Geological Survey of New South Wales 1875-1974, (Geological Survey of New South Wales, Department of Mines, GS74/506, (Sydney, February 1974)

This decision was partly informed by ICAC recommendations on reducing opportunities and incentives for corruption in the management of NSW coal resources. The charges laid against Minister Obeid[413] over the Mount Penny and Glendon Brook exploration licences,[414] is a testament to the malfeasance which accompanied resource allocation at the height of the coal market from 2007-2012. Another case was Nucoal's Doyle's Creek tenement,[415] '…so tainted by corruption'.[416] Acting on ICAC recommendations, Premier O'Farrell cancelled the exploration licences for Doyles Creek, Mt Penny and Glendon Brook, in 2014, without compensation.

These high-profile examples of actionable conduct, are perhaps less significant to the integrity of governance than the inherent biases of resource allocation decisions taken by the Government. The granting of the Wilpinjong coal area to Excel Mining in 2004,[417] contested and appealed by Xstrata,[418] favoured an emerging Australian company over a European one. The Excel directors had a long association with NSW coal, owning 47% of the capital[419] on divestment of Wilpinjong to Peabody in 2006. Timing is everything, as in 2007, the SEPP governing assessment and development of mining proposals was introduced,[420] which may have reached a decision on awarding the tender based on other grounds. Current operators, Peabody, a US Company with a history of coal investment in Australia since 1962 is now

[413] The conspiracy charges relate to a coal tenement the Independent Commission Against Corruption heard was created over the Obeid family's rural property Cherrydale Park while Obeid was in office. The charges against father and son follow the 2012 ICAC inquiry, which revealed the Obeid family received a $30 million windfall from the coal deal. http://www.smh.com.au/nsw/eddie-obeid-and-son-moses-charged-over-30-million-coal-deal-20160706-gpzycv.html

[414]

[415] State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, http://www.legislation.nsw.gov.au/#/view/EPI/2007/65/part3/cl15

[416] The ICAC investigation found that the exploration licence was corruptly awarded to Doyles Creek Mining in 2008 by former NSW mineral resources minister Ian MacDonald. https://www.australianmining.com.au/news/corruption-findings-over-nucoal-licence-upheld/

[417] Exploration Licence EL 6169

[418] Now Glencore after buyout

[419] Excel Coal Limited Presentation to the Sydney Mining Club - http://www.sydneyminingclub.org/presentations/2006/april/Excel-Coal.pdf - Capitalised at $1.6 billion in April 2006

[420] State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, http://www.legislation.nsw.gov.au/#/view/EPI/2007/65/part3/cl15

facing bankruptcy, and may sell at a fraction of the $1.9 billion it paid in 2006.[421] Resource allocation decisions have followed the recommendations made by small Departmental committees unaccountable, except within Government,[422] and leaving no cogent public record of decision making.[423] The power and importance of the professions within Government come into play here, as Foucault postulated.[424] Critical to NSW policy formation and action is the power of a bureaucracy harnessing the inherent political power of enumeration and quantification as a diagnostic instrument[425] defining the economy including here coal resources and ownership of production. With the ICAC recommendations,[426] the Coal Exploration Steering Group (CESG) recommends on where, when, and how coal resources are to be released for exploration to suitably qualified companies who tender for the exploration rights. Some 18,000 km^2 of coal titles within the Sydney and Gunnedah Basins are held by the state [427] which may be made available for future exploitation.

Appeals and Ministerial powers

The period has marked significant shifts in governance since the rise of the first environmental legislation in 1979,[428] and the widening of the range of courts with jurisdiction to hear mining related matters. As recently as 2009, disputes over mining title were dealt with

[421] Xstrata has reverted to the name of its parent company, Glencore. Peabody, a USA company, active in Australian coal since 1962, acquired Excel Coal in 2006 for $1.9 billion has filed for bankruptcy protection and is looking to sell its Australian assets. http://www.theaustralian.com.au/business/dataroom/peabody-energy-looms-as-target-for-glencore/news-story/e514d539ddc12351cfab87ab5e27c0b4
[422] Department of Mines and its successor organisations, Department of Mineral Resources, currently Resources & Energy
[423] The author was a witness to this process while working in policy at the New South Wales Department of Mineral Resources, 2001-2006
[424] Foucault, Michel, (1991), op. cit., p. 101-102
[425] Rose, (1999), op. cit., p. 197
[426] Independent Commission Against Corruption, Reducing the Opportunities and Incentives for Corruption in the State's Management of Coal Resources, ICAC Report, October 2013, p. 8, http://www.icac.nsw.gov.au/docman/investigations/reports/4209-reducing-the-opportunities-and-incentives-for-corruption-in-the-state-s-management-of-coal-resources-oct-2013/file
[427] NSW Department of Industry, Resources & Energy, State held licences, listed at http://commonground.nsw.gov.au/#!/title-map/Coal/Exploration%20Licence/Standard/5/-32.69486597787506/148.68896484375
[428] NSW Environmental Planning and Assessment Act 1979

by the Mining Warden, with appeals to the District and Supreme Courts.[429] Inquiries into Mining accidents and breaches of the coal mining legislation were the province of the Court of Coal Mines Regulation, in operation from 1984 to 2006.[430] Both of these courts were abolished after the advent of the *Coal Mine Health and Safety Act 2002*, and the Mining Warden's jurisdiction brought under the coverage of the Land and Environment Court (LEC) established in 1980.[431] In both cases the changes in legislation and court jurisdictions were a response to the Federal OHS legislation of 2000.[432]

The LEC is also the court for grievance by the population against Governmental or Ministerial decisions.[433] In the Ashton Coal decision in 2015 it dismissed an appeal by a landowner but put conditions which effectively disrupted the company from executing its mining plan.[434] However, the use of ministerial and legislative powers to circumvent court decisions has been a feature of recent coal history. Any threats to project proposals such as the Mount Thorley Warkworth expansion are met with industry shouts of 'loss of jobs', usually enough for court decisions to be subverted after lobbying by the industry for Government intervention. Rio Tinto had lost its LEC case and appeal to the Supreme Court in 2014, but submitted a new proposal. The state had amended the SEPP in September 2013, to place economic concerns above any other, resulting in the Government appeals intervention due to the 'uncertainty' generated by the LEC decision. With Minister Roberts stating that '…the significance of a resource is not determined by mining companies but by the Department…'.[435]

[429] NSW Land and Environment Court, http://www.lec.justice.nsw.gov.au/Pages/types_of_disputes/class_8/Mining-matters-the-process/MiningMattershelpfulmaterials/undetermined_mining_wardens_after_7_april_2009.aspx
[430] The court was established under the Coal Mines Regulation Act 1982 (NSW). It could exercise functions under the Act from 26 March 1984.
[431] Land and Environment Court Act 1979 (NSW)
[432] Occupational Health and Safety Act 2000
[433] Land and Environment Court, History, http://www.lec.justice.nsw.gov.au/Pages/about/history.aspx
[434] Ashton Coal Operations v Hunter Environmental Lobby, https://www.caselaw.nsw.gov.au/decision/564cf45be4b0eaaf45aefacc
[435] NSW Government Media Release Monday 7 April 2014 – Government Considers Warkworth Decision

The subsequent SEPP review under Minister Stokes, has restored equal weight to social and environmental interests but the PAC still approved the project in late 2015.[436] The Environmental Defenders Office has since advised local residents to drop their appeal as unwinnable.[437] In December 2013 the PAC recommended to refuse the Drayton South coal mine expansion on the grounds that two Upper Hunter horse studs would be threatened by the development.[438] Barring intervention, this decision is expected to lead to the Drayton mine's closure in 2016.[439] In contrast to the Warkworth extension opposed by a community group, the Drayton extension was opposed by a competing land use, through the powerful Hunter Thoroughbred Breeders Association.[440] Business can influence where communities cannot. The use of policy instruments and limits to merit appeals rights, have been powerful political tools to support coal development decisions, while maintaining public recourse to courts, despite Federal Government opposition to third-party appeals,[441] in view of the strong media interest in such cases.

Very Public Policy - The Power of media and interest organisations

The pervasiveness in our lives of mass media shall go unremarked here, but policy by media campaign was influential both for and against the coal industry. The Mining Council Australia, (MCA) formed in 1967[442] to provide a consultative mining body for the Federal Government,[443] was influential on various decisions, to reserve land from mining or exploration

[436] Planning Assessment Commission, Mt Thorley Continuation Project - determination - D362/15, http://www.pac.nsw.gov.au/projects/2015/05/mt-thorley-continuation-project--determination
[437] ABC, 20 May 2016, Bulga residents withdraw appeal against Warkworth mine expansion, http://www.abc.net.au/news/2016-05-20/bulga-residents-withdraw-appeal-against-warkworth-mine-expansion/7430804
[438] https://www.australianmining.com.au/news/ombudsman-to-investigate-coal-conflicts-of-interest-2/
[439] Anglo American, Press release 17th June 2016, http://australia.angloamerican.com/media/press-releases/pr-2016
[440] Hunter Thoroughbred Breeders Association, press release, http://www.htba.com.au/drayton-south
[441] ABC Radio, http://www.abc.net.au/am/content/2015/s4296598.htmFederal Attorney General George Br, 'there may be people who care deeply about the environment but they should prosecute their views through the political system, not through the courts'
[442] Australian Mining Industry Council became the Mining Council Australia
[443] Kellow, Aynsley, & Simms, Marian, (2013), op. cit., p. 43

activity, the diesel excise exemption, amendments to the Native Title Act in 1996 and as advocates for further liberalisation of trade.[444] The NSW Minerals Council's position in 1997 on NSW coal industry change '…Too Little, Too Slow and Too Costly' railed against a culture resistant to change, and the prescriptive legislation emphasising compliance over best practice.[445] In particular, it resented the quarantining of the coal mining industry from mainstream industrial relations decisions by the Coal Industry Tribunal.[446]

That the MCA was not consulted on the Resource Super Profits Tax (RSPT), aimed at the bulk commodity exporters, provoked a backlash through an advertising campaign co-ordinated by the MCA in 2010,[447] resulting in a negotiated[448] and diluted Mineral Resource and Rent Tax (MRRT). This followed on earlier media attacks by the Australian Coal Association (ACA) against the Carbon Pollution Reduction Scheme in 2009[449] and the Carbon Tax in 2011-12.[450] These attacks on Federal resources policy, deemed by the MCA as heralding a 'new paradigm' of 'public contest through the popular media,'[451] would have ramifications later, as oppositional forces coalesced against coal projects, discussed in chapter 4. Through these media driven events Government policy was influenced in favour of corporate interests, to which there was a significant alignment, despite electoral risks.

[444] Kellow, Aynsley, & Simms, Marian, (2013), op. cit., p. 52
[445] NSW Minerals Council, Change in the NSW Coal Industry, 'Too Little, Too slow, and Too Costly', a submission to the Industry Commission Inquiry into the Australian Black Coal Industry, NSW Minerals Council, October 1997, p. 3
[446] NSW Minerals Council, 1997, p. 15
[447] McKnight, David & Hobbs, Mitchell, Public Contest through the Popular Media: The Mining Industry's Advertising War against the Australian Labor Government, Australian Journal of Political Science, 48:3, 2013, pp. 307-308
[448] BHP Billiton, RioTinto and Xstrata (now Glencore)
[449] Australian Government, Carbon Pollution Reduction Scheme: Australia's Low Pollution Future, White Paper, Canberra, Commonwealth of Australia (2008)
[450] McKnight, David & Hobbs, Mitchell, (2013), op. cit., pp. 307-308
[451] ibid.

4.0 SOCIAL IMPACTS AND RESISTANCE

4.1 Introduction – Out of Sight, Out of Mind

The mining centres of NSW grew around finite coal mines, first as villages, then with urban infill creating the larger agglomerations of Newcastle, Wollongong, Lithgow, most closely associated with coal.[452] Here for workers, residency and place of work were often within sight. Coal mining was underground mining until the 1970s, but greenfield open cut mining spread from these centres, following the seam into greener pastures and valleys. The historic centres - Newcastle, Wollongong, Lithgow - have largely shed their mining heritage in favour of environmental restoration and other land uses, and for the current mining centres – Singleton, Muswellbrook, Lake Macquarie, Narrabri, Boggabri, and the Ulan area - historically more connected with agriculture, coal has become a source of income, regional development and conflict.

The commensurate rise in the visibility of the coal industry as the industry expanded north and west in the Hunter Valley and Gunnedah region has created regional conflicts, over land use, amenity, environmental sustainability, increasingly conflated with ideologically based divisions over energy policy and direction within Governments and in the broader community. The coal industry has invested heavily and it is difficult for Governments to argue against the weight of capital investment and the longevity of some of these existing operations. Even the powerful 'horse-and-vine' lobby preached coexistence with current operations - as Winemaker Margan attested in 2012 (p. 11) - while opposing further developments.

[452] For example, see Turner, (1982) for an account of the development and spread of coal mining in Newcastle

Perceptions of the mining industry have changed over time. In the 1970s it was foreign investment and ownership, uranium, nuclear power and in the 1980-90s climate change, environmental damage, land rights. Since 2000, the lack of accurate information on mining impacts, differing expectations of social and economic benefits, and disputes over land use and economic compensation, join climate change in the current wave of public discontent. The shifting relationships between capital, labour, Government and community – whether manifest as control, collusion, conflict, disengagement or rent seeking, have rapidly changed since 1980. Public indifference has transformed into rising land and environmental activism and resistance. This chapter briefly explores the historical dimensions of social impacts and resistance to coal mining.

4.2 Coal Mining - Now 'Hi-Vis' In Every Way

The photos in Figure 1 seeks to evoke the change of scale and visibility. Myuna Colliery still operating after 38 years, has not varied its spatial footprint, but Bengalla, a 10Mtpa modern super-pit operating since 1999, produces five times the coal of Myuna, is export oriented, and typical of the enlarged mining footprint since 1980 due to large scale open cut mining. Visibility in the landscape mirrored in the social sphere by the high visibility clothing worn by the mining workforce, in stark contrast to the pre-1980 period.

In 2015, 26,923 square kilometres, or 3.33% of the total area of NSW was under mining title with nearly 70% of this total held in the form of unreleased Coal Authorisations and Exploration Licences.[453] Total operational mining land amounts to 3,767 square kilometres,[454] with much of this land owned by the mining companies under freehold title. This

[453] Held by the Secretary NSW Department of Industry, Skills & Regional Development on behalf of Crown. Data compiled from Resources & Energy website, http://commonground.nsw.gov.au/#!/title-map/Show%20All%20Resources/Show%20All%20Stages/Standard/5/-32.69486597787506/148.68896484375, and the NSW Coal Industry Profile 2014
[454] ibid.

area would contain a significant proportion of historical mining activities. Unlike the situation from metalliferous mining, little of the past coal mining legacy remains, a few heritage sites such as Richmond Main, but mostly the pit top superstructures have been dismantled and the land reformed and returned to use in state forests, recreation reserves and given the high urban land values, for housing and industrial development. State policy has favoured rehabilitation over heritage.[455] The rehabilitation of mines is legislated[456] with mine-specific lease conditions[457] but does not explicitly support heritage values. Perhaps coal mining has been embedded in landscape for so long, with its ephemeral mines and blackened landscapes deemed incompatible with an 'inspirational view of history'[458] and its attending ideas and morals.

The large open cuts of the Hunter Valley are progressively rehabilitated, but the task of rehabilitating the final voids and legacy washery (and power station) tailings and ash ponds, will be daunting. These mines do not easily lend themselves to heritage preservation as the older underground mines with their evocative headframes, portals and dark concealed workplaces. Whereas an underground mine such as Dendrobium at Mount Kembla, operates on leases with 150 years of mining legacy and history.[459] This heightened visibility and encroachment on pastoral and urban lands, and perhaps the detachment from the means of production of an economy dominated by urban service industries, have meant the resource extraction industries now have a different meaning in the broader public consciousness.

[455] McQueen, (2012), op. cit., pp. 316-320
[456] Under the Mining Act 1992, environmental protection and rehabilitation are regulated by conditions included in all mining leases to ensure that all mining operations are safe, the resources are efficiently extracted, the environment is protected and rehabilitation achieves a stable, satisfactory outcome.
[457] Pinkster, H., Planning for Mine Closures, Coal Operators' Conference Faculty of Engineering and Information Sciences, University of Wollongong Research Online, 2004, p. 57
[458] Russell, Jim, Relating Heritage to the Environment in Australia, Environmental History Review, Vol. 15, No. 3 (Autumn, 1991), pp. 65-81, p. 74
[459] Whittall, Peter, Dendrobium Mine: From Paper to Production, in Aziz, N (ed.), Coal 2004: Coal Operators' Conference, (University of Wollongong & the Australasian Institute of Mining and Metallurgy, Wollongong, 2004), p. 25, also http://www.illawarracoal.com/mtkembla.htm, Mining at Mount Kembla from 1865.

4.3 Environmental Politics and Land Use Conflict

The emergence of environmentalism both as a political force and as a meme for a broader social consciousness had its antecedents in 1970s reforms and activism. The Whitlam Government from 1972 introduced a raft of environmental legislation covering heritage and conservation[460] along with a nationalist protectionist resource policy.[461] While these reforms consolidated the primacy of Commonwealth legislation over development, they did not defuse inter-governmental conflict arising from division of powers and juridical boundaries,[462] but had the effect of consolidating Federal constitutional powers to act on environmental matters, a hold only relinquished by the Howard Government in 1999.[463]

The rise of environmental politics in the 1970s was ostensibly a response to ecological threats to wilderness wielded through the embedded power of the Australian Conservation Foundation and the Wilderness Society.[464] Resistance in the 1970s was centred on uranium, bauxite,[465] and mineral sands mining. A focus on wilderness and pristine environments diverted attention from the broader environmental degradation issues affecting the coal and broader mining industry, the most significant the long term and large scale effects of soil degradation through erosion, salination and acid mine drainage. Coal mines simply avoided environmental scrutiny for much of its history largely because of its small surface imprint, mostly physically, socially and economically embedded within urban areas, with

[460] Environmental Protection Act (Impacts of Proposals) Act 1974; Australian National Parks and Wildlife Conservation Act 1975, Great Barrier Reef Marine Park Act 1975, and, Australian Heritage Commission Act 1975.
[461] Hay, James, L., (2009), op. cit., p. 143
[462] Doyle, Timothy, & Kellow, Aynsley, Environmental Politics and Policy Making in Australia, (Macmillan, South Melbourne, 1995), p. 6
[463] Environment Protection and Biodiversity Conservation Act 1999, replaced the Environmental Protection (Impact of Proposals) Act 1974, and other legislation
[464] Doyle, T., J., (1991), 'The Green Elites and the 1987 Federal Election', Chain Reaction, Nos. 63/64, pp. 26-32
[465] Barton & Bennett, (2003), Op. cit., p. 464

the extensive underground workings inaccessible and unknowable - mine plans of operations are not on the public record.

What changed? By 1980, increased awareness of development and resource exploitation in pristine environments had reached the popular consciousness, but there was little momentum with which broader environmental concerns might displace economic concerns. While environmental degradation was linked to economic development and issues of poverty and inequality, the super-structure of class, capital and gender was absent from this high-minded environmentalism. [466]

These priorities would shift with encroaching suburbanisation and land reservation, the fading of the smelting industries in Newcastle and Wollongong in the 1980s, now presenting a changing, deindustrialising landscape. The opposition to coal projects commenced with exploration activity as the large open cuts spread north into the Hunter Valley. The Anvil Hill Project Watch Association (AHPWA) formed in 1999 from nearby Wybong, in response to the grant of an exploration license over Anvil Hill, near Muswellbrook. This became Glencore's Mangoola Project, approved in 2007 with a planned 'disturbance' (mining) area of 22.38 km^2.[467] A series of challenges in State and Federal jurisdictions before and after approval, failed due, Connor et. al., argue, because of the way Companies and Governments control access to knowledge about the progress of development permitting and approvals – a restriction on political capital of the AHPWA.[468] The mode of acquisition of properties with 'gag' provisions on individual valuations, also creating conflict within communities.[469] With up to 30 local, national and transnational groups opposing the development, the Anvil Hill Alliance (AHA), the opponents could ride the wave of global public concern for climate change. Conner, et. al., point to the power imbalance between citizen groups and

[466] Doyle, Timothy, & Kellow, Aynsley, (1995), op. cit., p. 13
[467] Connor, L., Higginbotham, N. and Freeman, S. (2009), op. cit., pp. 494-495
[468] Connor, L., Higginbotham, N. and Freeman, S. (2009), op. cit., p. 497
[469] Connor, L., Higginbotham, N. and Freeman, S. (2009), op. cit., p. 498

the industry and its support groups, the state, the CFMEU and infrastructure groups.[470] Here a global company operating in a global coal market was opposed through 'transnational activism' pointing to a new condition of connectedness between the local, regional and the global. The opposition failed to halt the project, with the economic benefits overriding other considerations and the Government restating its support for the coal industry.[471] The transformative discourse being the conflation of coal (and coal seam gas) mining activity with climate change, though as Yapp has found, economic considerations take priority over climate change actions based on household connection to the coal industry.[472] The hotly contested Maules Creek mine, was challenged on the adequacy of environmental offsets, and whether the state had suppressed conservation advice, but gained approval after appeal in the Federal Court in 2013.[473]

State policy has had a corrosive effect with the Maules Creek, Caroona and Landmark Projects subjected too intense public and media scrutiny, creating a distinctive regional oppositional political ecology through such policies. This dissonance also feeds the perception of a lack of cohesion and inertia in national energy policy resulting from individual state frameworks and ad-hoc decision making.

4.4 Epilogue: From the Palaeozoic to the Anthropocene

All coal mining in NSW is currently located within the sedimentary Sydney, Gunnedah and Gloucester Basins, with sediments in the Sydney Basin dating from Early Permian, possibly

[470] Connor, L., Higginbotham, N. and Freeman, S. (2009), op. cit., p. 503
[471] NSW Government, Strategic Statement on NSW Coal, August 2014, - target of increasing the value of mining production by 30% by 2021.
[472] Yapp, Kiri, (2011), op. cit., pp. 54-55
[473] Federal Court, 218FCR491, Northern Inland Council for the Environment Inc., v Minister for the Environment and Aston Coal 2 Pty Limited

Late Carboniferous, to Triassic periods.[474] (Figure 38) Coal mining since settlement has penetrated these 300-million-year-old strata to depths of 900 metres below surface[475] mining wider and deeper through the power of capital to harness technology.

Figure 38, Geological time scale[476]

EON	ERA		Years Before Present	Period	Epoch
Phanerozoic	Cainozoic		250?		Anthropocene?
			12,000	Quaternary	Holocene
			2.6 m		Pleistocene
			5.3 m	Neogene	Pliocene
			23 m		Miocene
			34 m		Oligocene
			56 m	Palaeogene	Eocene
			65 m		Palaecene
	Mesozoic		145 m	Cretaceous	
			201 m	Jurassic	
			252 m	Triassic	NSW Coal
	Palaeozoic	Late	299 m	Permian	formed
			359 m	Carboniferous	
		Early	419 m	Devonian	
			444 m	Silurian	
			485 m	Ordovician	
			541 m	Cambrian	
Proterozoic	Neoproterozoic		635 m	Ediacaran	
			850 m	Cryogenian	
			1000 m	Tonian	
	Mesoproterozoic		1200 m	Stenian	
			1400 m	Ectasian	
			1600 m	Calymmian	
	Palaeoproterozoic		1800 m	Statherian	
			2050 m	Orosirian	
			2300 m	Rhyacian	
			2500 m	Siderian	
Archaean	Neoarchaean		2800 m		
	Mesoarchaean		3200 m		
	Palaeoarchaean		3600 m		
	Eoarchaean		4000 m		
Hadean	Hadean		4560 m		

[474] Hutton, A., C., Geological Setting of Australasian Coal Deposits, In, R. Kininmonth & E. Baafi (Eds.), Australasian Coal Mining Practice, (The Australasian Institute of Mining and Metallurgy, Carlton, 2009)., p. 42

[475] Historically, the deepest coal mine in NSW was Sydney Harbour Colliery, Balmain whose main vertical shafts reached a depth of 898 metres in 1905. Currently, mining occurs at around 700 metres at Appin and Austar Collieries.

[476] Australian Museum, adapted, redrawn with author's annotation, http://australianmuseum.net.au/uploads/documents/4639/geo_time_scale.pdf

In defining the anthropocene in NSW, it perhaps should be evoked as Cunha surmised, as a '…geology of capital,'[477] as much as a geology of humanity, one created through material exchange and accelerated by the global commodities business, whether mining or agriculture. While in agreement with Hamilton that these human impacts are on the 'earth system', commencing with the Great Acceleration in Europe, based on coal as a fuel and steam as a motive force,[478] they are spatially and temporally particular in their effects. It was the exogenous intensification of capital and acceleration in consumption of coal of industrialising Asian nations which expanded the NSW industry after 1980. The older industry born during Europe's great acceleration and fuelling our own from settlement, has been largely obliterated from sight, with the occasional subsidence event as a reminder of past labours.

The situation now is that we have larger areas of mined disturbance born in the recent period of global optimism for the longevity and centrality of coal as a fuel. A further downward shift in demand or sentiment, could strand many current operations, or even worse, mothball them on 'care and maintenance' or see them sold to a junior company for a peppercorn,[479] promulgating long term environmental damage and public financial burdens. The two billion dollars currently held in security bonds over mining land,[480] is inadequate to cover eventual rehabilitation.

A consciousness of the aggregate effects of coal production and consumption, while pursuing economic outcomes quarantined from an energy policy adaptive to climate change, reminds one of Marx's, 'they do this without being aware of it, by reducing the material

[477] Cunha, Daniel, The Geology of the Ruling Class, The Anthropocene Review, Vol. 2 (3), 2015, p. 264
[478] Hamilton, Clive, Getting the Anthropocene so wrong, The Anthropocene Review, Vol. 2, (2), 2015, p. 103
[479] In July 2016, Rio Tinto have sold its Blair Athol Mine in Queensland to TerraCom for $1 plus transfer of the $80 million security bond, to mine remnant coal but on a site which is expected to cost hundreds of millions to rehabilitate. http://www.abc.net.au/news/2016-07-12/rio-tinto-selling-massive-queensland-coal-mine-for-dollar/7588916?pfmredir=sm
[480] The NSW Government holds held about $2 billion in security deposits or bank guarantees in February 2016, http://www.resourcesandenergy.nsw.gov.au/miners-and-explorers/applications-and-approvals/mining-and-exploration-in-nsw/rehabilitation-security-deposits

thing to the abstraction, value',[481] as aptly describing this contemporary epistemological blind spot. 'You've only got to look at the relationship in the mining industry and the Howard Government and the fact that they were writing their Cabinet minutes for them over green-house issues',[482] said NSW Planning Minister Sartor in 2008.

Coal fuelled an industrial revolution and remains proportionally the single greatest contributor to atmospheric carbon for the amount of energy produced.[483] Coal has largely lost its relevance as a fuel in NSW, and local consumption may end with the processes of deindustrialisation and energy fuel-switching currently underway. Barring a catastrophe, an early industry exit is unlikely, given the large commitment to coal in electricity and steel production in the key Asian export markets - a massive sunk investment unlikely to be re-placed within a generation.

[481] Marx, Karl, Capital, Volume 1: A Critique of Political Economy, (Penguin classics, Harmondsworth, 1973), pp. 166-167
[482] Frank Sartor, NSW Planning Minister, Transcript, "Gong-gate", Broadcast: 29/02/2008, Reporter: Quentin Dempster, http://www.abc.net.au/stateline/nsw/content/2006/s2177024.htm
[483] US Energy Information Administration, Carbon Dioxide Emissions Coefficients, https://www.eia.gov/environment/emissions/co2_vol_mass.cfm

5.0 CONCLUSION

I have situated the transformation in scale and market orientation of the coal industry after 1980 because of changes wrought in the post-war period, and the acceleration of trade and capital flows commencing in the post-Keynesian market oriented 1980s. The following summaries my preliminary conclusions to my thesis question, drawn from my brief survey of a large and nuanced field of enquiry.

In chapter 2, charting the post-war industry reforms and modernisation, I situated the industry as a state controlled enterprise, with the JCB charged with overseeing adequate coal supply and modernisation. State interventions acted as a catalyst for change establishing open cut mining as a productive method, and allowing progressive mechanisation of work in underground mines, completed by the 1970s. The state retained its war-time powers for industry intervention, ensuring adequate supply and encouraging the growth of exports and more importantly control over the resource allocation, location and the conduct of operations. The growth of exports slowly turned the industry orientation away from a domestic market underpinned by growth in electricity production and offering slim profit margins for producers. Asian demand, particularly from Japan, was the initial impetus to develop mines specifically for export, and was the catalyst for the shift from coking coal to thermal coal, intensifying after the 1970s oil shocks. The rise of large scale, high capital, open-cut mines after 1980 was to increase supply and improve productivity for the TNCs. Capital and technology have wrought this transformation – the industry expanded five-fold, without a sustained increase in employment over its historical high of 1927, and has accepted high levels of foreign capital and ownership of production.

Chapter 3 discusses the growth orientation of successive governments and the reforms of the 1980s to open a previously inward looking and tariff protected economy. One

constant in Australia's economic history has been the export of natural resources, Mclean's resources based prosperity. The Hawke Government's financial sector deregulation and labour accord, was a catalyst for change in relationships enabling industry transformation to global significance.

On labour relations, I have provided a brief overview of the historical enmities between state and worker and enterprise and worker, creating labour tensions and mutual suspicions which were transmitted into the post 1980 period. The industrial militancy and lost-time narrative was replaced with a productivity drive and an anti-union policy, and the creation of the individual enterprise worker, through regional managerialism and site-specific conditions, as the coal industry dispersed into new locations. The shift to the north and north west of NSW as a locus of production constitutes a new periphery eroding solidarities associated with labour in the earlier more urban setting.

The relationship between capital and the state was governed by large capital flows and a new regulatory state capitalism, where governments played policy 'catch-up' obsessively pursuing the 'jobs and growth' mantra, allowing development to proceed unfettered seeking resource rents and revenues through its monopoly on resources and infrastructure. All of this under the rubric of neo-liberalism allowing an expanding export trade by an industry now less integrated with its historical domestic setting, both in location of production and end-use of the coal produced. Policy formation became ad-hoc and reactive, as the state lost control of a globalising industry. A Foucauldian Governmentality was apparent in the form of the obsessive scrutiny through its obsessive data collection, control over labour practice, the political alignment of state policy with sympathetic industry groups, and the high reliance on technical professions, geologists and engineers for the conduct of the industry. The quantification of resources, and ideas of efficient exploitation dominated planning and permitting decisions. These have overridden other competing economic and environmental

voices, triumphed open cut mining over underground mining driving a productivity mantra, and suppressed broader energy policy geared towards mitigation of environmental damage and climate change.

The state remains dependent and enamoured upon coal and upon the capital investment and income, a mentality born of ownership of the large coal endowments and its historical role in a more regulated and interventionist past. Reactive and reckless policy such as the Cobbora decision, show a resentment over the loss of control of assets where the state was once a participant, in support of its ageing electricity generation and railway monopolies. These natural monopolies have dissipated, with exogenous factors and global coal pricing, but still providing an important dividend to state revenues.

In Chapter 4, I discussed how the higher visibility of the industry has created a consciousness of coal mining, distinct from that accompanying the old embedded mostly underground operations in the urban coal centres which has been largely obliterated from view. The encroachment on agricultural lands and the sense of environmental damage conflated with climate anxiety has raised oppositional voices. This push back has led to a recent buyback at substantial cost to the public, both in the re-acquisition cost and the disruption to regional rural industries. Community opposition did not contain the industries' geographical expansion, but the imminent victory on the Liverpool Plains has narrowed the parameters for development approvals. The threats of climate change did not affect industry policy, which despite some opposition is still expanding capacity, with the completion of such projects as Maules Creek. The latter may be the last new large scale open cut mine. I evoked the idea of the anthropocene in NSW as Cunha's 'geology of capital,' reaping while the sun shines, as a future post-coal age will be left with an environmental legacy not covered by current rehabilitation bonds. The industry may, on any final cost-benefit analysis, prove to have served the growth of the global economy to the detriment of our own.

Finally, this thesis pricks the surface of many issues, illustrating and arguing for the changing face of labour, capital and state governance but with persistent themes from past epochs. Beyond research into trade, work, labour and policy issues, the paucity of interest in this industry makes this a rich field of inquiry, in such matters as – acceleration, trade relationships, the state-corporate relationship after 1980, the coal industry as a detour from sustainable planning and energy policy, and the lost opportunity and cost of pursuing coal over other industries - a 'what if' history.

The coal industry was a special case as each of its proponents, the state, labour and the coal owners have argued in their self-interest, as I have tried to demonstrate. Relationships in the superstructure of power change, and history is a flow, with the coal industry now entering its indeterminate final phase. I surmise Karl Marx, may have been surprised at the current power of global capital over the nation-state, and the behemoth it has conjured in coal in NSW. Regardless, he may have marvelled at the sheer scale, technological complexity, global reach and longevity of the coal industry and coal as a fuel, and perhaps even more surprising, the relative and hard-won wealth of the coal miners.

6.0 BIBLIOGRAPHY

6.1 Primary Sources

New South Wales Government Coal Industry Statistical Sources

Joint Coal Board, *First Report of the Joint Coal Board, 1st March 1947, to 30th June 1947, and 1947-48*, (A.H. Pettifer, Government Printer, Sydney, 1948)

Joint Coal Board, *Second Annual Report 1948-49*, (A.H. Pettifer, Government Printer, Sydney, 1950)

Joint Coal Board, *Third Annual Report 1949-50*, (A.H. Pettifer, Government Printer, Sydney, 1951)

Joint Coal Board, *Fourth Annual Report 1950-51*, (A.H. Pettifer, Government Printer, Sydney, 1952)

Joint Coal Board, Fifth Annual Report 1951-52, (A.H. Pettifer, Government Printer, Sydney, 1952)

Joint Coal Board, Sixth Annual Report 1952-53 (A.H. Pettifer, Government Printer, Sydney, 1953)

Joint Coal Board, Seventh Annual Report 1953-54, (A.H. Pettifer, Government Printer, Sydney, 1954)

Joint Coal Board, Eighth Annual Report 1954-55, (A.H. Pettifer, Government Printer, Sydney, 1955)

Joint Coal Board, Ninth Annual Report 1955-56, (A.H. Pettifer, Government Printer, Sydney, 1956)

Joint Coal Board, Tenth Annual Report 1956-57, (A.H. Pettifer, Government Printer, Sydney, 1957)

Joint Coal Board, Eleventh Annual Report 1957-58, (V. C. N. Blight, Government Printer, Sydney, 1959)

Joint Coal Board, 12th Annual Report 1958-59, (V. C. N. Blight, Government Printer, Sydney, 1959)

Joint Coal Board, Thirteenth Annual Report 1959-60, (V. C. N. Blight, Government Printer, Sydney, 1960)

Joint Coal Board, Fourteenth Annual Report 1960-61, (V. C. N. Blight, Government Printer, Sydney, 1962)

Joint Coal Board, Fifteenth Annual Report 1961-62, (V. C. N. Blight, Government Printer, Sydney, 1962)

Joint Coal Board, Sixteenth Annual Report 1962-63, (V. C. N. Blight, Government Printer, Sydney, 1963)

Joint Coal Board, Seventeenth Annual Report 1963-64, (V. C. N. Blight, Government Printer, Sydney, 1964)

Joint Coal Board, Eighteenth Annual Report 1964-65, (V. C. N. Blight, Government Printer, Sydney, 1965)

Joint Coal Board, Nineteenth Annual Report 1965-66, (V. C. N. Blight, Government Printer, Sydney, 1966)

Joint Coal Board, Twentieth Annual Report 1966-67, (V. C. N. Blight, Government Printer, Sydney, 1967)

Joint Coal Board, Twenty-First Annual Report 1967-68, (V. C. N. Blight, Government Printer, Sydney, 1968)

Joint Coal Board, 22nd Annual Report 1968-69, (V. C. N. Blight, Government Printer, Sydney, 1969)

Joint Coal Board, 23rd Annual Report 1969-70, (V. C. N. Blight, Government Printer, Sydney, 1969)

Joint Coal Board, 24th Annual Report 1970-71, (V. C. N. Blight, Government Printer, Sydney, 1971)

Joint Coal Board, 25th Annual Report 1971-72, (V. C. N. Blight, Government Printer, Sydney, 1972)

Joint Coal Board, 26th Annual Report 1972-73, (V. C. N. Blight, Government Printer, Sydney, 1973)

Joint Coal Board, 27th Annual Report 1973-74, (D. West, Government Printer, Sydney, 1974)

Joint Coal Board, 28th Annual Report 1974-75, (Joint Coal Board, Government Printer, Sydney, 1975)

Joint Coal Board, 29th Annual Report 1975-76, (Joint Coal Board, Government Printer, Sydney, 1976)

Joint Coal Board, 30th Annual Report 1976-77, (Joint Coal Board, Government Printer, Sydney, 1977)

Joint Coal Board, Black Coal in Australia 1977-78, A Statistical Yearbook, (Joint Coal Board, Sydney, 1979)

Joint Coal Board, *Black Coal in Australia 1978-79*, (Joint Coal Board, Sydney, 1980)

Joint Coal Board, *Black Coal in Australia 1980-81*, (Joint Coal Board, Sydney, 1982)

Joint Coal Board, *Black Coal in Australia 1981-82*, (Joint Coal Board, Sydney, 1982)

Joint Coal Board, *Black Coal in Australia 1982-83*, (Joint Coal Board, Sydney, 1983)

Joint Coal Board, *Black Coal in Australia 1983-84*, (Joint Coal Board, Sydney, 1984)

Joint Coal Board, *Black Coal in Australia 1984-85*, (Joint Coal Board, Sydney, 1985)

Joint Coal Board, *Black Coal in Australia 1985-86*, (Joint Coal Board, Sydney, 1986)

Joint Coal Board, *Black Coal in Australia 1986-87*, (Joint Coal Board, Sydney, 1988)

Joint Coal Board, *Black Coal in Australia 1987-88*, (Joint Coal Board, Sydney, 1989)

Joint Coal Board/Queensland Coal Board, *Australian Black Coal Statistics, 1989*

Joint Coal Board/Queensland Coal Board, *Australian Black Coal Statistics, 1990*

Joint Coal Board/Queensland Coal Board, *Australian Black Coal Statistics, 1991*

Joint Coal Board/Queensland Coal Board, *Australian Black Coal Statistics, 1992*

Joint Coal Board/Queensland Coal Board, *Australian Black Coal Statistics, 1993*

Joint Coal Board/Queensland Coal Board, *Australian Black Coal Statistics, 1994*

Joint Coal Board/Queensland Coal Board, *Australian Black Coal Statistics, 1995*

Joint Coal Board/Queensland Coal Board, *Australian Black Coal Statistics, 1996*

Joint Coal Board/Queensland Coal Board, *Australian Black Coal Statistics, 1997*

Joint Coal Board/Queensland Coal Board, *Australian Black Coal Statistics, 1998*

Joint Coal Board/Queensland Coal Board, *Australian Black Coal Statistics, 1999*

Joint Coal Board/Queensland Coal Board, *Australian Black Coal Statistics, 2000*

Joint Coal Board/Queensland Coal Board, *Australian Black Coal Statistics, 2001*

Joint Coal Board/Queensland Coal Board, *Australian Black Coal Statistics, 2002*

Joint Coal Board/Queensland Coal Board, *Australian Black Coal Statistics, 2003*

Joint Coal Board/Queensland Coal Board, *Australian Black Coal Statistics, 2004*

Joint Coal Board/Queensland Coal Board, *Australian Black Coal Statistics, 2005*

NSW Coal Compensation Board, *Annual Report 2005*, (NSW Coal Compensation Board, Sydney, 2005)

NSW Government, Department of Mineral Resources, *Annual Report 2003-2004*, (Government Printer, St. Leonards, 2004)

NSW Government, Department of Mineral Resources, *New South Wales Coal Industry Profile 1995,* (NSW Government, St. Leonards, 1995)

NSW Government, Department of Mineral Resources, *New South Wales Coal Industry Profile 1996,* (NSW Government, St. Leonards, 1996)

NSW Government, Department of Mineral Resources, *New South Wales Coal Industry Profile 1997,* (NSW Government, St. Leonards, 1997)

NSW Government, Department of Mineral Resources, *New South Wales Coal Industry Profile 1998,* (NSW Government, St. Leonards, 1998)

NSW Government, Department of Mineral Resources, *New South Wales Coal Industry Profile 1999,* (NSW Government, St. Leonards, 1999)

NSW Government, Department of Mineral Resources, *New South Wales Coal Industry Profile 2000,* (NSW Government, St. Leonards, 2000)

NSW Government, Department of Mineral Resources, *New South Wales Coal Industry Profile 2001,* (NSW Government, St. Leonards, 2001)

NSW Government, Department of Mineral Resources, *New South Wales Coal Industry Profile 2002,* (NSW Government, St. Leonards, 2002)

NSW Government, Department of Primary Industries, Mineral Resources Division, *New South Wales Coal Industry Profile 2003,* (NSW Government, Maitland, 2003)

NSW Government, Department of Primary Industries, Mineral Resources Division, *New South Wales Coal Industry Profile 2004,* (NSW Government, Maitland, 2004)

NSW Government, Department of Primary Industries, Mineral Resources Division, *New South Wales Coal Industry Profile 2005,* (NSW Government, Maitland, 2005)

NSW Government, Department of Primary Industries, Mineral Resources Division, *New South Wales Coal Industry Profile 2006,* (NSW Government, Maitland, 2006)

NSW Government, Department of Primary Industries, Mineral Resources Division, *New South Wales Coal Industry Profile 2007,* (NSW Government, Maitland, 2007)

NSW Government, Department of Primary Industries, Mineral Resources Division, *New South Wales Coal Industry Profile 2008,* (NSW Government, Maitland, 2008)

NSW Government, Department of Primary Industries, Mineral Resources Division, *New South Wales Coal Industry Profile 2009,* (NSW Government, Maitland, 2009)

NSW Government, Department of Primary Industries, Mineral Resources Division, *New South Wales Coal Industry Profile 2010,* (NSW Government, Maitland, 2010)

NSW Government, Department of Primary Industries, Mineral Resources Division, *New South Wales Coal Industry Profile 2011,* (NSW Government, Maitland, 2011)

NSW Government, Department of Primary Industries, Mineral Resources Division, *New South Wales Coal Industry Profile 2012,* (NSW Government, Maitland, 2012)

NSW Government, Department of Trade & Investment, Division of Resources and Energy, *New South Wales Coal Industry Profile 2013,* (NSW Government, Maitland, 2013)

NSW Government, Department of Trade & Investment, Division of Resources and Energy, *New South Wales Coal Industry Profile 2014*, Volume 1 & Volume 2, (NSW Government, Maitland, 2015)

Parliament of New South Wales, *Report of the Department of Mines New South Wales for 1946*, (A.H. Pettifer, Government Printer, Sydney, 1950)

Parliament of New South Wales, *Report of the Department of Mines New South Wales for 1947*, (A.H. Pettifer, Government Printer, Sydney, 1955)

Parliament of New South Wales, *Report of the Department of Mines New South Wales for 1948*, (A.H. Pettifer, Government Printer, Sydney, 1956)

Parliament of New South Wales, *Report of the Department of Mines New South Wales for 1949*, (A.H. Pettifer, Government Printer, Sydney, 1955)

Parliament of New South Wales, *Report of the Department of Mines New South Wales for 1950*, (A.H. Pettifer, Government Printer, Sydney, 1954)

Parliament of New South Wales, *Report of the Department of Mines New South Wales for 1951*, (A.H. Pettifer, Government Printer, Sydney, 1955)

Parliament of New South Wales, *Report of the Department of Mines New South Wales for 1952*, (A.H. Pettifer, Government Printer, Sydney, 1956)

Parliament of New South Wales, *Report of the Department of Mines New South Wales for 1953*, (A.H. Pettifer, Government Printer, Sydney, 1956)

Parliament of New South Wales, *Report of the Department of Mines New South Wales for 1955*, (A.H. Pettifer, Government Printer, Sydney, 1957)

Parliament of New South Wales, *Report of the Department of Mines New South Wales for 1956*, (A.H. Pettifer, Government Printer, Sydney, 1958)

Parliament of New South Wales, *Report of the Department of Mines New South Wales for 1957*, (V. C. N. Blight, Government Printer, Sydney, 1959)

Parliament of New South Wales, *Report of the Department of Mines New South Wales for 1958*, (V. C. N. Blight, Government Printer, Sydney, 1960)

Parliament of New South Wales, Report of the Department of Mines New South Wales for 1960, (V. C. N. Blight, Government Printer, Sydney, 1962)

Parliament of New South Wales, Report of the Department of Mines New South Wales for 1961, (V. C. N. Blight, Government Printer, Sydney, 1962)

Parliament of New South Wales, Report of the Department of Mines New South Wales for 1963, (V. C. N. Blight, Government Printer, Sydney, 1965)

Parliament of New South Wales, *Report of the Department of Mines New South Wales for 1964*, (V. C. N. Blight, Government Printer, Sydney, 1965)

Parliament of New South Wales, *Report of the Department of Mines New South Wales for 1965*, (V. C. N. Blight, Government Printer, Sydney, 1966)

Parliament of New South Wales, *Report of the Department of Mines New South Wales for 1966*, (V. C. N. Blight, Government Printer, Sydney, 1968)

Parliament of New South Wales, *Report of the Department of Mines New South Wales for 1967*, (V. C. N. Blight, Government Printer, Sydney, 1969)

Parliament of New South Wales, *Report of the Department of Mines New South Wales for 1968*, (V. C. N. Blight, Government Printer, Sydney, 1970)

Parliament of New South Wales, *Report of the Department of Mines New South Wales for the Period 1 January – 30 June 1969*, (V. C. N. Blight, Government Printer, Sydney, 1970)

Parliament of New South Wales, Report of the Department of Mines New South Wales for the year Ended 30 June 1970, (V. C. N. Blight, Government Printer, Sydney, 1971)

Parliament of New South Wales, Report of the Department of Mines New South Wales for 1971-72, (V. C. N. Blight, Government Printer, Sydney, 1973)

Parliament of New South Wales, Report of the Department of Mines New South Wales for the year Ended 30 June 1972, (V. C. N. Blight, Government Printer, Sydney, 1973)

Parliament of New South Wales, Report of the Department of Mines New South Wales for the year Ended 30 June 1974, (D. West, Government Printer, Sydney, 1975)

Parliament of New South Wales, Report of the Department of Mines New South Wales for the year Ended 30 June 1976, (D. West, Government Printer, Sydney, 1977)

Parliament of New South Wales, Report of the Department of Mineral Resources and Development for the Year Ended 30 June 1978, (D. West, Government Printer, Sydney, 1979)

New South Wales Policy Documents

Department of Trade and Investment, EDP11: Rehabilitation Security Deposits, January 2012

Department of Industry, Skills and Regional Development, ESG2: Guideline for Preparing a Review of Environmental Factors for mining and petroleum exploration activities subject to Part 5 of the Environmental Planning and Assessment Act 1979, July 2015

Department of Industry, Resources & Energy, ESG 5: Assessment Requirements for Exploration Activities: Guideline for the Assessment and Determination of Mining and Petroleum Exploration Activities, July 2015

Department of Planning and Environment, Strategic Regional Land Use Policy Guideline for Agricultural Impact Statements at the Exploration Stage, August 2015

Department of Planning and Environment, *Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals*, (NSW Department of Planning and Environment, Sydney, December 2015)

NSW Treasury, NSW Government Guidelines for Economic Appraisal. Office of Financial Management: Policy and Guidelines Paper, 2007

NSW Trade and Investment, NSW Coal Mining Guidelines for Royalty Compliance, http://www.resourcesandenergy.nsw.gov.au/__data/assets/pdf_file/0007/399562/ royalty-and-statisticsguidelines-coal.pdf

Department of Industry, Resources & Energy, Strategic Statement on NSW Coal, August 2014, http://www.resourcesandenergy.nsw.gov.au/__data/assets/pdf_file/0006/521637/Strategic-statement-on-NSW-coal.pdf

Commonwealth Government Position and Policy Documents

Australian Government, *Adapting to Climate Change in Australia: An Australian Government Position Paper*, (Canberra, Department of Climate Change, 2010)

Australian Government, *Carbon Pollution Reduction Scheme: Australia's Low Pollution Future*, White Paper, Canberra, Commonwealth of Australia (2008)

Australian Government, *Securing Australia's Energy Future*, (Department of the Prime Minister and Cabinet, Canberra, 2004), Available online: http://www.efa.com.au/Library/CthEnergyWhitePaper.pdf.

Australian Greenhouse Office, The National Greenhouse Strategy. Canberra, (1998), Available online: http://australianpolitics.com/foreign/environment/ngs.pdf.

Legislation - New South Wales

Coal Industry Amendment Bill 1992

Coal Mine Health and Safety Act 2002

Coal Mine Health and Safety Regulation 2006

Electricity Commission Act 1950

Mining Act 1992

Mine Health and Safety Regulation 2007

Mine Health and Safety Act 2004

Mining and Petroleum Legislation Amendment (Grant of Coal and Petroleum Prospecting Titles) Bill 2015

Mining and Petroleum Legislation Amendment (Land Access Arbitration) Bill 2015

Mining and Petroleum Legislation Amendment (Harmonisation) Bill 2015

Protection of The Environment Operations Amendment (Enforcement of Gas and Other Petroleum Legislation) Bill 2015

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

State Environmental Planning Policy (State and Regional Development) 2011

Work Health and Safety Act 2011

Work Health and Safety (Mines) Act 2013

Work Health and Safety (Mines and Petroleum) Legislation Amendment (Harmonisation) Bill 2015

Work Health and Safety (Mines and Petroleum Sites) Act 2013

Work Health and Safety (Mines and Petroleum Sites) Regulation 2014

Work Health and Safety Act 2011

Work Health and Safety Regulation 2011

Legislation – Commonwealth of Australia

Australian National Parks and Wildlife Conservation Act 1975

Australian Heritage Commission Act 1975.

Environment Protection and Biodiversity Conservation Act 1999

Environmental Protection Act (Impacts of Proposals) Act 1974

Great Barrier Reef Marine Park Act 1975

The Workplace relations and Other Legislation Amendments Act, 1996

6.2 Secondary Sources

ABS, Australian Mining Industry, 1998-99, ABS Catalogue No. 8414.0

Adams, S., P., "Promotion, Competition, Captivity: The Political Economy of Coal", *The Journal of Policy History*, 18(1), (2006), 74-95.

Adrian, Jeanette, *History of the Geological Survey of New South Wales 1875-1974,* (Geological Survey of New South Wales, Department of Mines, GS74/506, (Sydney, February 1974)

Anon., 'The N.S.W. coalfields - a historical survey', in *The Coal Miner*, Sydney, (The New South Wales' Combined Colliery Proprietors Association, March 1953), pp. 14–17

Australian Guidelines for The Estimation and Classification of Coal Resources, 2014 Edition, Prepared by the Guidelines Review Committee on behalf of the Coalfields Geology Council of New South Wales and the Queensland Resources Council, (2014)

Auty, Richard, M., *Sustaining Development in Mineral Economies: The resource Curse Thesis,* (Routledge, Oxford, 2001)

Barber, Elizabeth, Transportation issues of Australian Coal and Iron Ore, in, Finch, Nigel, (ed.), *Contemporary issues in Mining: Leading Practice in Australia,* (Palgrave Macmillan, Basingstoke, 2012)

Barry, Michael, & Waring, Peter, 'Shafted': Labour Productivity and Australian Coal Miners, *Journal of Australian Political Economy*, Vol. 44, Dec 1999, pp. 89-112

Barry, Michael & Michelotti, Marco, Market Power Constrained: Union and Non-Union Collective Bargaining Outcomes, *The Australia Resources Sector, Labour & Industry: a journal of the social and economic relations of work,* 20:1, (2009), pp. 25-44

Barton, Gregory, & Bennett, Brett, 'The Environment', in, Ville, Simon, & Withers, Glenn (eds.), *The Cambridge Economic History of Australia*, (Cambridge University Press, Port Melbourne, 2003), pp. 452-471

Beaumont, P., B., 'Conflict in coal: the NSW experience', in, *Journal of Industrial Relations*, vol. 17, March (1975), pp. 44–59

Blainey, Geoffrey, *The Rush That Never Ended*, 3rd Edition, (Melbourne University Press, Carlton, 1978)

Bowden, Bradley, A History of the Pan-Pacific Coal Trade from the 1950s to 2011: Exploring the Long-Term Effects of a Buying Cartel, in, *Australian Economic History Review*, Vol. 52, No. 1, (March 2012)

BP Ltd, BP Statistical Review of World Energy, Statistical Workbook, (June 2016), http://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html

Brady, Frank, (ed.,), Contribution on Australia, Prepared for the Australian National committee of CIGRE, A Dictionary on Electricity, A Joint project of CIGRE and AHEF, (IEEE, 1996)

Branagan, David, F., 'A History of New South Wales Coal Mining', in, *Coal in Australia, the Third Edgeworth David Day Symposium,* (The University of Sydney, Sydney, 1990)

Branagan, D., F., *Geology and Coal Mining in the Hunter Valley 1791-1861*, (Newcastle Public Library, Newcastle, 1972)

Brown, S., et. Al. (eds.), Can Environmental History Save the World?, *History Australia*, Vol. 5, No. 1, 2008, (Monash University EPress, Monash University, 2008)

Burchell, Graham, Gordon, Colin, Miller, Peter, (eds.), *The Foucault Effect: Studies in Governmentality, with Two Lectures by and an Interview with Michel Foucault*, (Harvester Wheatsheaf, London, 1991)

Burke, Jessica, Ban on All New NSW Mining Operations, *Australian Mining Journal*, May 23, (2011), https://www.australianmining.com.au/news/ban-on-all-new-nsw-coal-mining-operations/

Butlin, S., J., *Official Histories – Second World War, Volume III – War Economy, 1939–1942*, (Canberra, 1st edition, 1955), pp. 397-425

Butlin, S., J., & Schedvin, C., B., *Official Histories – Second World War, Volume IV – War Economy, 1942–1945*, (Canberra, 1st edition, 1977)

Bashford, Alison, & Macintyre, Stuart (ed.), *The Cambridge History of Australia*, (Cambridge University Press, Melbourne, 2003)

Brown, Jim, W., *Bent backs: an illustrated social and technological history of the Western Coalfields*, (Lithgow, N.S.W: Industrial Printing Co., 1989)

Campbell, Rod, Cobbora coal project: Submission to planning and assessment commission, *The Australia Institute*, (March 2014)

Coal Resources Development Committee, *Effects of land use on Coal Resources*, Report for NSW Minister for Mines, Department of Mineral Resources, Sydney, 1994)

Coleman, W., 'What Was 'New' About Neoliberalism?', *Economic Affairs*, vol. 33, no. 1, (2013), pp. 78-92

Coleman, W., "The Power of simple theory and important facts": A Conversation with Bob Gregory', *Agenda: A Journal of Policy Analysis and Reform*, vol. 16, no. 2, (2009), pp. 61-89.

Coleman, William, 'Chapter 1 - The historiography of Australian economic history', in, Ville, Simon, & Withers, Glenn (eds.), *The Cambridge Economic History of Australia*, (Cambridge University Press, Melbourne, 2003) pp. 27-28

Commonwealth of Australia, Royal Commission into Trade Union Governance and Corruption, *Royal Commission into Trade Union Governance and Corruption Final Report: Volume 3*, (December 2015), https://www.tradeunionroyalcommission.gov.au/reports/Documents/Final-Report/Volume-3/Final-Report-Volume-3.pdf

Commonwealth of Australia, *The Australian Black Coal industry, Inquiry Report, Volumes 1 & 2*, Report no. 1, 3 July 1998, (Productivity Commission, Canberra, 1998)

Commonwealth of Australia, *Industrial Court of Australia, Annual Report 1996-97*, (Sydney, September 1997)

Cook, L. H., & Porter, M., G., (eds.), *The Minerals Sector and the Australian Economy*, (Allen & Unwin, Sydney, 1984)

Connor, L., Higginbotham, N. and Freeman, S. "Not Just a Coalmine: Shifting Grounds of Community Opposition to Coalmining in South-eastern Australia". *Ethnos*, 74(4), (2009), pp. 490-513.

Cooper, Rae, & Ellem, Bradon, 'Less Than Zero': union recognition and bargaining rights in Australia 1996-2007, *Labor History*, Vol. 52, No. 1, (2011), pp. 49-69

Cooper, Rae, & Ellem, Bradon, Chapter Seven, 'Union Power: Space, Structure and Strategy', in, Hearn, Mark & Michelson, Grant, (eds.), *Rethinking Work: Time, Space and Discourse*, (Cambridge University Press, Port Melbourne, 2006)

Court of Appeal, Supreme Court, New South Wales, Ashton Coal Operations Pty Ltd v Hunter Environment Lobby Inc [2015] NSWCA 358, 20 November 2015, (2015), https://www.caselaw.nsw.gov.au/decision/564cf45be4b0eaaf45aefacc

Court of Coal Mine Regulation, In the Matter of an investigation in pursuance of the Coal Mines Regulation Act 1982 into an accident which occurred at Gretley Colliery on 14 November 1996 and its causes and circumstances, *Report of a Formal Investigation under Section 98 of the Coal Mines Regulation Act 1982,* Volume 1 & Volume 2, (June 1998)

Cox, Robert, W., *Production, Power and World Order: Social Forces in the Making of History*, (New York, Columbia University Press, 1987)

Cunha, Daniel, The Geology of the Ruling Class, *The Anthropocene Review*, Vol. 2 (3), (2015), pp. 262-266

Davidson, Sinclair and de Silva, Ashton, *The Australian Coal Industry – Adding value to the Australian Economy*, (April 2013), http://www.minerals.org.au/file_upload/files/reports/Att_8-2__2013-04-24_Coal_Economy_report-Sinclair_Davidson_report.pdf

Davidson, C., G., W., "Report on the Coal-Mining Industry ", *Parliamentary Paper No. 51*, (Mar 1946)

Dean, Mitchell, *Governmentality: Power and Rule in Modern Society*, (Sage Publications, London, 1999)

Deery, Phillip, Chifley, The Army and the 1949 Coal Strike, *Labour History*, No. 68, (1995), pp. 80-97

Deery, Phillip, (ed.), *Labour in Conflict: The 1949 Coal Strike*, (Australian Society for the Study of Labour History, Canberra, 1978)

Dingsdag, Donald Pierre, *The restructuring of the NSW coalmining industry, 1903-1982*, Doctor of Philosophy thesis, (Department of History and Politics, University of Wollongong, 1988), http://ro.uow.edu.au/theses/1444

Donaldson, M., and Donaldson, T., The Crisis in the Steel Industry, *Journal of Australian Political Economy*, 14, (1983), pp. 33-43

Dore, J., and Woodhill, J., *Sustainable regional development*, (Canberra: Greening Australia, 1999)

Dovers, S, 'Can environmental history engage with policy?', *History Australia*, vol. 5, no. 1, (2008), pp. 03.2-03.6.

Doyle, Timothy, & Kellow, Aynsley, *Environmental Politics and Policy Making in Australia*, (Macmillan, South Melbourne, 1995)

Doyle, T., J., 'The Green Elites and the 1987 Federal Election', *Chain Reaction*, Nos. 63/64 (1991), pp. 26-32

Dreyfus, Hubert, L., and, Rabinow, Paul, *Michel Foucault: Beyond Structuralism and Hermeneutic*, 2nd Ed., (The University of Chicago Press, Chicago, 1983)

Eley, Geoff, *A Crooked Line; From Cultural History to the History of Society*, (The University of Michigan Press, Ann Arbor, 2005)

Elford, Harold, S., & McKeown, Maurice, R., *Coal Mining in Australia*, (Tait Publishing Company Pty Ltd, Melbourne and Sydney, 1947)

Ellem, Bradon, Resource Peripheries and Neoliberalism: The Pilbara and the remaking of industrial relations in Australia, *Australian Geographer*, 46:3, (2015), pp. 323-337

Ellem, Bradon, The making of industrial relations policy: Where are we now and how did we get here?, *Labour and History*, 21,1, (August 2010), pp. 353-368

Fitzgerald, Anne, *Mining Agreements: Negotiated Frameworks in the Australian Mining Sector*, (Prospect Media, Chatswood, 2010)

Folie, Michael, and McColl, Gregory, *The Australian Coal Industry: An Economic Appraisal*, Resource Policy, (March 1980)

Foucault, Michel, 'Governmentality', in, Burchell, Graham, Gordon, Colin, Miller, Peter, (eds.), The Foucault Effect: Studies in Governmentality, with Two Lectures by and an Interview with Michel Foucault, (Harvester Wheatsheaf, London, 1991), pp. 87-104

Foucault, Michel, 'The Subject and Power', in, Dreyfus, Hubert, L., and Rabinow, Paul, *Michel Foucault: Beyond Structuralism and Hermeneutic*, 2nd ed., (The University of Chicago Press, Chicago, 1983)

Foucault, Michel, *Power/Knowledge: Selected Interviews and Other* Writings, 1972-77, ed., C. Gordon, (Brighton, Harvester, 1980)

Fraser, Bryce, *People of Australia, Key Events in Population, Society, The Environment*, devised by Bryce Fraser, (The Macquarie Dictionary, Macquarie University, 1998)

Freese, Susan, Coal: A Human History, (Arrow Books, London, 2006)

Gallop, Geoff, & Patmore, Greg, Social Democratic Governments and Business, *Labour History*, Number 98, (May 2010)

Gillespie Economics, *Watermark Coal Project Economic Impact Statement*, Prepared for Shenhua Watermark Coal Pty Ltd C/- Hansen Bailey Pty Limited, (October 2012)

Gollan, R., *The Coalminers of New South Wales: A History of the Union, 1860 - 1960*, (Melbourne University Press, Carlton, 1963)

Goot, Murray, The New Millennium', in, Bashford, Alison, and, Macintyre, Stuart, (eds.), *The Cambridge History of Australia*, (Cambridge University Press, Port Melbourne, 2003), pp. 187-212

Gunn, John, *Along parallel lines: a history of the railways of New South Wales 1850-1986*, (Melbourne University Press, Carlton, 1989)

Gunningham, Neil, Prosecution for OHS offences: Deterrent or Disincentive?, *The Sydney Law Review*, Vol. 29, No. 3, (Sept 2007), pp. 359-390

Haddad, David, (ed.), *BJ Coal 2003*, (Barlow Jonker, Sydney, 2003)

Hamilton, Clive, Getting the Anthropocene so wrong, *The Anthropocene Review*, Vol. 2, (2), (2015), pp. 102-107

Hamilton, Clive, & Turton, Hal, *Subsidies to the Aluminium Industry and Climate Change*, Submission to Senate Environment References Committee Inquiry into Australia's Response to Global Warming, November 1999, Background Paper No. 21, (The Australia Institute, Canberra, 1999)

Hartcher, Peter, *The Sweet Spot: How Australia Made Its Own Luck – And Could Throw It All Away*, (Black Inc., Collingwood, 2011)

Hay, James, L., Challenges to liberalism: The case of Australian energy policy, *Resources Policy*, 34, (2009)

Hearn, Mark & Michelson, Grant, (eds.), *Rethinking Work: Time, Space and Discourse*, (Cambridge University Press, Port Melbourne, 2006)

Hearn McKinnon, B., CRA/Rio Tinto in the 1990s: A Decade of Deunionisation, *Labour History*, No. 97 (Nov., 2009), pp. 75-96

Hettne, Bjorn, "Introduction: The International Political Economy of Transformation" in Hettne, B and Cox, R., *International political economy: understanding global disorder*, London: Zed Books, (1995)

Higgins, Winton, How we are governed now: globalisation, neo-liberal governmentality and the nullification of substantive policy, *Journal of Australian Political Economy*, No 57, (2006), pp. 5-29

Hill, Elizabeth, (ed.), *New South Wales Coal Industry Profile 2013*, New South Wales Department of Trade and Investment, Sydney, (2013)

Hopkins, A, Deterrence and risk-based OHS law, *Journal of Occupational Health and Safety, Australia and New Zealand*, Vol. 23, No. 5, (Dec 2007), pp. 433-444.

Huleatt, M., B., *Handbook of Australian black coals: Geology, resources, seam properties and product specification*, Resources Report 7, (Bureau of Mineral Resources, Geology and Geophysics, Canberra, 1991)

Huleatt, M., B., Black Coal in Australia, Bureau of Mineral Resources, Geology and Geophysics, *Australian Mineral Industry Quarterly*, 34 (1981).

Hutton, A., C., Geological Setting of Australasian Coal Deposits, In, R. Kininmonth & E. Baafi (Eds.), *Australasian Coal Mining Practice*, (The Australasian Institute of Mining and Metallurgy, Carlton, 2009)

Independent Commission Against Corruption, *Reducing the Opportunities and Incentives for Corruption in the State's Management of Coal Resources*, ICAC Report, (October 2013), http://www.icac.nsw.gov.au/docman/investigations/reports/4209-reducing-the-opportunities-and-incentives-for-corruption-in-the-state-s-management-of-coal-resources-oct-2013/file

Jack, R., Ian, and Cremin, Aedeen, *Australia's Age of Iron*, (Oxford University Press, Sydney University Press, Sydney, 1994)

Jerram, Leif, Space: A Useless Category for Historical Analysis? *History and Theory*, 52 (October 2013), pp. 400-419

Joint Ore Reserves Committee, *Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code, 2012*, Prepared by the Joint Ore Reserves Committee of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia (JORC) (2012)

Kellow, Aynsley, & Simms, Marian, Policy Change and Industry Associability: The Australian Mining Sector, *Australian Journal of Public Administration*, vol. 72, no. 1, (2013), pp. 41-54

Kirsch, Philipp, Hine, Amelia, Maybury, Terry, A model for the implementation of industry-wide knowledge sharing to improve risk management practice, *Safety Science*, 80, (2015), pp. 66-76

Larner, Wendy & Walters, William, Globalization as Governmentality, Alternatives: Global, Local, Political, Vol. 29, No. 5, *Governing Society Today*, (Nov-Dec. 2004), pp. 495-514

Lauber, Volkmar, 'Ecology Politics and Liberal Democracy', *Government and Opposition*, Vol. 13, (1978), pp. 199-217

Levitt, Theodore, 'The Globalization of Markets', *Harvard Business Review*, 61, 3, (1983), pp. 92-102

Livett, Kate, Review, *Southerly*, vol. 72, no. 1, (2012), p. 229

Lloyd, Christopher, "Australian capitalism since 1992: a new regime of accumulation?" Journal of Australian political economy, 61, (2008), pp. 30-55.

Lloyd, Christopher, "Regime change in Australian capitalism: towards an historical political economy of regulation", *Australian Economic History Review* ,42 (3), (2002), pp. 238-266.

Lloyd, Christopher, 'Can Economic History be the core of social science? Why the Discipline must open and integrate to ensure the survival of Long Run Economic Analysis', in, *Australian Economic History Review*, Vol. 37, No. 3, (1997), p. 259

Manners, Gerald, Unresolved Conflicts in Australian Mineral and Energy Resource Policies, The Geographical Journal, Volume 158, Part 2, (July 1992), pp. 129-144

McDougall, Russell and Croft, Julian, Industrial Pastoral: Lake Macquarie Coal Miners' Holidays, *Transnational Literature*, Vol. 3, No. 1, (November 2010), http://fhrc.flinders.edu.au/transnational/home.html

Martin, C., H., et. al., *History of Coal Mining in Australia*, Monograph Series No. 21, (Australian Institute of Mining and Metallurgy, Parkville, 1993)

Marx, Karl, *Capital, Volume 1: A Critique of Political Economy*, (Penguin classics, Harmondsworth, 1973)

McGrath-Champ, Susan, Integrating industrial geography and industrial relations research, *Tijdschrift Economische en Sociale Geograjie*, Vol. 85, No. 3, (1994), pp. 195-208

McKnight, David & Hobbs, Mitchell, Public Contest through the Popular Media: The Mining Industry's Advertising War against the Australian Labor Government, *Australian Journal of Political Science*, 48:3, (2013), pp. 307-319

McNaly, Lois, *Foucault, A Critical Introduction*, (Polity Press, Cambridge, 1994)

McLean, Ian, W., *Why Australia Prospered; The Shifting Sources of Economic growth*, (Princeton University Press, Princeton and Oxford, 2013)

McQueen, Ken, The Importance and Future of Mining History: An Australian Perspective, in, 'Symposium on Mining History' in *Earth Sciences History*, Vol 31, 2, (2012), pp. 316-320

Miyamoto, Yasuhisa, (ed.), *Coal Manual, 2011 Edition*, (The Tex Report Pty Limited, Tokyo, 2011)

Miyamoto, Yasuhisa, (ed.), *Coal Manual, 2008 Edition*, (The Tex Report Pty Limited, Tokyo, 2008)

Mulder, Peter, and, Van Den Bergh, Jeroen, C., J., M., Evolutionary Economic Theories of Sustainable Development, *Growth and Change*, Vol. 32, (Winter 2001), pp. 110-134

Murray, G., & Peetz, D., *Women of the Coal Rushes*, (University of NSW Press, Sydney, 2010)

NSW Minerals Council, *Change in the NSW Coal Industry, 'Too Little, Too slow, and Too Costly', a submission to the Industry Commission Inquiry into the Australian Black Coal Industry*, (NSW Minerals Council, Sydney, October 1997)

New South Wales Government, *New South Wales Coal Strategy 1983, Volume 1: Strategic Plan, Report Prepared for the New South Wales Government by the Coal Resources Development Committee, NSW Department of Mineral Resources*, (D. West, Government Printer, September 1983)

New South Wales Government, *New South Wales Coal Strategy 1983, Volume 2: Industry Review, Report Prepared for the New South Wales Government by the Coal Resources Development Committee, NSW Department of Mineral Resources*, (D. West, Government Printer, September 1983)

O'Brien, Robert, & Williams, Marc, *Global political Economy*, 4th Edition, (Palgrave Macmillan, London, 2013)

O'Neill, P., and Fagan, R., 'The new regional policy: what chance of success?', *Australian Quarterly*, 67, (2), (1995), pp. 55-68.

Owen, H., B., Burton, G., M., *The coal resources of New South Wales*, Report, Records 1950/26, (Department of Supply and Shipping, Bureau of Mineral Resources Geology and Geophysics, Canberra, 1950)

Patmore, Greg, *Australian Labour History*, (Longman Cheshire, Melbourne, 1991)

Pearse, G., "Quarry Vision: Coal, Climate Change and the End of the Resources Boom." *Quarterly Essay* (33) (2009), pp. 1-122.

Pearse, G., McKnight, D., Burton, Bob, *Coal: Australia's Dirtiest Habit*, (New South, Sydney, 2013)

Peetz, David, & Murray, Georgina, *Involuntary Long Hours in Mining*, (2010), http://www98.griffith.edu.au/dspace/bitstream/handle/10072/34048/59710_1.pdf?sequence=1

Planning Assessment Commission, *Mt Thorley Continuation Project - determination* - D362/15, (2015), http://www.pac.nsw.gov.au/projects/2015/05/mt-thorley-continuation-project--determination

RioTinto Energy, *Submission to the Industry Commission: The Australian Black Coal Industry, Killing the Goose, The Urgent Need for Reform in Australia's Black Coal Industry*, (24 October 1997), http://www.pc.gov.au/inquiries/completed/black-coal/submissions/rio_tinto_energy_/sub022.pdf

Rodgers, Daniel, T., *Age of Fracture*, (The Belknap Press, Cambridge, 2011)

Rose, Nicholas, *Powers of Freedom: Reframing Political Thought*, (Cambridge University Press, Cambridge, 1999)

Ross, Edgar, *A History of the Miner's Federation of Australia*, (Halstead Press, Sydney, 1970)

Cooper, Rae and, Patmore, Greg, Private Detectives, Blacklists and Company Unions: Anti-Union Employer Strategy & Australian Labour History, *Labour History*, No. 97 (Nov., 2009), pp. 1-11

Russell, Jim, Relating Heritage to the Environment in Australia, *Environmental History Review*, Vol. 15, No. 3 (Autumn, 1991), pp. 65-81

Sadler, David and Fagan, Bob, Australian Trade Unions and the Politics of Scale: Reconstructing the Spatiality of Industrial Relations, *Economic Geography*, Vol. 80, No. 1 (Jan., 2004), pp. 23-43

Sheehan, Peter, & Gregory, Bob, *The Resources Boom and Economic Policy in the Longer Run*, The Australian National University Centre for Economic Policy Research, Discussion Paper No. 683, Australian National University, (March 2013)

Sheridan, Tom, *Division of Labour, Industrial relations in the Chifley Years, 1945-1949*, (Oxford University Press, South Melbourne, 1989)

Sklarew, Jennifer, F., *Shock to the system: how catastrophic events and institutional relationships impact Japanese energy policymaking, resilience, and innovation*, PhD Dissertation, (George Mason University, Fairfax, VA, 2015)

Sparke Helmore Solicitors, *Contract between Macquarie Generation and Coal Operations Australia Limited, 30 June 1998*, Contract for Supply of Coal from Mount Arthur North, Schedule MAN COAL Supply Contract, (Newcastle, 30 June 1998)

Strange, Susan, States and Markets, 2nd ed. (London: Pinter, 1994)

Spires, Robert, History of Kemira Colliery, 1857 – 1984, (1984) - http://www.illawarra-coal.com/kemira.htm

Taylor, Rae, Study of the Queensland and New South Wales black coal industry: a report to the Australian Coal Industry Council, (Australian Coal Industry Council, Canberra, 1994)

Tapp, B., A., Watkins, J., R., Energy and Mineral Resource Systems: An Introduction, (Cambridge University Press, Cambridge, 1990)

The Centre for International economics, *The Contribution of mining to the New South Wales Economy, prepared for the NSW Minerals Taskforce*, 16 September 2014, (Centre for International Economics, Canberra, 2014)

Thomas, Pete, *The Nymboida Story: The work-ins that saved a coalmine*, (Australian Coal & Shale Employees' Federation (Miners Federation), Sydney, 1975)

Tonks, Ed, *Northumberland - Newstan, 1887–1987: 100 years of coal mining*, (Elcom Collieries, Cardiff, NSW, 1987)

Turner, J., W., Coal mining in Newcastle, 1801–1900, Newcastle Region Public Library, Newcastle, (1982)

US Energy Information Administration, Carbon Dioxide Emissions Coefficients, (2015) https://www.eia.gov/environment/emissions/co2_vol_mass.cfm

Walter, James, Chapter 7, '*Growth resumed 1983-2000'*, in, Bashford, Alison, & Macintyre, Stuart, (eds.), The Cambridge History of Australia, (Cambridge University Press, Port Melbourne, 2003), pp. 162-186

Walters, William, *Governmentality: critical encounters*, (Routledge, London, 2012)

Waring, Peter, Macdonald, Duncan, & Burgess, John, Globalization and Confrontation: The Transformation of the Australian Coal Industry, *Asia Pacific Business Review*, 7:1, (2000), pp. 21-45, DOI: 10.1080/13602380000000002

White, G, Sterilisation of Coal Resources in the Southern NSW Coalfields: The CFMEU Perspective, in Aziz, N (ed.), *Coal 2006: Coal Operators' Conference*, (University of Wollongong & the Australasian Institute of Mining and Metallurgy, 2006), pp. 346-348.

Whittall, Peter, Dendrobium Mine: From Paper to Production, in Aziz, N (ed.), Coal 2004: Coal Operators' Conference, (University of Wollongong & the Australasian Institute of Mining and Metallurgy, Wollongong, 2004), pp. 21-39.

Wilkinson, John, *Coal production in New South Wales*, *Briefing Paper No 10/95*, (NSW Parliamentary Library Research Service, Sydney, 1995)

Yapp, Kiri, *Cultures of Coal and Climate Change in Helensburgh*, New South Wales, Thesis, Faculty of Science, Medicine & Health (University of Wollongong, 2011)

Zola, Emile, *Germinal*, Trans. by Colin Smethurst, (Edward Arnold, London, 1974)