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# **When you're in a hole - stop digging!**

## **The economic case for a moratorium on new coal mines**

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Discussion paper

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# Introduction

This paper focuses on the potential for Australia and the world to build ‘too many’ coal mines. It builds on an earlier paper ‘*Too Much of A good thing? The Macroeconomic case for slowing down the mining boom*’.<sup>1</sup>

Debate about mining in Australia often conflates the economic benefits associated with constructing mines with the economic benefits of selling the minerals. While there is no doubt that short term jobs are created by large construction projects, be they coal mines or public transport infrastructure, in the long term, economic benefits to Australia are determined not by the amount of activity in construction, but by the flow of benefits from the project once constructed.

While building new mines may provide a flow of future benefits, building too many mines has economic costs. Too many mines can push down the price of resources sold by existing mines, as has been seen in the iron ore market. Building too many mines at once can crowd out other economic activity, as farmers and manufacturers found during the mining boom.

Further, building too many mines increases the risk that some will become ‘stranded assets’. This occurs when the market for a resource declines significantly and the future benefits from the mine may not justify its construction or continuation. Such stranded assets affect not just shareholders, but also taxpayers who often subsidise the upfront cost of supporting infrastructure such as rail and ports.

The belief that the mere construction of new mines is, in itself, a source of economic benefit precludes the possibility that it is possible to have ‘too many mines’. Even if we ignore costs related to climate change and air pollution, the construction of new mines can lead to economic consequences such as:

- lower coal prices associated with increased supply (and associated reductions in royalty and corporate tax payments),
- decline in the terms of trade,
- job losses in existing coal mines and regions, and
- bankruptcies of coal companies and the inability to meet obligations to remediate disused mine sites.

Economists typically prefer to avoid making judgements about whether there is ‘too much’ of something, or that the price of something is ‘too low’, on the basis that such questions are best settled by the market. According to this way of thinking, if the price of something is ‘too low’ then unprofitable firms will exit the industry resulting in a reduction in supply and an increase in price. While such an approach is appropriate in a ‘perfect’ market, the

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<sup>1</sup> Denniss, R, Grudnoff, M, (2012) *Too Much of A good thing? The Macroeconomic case for slowing down the mining boom*, The Australia Institute, <http://www.tai.org.au/node/1835>

usefulness of such an approach diminishes as the extent of ‘market failure’ increases. Indeed, economic theory is clear that ‘too much’ of a product will be produced under a wide range of circumstances, including:

- 1) the existence of negative externalities (such as particulate pollution and climate change),
- 2) long lags between investment and production decisions (it can take 10 years to approve and build a large mine), and
- 3) the existence of subsidies (mining receives a wide range of direct financial subsidies as well as the provision of low cost or zero cost infrastructure).

This paper argues that there has been ‘too much’ investment in coal mining and that a global moratorium on new coal mines would be welfare enhancing. The paper also argues that it would be in Australia’s interests to act unilaterally and to introduce a domestic moratorium on new coal mines even if other countries chose not to.

Such a moratorium has been called for by President Tong of Kiribati and 11 other Pacific Island leaders. Significantly, these countries most threatened by climate change are not alone. The view that it is possible to have ‘too many’ coal mines and that subsidising new mines would impose costs on existing mines is shared by parts of the coal industry itself. The CEO of Glencore Australia, Peter Freyberg, recently stated that:

“Bringing on additional tonnes with the aid of taxpayers’ money would materially increase the risk to existing coal operations.”<sup>2</sup>

While Glencore has not supported a global moratorium on new coal mines, their global CEO Ivan Glasenberg has called on other coal mining companies to match Glencore’s to cut production. Speaking at the Annual General Meeting of Glencore, CEO Ivan Glasenberg stated:

“Unfortunately our competitors in the world have produced more supply than demand and commodity prices are down for that reason. I am doing my level best to convince my competitors that we should understand demand and supply”.<sup>3</sup>

In addition to shareholders of Glencore and residents of Pacific islands, a wide range of stakeholders would benefit from a moratorium on new coal mines, including:

- 1) the owners of incumbent coal mines,
- 2) financial institutions that have lent to incumbent coal mines,

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<sup>2</sup> Robins, B, Ker, P (2015) “Glencore hints at more Hunter Valley coal mine closures” in *Sydney Morning Herald*, 7 October, <http://www.smh.com.au/business/mining-and-resources/glencore-continuing-to-consider-coal-closures-20151007-gk334x.html#ixzz3oC58qokE>

<sup>3</sup> Lamiter, C (2015) “All commodity prices to decline in 2015” in *Australian Mining*, 27 July, <http://www.australianmining.com.au/news/all-commodity-prices-to-decline-in-2015>

- 3) the workers at incumbent coal mines,
- 4) the owners of oil and gas companies,
- 5) the owners of, and potential investors in, renewable energy,
- 6) those who want to see greenhouse gas emissions reduced and those harmed by climate change, and
- 7) those who will be harmed by an increase in particulate air pollution associated with an increase in coal production.

Those who bear the costs of the moratorium are largely limited to companies wanting to build coal mines in the future. Therein lies the strength of a moratorium on new coal mines both economically and politically. While many approaches to climate policy impose upfront costs on a small number of powerful political actors, such as the entire fossil fuel industry, and deliver to a diffuse and politically less powerful beneficiaries in the future, a moratorium delivers immediate benefit to many powerful stakeholders and puts costs on a small group of companies. These companies' proposals are, furthermore, already being undermined by recent changes in the competitive dynamic of the world coal industry.

# The changing competitive dynamic in the world coal industry

Global coal consumption grew by just 0.4 per cent in 2014, well below the 10 year average annual growth rate of 2.9 per cent. Chinese consumption grew by just 0.1 per cent and global coal production actually declined by 0.7 per cent over the same period.<sup>4</sup>

Macquarie Bank recently concluded of the coal market that

“Demand growth is now extremely stagnant... The only thing that will close the balance is supply cuts.”<sup>5</sup>

With flat demand for coal, the competitive dynamic between the coal mining companies has fundamentally changed. In a stagnant global coal market every new mine simultaneously reduces the market share of incumbent coal mines and drives the coal price down. Whereas miners were once united in their efforts to have new mines approved as quickly as possible (as the rate of return on coal was well above the cost of capital), the statements from Glencore show that the coal industry is now split between incumbents and potential new entrants.

Australia’s proposed expansion of coal mining must be viewed in this new competitive context of incumbents versus new entrants. While Australia’s incumbent miners are already large producers (Australia has a larger share of the seaborne coal market than Saudi Arabia has of the world oil market), there are 52 further coal expansion proposals with combined new capacity of more than 400 million tonnes of coal per year.<sup>6</sup> To put this in context, Australia’s coal exports in 2013-14 were 375 million tonnes.<sup>7</sup>

The scale of the proposed coal expansion in Australia is significant for global markets. The volume of the global seaborne coal trade, according to the IEA, was 1,232 million tonnes in 2014.<sup>8</sup> That means Australia’s proposed new coal export capacity is equivalent to more than

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<sup>4</sup> BP (2015) *Statistical Review of World Energy*, <http://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html>

<sup>5</sup> Smart, G (2015), “Global Metals Market Needs Widespread Supply Cuts: Macquarie” in *Platts*, 14 July, <http://www.platts.com/latest-news/metals/london/global-metals-market-needs-widespread-supply-26147614>

<sup>6</sup> Office of the Chief Economist, (2015a) “Major Coal Projects”, *Resources and Energy, Major Projects*, April <http://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Pages/Resources-and-energy-major-projects.aspx>, not including completed projects (currently ramping up production). Note this includes proposed lignite processing plants,

<sup>7</sup> Office of the Chief Economist (2015b) *2015 Australian Energy Statistics*, <http://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/aes/2015-australian-energy-statistics.pdf> Page 23

<sup>8</sup> IEA (2015) *2015 Coal Information*,



“One of the things they are looking at is how we can ensure that the railway line remains financially viable. I can’t give away too many details, but we are working away at that.”<sup>10</sup>

Similarly, the new Minister for Resources, Josh Frydenberg, described the Adani/Carmichael mine as

“a very important project, which will see significant investment in Australia and provide electricity to millions of people in the developing world”<sup>11</sup>

When asked if the \$5 billion Northern Australia Infrastructure Fund might be used to fund the Adani/Carmichael rail line Minister Frydenberg said

“Yes, if there is a good case and state governments are willing to step up, then you would think that rail is one of the areas where it will go.”<sup>12</sup>

The Queensland State Government is also considering supporting the project financially and providing subsidised infrastructure:

“Fairfax Media obtained a trove of documents under Right to Information requests submitted to Queensland Treasury. These show a retinue of meetings between Adani and bureaucrats and politicians in Brisbane, almost from the moment the Labor government came to power.

The correspondence is heavily redacted but it includes evidence of a legal advice memo about Galilee rail project financing, risk reports and a memo entitled “Memo re: Galilee Rail Line Infrastructure Draft Term Sheet Principles”.<sup>13</sup>

Leaving aside the issues of climate change, air pollution, and the views of incumbent miners like Glencore, the clear proof for economists that we are building ‘too many’ coal mines is the fact that the proposed new projects need subsidies to proceed. If proponents of new coal mines genuinely believed that the long run benefits of the mine exceeded the costs of construction and operation they would be willing to risk their money on such a belief, or find private financiers willing to take that risk. No banks have offered to support Adani and many have publicly ruled it out.

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<sup>10</sup> in Cox, L (2015) “Abbott government hints Adani could be considered for rail funding” in *Sydney Morning Herald*, 24 August <http://www.smh.com.au/federal-politics/political-news/abbott-government-hints-adani-could-be-considered-for-rail-funding-20150824-gj6ci9.html>

<sup>11</sup> West, M, (2015) “Adani loses Liberals but gaining Labor?” in *Sydney Morning Herald*, 8 October, <http://www.smh.com.au/business/mining-and-resources/adani-loses-liberals-but-gaining-labor-20151008-gk50dm#ixzz3oCHOxUwH>

<sup>12</sup> Cox, L, (2015) “Josh Frydenberg says \$5 billion northern Australia fund could be used to finance coal” in *Sydney Morning Herald*, 22 September <http://www.smh.com.au/federal-politics/political-news/josh-frydenberg-says-5-billion-northern-australia-fund-could-be-used-to-finance-coal-20150922-gjstnp.html#ixzz3oCLo0vjb>

<sup>13</sup> West, M, (2015) “Adani loses Liberals but gaining Labor?”

# Greenhouse gas emissions have risen steadily since the world agreed they needed to fall

In 1992 the global community agreed on the UN Framework Convention on Climate Change (UNFCCC), which committed countries to work towards reducing greenhouse gas emissions. In the following 23 years the world has done the opposite. Indeed, since signing the UNFCCC, the world's nations have let CO2 emissions grow more than 53%. Coal is the major source of greenhouse gas emissions.<sup>14</sup>

Despite the failure of previous global commitment to reduce greenhouse gas emissions to reduce greenhouse gas emissions optimism still features prominently in the statements of national leaders. For example, in the lead up to the 21<sup>st</sup> Conference of the parties (COP 21) President Obama has declared:

“This year, in Paris, has to be the year that the world finally reaches an agreement to protect the one planet that we’ve got while we still can.”<sup>15</sup>

Asked about what success at COP21 means for fossil fuels, President Obama said:

“We’re not going to be able to burn it all. Over the course of the next several decades, we’re going to have to build a ramp from how we currently use energy to where we need to use energy.”<sup>16</sup>

Similarly the G7 group of major countries have explicitly committed to:

“decarbonise the global economy in the course of this century”.<sup>17</sup>

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<sup>14</sup> Jos G.J. Olivier, J G J, Janssens-Maenhout, G, Muntean, M, Peters, J A H W (2014) *Trends in global CO2 emissions: 2014 Report*, PBL Netherlands Environmental Assessment Agency The Hague, [http://edgar.jrc.ec.europa.eu/news\\_docs/jrc-2014-trends-in-global-co2-emissions-2014-report-93171.pdf](http://edgar.jrc.ec.europa.eu/news_docs/jrc-2014-trends-in-global-co2-emissions-2014-report-93171.pdf)

<sup>15</sup> Obama, B (2015) “Remarks by the President at the GLACIER conference – Anchorage, AK”, *The White House* 1 September <https://www.whitehouse.gov/the-press-office/2015/09/01/remarks-president-glacier-conference-anchorage-ak>

<sup>16</sup> Romm, J (2015) “‘Science Is Science’: Obama Embraces Price On Carbon, Leaving Fossil Fuels In The Ground” in *Climate Progress*, 8 June, <http://thinkprogress.org/climate/2014/06/08/3446271/obama-carbon-price/>

<sup>17</sup> Connolly, K (2015) “G7 Leaders agree to phase out fossil fuel use by end of century” in *The Guardian*, 8 June, <http://www.theguardian.com/world/2015/jun/08/g7-leaders-agree-phase-out-fossil-fuel-use-end-of-century>

It is now widely accepted that meeting the Internationally agreed goal of limiting warming to 2 degrees Celsius requires keeping most fossil fuels unburnt and in the ground. This fact has been acknowledged by the IPCC, the IEA, the Bank of England, the US President and the French President.

But at the same time that the leaders of the world's largest economies are making commitments to not just reduce their greenhouse gas emissions but to 'decarbonise' their entire economy the Australian government remains committed to the idea that building enormous new coal mines such as the Adani/Carmichael mine in Queensland's Galilee Basin represents not just a good private sector investment opportunity, but potentially a good use of taxpayers funds. Previous research by The Australia Institute has found that state government's spent around \$17 billion on mining subsidies in the past six years.<sup>18</sup>

The fact that Adani is willing to proceed with a mine that would produce more than 2 billion tonnes of coal over its life, and the fact that the Australian government is supportive of such a mine, says much about their view of the COP21 talks delivering a significant and legally binding commitment to reduce greenhouse gas emissions. Similarly, it is ironic that while Australia is often criticised for a 'lack of ambition' in its emission reduction commitments, successive Australian Governments are almost never criticised for their ambition to double Australia's coal exports, despite the fact that burning that coal has a much greater impact on the climate than the unambitious domestic targets.

The existing UN process of negotiating multilateral emission reductions is both slow and expensive with an estimated 15,000 people involved in the Copenhagen climate negotiations.<sup>19</sup> Of course every year that the world defers agreeing to achieve emission reductions is a profitable year for the owners of fossil fuel assets. Such profitable delay also makes the future task of stabilising the climate exponentially harder.

One of the simplest ways to stop increasing greenhouse gas emissions and start phasing out their use is to introduce a moratorium on new fossil fuel extraction projects. Avoiding new investment in long lived assets is, by far, the cheapest form of long term emission reductions. This paper does not argue that a moratorium is the only policy measure required to tackle climate change. However, given that there is no plausible scenario in which a world that is tackling climate change needs more coal mines, support for a moratorium on new mines would seem to be a precondition for any successful strategy to reduce greenhouse gas emissions.

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<sup>18</sup> Peel, Campbell and Denniss (2014), Mining the Age of Entitlement: State government assistance to the minerals and fossil fuel sector, <http://www.tai.org.au/content/mining-age-entitlement>

<sup>19</sup> Simplicity is often an overlooked virtue in policy design.

# Why a moratorium on new coal mines?

Coal is by far the biggest source of greenhouse gas emissions and, as a source of energy, also has the most substitutes. With that in mind the President of the small island state of Kiribati has recently called for a moratorium on new coal mines. He has also written to the leaders of every country asking for their support. His call has already been supported by 11 other pacific island nations, the Nobel Prize winning scientist Peter Doherty and economist Sir Nicholas Stern.

In the words of Lord Nicholas Stern:

A moratorium on new mines and mine extensions would complement the action that is being taken around the world to radically reduce and eliminate the demand for coal through the introduction of cleaner energy sources. Coal is not only the worst fossil fuel in terms of emissions of carbon dioxide, but also contributes worldwide each year to human illness and the premature deaths of millions of people from air pollution. When its true costs are taken into account, coal is far more expensive than its current purchase price, and it is poor people who are most exposed and vulnerable to the impacts of air pollution and climate change. The failure by governments to price coal correctly represents a huge and unjustified subsidy of hundreds of billions of dollars each year. The use of coal is simply bad economics, unless one refuses to count as a cost the damages and deaths now and in the future from air pollution and climate change.<sup>20</sup>

Further, major financial analysts have concluded that there is no near-term financial case for new coal mines to be built. A UBS analyst recently reported on thermal coal that “no new coal mines needed on 5+ year view”.<sup>21</sup> Goldman Sachs said that “The [coal] industry does not require new investment given the ability of existing assets to satisfy flat demand.”<sup>22</sup> Moody’s said half of world output is uneconomical at current prices and “Further

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<sup>20</sup> Stern, N, (2015) “Nicholas Stern Welcomes Initiative on Coal Mines by Anote Tong, President of the Republic of Kiribati”, *Grantham Institute, London School of Economics*, <http://www.lse.ac.uk/GranthamInstitute/news/nicholas-stern-welcomes-initiative-on-coal-mines-by-anote-tong-president-of-the-republic-of-kiribati/>

<sup>21</sup> Shaw, L, (2015) “Thermal Coal Markets, Opportunity for Japan?”, *UBS* <http://ieefa.org/wp-content/uploads/2015/09/UBS-report-Japan-et-al.pdf>

<sup>22</sup> Gloystein, H, (2015) “Coal futures drop to \$50/T first time since 2003 as Goldman calls peak”, in *Reuters*, <http://www.reuters.com/article/2015/09/23/coal-markets-slump-idUSL5N11T01420150923>

production cuts are necessary to bring the market back into balance,"<sup>23</sup>

A moratorium on the construction of new coal mines has a wide range of economic, political and diplomatic benefits. The economic benefits include:

- 1) The cheapest way to reduce greenhouse gas emissions is to avoid making expensive investments with long physical lives which will be unnecessary in a carbon constrained world. The opportunity cost of building large mines like Adani/Carmichael is substantial. The skilled labour and scarce resources used to build it can never be reused. Put another way, the cheapest way to phase out coal production is to stop building new coal mines.
- 2) A moratorium on new coal mines will put upward pressure on the coal price which both reduces coal consumption directly in the short term (price effect) and encourages fuel switching to new investment in renewable energy generation in the medium term (substitution effect). While such price effects are also associated with carbon pricing, the distribution of costs and benefits associated with a moratorium make a moratorium more politically feasible.
- 3) Simplicity is a policy virtue. Despite 20 years of intense debate, there is no consensus on the 'optimal carbon price' or 'optimal emission reduction target'. While economists may prefer to continue searching for the emissions price or quantity that delivers a safe climate at 'least cost' there is no economic reason that simple interim policy steps such as a moratorium on new coal mines cannot be pursued.
- 4) A moratorium helps to overcome the incentive to increase fossil fuel production which can accompany proposals to reduce fossil fuel use in the future. As discussed below, the so called 'Green Paradox' suggests that the rational owner of fossil fuel assets should accelerate their rate of extraction ahead of the introduction of future binding policy being introduced. Put simply, talking about tackling climate change can give fossil fuel owners an incentive to cause it more quickly.
- 5) As discussed further below, because of the negative externalities associated with coal production and consumption, the market price for coal is below the socially optimal price. Therefore, an increase in this price cannot be meaningfully described as a 'cost'. On the contrary, by increasing the price of a product that is already inefficiently cheap, a moratorium on new coal mines is welfare enhancing.

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<sup>23</sup> Parker, M (2015) "Half of global coal output uneconomical, says Moody's" in *Sydney Morning Herald*, 2 October <http://www.smh.com.au/business/markets/half-of-global-coal-output-uneconomical-says-moodys-20151001-gjziun.html>

# The Green Paradox

Standard economic modelling of carbon pricing schemes suggest that the policy change will increase the price of coal fired electricity and in turn, reduce the quantity consumed of coal consumed.

But could the introduction of policy designed to increase the price of fossil fuels *be the cause of* an increase in the supply of those same fossil fuels? The idea that the threat of future emission reduction policies might drive an increase in current coal production is known as the 'green paradox'.<sup>24</sup> Consider the following analogy:

Imagine you owned an ice cream van and were parked at the beach on a hot summer day profitably selling ice creams for \$3 each. Now imagine that your refrigerator broke and that you didn't have enough time to get back to your warehouse before all of your ice creams melted. What would you do to the price of your ice creams?

The economists answer to this question is to drop the price low enough to sell as many ice creams as you can before they melt.<sup>25</sup>

For the owners of fossil fuels, the threat of future climate action is the potential broken refrigerator in our example. On seeing the tentative first steps of global climate action, they are trying to increase the rate at which they extract their scarce resources from the ground before they become worthless like melted ice cream. Under the green paradox, modest attempts to reduce the demand for coal can lead to a flood of new supply as rational owners of coal try to dispose of their assets

Economists have typically relied on the 'Hotelling Rule' to predict how rapidly the owner of a scarce resource would extract it and sell it.<sup>26</sup> The Hotelling Rule suggests that a rational, profit maximising owner of a finite resource would seek to balance the short term desire to have money today with the long term desire to maximise profit by leaving an appreciating asset in the ground to be sold at higher prices in the future. In short Hotelling's rule suggests owners of coal would not be in a rush to dig up all of their coal and sell it in a hurry, especially when doing so would further push down the price of coal.

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<sup>24</sup> Sinn, H-W, (2012), *The Green Paradox - A Supply Side Approach to Global Warming* The MIT Press

<sup>25</sup> Without dropping the price so low that the revenue you receive is less than the cost of the time you were spending in the van selling them.

<sup>26</sup> Hotelling, H. (1931). "The Economics of Exhaustible Resources". *Journal of Political Economy* 39 (2): 137–175. doi:10.1086/254195

However, like all economic models, Hotelling's rule is based on the assumption of *ceterus paribus* (all other things remaining equal). In turn, when other things do not remain equal, predictions made based on Hotelling's rule will not hold. Put simply, if the owners of significant coal resources think that they will be unable to sell coal in 50 years' time then it is both rational and profit maximising to bring forward the extraction of coal as long as the marginal cost is lower than the market price.

This is especially the case when the fixed costs of building the mine can be covered, or reduced, via the provision of financial subsidies or direct infrastructure provision

# Political benefits of a global moratorium on new coal mines

Climate change has been described as a ‘wicked’ policy problem because it has the following characteristics:

- 1) upfront costs borne by a small number of powerful political actors,
- 2) future benefits accrue to a diffuse and politically less powerful constituency, and
- 3) deep uncertainty and disagreement about the nature of the problem and optimal solution.

While the pursuit of ‘optimal’ climate policy may indeed be a ‘wicked’ problem, policy solutions such as a moratorium on the construction of new mines provide a path towards an optimal outcome without encountering the political problems associated with, for example, carbon pricing. Consider the following:

- 1) By protecting existing coal mine owners from competition from new entrants a moratorium delivers short term, financial benefits to incumbents.
- 2) By increasing the price of coal and reducing the risk of the coal price falling further a moratorium delivers benefits to those who have lent money to the coal industry.
- 3) By reducing the supply, and increasing the price, of coal a moratorium delivers benefits to the oil and gas industry as well as providing them with a bigger share of any future ‘carbon budget’.
- 4) By reducing the supply and increasing the price of coal a moratorium delivers benefits to the renewable energy industry.
- 5) A moratorium on new coal mines protects workers in existing coal mines. In a flat market for coal it is new coal mines, not environmentalists, who threaten jobs in existing marginal coal mines.
- 6) Avoiding the cost of subsidising new mines provides politicians with the opportunity to make alternative spending promises designed to secure political support.
- 7) A reduction in coal production and consumption is good for human health. As coal consumption grows in densely populated countries the political benefits of reducing reliance on coal grow.

Whereas carbon pricing and plans to cap global fossil fuel consumption spread the financial costs of tackling climate change across the fossil fuel sector generally (and in turn unite powerful groups against such change) a moratorium on new mine construction focuses the costs of climate action on the owners of yet to be built coal mines.

Put another way, a moratorium delivers a built-in 'grand bargain' in which incumbent coal mine owners (and workers) benefit from higher prices and higher market share in exchange for supporting a policy which reduces the long run growth prospects for the industry. Only the most optimistic coal mine owner would be willing to forego an upfront increase in profit and a long term reduction in price risk in pursuit of a small share of possible future growth.

# The case for Australia proposing a domestic moratorium on new coal mines

There are a number of reasons for Australia to unilaterally introduce a moratorium on new coal mines:

- 1) With flat demand for world coal there is no obvious economic case for the rapid development of new mines as demand for the foreseeable future can be met from existing mines and building new ones will impose costs on existing mines and industries. Indeed, even the modelling conducted by the proponents of the Carmichael mine predicts that building such mines will impose costs on other industries, particularly manufacturing and other coal mines.
- 2) Beyond the foreseeable medium term, there is a high degree of uncertainty around world demand for coal and the future relative costs of renewable energy, battery storage and coal fired power. Given the 50-90 year life of some of large new mines proposed in Australia, and given the significant draw on scarce resources associated with the construction of such mines, the case for expediting the development of large new mines with large upfront infrastructure needs is weak. Put simply, if the new mines are viable over the next 50-100 years then postponing their construction for 10 years would have trivial costs and significant benefits.
- 3) Early unilateral action on coal mines from developed coal producing countries like Australia can provide impetus for an agreement that includes all producing nations.<sup>27</sup>
- 4) There are significant local health impacts from coal, as discussed below.

The reasons most commonly advanced against a moratorium by the mining industry's political supporters include:

- 1) A moratorium in Australia will do nothing to reduce global greenhouse gas emissions as if we do not build new mines other countries will.
- 2) We need to build new mines to help lift a billion people out of energy poverty.

It is important to note that these two arguments are contradictory; the industry's environmental argument is inconsistent with its social justice argument. The first argument suggests that coal mines are substitutes and that building new mines *does not add to* world

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<sup>27</sup> Collier, P, Venables, A J (2014) *Closing Coal: Economic and Moral Incentives*, May 2014 Centre for Climate Change Economics and Policy Working Paper No. 176 Grantham Research Institute on Climate Change and the Environment Working Paper No. 157, <http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2014/05/Closing-Coal-economic-and-moral-incentives.pdf>

supply (or the world's emissions). Rather increased Australian output simply substitutes Australian coal for foreign coal. The second argument, however, suggests that new Australian coal mines *do add to* the world supply of coal and, in so doing, allow more people to escape 'energy poverty'.

From an Australian point of view, however, the fact that new mines require significant subsidies to be 'viable' is proof that their long run benefits are unlikely to exceed their long run costs. Further, the fact that state governments have offered 'royalty holidays' and other incentives that reduce the benefits of mining to the Australian economy highlights how marginal the benefits of new mines have become.

Importantly, the idea that Australia will somehow 'miss out' on economic benefits unless we 'out-subsidise' other countries is inconsistent with 30 years of trade policy in Australia which has been based on the belief that other countries' willingness to subsidise their exports provides an opportunity for Australia, not a threat.

Further, if the purpose of building new coal mines is to help those in developing countries then the cost of other forms of international assistance need to be considered. For example, if the cost of mining subsidies was transferred to foreign aid then assistance could be targeted more directly and there would be no adverse impact on Australia's terms of trade.

To conclude, while there are obvious global benefits from Australia introducing a moratorium on new coal mines, such a policy change would deliver domestic economic benefits in the short term as well. If public funding earmarked for mining infrastructure is invested in transport and other infrastructure then construction activity will still occur. In avoiding a significant increase in new supply a moratorium would avoid further coal price reductions and, in turn, avoid reductions in the terms of trade, royalty payments from other mines and job losses at existing mines.

If coal demand rebounds strongly, perhaps after Carbon Capture and Storage has been made economically viable, then Australia could always revisit the case for continuing the moratorium.

# Who loses from a moratorium on new coal mines?

Cartels such as OPEC have delivered significant benefits to oil producing states, including those states that are not part of the cartel. The benefits of the oil cartel are, however, offset by higher costs to oil consumers. Similarly, a moratorium on new coal mines would, to the extent it reduced the supply of coal, lead to increases in the price of coal and products that rely heavily on coal, such as coal fired electricity

But while there is no doubt that imposing a moratorium on new coal mines would put upward pressure on coal prices over time, this provides benefits, in much the same way as an instrument to price externalities. It provides certainty for investment in cleaner energy and energy efficiency, driving greater cost reductions and disruption of the incumbent system, which can deliver substantial benefits to consumers. Moreover, the nature and extent of the (currently unpriced) negative externalities associated with coal production and consumption provide strong evidence that such a change in coal prices would enhance social welfare with substantial benefits to many consumers.

In recent years the rapid development of new coal fired power stations in densely populated regions of China has provided clear evidence of the significant costs associated with particulate air pollution caused by burning coal. However impacts of coal mining, transport and combustion are substantial in many countries. One study in the *American Economic Review* estimated local pollution from the US coal industry imposes damages of 0.8 to 5.6 times the industry's value added, mostly through death and health costs.<sup>28</sup> A recent study estimated 460,000 premature deaths per year worldwide from power generation emissions, comparable to deaths from malaria, and most of these fatalities come from coal.<sup>29</sup> According to other studies, outdoor air pollution from coal leads to:

- 260,000 premature deaths a year in China,<sup>30</sup>
- 115,000 premature deaths a year in India,<sup>31</sup> and

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<sup>28</sup> Muller, N Z, Mendelsohn, R, Nordhaus, W (2011) *American Economic Review* 101, pp1649–1675

<sup>29</sup> Lelieveld, J, Evans, J S, Fnais, M, Giannadaki, D, Pozzer, A (2015) "The contribution of outdoor air pollution sources to premature mortality on a global scale" in *Nature*, 525, 367–371, Calculated from table 2.

<sup>30</sup> Duggan, J (2013) "China's coal emissions responsible for 'quarter of a million premature deaths'" in *The Guardian*, 12 December, <http://www.theguardian.com/environment/2013/dec/12/china-coal-emissions-smog-deaths>

<sup>31</sup> Friedman, L (2015) "Coal-Fired Power in India May Cause More Than 100,000 Premature Deaths Annually" in *Scientific American*, 11 March. <http://www.scientificamerican.com/article/coal-fired-power-in-india-may-cause-more-than-100000-premature-deaths-annually/>

- 22,500 premature deaths a year in the EU.<sup>32</sup>

The cost of such lives, and broader health impacts, are not included in the conventional financial analyses typically used to argue that the ‘costs’ of coal fired electricity are significantly lower than the ‘cost’ of renewable energy. The terms ‘cost’ and ‘price’ are quite distinct concepts in well-structured economic analyses of products associated with externalities however this distinction is often missing from public debate around coal fired electricity

In addition to the local externalities associated with the consumption and production of coal there are also the significant global externalities associated with climate change. The US Government, for example, estimates the average damage inflicted through climate change from CO<sub>2</sub> (the ‘Social Cost of Carbon’) is currently US\$40 per tonne, and rising for emissions in later years.<sup>33</sup> While this figure is widely viewed as far too conservative and ignores extreme risks, even on these terms it is clear that burning a tonne of coal causes significantly more damage than that tonne of coal is worth on world markets. While on current forecasts the coal price is unlikely to rise substantially for many years, the damage from burning that coal will only continue to rise.

Put simply, given that climate change and particulate air pollution are caused by the fact that the market price of coal is ‘too cheap’ it is economically meaningless to argue that preventing the price of coal from falling further is ‘inefficient’.

The other group that could be said to ‘lose’ as a result of a moratorium on new coal mines are the owners of yet to be opened mines. While it is true that such owners would be harmed by the introduction of a moratorium it is also true that those owners would be harmed by the introduction of any binding commitment to reduce emissions or effective demand side policy.

That said, if it was believed that a moratorium imposed unfair burdens on particular owners or particular countries it would be possible to provide compensation to those groups. Indeed, some (but not all) of the windfall profits received by incumbent coal mining companies could be used to fund such compensation. Alternatively, a moratorium could be phased in on developed countries first, or on export mines first.

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<sup>32</sup> Vidal, J (2013) “European coal pollution causes 22,300 premature deaths a year, study shows” in *The Guardian* 12 June <http://www.theguardian.com/environment/2013/jun/12/european-coal-pollution-premature-deaths>

<sup>33</sup> Note this uses a 3% discount rate, which would have us care little about the wellbeing of our grandchildren later in their lives. It is also the average of a range. The 95<sup>th</sup> percentile of the range puts the damage at US\$120 per tonne.

US EPA (2015) *Social Cost of Carbon*, <http://www3.epa.gov/climatechange/EPAactivities/economics/scc.html>

# Conclusion

Economic policy debates are often based on two contrasting ideas, namely:

- 1) That all choices involve trade-offs (otherwise known as ‘there is no such thing as a free lunch’)
- 2) That self-interest drives the pursuit of Pareto efficient outcomes (otherwise known as ‘win-win’ outcomes or ‘the gains from trade’).

When it comes to tackling climate change proponents of rapid emission reductions typically focus on the long term benefits to everyone of tackling climate change (a win-win outcome in the long run) while opponents of rapid emission reduction policies typically focus on the short term cost to polluting industries (profit/jobs losses in the short term versus the environmental benefits in the long term).

A moratorium on new coal mines helps to solve the ‘wicked problem’ of climate change by delivering benefits to powerful groups up front and benefits to less politically powerful groups both up front and over time.

Tackling climate change requires major changes to the way that energy is produced and consumed. The rapid growth in investment in renewable energy and the rapid falls in the cost of battery storage are part of the economic transition that is required, but so too is the phasing out of coal production and consumption. While the rate at which coal should be phased out may be debatable, what is not debatable is that a world that is tackling climate change is a world that needs less coal mines, not more. In turn, the easiest and lowest cost way to begin that transition is to stop building new coal mines.

A moratorium on the construction of new coal mines such as that called for by President Tong of Kiribati is an essential first step towards significantly reducing greenhouse gas emissions. Fortunately, the introduction of such a moratorium at a time of stagnant growth in the demand for coal provides a unique opportunity to unite powerful vested interests and those seeking to tackle climate change.

# Appendix - Public polling

This paper has discussed the economic and policy dimensions a coal mine moratorium. But what do Australians think about the proposal?

In September 2015 The Australia Institute commissioned Research Now to conduct a national opinion poll of 1408 people, with nationally representative samples by gender, age and state or territory. The poll asked:

*A global moratorium on new coal mines would stop the building of new coal mines and coal mine expansions. Existing mines would continue to operate until the end of their approvals.*

*Do you support a global moratorium on new coal mines, as part of the Paris climate talks in December?*

The results were:

- 42.4 per cent support the proposal,
- only 19.1 per cent oppose, and
- 38.5 per cent say they neither support nor oppose.

Support for the moratorium increases, and both opposition and neutral responses decrease, when subsequently asked in the following terms:

*Would you support a global moratorium on new coal mines if global leaders said it was necessary to tackle global warming?*

Framed in terms of global leaders,

- only 14.4 per cent of respondents opposed the proposal,
- 31 per cent were neutral, but
- now 54.6 per cent said they support the proposal in total, an increase of 12.2 percentage points over the previous question.

**Table 1 – National Survey Results**

	Strongly support	Support	Neither support or oppose	Oppose	Strongly oppose
<i>Do you support a global moratorium on new coal mines, as part of the Paris climate talks in December?</i>	16.5%	25.9%	38.5%	14.1%	5.0%
<i>Would you support a global moratorium on new coal mines if global leaders said it was necessary to tackle global warming?</i>	20.3%	34.3%	31.0%	9.9%	4.5%

Interestingly, similar results were found in the city of Newcastle, home to the world's biggest coal port. Recently the NSW Planning and Assessment Commission granted approval for a new Terminal which would increase export capacity by 70 million tonnes of coal a year. Yet in Newcastle there is also support for the idea.

In September 2015 ReachTel conducted a poll for The Australia Institute of 764 residents of the NSW electorate of Newcastle. The residents were asked:

*Do you support or oppose a global moratorium on new coal mines and coal mine expansions, as part of the Paris climate agreement in December?*

Among Newcastle residents,

- 42.2 per cent said they support the proposal,
- 25.5 per cent opposed it.
- 32.2 per cent were undecided or said they did not know.

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