19 Economics

19.1 Assessment of Project changes

The estimated closure cost in the EA was $69 m but detailed engineering estimates that include the additional works to back-fill mine voids as described in the EA have increased this estimate to $340 m. The impacts of this change are described in Section 19.2.1. There are no other changes which affect economic aspects of the Project.

19.2 Economic issues

19.2.1 Project viability questioned

Submissions:

NA-13, I-4, I-7, I-8, I-15, I-18, I-20, I-21, I-22, I-23, I-26, I-27, I-28, I-29, I-30, I-32, I-35, I-37, I-38, I-39, I-44, I-46, I-47, I-48, I-54, I-55, I-58, I-59, I-61, I-62, I-64, I-66, I-67, I-68, I-69, I-71, I-72, I-74, I-75, I-76, I-79, I-80, I-81, I-83, I-84, I-85, I-86, I-89, I-90, I-91, I-93, I-95, I-97, I-98, I-100, I-104, I-106, I-107, I-110, I-111, I-114, I-116, I-117, I-118, I-119, I-125, I-128, I-130, I-131, I-132, I-133, I-134, I-135, I-136, I-137, I-140, I-142, I-144, I-148,151, I-152, I-153, I-154, I-156, I-157, I-161, I-163, I-164, I-168, I-169, I-170, I-172, I-177, I-178, I-179, I-181, I-185, G-1, G-2, G-5, G-10, G-13, G-15, G-19, G-27, C-2

Issues

The Project's financial viability is questioned mainly because the suggested 'agreed' price of product coal — $31.16 — is too low to cover the Project's development and operational costs. While only DP&I presented estimates of expected Project development and operations costs (i.e. $392 m a year or $19.60 per tonne of ROM coal), estimates of the required 'subsidy' were made by comparing the 'agreed' coal price with market prices for thermal coal of between $55 and $77 a tonne. The resulting estimates of subsidies over the Project's life were between $1.9 bn and $4 bn. The submission(s) then argue(s) this subsidy will be borne by NSW taxpayers (ie the public) and this could result in either or both increased State taxes or reduced State social, environmental and other programs.

Another viability-related issue is the State (ie the NSW community) will bear the risks of the Project's development and operations. These risks are perceived as being substantial for many reasons, including CHC's inexperience, poor coal quality, and the Project's large size and long life. A related concern is the 'cost recovery' nature of the Project could cause skimping in operational expenditure, including for environmental and social obligations. Some submissions go so far as to suggest the Project will operate at a loss and be an ongoing burden for taxpayers.

Specific issues submissions raise about the Project's viability are as follows:

- it was originally intended to provide fuel supplies for State-owned power generators but now that power stations are privately owned, why is the government continuing to pay for the development? It is claimed the Project will lock-in subsidised coal-fired power generation for the next 20–30 years despite the Coalition Government noting the 'significant risk and costs' the Project could pose (attributed to the NSW Treasurer);

- NSW Government mines were sold many years ago because the cost of extraction was too high, and it is not logical or economically viable to repeat this cycle.

- Coal-fired power generation is a 'sunset industry', which will diminish in the future. In addition, the cost of electricity is more influenced by 'gold-plating of wires' than coal and subsidising the proposed coal mine will damage the NSW economy. An illustration cited is Indonesia's petroleum industry where, it is suggested, 40% of that country's budget is used to subsidise the industry and this has ruined the country's economy.

- Subsidies for the mine will lead to increased taxes and electricity prices, and unless the mine is operated by the State, the cost of the mine contracts would need to be recouped by increasing the price of electricity.

- The Project should be required to operate in the open market, with coal sold at competitive prices and the profit used for other investments. This would provide more sustainable jobs and a more stable economic position in the future.

- the costs of rail upgrades needed for the Project, including those for two major level crossings in Newcastle, will either increase the price of the coal produced or increase the subsidy paid by taxpayers to the power industry.

- the cost of Project infrastructure, particularly for the rail system, is said to be very large and the same funds could be used to benefit other sectors, such as health and education, which implies that these upgrades will be a large social cost now and in the future.

- there is no justification for sourcing coal so far from the power stations in the Hunter and Central Coast, which were built near known coal resources. These submissions question the Project's location and maintain that to be economically viable it would be better situated close to these power stations. It is further argued that the impact of additional train movements on the communities along the Hunter rail corridor is unnecessary.

- the potential privatisation of the mine and generators may affect the Project's viability. In particular, this may create a consequential need for subsidies need to maintain a low contract price of coal and still meet the Project's operational costs.

- the estimated annual operating costs for the mine ($392 m or $19.60 a tonne of ROM coal) appear to be low and are questioned. A clear breakdown of forecast costs to extract, treat and transport the coal is requested.

Response

The Director General's environmental assessment requirements (DGRs) for the Project include requirements for the following to be included in the economic assessment:

- potential direct and indirect economic benefits of the project for local and regional communities and the State; and

- a detailed assessment of the costs and benefits of the development as a whole, and whether it would result in a net benefit for the NSW community.

Correspondingly, the EA presents an economic analysis as there is no requirement for the EA to consider the financial implications of the Project for the proponent. The former is about the benefits and costs of the Project to Australia taken together, whereas the latter is about the financial implications to a specific entity, in this case CHC.

As explained in the following section, the finding of the economic analysis that the Project will have net benefits to Australia of between $1,937 m and $2,138 m, excluding changes to the final rehabilitation costs, remains valid. The estimated closure cost increase from $69 m to $340 m is a net present value difference of $65 m (based on a discount rate of 7%). The adjusted net benefits to Australia will be between $1,872 m and $2,073 m.

19.2.2 Cost-benefit analysis questioned

Submissions:

I-4, I-28, I-38, I-46, I-55, I-64, I-74, I-84, I-85, I-92, I-98, I-110, I-116, I-118, I-136, I-140, I-148, I-152, I-157, I-170, I-185, G-5, G-10, G-13, G-16, C-1, C-2, NA-3

Issues

The accuracy of the cost-benefit analysis (BCA) for the Project is questioned, with assertions it did not take into account the social disruption; competition for workers in other industries, particularly local agriculture and tourism; or the costs of major infrastructure upgrades, particularly to rail lines, to accommodate additional coal transport.

It is suggested the indirect public costs of the Project, including climate change impacts were not incorporated into the Project BCA. Relevant social costs would include those associated with population displacement due to changed climatic conditions, increased incidence of tropical diseases, and injury and loss of life associated with extreme weather events.

A number of submissions question the BCA results and suggest the benefits have been overstated and costs understated. The main suggested overstatement is revenues received from coal sales given the assumed price of $77 a tonne whereas the actual price is more likely to be around $31. One estimate of the net effect of this reduced price is the Project's benefits would fall from the $2 bn estimate given in the EA to minus $1 bn.

On the costs side there are suggestions that numbers have been either overstated or omitted. The EA includes costs for greenhouse gas emissions from Project operations but not those from combustion of coal at power stations. One estimate of these is around $4 bn, which, it is said, would "substantially exceed the estimated benefits of the project".

The estimated value of employment created by the Project is also contested. Effectively, the contention made is that no economic benefit should be attributed to the Project (and coal mining projects generally) because the economy is operating at 'full employment', meaning no recruits would be drawn from the unemployed. The assertion is the Project will cause excessive competition for labour, adversely affecting other industry sectors, particularly agriculture, renewable energy and tourism, resulting in a cost not a benefit. It is also said the Project will damage the region's image as a 'clean' agricultural area.

The remaining submissions suggest underestimated costs are environmental, social and for infrastructure. It is suggested local noise and dust costs and those along the rail corridor were not fully costed. The contention is no allowances were made for impacts beyond zones of affectation (ie where formal noise and other criteria would be breached) even though non-compliances are 'likely' and that purchasing properties causes disruption and hardship that was not costed. More broadly, the Project's land purchase program is said to be disrupting the 'social fabric' of the local rural community, with the associated cost being estimated at $1.96 bn and this cost is not included in the BCA. Other suggested cost omissions are for health effects of dust, damage to local roads and the attendant maintenance costs, rail upgrade and operating costs and ecological and water quality costs because the effectiveness of offsets as compensation is questioned. Doubt is expressed as to whether all acquisition and management costs for the offsets 'in perpetuity' have been included (as distinct for the Project's 21-year life).

The distribution of costs and benefits is also seen as an issue. Submissions claim these are skewed with nearly all costs being experienced locally and most benefits accruing to distant stakeholders, particularly the NSW Government. A related complaint is there has been little return of royalties' revenue to mining regions. This overall theme is a concern for the four affected councils, and most request a clearer analysis of local costs and benefits.

The final critique of the BCA is some parameters are not transparent enough to allow independent checks. Suggested specific examples are: the volume of run-of-mine coal that will be produced, coal quality so as to check likely sales prices, the product coal price and the likelihood of occurrence of different coal prices used in the sensitivity analysis.

The suggested overall outcome is the Project will cause a net loss to 'the welfare of the NSW public' and therefore the Project is not in the public interest and should be refused.

Response

The most contentious aspect of the economic analysis is the finding the Project will produce a net benefit to the Australian community while other reports and commentators suggest that it could result in a loss for taxpayers. One of the main reasons is the use of a coal value of $77 a tonne in the EA, whereas others suggest the correct price should be $31.

The disparity arises because of the difference between economic and financial analyses. As explained in Section 19.2.1, the EA is only concerned with the former. In economic analysis the correct value of an output is that in a competitive market. As identified by Sinden and Thampapillai (1995), the world market for a good is larger and so more competitive than any domestic market. The world market is therefore an appropriate one from which to derive shadow prices for goods that could be traded with other countries.

In the EA's economic analysis the world market price for the Project's lower value coal output is used, that is $77 a tonne for coal delivered to port and $77 a tonne less delivery costs to port for coal free-on-rail for domestic generators. Using these values the net economic benefits estimated in the BCA of between $1,872 m and $2,073 m (adjusted for closure costs — see Section 19.2.1) are correct, assuming other estimates of various costs and benefits that have been questioned remain valid, as is discussed further below.

Climate change costs

A number of submissions suggest climate change costs were underestimated. However, it is considered the approach used in the EA is correct for the following reasons:

- The Project is for the mining, processing and delivery of coal to domestic and export customers only. The relevant costs and benefits are those from these activities not further uses of the product;

- coal is an intermediate good, which is one used to produce other goods or services. It is not correct to include the costs and benefits of the downstream use of coal. BCA is a type of partial equilibrium analysis that attempts to isolate the marginal effects of a particular project, holding all other things equal, including, in this case, the downstream uses of coal;

- the downstream use of coal is a secondary market effect. According to Sinden and Thampapillai (1995), net benefits that accrue to those who sell inputs to a project or process outputs from a project are secondary effects. These effects can only be truly identified, and their inclusion in a BCA is justified when the market for inputs or outputs is clearly non-competitive. This is not the case with coal and normal practice is to exclude them in BCAs (see for instance Sinden and Thampapilla (1995), Department of Finance (2006), and Boardman, Greenburg, Vining and Wiemer (2001); and

- the downstream use of coal constitutes a different project. The NSW Treasury (2007) cautions against excessive combining of activities in projects that can themselves be subject to BCA. If coal is proposed to be used for electricity generation then the costs associated with that project would include those for coal, labour, land, equipment, electricity distribution and environmental impacts, including greenhouse gas generation. The relevant benefits would include competitively priced electricity, and various positive externalities, including better medical, education and general economic development conditions.

Employment as a benefit

Various submissions contest the inclusion of additional employment as an economic benefit. There are two shortcomings with this suggestion and the references cited in the submissions. Firstly, it misunderstands the fundamental concepts of neoclassical welfare economics on which this value is based and, secondly, the views of economists cited are misrepresented.

Neoclassical welfare economics and BCA are based on the concept that individuals are the best judge of what makes them better or worse off. It is then the addition of individual benefits and costs that gives an indication of community wellbeing and hence costs and benefits in BCA. Therefore, it is not up to other economists to determine (without any empirical evidence) whether the community holds values for the employment of others — it depends on the preferences of individuals in the community.

Portney (1994) (a member of the so-called Blue Ribbon Panel that considered the merits of non-market valuation methods in assessing environmental damage claims in the USA) recognised the broader community may hold non-market values for social outcomes, such as employment. Portney (op cit) identified that the concept of existence values (which has been applied extensively in an environmental context) should be interpreted more broadly and include non-market, non-environmental goods:

> If I derive some utility from the mere existence of certain natural environments I never intend to see (which I do), might I not also derive some satisfaction from knowing that refineries provide well-paying jobs for hard-working people, even though neither I nor anyone I know will ever have such a job? I believe I do. Thus, any policy change that "destroys" those jobs imposes a cost on me – a cost that, in principle, could be estimated using the contingent valuation method...Since regulatory programs will always impose costs on someone – taking the form of higher prices, job losses, or reduced shareholder earnings – lost existence values may figure every bit as prominently on the cost side of the ledger as the benefit side. (Portney 1994, p. 13).

There is considerable empirical evidence to support Portney's position. A number of choice modelling (CM) studies have included employment effects, such as in energy programs (Johnson & Desvouges 1997), forest industry employment changes from protection of threatened Woodland Caribou in Alberta (Adamowicz et al. 1998), direct forest industry impacts from different forest management in Saskatchewan (Moon 2004), irrigation-related employment losses as a result of wetland protection (Morrison et al. 1999), loss of direct jobs and regional income from a reduction in broad-scale tree clearing in the Desert Uplands of Queensland (Blamey et al. 2000), and local employment losses from different conservation management strategies for the Matang Mangrove Wetlands in Perak State, Malaysia (Othman et al. 2004).

In all cases, apart from Adamowicz (1998), the social attribute of employment was highly significant in the respective econometric models. In a coal mining context, Gillespie Economics (2008, 2009a and 2009b) found the NSW community had a positive and statistically significant willingness to pay for additional years that mines would provide direct jobs.

There are therefore very strong theoretical and empirical arguments for attributing a social value to employment provided by the Project in the BCA.

Concerns raised about ANU's Professor James Bennett having doubts in relation to inclusion of a social value for employment in the Maules Creek economic assessment concerned the limitations of benefit transfer. This is the transfer of a value from a study in a different location and context, and situations where the economy may be at full employment and hence projects do not add to employment in society. This issue is not considered relevant to this Project, because it is difficult to argue the Australian economy would be at full employment over its full life. Limitations with benefit transfer are acknowledged and hence were conservatively treated in the economic analysis of the Project, with the BCA providing alternative results both with and without a social value for employment.

Professor Bennett is one of Australia's most senior academic economists. His field of expertise is non-market valuation. He has included social values for employment in a number of his research studies, including the following peer reviewed and published reports:

- Morrison, M, Bennett, J and Blamey, R 1999, 'Valuing improved wetland quality using choice modelling', *Water Resources Research*, Vol. 35, No. 9, pp. 2805–2814;
- Bennett, J, Van Bueren, M and Whitten, S 2004, 'Estimating society's willingness to pay to maintain viable rural communities', *Australian Journal of Agricultural and Resource Economics*, Volume 48, Issue 3, pp. 487–512;
- R K Blamey, Bennett J W, Louviere J J, Morrison M D and Rolfe J C 2002, 'Attribute Causality in Environmental Choice Modelling', *Environmental and Resource Economics*, 23: 167–186, 2002;

- Blamey, R, Rolfe, J, Bennett, J, and Morrison, M, (2000), 'Valuing remnant vegetation in Central Queensland using choice modelling', *The Australian Journal of Agricultural and Resource Economics*, 44(3): 439–56; and

- Gillespie, R and Bennett, J 2012, 'Valuing the Environmental, Cultural and Social Impacts of Open Cut Coal Mining in the Hunter Valley of NSW, Australia', *Journal of Environmental Economics and Planning,* in press.

Professor Quiggin and Dr Denniss are also quoted in submissions as criticising the inclusion of the social value of employment in BCAs. However, examination of the references provided does not support the claims made.

Professor Quiggin is cited in the context of the Warkworth coal project in the Hunter Valley. His main concern was whether employment effects at Warkworth, from a general equilibrium perspective, would be as great as suggested. He made no comment on the veracity, or truth, of attributing a social value to employment in CM studies. Similarly, the affidavit of Dr Denniss was mainly concerned with the use of input-output analysis and the extent to which employment generated by the Warkworth project would crowd-out other employment in the region. Dr Denniss made no comment on the legitimacy, that is whether it was right, of including a social value for employment in that BCA.

As previously mentioned, BCA is a partial equilibrium analysis rather than a general equilibrium framework and secondary market effects are not relevant. In this partial equilibrium framework, the full direct employment impacts provided by mining projects are relevant for inclusion in BCAs provided households hold values for them.

Noise, dust and other amenity costs

Some submissions suggest these costs had been assigned a zero value beyond the costs of mitigation that were included in the Project's capital costs. This assertion is not correct.

Land directly required for mining was included in the BCA either as part of the Project's development costs or as an opportunity cost (if the land had already been acquired). Impacts on properties that are likely to be adversely impacted by noise or dust above relevant guidelines were included as the full acquisition cost of the land rather than the partial property devaluation that they are likely to experience.

Exposure of private landowners to visual impacts of the Project was largely minimised by acquiring most affected land. Hence, the full cost of the land rather than partial property devaluation has been included in the analysis. The cost of targeted tree planting to mitigate other visual impacts has also been included in the analysis.

For those properties identified as not being significantly impacted (according to government guidelines), it is considered there are not significant impacts on their property value that warrant inclusion in the BCA, particularly given that for the for properties that are significantly impacted the cost has been overstated by including the full property value rather than the partial property devaluation. As identified in the NSW Government draft guideline for the use of BCA in mining and coal seam gas proposals: "in estimating these benefits and costs, there is the practical principle of materiality — costs and benefits that will not have a material bearing on the decision do not need to be included in a CBA".

Disruption of rural communities

One submission questions why values for employment and Aboriginal site impacts used in the CM study for the Warkworth project were used in the Project's BCA but costs from the loss of rural communities used in the same study were not.

The answer is that the attribute for rural communities used in the Warkworth study related to the Bulga village (a small rural community comprising 175 families on mainly rural residential blocks, a tavern, a cafe/roadhouse, a police station and a church) that might be disrupted as a result of noise and dust impacts[1]. No similar rural village is likely to be affected by the Cobbora Project and hence the value estimated in the Warkworth study has no relevance to it.

The same submission is critical of the CM study made for the Warkworth project because of 'various methodological flaws'. It is therefore relevant to note this study was subject to a double-blind peer review and has now been published in the *Journal of Environmental Economics and Planning*. The journal is edited by Dr Ken Willis, who is one of the foremost experts in non-market valuation in the world.

Costs of ecological losses and lower water quality

The economic assessment identifies that the Project will require the removal of threatened flora species, threatened ecological communities and threatened habitats. However, while the Project will result in some impacts to threatened species and communities within the disturbance footprint, it will also include the implementation of an offset strategy. In accordance with the NSW Government's policy on offsets it is a requirement that offsets meet the 'improve or maintain' standard. Provided that this is the case then it is appropriate to only include the cost of providing the offset strategy in the BCA.

Road and rail costs

Some submissions assert that VPAs negotiated by councils are not covering the full costs of associated damage, and that residual costs should be included in the BCA.

As identified in the BCA, **t**he Project will increase road traffic levels during construction and operations. As a result, some sections of local roads will require road realignments and intersection upgrades, road shoulder upgrades, and additional traffic management or maintenance. Existing traffic safety conditions on the affected road network are relatively good. Implementation of the identified road and intersection capacity improvements will ensure road conditions remain good. The capital costs of these works have been included in the estimate of all costs applying to the Project and have been deducted from the gross benefits.

The Project will increase demand for the rail network to allow coal to be delivered to customers. In recognition of the growing demand for coal and other freight transport, there are a wide range of network improvements the ARTC and RailCorp have identified to improve freight train capacity on the most constrained sections of the rail networks. The costs of these improvements and operation of rolling stock are reflected in the user charges, which were included in the estimate of net production benefits.

[1] Although it should be noted that mine design was such that no adverse impacts were ultimately predicted for the village.

Distribution of costs and benefits

In terms of the distribution of the net production benefits, the economic analysis clearly indicates there are likely to be minimal after tax profits to CHC or company tax payments to the Commonwealth Government given the cost recovery nature of the Project. The main net production benefits will accrue to:

- the NSW Government via royalties (estimated at $407 m or $158 m present value at 7% discount rate), which will then be used to fund government infrastructure and services across the State, including the local region;
- coal-fired power generators through lower cost coal and then NSW electricity consumers (and to a lesser extent Australian electricity consumers) through lower cost electricity (estimated at $1,856 m); and
- the local community in the form of voluntary contributions to community infrastructure and services.

Transparency of calculations in BCA

One submission asserts that key data and assumptions are omitted from the BCA so that independent checking is not possible.

It is correct that the detailed financial cost and revenue estimates underpinning the economic analysis of the Project are not reported. This is because this information is commercially sensitive. Nevertheless, enough information is provided to roughly replicate the results, including ROM coal production levels, product coal production levels, opportunity cost of land and water, assumed value of the coal, capital costs and average operating costs.

The same submission provides a reworking of the calculations giving a different result. However, this submission fails to incorporate the fact that coal production will not start until year 5 of the BCA, with operating costs increasing over a further five-year period. It is relevant to note the group in question made the same errors in similar submissions to the Boggabri and Maules Creek Projects.

19.2.3 Regional economic impacts

Submissions

G-10

Issues

The utility of input-output analysis as a tool for estimating regional economic effects is questioned. The basis is qualifications expressed by the ABS in 2011 and Professor Peter Abelson in the same year. In essence the proposition put is input-output modelling ignores capacity constraints in the economy and thus ignores the effects of mining on other sectors, such as agriculture. An alternative method, general equilibrium modelling, is nominated as a more appropriate tool. It suggests this technique would show substantial destruction of jobs in other sectors, especially agriculture and manufacturing, as a result of the Project.

The submission suggests that using input-output analysis creates a misleading impression of the Project's impacts. It suggests input-output analysis has fallen out of favour with economists for a number of reasons and provides a number of quotes referring to the assumptions of input-output analysis. It refers to the proposed China First coal project in Queensland where general equilibrium modelling was used and found to partly offset some industry impacts.

Response

Input-output analysis is a suitable methodology for predicting changes in the structure of regional economies and is consistent with the NSW DP&I *draft Guidelines on Economic Effects and Evaluation in EIA,* page 18:

> If a proposal is predicted to have significant economic impacts at the regional or State scale, it is appropriate to assess these economy-wide effects.....These impacts can be assessed by means of a multi-sectoral or input-output model which identify regional impacts in terms of changes in the value of output for separate sectors of the regional economy, as well as changes in value-added, income and employment.

The assumptions underlying input-output analysis are well documented, including in the economic analysis of the Project (Appendix R). The main input-output analysis assumptions relate to full employment with no capacity constraints, and thus prices have no role to play in the input-output model (unlike general equilibrium modelling). However, if the area under study is a small, open economy relative to the rest of the nation, where factors of production can easily move into and out of the region and local prices gravitate to external prices (subject to transport margins etc), then the input-output model provides a reasonable and cost-effective approach to estimating disaggregated impacts by sector at the regional level (Powell et al. 1985; West undated).

Alternative approaches, such as general equilibrium modelling, relax some of the input-output assumptions. However, developing these models at the regional scale is complex and there are difficulties associated with estimating a large number of coefficients and parameters when there are virtually no local data available. Equilibrium modelling has therefore usually been applied at the state or national level to policies with a broader dimension, while input-output analysis has usually been applied at a regional level.

Equilibrium modelling has been applied in the case of the China First Project because of its very large scale, that is:

- four 9 Mtpa underground longwall coal mines;
- two 10 Mtpa open cut pits;
- two coal preparation plants, each with raw washing capacity of 28 Mtpa;
- a world class railway facility;
- a 40 Mtpa port facility; and
- other associated supporting infrastructure.

Contrary to assertions that input-output analysis has fallen out of favour, it was recently used by the NSW Government in relation to National Parks[2] and the Commonwealth Government in relation to the draft Murray Darling Basin Plan[3]. The submission also implies that the ABS warns against using input-output analysis. This is not the case as the ABS produces and publishes input-output tables. It is clear that input-output analysis is an appropriate and helpful tool for decision-makers, albeit subject to the caveats (warnings) cited by the ABS.

19.2.4 Declining demand for coal

Submissions

I-8, I-73, I-152, I-161, G-5, G-10

Issues

Several submissions argue the demand for the coal is declining and this means coal could be supplied from other sources without the need for a new mine at Cobbora. One submission further states there is no definition of domestic and export capacity in the proposal and that no one would buy the coal as it could be sourced more cheaply from China and Indonesia.

Further submissions question the use of tax-payers' money, without representation, to subsidise coal when demand for it is dropping 'dramatically'. One refers to the privatisation that occurred under the Keneally Government and rising public awareness (about climate change) as drivers for decreasing demand.

Response

Coal is a globally traded commodity. As such future demand and prices will be strongly influenced by international factors, as well as those specific to NSW. This combination of global and domestic factors is complex and a summary is provided below.

Global consumption of coal has increased substantially over the past decade. In 2001, coal provided about 28% of the world's primary energy supplied by fossil fuels whereas by 2011, coal's proportion had grown to around 35% (*The Economist* 5 January 2013). At the same time total consumption of fossil fuels for primary energy production grew by about 30% from 8.15 bn to 10.7 bn tonnes of oil equivalent (btoe) as global energy supply almost doubled. According to the International Energy Agency (IEA 2012), "coal met nearly half of the rise in global energy demand, growing faster even than renewables".

Most of the growth in coal demand has come from China, which, in 2011, overtook the USA as the world's largest electricity producer. In 2001, Chinese coal demand was about 600 Mtpa. By 2011, its demand had tripled. Other developing countries are also consuming more coal with India's recent consumption growing at around 6% annually (*The Economist* op cit).

[2] CARE 2009, *Regional Economic Impacts of National Parks in the Riverina Bioregion*, prepared for NSW DECCW.

[3] Arche Consulting and Gillespie Economics 2011, *Assessing the Local Economic Impacts of the Draft Basin Plan*, prepared for MDBA.

In Europe coal demand has fluctuated since 2008 at between 420 and 430 Mtpa. This is despite a strong policy context, principally the EU's emissions trading scheme, aimed at reducing carbon emissions. In 2009, coal demand fell by about 5% but a combination of higher prices for alternative fuel supplies (especially gas where the price in Europe is almost five times that in the US), closure of nuclear plants and low carbon prices under the ETS improved the relative position of coal. Consequently coal demand rose again and in 2011 reached a five-year peak of about 430 Mtpa. In is not certain that this surge in demand will continue as the EU's target is to reduce carbon emissions to 80% of their 1990 levels by 2020 but, at present, 69 new coal generation plants are planned in Europe.

Not all of the world's major economies are experiencing growth in coal demand, with the US being a notable example. Historically coal has been the main fuel source providing 60% of electricity in 1988. However, in the intervening period, shale gas has emerged as an alternative energy source and, by 2012, gas and coal provided roughly equivalent proportions of about a third each (*The Economist* op cit). The combination of more and cheaper gas and stricter regulation of coal-fired power stations has reduced US coal demand, leading to a fall in coal output of about 100 Mt or 10% in 2012 compared to the previous year.

Turning to the future, global demand for thermal coal in the short term, to 2017, is expected to grow by about 13%. Beyond this global energy forecasts show growth of more than 33% to 2035 — this is the International Energy Agency's New Policies or central scenario. It assumes a substantially increased share of electricity from renewables, rising to up to a third, but fossil fuels remain the principal source providing between 66 and 75%. Whether coal remains the main fossil fuel depends on its comparative price and the strength of policy measures favouring lower carbon emissions and the resultant rate of deployment of more efficient coal-burning technologies. The most important decisions will be taken in Beijing and New Delhi because China and India could account for almost 75% of global growth in coal demand.

In NSW demand for electricity will increase by 14,000 GWh in the decade to 2016, that is on average by 1,500 GWh annually. More recently annual growth has slowed to about 1,400 GWh due to slower population growth, reduced energy intensity in the State's economy and improved energy efficiency.

The Australian Energy Market Operator produces the National Electricity Statement of Opportunities annually. The most recent statement (AEMO 2012), predicts that average electricity demand will grow 1.7% annually (to 2022). This is lower than the growth predicted in the previous statement (2.3%) (AEMO 2011). AEMO (2012) also predicts that maximum NSW demand will grow 1.2% annually (lower than the AEMO (2011) prediction of 2% annually). These lower demand growth rates mean that NSW is not projected to experience energy reserve deficits till at least three years after 2022 (AEMO 2012) rather than reaching a deficit of 190 MW in 2018–2019 (AEMO 2011). The predicted increased electricity demand will be met by the four major power stations that the Project will supply and has been allowed for in the AEMO's assessment of available generation capacity.

The reductions in the projected **growth** of energy demand are due to the following factors:

- changes in the economic outlook, including a reduced gross domestic product (GDP);
- reduced manufacturing consumption in response to the high Australian dollar;
- penetration of rooftop photovoltaic systems, which is expected to partially offset the needs for increased energy generation; and
- consumer responses to rising electricity prices and energy efficiency measures.

Coal is and will almost certainly continue to be the primary fuel source. Within the Project's life span the only factor that could change this materially is the emergence of much larger and cheaper supplies of coal seam gas. However, this industry is in its infancy in NSW and substantial production facilities may not be developed, as has been the case in Europe where regulation has virtually stopped the domestic industry's growth leading to continued reliance on expensive supplies from Russia. It also appears the developers of the new gas supplies are targeting the export market to such an extent there are fears that there will not enough gas for domestic uses unless the government intervenes.

The overall conclusion is there are almost no signs of decreased demand for thermal coal both globally and locally over the Project's life span. While there will be short-term fluctuations in demand and prices, the trend will be increased demand.

19.2.5 Coal-fired versus renewable energy

Submissions

I-6, I-7, I-12, I-13, I-15, I-20, I-21, I-22, I-23, I-26, I-27, I-29, I-30, I-32, I-35, I-38, I-39, I-44, I-46, I-48, I-54, I-55, I-58, I-59, I-61, I-62, I-64, I-66, I-67, I-68, I-71, I-72, I-74, I-75, I-76, I-79, I-80, I-83, I-84, I-85, I-86, I-89, I-90, I-91, I-93, I-95, I-97, I-98, I-100, I-104, I-106, I-107, I-110, I-111, I-114, I-116, I-117, I-118, I-125, I-127, I-128, I-130, I-131, I-132, I-133, I-134, I-136, I-137, I-140, I-142, I-144, I-148, I-150, I-151, I-152, I-153, I-154, I-156, I-157, I-163, I-168, I-169, I-170, I-172, I-177, I-178, I-179, I-180, I-185, G-10, G-11, G-15, G-24, G-27

Issues

A number of submissions call for the comparative BCA of coal-fired electricity against renewable energy sources, including their respective long-term benefits and costs. These submissions assert that tax payers' money would be better invested in renewable energy sources.

The above also argue that approval of the mine will stifle investment in renewable energy and reduce the competitive position of renewables. Some suggest subsidies for the renewable energy industry have been withdrawn in favour of old technology. Others are concerned about locking-in outdated coal-fired power generation for many years when it is suggested demand will decrease.

Related suggestions are that investment in renewable energy would be more effective than a coal mine in attracting new capital and creating more jobs, particularly in regional NSW.

Response

It is agreed that providing low-cost coal for coal-fired electricity generation will affect the price competitiveness of alternative forms of energy. Although is noted that forecasts of the relative price of alternative energy generation processes (BREE 2011 Figure F) indicate the cost advantage held by coal over renewable energy sources is likely to be maintained for the next twenty years. Most substitution across energy sources is predicted to be between natural gas and coal. Further discussion of alternative energy is provided in Section 14.2.4.

19.2.6 Effects of mine closure

Submissions

G-10, C-1, NA-13

Issues

One submission considers there needs to be deeper consideration of the socio-economic effects of ultimate mine closure and associated mitigation measures.

This submission notes that decommissioning and rehabilitation costs are identified as $69 m but considers further details should be provided as to how this figure was determined. In particular, the submission notes the general nature of final rehabilitation options for the mining voids, and considers that if costs of backfilling the voids were included, rehabilitation costs could be much higher than this estimate.

Another submission states it will not financially feasible to fully backfill the void in Mining Area B. It notes that no costs have been provided of the backfill option and how this affects capital costs. The submission seeks further justification about the option of backfilling to avoid pit lake development and issues associated with this, including rehandling overburden and seepage from emplaced material.

Response

The economic effects of closure were considered in the benefit/cost analysis in the BCA (EA Section 20.3.1). The residual value of assets and infrastructure, and workplace skills were expressly considered. In particular, it was noted that about 50% of the operations workforce will be recruited locally and these workers will receive considerable training thus improving their long-term employability.

The Project envisages closure after 21 years of mining. However, it is very difficult to be precise about such long-term actions and the potential for extended mining will be reviewed in Year 14, followed by a detailed closure plan (or extended mine plan) in Year 15. If the final decision confirms that closure will occur, the plan will reference relevant good practice guidance, which includes tools for social actions after closure, such as that prepared by the ICMM (2008).

As described in Section 19.2.1, the closure cost estimate has been increased to $340 m to allow for the additional measures to minimise post-closure impacts.

19.2.7 Lower electricity prices questioned

Submissions

NA-13, G-11, G-27

Issues

A number of submissions question whether the Project would result in more competitively priced electricity as claimed in the EA.

The EA says the extent of savings passed on to electricity consumers will depend on the level of competition in the marketplace. It is claimed that this is low with the Reserve Bank, for one, describing the electricity industry as 'highly regulated'. The suggested outcome is the Project is unlikely to result in 'any real discount' to electricity consumers.

One submission disagrees with the statement that in a competitive market the benefit of lower cost coal to electricity generators would be passed on to electricity consumers. It states that in a competitive market, suppliers will price their product equal to their long run marginal cost (LRMC) and that if all suppliers were given a subsidy, then the whole industry's costs would decline and prices would fall, passing a benefit to consumers. But where only three suppliers are subsidised they could either take the subsidy as a windfall or, if they pass it on their buyers, it would be at the expense of other non-subsidised generators, which has not been considered.

It is considered that the Project could affect the price and supply of electricity in the marketplace. Any subsidy of the Project would distort the market and support inefficient and expensive energy, and questions are raised as to why tax-payers [sic] should have to support this burden? It is considered that the best way to lower the cost of electricity is to encourage a competitive market where the cheapest energy source will emerge. A subsidy to coal-fired power generation in NSW would inhibit this process.

The estimated electricity cost savings given in the main EA ($1,856 m) are questioned. This value appears to have been derived from the surplus as a result of the lower coal price paid by the power stations against the identified value of the assumed value of the coal at $77 a tonne free-on-board price. This should be clearly explained with some discussion of the contract price to electricity generators and sensitivity assessment about this contract price. Also, further discussion on the potential impacts of operating costs is required as this appears to be a key assumption in the economic assessment, particularly with the sensitivity analysis results including a 20% increase in operational expenditure and showing net benefits would reduce to $1,304 m, or $1,239 m with the inclusion of the additional closure costs.

Response

The submissions acknowledge the extent to which lower cost coal is passed on to electricity consumers will depend not only on competition between generators but also on competition in distribution and retailing. As identified in the BCA, the deregulation of electricity providers (wholesalers and retailers) in NSW aims to promote competition, customer choice and encourage cheaper electricity. To the extent this deregulation is and will be successful, then the provision of cheaper coal will be passed on to electricity consumers. As described Section 14.2.4, the Project is being developed as the Gentrader transactions that intend to achieve these goals.

The submission about pricing according to LRMCs misunderstands the meaning of a competitive market. In a competitive market, suppliers of a good or service are price-takers. They do not price their product equal to their LRMC (as they have no control over price), but produce a quantity of good or service up until the LRMC of producing the good equals the market price. A reduction in the LRMC of a number of suppliers as a result of a reduction in costs, such as coal, would lead to a shift in the market supply curve (since the market supply curve is the addition of all individual supply curves), resulting in a lower price and increase in quantity produced. The extent to which a subsidy is passed on to consumers depends on the price elasticity of demand. The more inelastic the demand curve, the greater the consumer's gain from a subsidy. When demand is perfectly inelastic the consumers gain all of the benefit from the subsidy, since all the subsidy is passed on to the consumer through a lower price. The data on price elasticity of demand for electricity in Australia suggests it is relatively inelastic.

Electricity price reductions as a result of a supply shift would reduce the producer surplus (benefits) to other electricity generators but this would be more than offset by gains to consumers.

19.3 Conclusions

The Project is not being developed by a private company for commercial gain. As described in the EA (Section 2.1.2), it is being developed by CHC on behalf of the NSW Government to provide a reliable, secure and economically stable domestic coal supply NSW generators so they can provide affordable electricity in NSW. It is therefore appropriate to consider the net economic benefits to Australia based on the cost of alternative fuel supplies rather than considering the Project's contractual and financial arrangements. On this basis, the net benefits to Australia will be between $1,872 m and $2,073 m (including updated closure cost estimates).