

Hancock Coal Pty Ltd v Kelly & Coast & Country Association of Queensland and Ors
Joint Expert Report to the Land Court by Professor Roger Jones, Professor David Karoly and Dr Chris Taylor

1. Expert Details

1.1 Names

This joint expert report has been prepared by Professor Roger Jones, Professor David Karoly and Dr Chris Taylor for the Land Court in accordance with paragraphs 8 and 9 of the Order dated 27 May 2013.

1.2 Previous Expert Reports

This joint expert report is supported by, and relies upon, the following expert reports:

- (a) Expert Report of Professor Roger Jones, dated 2 July 2013, to the extent relevant to greenhouse gas (GHG) emissions accounting and climate change science; and
- (b) Expert Report of Professor David J. Karoly, dated 1 July 2013; and
- (c) Expert Report of Dr Chris Taylor, dated 30 May 2013.

1.3 Dates of Meetings of Experts

The experts met via teleconference on 25 July 2013.

2. Key issues of Agreement

Greenhouse gas emissions from the Alpha Coal Mine

Emissions in the reports of Dr Taylor and Prof Karoly are generally described in terms of carbon dioxide equivalent (CO_{2-e}), whereas Prof Jones has generally used carbon equivalent. To convert from carbon equivalent to CO_{2-e} one must multiply by 3.667. To convert from CO_{2-e} to carbon, multiply by 0.2727.

The predicted GHG emissions associated with the operation of the Alpha Coal Mine, as set out in the EIS, SEIS and Dr Taylor's Expert Report, are not disputed. Emissions estimates in these documents are set out in terms of internationally agreed definitions of scope.

The calculation of scope 3 emissions from the burning of product coal presented in Dr Taylor's report relied upon measured values for the energy content of the coal at the Alpha Coal Mine. It was agreed that this measured value should be preferred to the generic National Greenhouse Accounting factor.

As noted by Prof Karoly in his report, the emissions estimates depend on the total volume of coal produced over the life of the mine. Actual emissions, therefore, could be higher or lower if the volume of coal differs from that projected in the EIS.

Prof Jones was asked to consider the combined emissions of the Alpha Coal Mine and Rail project, and also the emissions from the Kevin's Corner Coal Mine and Galilee Coal Project (also known as the China First Coal Project). The data he presents are consistent with the EIS and SEIS, but are aggregated differently.

In Prof Jones report, Table 2 Column 1 shows scope 1 and scope 2 emissions from the Alpha Coal Mine and Rail projects. These emissions would fall under Australian national greenhouse gas

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reporting. Table 2 Column 2 shows scope 1, scope 2 and scope 3 emissions from the Alpha Coal Mine and Rail projects. This includes transport and burning of the product coal, which would not fall under Australian national greenhouse gas reporting. Table 2 Column 3 shows scope 1, scope 2 and scope 3 emissions from the Alpha Coal Mine, Rail project, Kevin's Corner Coal Mine and Galilee Coal Project. Again, this includes transport and burning of product coal, which would not fall under Australian national greenhouse gas reporting.

Current understanding of climate change

The current understanding of climate change is not disputed. The most comprehensive assessment of the subject available is the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), released in 2007. The most appropriate and more recent discussion of global climate change and regional implications for Australia can be found in the Climate Commission's reports, *The Critical Decade* (2011) and *The Critical Decade 2013* (2013).

Prof Jones has relied upon the estimates of climate sensitivity provided by IPCC (2007). Some recent published literature (Otto et al. 2013) has suggested a slightly reduced lower limit for both equilibrium and transient climate sensitivity (the latter affecting the rate of warming). However, other recent publications (Bodman et al., 2013) support the IPCC (2007) estimates of climate sensitivity, which appear to be consistent with recent observations and the published literature.

Global greenhouse gas emission scenarios

As noted in Prof Karoly's report, global emissions since 1990 have been consistent with the highest emissions scenarios considered by the IPCC.

Countries participating in the UN Framework Convention on Climate Change (UNFCCC), including Australia, have agreed to take action to limit increases in global mean temperature to less than 2°C above pre-industrial levels. However, current international emission reduction commitments (see Rogelj et al. 2010, for example) are inconsistent with this target.

The future emissions scenarios described in Prof Jones report are based on the following assumptions:

- MEP2030 applies the Copenhagen pledges made following the UNFCCC Council of Parties (CoP) 15 meeting and subsequently projected out to 2030 under assumptions of growth post GFC, after which a minimum emissions pathway is followed until 2100.
- MEP2010 applies the higher end Copenhagen pledges made following the UNFCCC CoP 15 meeting and subsequently following a minimum emissions pathway until 2100. This scenario is consistent with a slightly better than 50% chance of avoiding the 2°C global mean warming target.

Estimates of coral bleaching

Critical coral bleaching estimates were given as an example of physical impacts. In Prof Jones' report paragraph 25 states 'Averaged across all scenarios, global impacts as a result of the Project would exceed 100 km² of coral reef during 2020–2030.' This statement needs to be clarified as it is unclear. The estimate is added area critically bleached each year and will total >100 km² by 2030 unless the area of reef is 75% damaged, then the figure may fall below that level. This is the case

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for both MEP2030 and MEP2010 scenarios. The estimates cover column two of Table 2 covering domestic and international Alpha coal and rail emissions.

Note also that because the precision of the MAGICC simple climate model is four decimal figures, emissions from Table 2 Column 1 are nearing the lower limit for which reliable estimates of marginal impacts can be estimated.

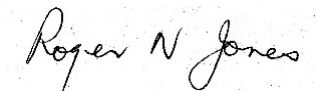
3. Key issues of Disagreement

There were no issues of disagreement, as the different experts were asked to consider different questions in their reports.

4. Expert's Statement

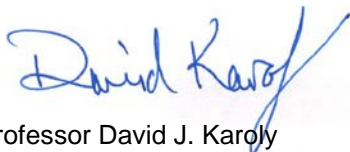
We confirm the following:

- (a) the factual matters stated in this report are, as far as the experts know, true;
- (b) the experts have made all enquiries that they consider appropriate;
- (c) the opinions stated in this report are genuinely held by all experts;
- (d) the report contains reference to all matters the experts consider significant; and
- (e) the experts understand their duty to the court and have complied with the duty.



Professor Roger Jones

[July 30 2013]



Professor David J. Karoly

[31 July 2013]



Dr Chris Taylor

[31 July 2013]

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- Bodman, R., P. Rayner and D. Karoly (2013) Reduced uncertainty in temperature projections using carbon cycle and climate observations. *Nature Clim. Change*, **3**, doi:10.1038/nclimate1903 .
- Otto, A., et al. (2013) Energy budget constraints on climate response. *Nature Geoscience*, **6**, 415–416.
- Rogelj, J., et al (2010) Analysis of the Copenhagen Accord pledges and its global climatic impacts – a snapshot of dissonant ambitions. *Environ. Res. Lett.* **5**, doi:10.1088/1748-9326/5/3/034013
- The Critical Decade: Climate science, risks and responses*. The Climate Commission, DCCEE, Australia, 2011.
- The Critical Decade 2013: Climate change science, risks and responses*. The Climate Commission, Australia, 2013.