

15 Greenhouse gas

15.1 Assessment objectives

The DGRs for the environmental assessment of greenhouse gases for the Project are:

Greenhouse gases – including:

- a qualitative assessment of the potential Scope 1, 2 and 3 greenhouse gas emissions of the Project;
- a qualitative assessment of the potential impacts of these emissions on the environment; and
- an assessment of all reasonable and feasible measures that could be implemented on site to minimise the greenhouse gas emissions of the Project and ensure it is energy efficient.

15.2 Assessment method

The greenhouse gas (GHG) assessment for the Project has been prepared by Environ Australia Pty Limited (Appendix M) and the results are summarised in this chapter. The assessment was in accordance with the following regulations, methods and guidance documents as specified in the DGRs:

- *National Greenhouse Accounts Factors* (DCCEE 2008 and 2011a); and
- Guidelines for Energy Savings Action Plans (DEUS 2005).

Organisational and operational boundaries for the Project and the calculations of its Scope 1, 2 and 3 GHG emissions are described below.

15.2.1 Organisational and operational boundaries

An organisational boundary for the assessment was defined for the Project using the operational control approach, as defined in the *National Greenhouse and Energy Reporting Act 2007* (NGER Act). In general, a corporate group member has operational control of a facility if it has the authority to introduce and implement any or all of the operating, health and safety and environmental policies for the facility. Only one corporation or group member can have operational control of a facility at a time. Project operations will rely on a number of contractors. CHC will account for Scope 1 and 2 emissions associated with the major contractors. The operational boundary will include the mining operations area and mine infrastructure areas. It will not include the rail spur.

15.2.2 Emission sources

Scope 1 emissions are those produced as a direct result of an activity (including ancillary activities) within the operational boundary. Scope 2 emissions include emissions directly released into the atmosphere by one or more activities that generate electricity, heating, cooling or steam that is consumed within the operational boundary but is not part of the facility. Scope 3 emissions are generated in the wider economy as a result of activities at a facility but are physically produced by another facility. Scope 3 emissions are not reported under the NGER Act.

Scope 1, 2 and 3 emissions are described below based on the 'Project description' (Chapter 3).

Scope 1 emissions will be:

- from the combustion of diesel, largely by primary mining equipment (eg excavators, front end loaders and dump trucks) and secondary mining equipment (eg bulldozers, graders, water trucks and service trucks);
- from blasting; and
- fugitive methane and carbon dioxide emissions from coal seams.

Scope 2 emissions will be:

- from the generation of purchased electricity that will be used by mine infrastructure (eg CHPP, pumps, workshops and maintenance facilities and offices).

Scope 3 emissions will be:

- upstream emissions generated from the supply of raw materials;
- downstream emissions generated from off-site transportation and distribution of final product;
- combustion of product coal by end customers in Australia; and
- off-site travel by Project personnel (business and personal).

While the Project is primarily being developed to supply coal to domestic power stations, up to 2.5 Mtpa may also be transported for spot sales to domestic customers or to port for export. The GHG assessment considers emissions when 2.5 Mtpa of coal is export (Scenario A) and emissions when all coal is consumed domestically (Scenario B).

The annual emissions of carbon dioxide, methane and nitrous oxide were used to calculate total greenhouse gas emissions as carbon dioxide equivalents (CO₂-e).

15.3 Environmental management and monitoring

The design, control and operational management measures to minimise the Project's energy use and GHG emissions are described below.

15.3.1 Scope 1 emissions

Scope 1 emissions will be minimised through measures detailed in an air quality management plan and will include the following:

- mining equipment and vehicles will be regularly maintained and serviced to maximise its operational efficiency;
- the use of lower emission fuels (eg biodiesel or natural gas) will be investigated;
- the distance vehicles travel on site will be minimised as part of mine planning which will minimise GHG emissions; and

- energy consumption will be monitored and GHG emissions calculated to identify measures to reduce emissions.

Measures to minimise the generation of post-blast fume GHG emissions will be implemented, as described in Section 14.5.4 'Post-blast fume' of the air quality assessment (Appendix M).

15.3.2 Scope 2 and 3 emissions

Scope 2 and 3 emissions will be minimised through the following management measures:

- the CHPP and pumps will be designed and operated to minimise electricity use;
- energy efficient lighting technologies and hot water and air conditioning systems will be used wherever practical;
- alternative energy sources such as solar power and green power will be used wherever practical;
- energy efficiency measures will be progressively reviewed and implemented throughout the life of the Project;
- periodic audits and reviews will be conducted on the amounts of materials used, amount of mine waste and non-mine waste generated and disposed; and
- materials will be sourced locally where feasible to minimise emissions generated from upstream activities and materials will be reused wherever practical.

15.4 Impacts

The cumulative Scope 1, 2 and 3 emissions and the total GHG emissions for each year of the Project, following the implementation of the management measures described in Section 15.3, are presented in Table 15.1.

Table 15.1 Calculated annual GHG emissions (Mt CO₂-e)

Mine year	Scope 1	Scope 2	Scenario A		Scenario B	
			Scope 3	Total	Scope 3	Total
1	0.04	0.08	0.77	0.89	0.77	0.89
2	0.12	0.16	14.02	14.30	13.90	14.18
3	0.17	0.16	18.01	18.34	13.91	14.24
4	0.19	0.16	22.26	22.61	17.85	18.20
5	0.20	0.16	24.01	24.37	22.06	22.42
Full production (Year 6 onwards)	0.20	0.16	24.01	24.37	23.77	24.13

Note: Scenario A: split of domestic and international coal sales and Scenario B: all coal consumed domestically (see Section 15.2.2).

At full production (from Year 6), annual Scope 1 emissions will be 0.2 Mt CO₂-e. Combustion of diesel fuel will be the largest source of emissions, contributing 82% of the overall Scope 1 emissions from the Project. However, the low waste:coal strip ratio (around 2:1) will minimise the diesel use for mining and the associated emissions. Scope 1 emissions will be further reduced through CHC's commitment to design, control and operational management measures, which will include the use of modern mining equipment and buildings to achieve high energy efficiencies.

The Project coal seams are covered by a relatively thin layer of rock (up to 75 m), which has allowed potential fugitive emissions (methane and carbon dioxide) to be released to the atmosphere over geological time rather than accumulating in the seams. Coal seam fugitive gas was measured in boreholes in the Project coal resource. The maximum total gas content of the coal (CO₂ and methane) was low, 0.73 m³/t ROM coal, with about 5% methane and 95% CO₂. Therefore, fugitive greenhouse gas emissions will be about 4% of the default value provided by the *National Greenhouse Accounts Factors Workbook* (DCCEE 2011a). Fugitive methane emissions are the greatest contributor to Scope 1 emissions for many coal mines. However, fugitive emissions will only be 15% of Scope 1 emissions from the Cobbora Coal Project. GHG emissions generated from the detonation of explosives account for the remaining 3%.

Total Scope 1 emissions generated by the Project will be between 0.02% and 0.15% (depending on the mine year) of annual NSW (2004) GHG emissions and 0.007% to 0.05% of all Australian (2009) GHG emissions (Appendix M 'Air quality and greenhouse gas assessment').

Annual Scope 2 emissions associated with the consumption of purchased electricity will be 0.16 Mt CO₂-e at full production.

Annual Scope 3 emissions will be approximately 24 Mt CO₂-e at full production, for both Scenarios A and B. Based on analysis of the Scope 3 emissions by source type, downstream activities including transportation to and combustion of product coal by domestic and international customers contributes 99.9% of all Scope 3 emissions after Year 1.

Increased GHG concentrations within the atmosphere are linked to climate change. The potential environmental impacts associated with climate change due to global GHG emissions are documented to include loss of biodiversity, water security issues in parts of Australia, increased drought and fire incidents, and risks of sea level rise and coastal flooding (IPCC). The contribution of the Project to these changes will be small.

The assessment shows that, at full production, Scope 1 emissions will account for 0.2 Mt CO₂-e a year, Scope 2 emissions will account for 0.16 Mt CO₂-e and Scope 3 emissions will account for 29.09 Mt CO₂-e. The greatest contributor to Scope 1 emissions from the Project will be the consumption of diesel fuel by mobile plant and equipment, which will be minimised by design, control and operational management measures. Overall, GHG emissions from the Project will contribute a small proportion to annual NSW (between 0.02% and 0.15%), Australian (0.007% to 0.045%) and global (0.0001% and 0.0005%) GHG emissions.

15.4.1 Greenhouse gas outcomes

At full production, the annual Scope 1 (direct), Scope 2 (from the consumption of electricity generated off-site) and Scope 3 (from upstream activities and the transport and combustion of the coal by customers) greenhouse gas emissions will be 0.2 Mt CO₂-e, 0.16 Mt CO₂-e and 29.09 Mt CO₂-e respectively. The greatest contributor to Scope 1 emissions will be from mobile plant and equipment using diesel fuel. However, the low waste to coal strip ratio in the Project mining area means diesel use and associated emissions will be low compared with many open cut mines in NSW. Also, the coal seams of the resource have low methane and CO₂ content so fugitive methane emissions will be low.

Design, control and operational management measures to minimise the Project's energy use and greenhouse gas emissions will be detailed in the air quality management plan. The Scope 1 greenhouse gas emissions from the Project will contribute a small proportion of annual GHG emissions: up to 0.15% of NSW emissions (as of 2004), up to 0.045% of Australian emissions (as of 2009) and up to 0.0005% of global emissions.

15.5 Monitoring

Scope 1 and 2 GHG emissions will be monitored to ensure that emissions per tonne of product coal are minimised.

