GREENHOUSE GAS EMISSIONS ASSESSMENT – ALBANY IRON ORE PROJECT

FOR: ECOLOGIA ENVIRONMENT

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KEWAN BOND PTY LTD

ENVIRONMENTAL ACCOUNTING
AND CONSULTING SERVICES

TABLE OF CONTENTS

Scope

The Greenhouse Gas (GHG) emissions assessment involved calculating the greenhouse gas emissions likely to be associated with the Albany Iron Ore Project (the Project). The following activities were included in the assessment:

- Construction of the mine infrastructure, including the concentrator plant
- Construction of the pipeline
- Construction of the port infrastructure in Albany, including dredging operations and concentrate thickening plant
- Vegetation clearing associated with the mine and pipeline construction
- Revegetation of cleared areas as part of the mine's rehabilitation programme
- Operation of the mine, pipeline and port facilities
- Transport of personnel and materials during construction and operational phases
- Shipping of concentrate to Malaysia

A GHG Emissions inventory was developed to calculate the likely quantities of GHG emissions based on the current level of understanding of the project. The calculation of GHG emissions are in accordance with methods and standards recommended by the Australian Commonwealth Government's Department of Environment and Heritage, and the Australian Greenhouse Office (AGO). Consideration was also given to the reporting standards under the internationally-recognised Greenhouse Gas Protocol – an initiative coordinated by the World Business Council for Sustainable Development (WBCSD) and the World Resources Institute (WRI).

The assessment also considers the reporting requirements under various Government greenhouse programmes including the Western Australian Greenhouse Strategy (2004), the Energy Efficiency Opportunities Assessment programme and the Greenhouse Challenge Plus programme. Some recommendations have been provided to assist with complying with any mandatory Government requirements.

1. Introduction

The Albany Iron Ore Project comprises of two related proposals – the Southdown Magnetite Proposal (Grange Resources Ltd) and the Port Expansion Proposal (Albany Port Authority). The environmental impacts of both proposals are being assessed together due to their interconnection.

Greenhouse gases from the Project are expected to result from direct fossil fuel combustion (i.e. diesel consumption), indirect fossil fuel consumption (i.e. grid electricity consumption) and biomass decomposition (i.e. from vegetation clearing). The revegetation of disturbed areas will sequester carbon dioxide from the air and act as a greenhouse sink.

2. Direct Fossil Fuel Consumption

Nearly all mobile equipment used during the construction and operational phases will be diesel-powered. This includes light vehicles, haul trucks, face shovels, dozers, dredges and concentrate ships. Estimates were made on the quantity of diesel to be consumed each year by the anticipated

number of pieces of equipment, their respective duties and approximate fuel efficiency. Greenhouse gas emissions were calculated by using an emission factor for diesel (2.7 t CO_2-e/kL), sourced from the AGO.

Annual diesel consumption for the project during full operation is estimated to be 51,760 kL. This equates to GHG emissions of 139,740 t CO_2-e/kL.

GHG emissions are also expected from the blasting activities during mining. The Project is expected to use approximately 16,670 tonnes of ANFO (a mix of ammonium nitrate and diesel) for blasting. Based on the AGO emissions factor for ANFO of 0.1673 t CO_2-e/t ANFO, blasting activities are expected to contribute approximately 2,790 t CO_2-e.

3. Indirect Fossil Fuel Consumption

During full operation, the Project is expected to consume approximately 624,150 MWh of electricity, sourced from the Western Australian grid. This electricity is generated at various power stations around Western Australia through the combustion of fossil fuels (e.g. coal, natural gas). Although the emissions occur beyond the Project boundaries, the emissions are still attributable to the Project. The emissions factor for WA grid electricity (0.958 t CO_2-e/MWh) was used to calculate the GHG emissions for electricity consumption associated with the Project - 598,000 t CO_2-e.

4. Biomass Decomposition

The Project requires the clearing of approximately 443 Ha of vegetation. The decomposition of this vegetative matter results in emissions of carbon dioxide. The Australian Greenhouse Office has recently released the National Carbon Accounting Toolbox, which was used to model and estimate the greenhouse gas emissions associated with the vegetation clearing associated with the Project. The Toolbox was also used to calculate the sequestration of carbon dioxide associated with revegetation of disturbed areas. The key assumptions used in the modeling are provided within the GHG inventory for the Project.

Greenhouse gas emissions associated with land clearing are estimated to peak at 14,200 t CO_2-e per annum in 2009, then gradually reduce so that only 4,700 t CO_2-e are expected in 2015. The model predicts that it will take approximately 30 years after revegetation for the equivalent quantity of emissions associated with land clearing to be fully sequestered.

5. Results

Under full production, the Project is expected to generate approximately 750,000 tonnes of CO_2-e per annum (presented in Figure 1). This compares with less than 25,000 tonnes of CO_2-e per annum during the construction phase. Figure 2 indicates that the majority of emissions during the project's production phase are associated with electricity consumption, contributing 80 percent of total emissions. Diesel consumption contributes nearly 20 percent, while land clearing and explosives both contribute less than 1 percent.

The GHG inventory predicts that approximately 14.9 million tonnes of CO_2-e will be emitted over the Project's anticipated life (20 years).

Figure 1 Greenhouse Gas Emissions per Annum

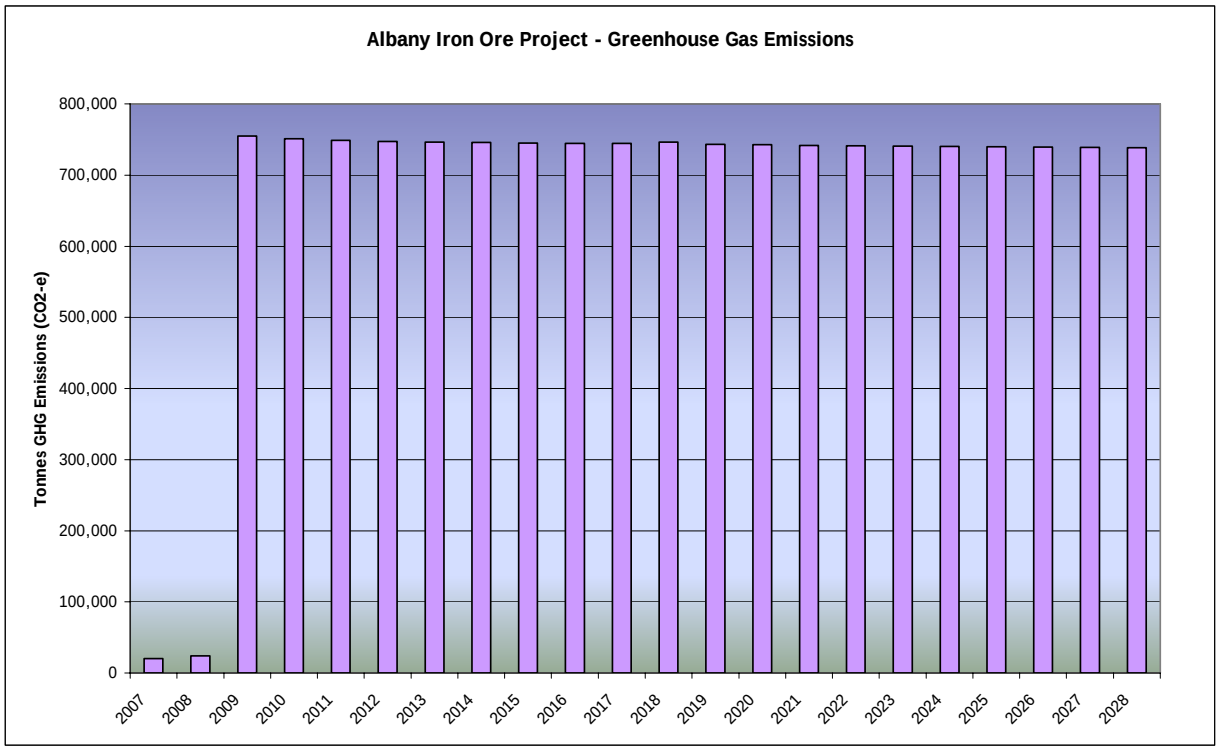
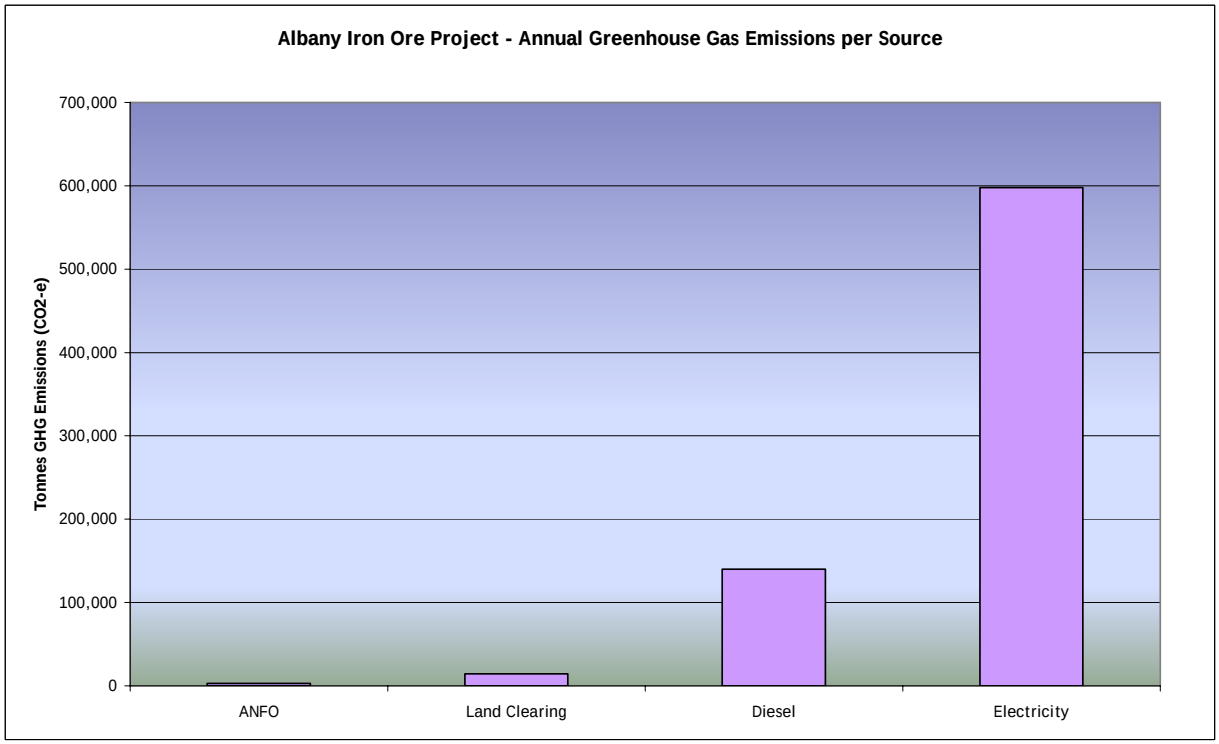


Figure 2 Greenhouse Gas Emissions per Energy Source



6. Relevant Greenhouse and Energy Programmes

A number of State and Commonwealth energy and greenhouse programmes will be applicable to the Project and are likely to involve monitoring and reporting of energy consumption and greenhouse gas emissions. The programmes also require the identification of actions that will improve energy efficiency (GJ/unit of production) and/or reduce greenhouse intensity (CO_2/unit of production). These programmes are briefly explained below:

Greenhouse Challenge Plus – a Commonwealth Government programme involving the annual reporting of energy consumption and GHG emissions. Participation is mandatory for companies receiving more than AUD 3 million in diesel fuel rebates. Information is available via the Australian Greenhouse Office (www.greenhouse.gov.au).

Energy Efficiency Opportunities – a Commonwealth Government programme commencing in 2006. This programme involves undertaking mandatory energy efficiency opportunity assessments and reporting publicly on the outcomes every 5 years. This programme applies to facilities that consume more than 0.5 PJ of energy per annum. The proposed Project expects to use more than 4 PJ per annum during full production, so will require reporting under the EEO programme. The EEO Bill is available at the following web address: www.aph.gov.au/library/pubs/BD/2005-06/06bd054.pdf.

Western Australian Greenhouse Strategy – This programme is progressively being implemented and is expected to involve the reporting of energy consumption, greenhouse gas emissions and actions to reduce greenhouse intensity. Further information on the WA Strategy is available from the WA Government's greenhouse website (www.greenhouse.wa.gov.au).

WRI/WBCSD GHG Protocol – provides internationally recognised standards for greenhouse accounting. Although reporting in accordance with this Protocol is not anticipated for the Albany Iron Ore Project in the immediate future, it may be useful if other countries or international customers/suppliers require greenhouse data. The Protocol stipulates the reporting of GHG emissions as either Scope 1, 2 or 3.

Scope 1 Emissions
Direct GHG emissions occur from sources that are owned or controlled by the company, for example, emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.; emissions from chemical production in owned or controlled process equipment. Direct CO_2 emissions from the combustion of biomass shall not be included in scope 1 but reported separately.

GHG emissions not covered by the Kyoto Protocol, e.g. CFCs, NOx, etc. shall not be included in scope 1 but may be reported separately.

Scope 2 Emissions
Scope 2 accounts for GHG emissions from the generation of purchased electricity consumed by the company. Purchased electricity is defined as electricity that is purchased or otherwise brought into the organizational boundary of the company. Scope 2 emissions physically occur at the facility where electricity is generated.

Scope 3 Emissions
Scope 3 is an optional reporting category that allows for the treatment of all other indirect emissions. Scope 3 emissions are a consequence of the activities of the company, but occur from sources not owned or controlled by the company. Some examples of scope 3 activities are extraction and production of purchased materials; transportation of purchased fuels; and use of sold products and services.

7. Recommendations

It is recommended that the Environmental Impact Assessment for the Project include some details of how the Project planning and operation will be in accordance with the relevant Government greenhouse and energy policies, guidelines and standards (e.g. WA Greenhouse Strategy, AGO guidelines). Some examples of these details might include:

- Explaining how this GHG assessment was conducted in accordance with relevant standards and methods;
- Providing details of Project design features that improve energy efficiency and/or represent best practice for energy efficiency (e.g. decision to transport concentrate to Albany by pipeline rather than by rail or road);
- Providing details of operational procedures/processes that maintain or improve energy efficiency;
- Committing to annual reporting of energy efficiency and GHG emissions (required under the Greenhouse Challenge Plus programme and WA Strategy);
- Committing to regular (e.g. triennial) energy efficiency audits (required under the EEO programme and WA Strategy);
- Explaining how the clearing of vegetation for the Project was minimised.
- Committing to participation in the Greenhouse Challenge Plus programme (even though it will be required anyway)

8. References

Australian Government – Dept of Industry Tourism and Resources (2005) *Energy Efficiency Opportunities – Draft Programme Material* (October 2005)

Australian Government – Dept of the Environment and Heritage/Australian Greenhouse Office, *National Carbon Accounting Toolbox and Data Viewer*.

Australian Greenhouse Office (2004), *AGO Factors and Methods Workbook – August 2004*.

Ecologia Environment (2006), *Albany Iron Ore Project – Draft Environmental Scoping Document*

Parliament of Australia, *Energy Efficiency Opportunities Bill 2005*.

Western Australian Government (2004), *Western Australian Greenhouse Strategy – September 2004*.

World Resources Institute and World Business Council for Sustainable Development, *The Greenhouse Gas Protocol – A Corporate Accounting and Reporting Standard (Revised Edition).*