

ENERGY EFFICIENCY OPPORTUNITIES REPORT

2011

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ENERGY EFFICIENCY OPPORTUNITIES (EEO) PUBLIC REPORT Thiess Pty Ltd

Controlling Corporation

Leighton Holdings Limited
(This report relates to Group Company, Thiess Pty Ltd, only)

Period to which this report relates

Start 1 July 2006 End 30 June 2011

Part 1 – Information on assessments completed to date

Table 1.1 – Description of the way in which the Corporate Group (or part of it) has carried out its assessments

1. Thiess Pty Ltd is a wholly owned subsidiary of Leighton Holdings Limited (LHL), Australia's largest project development and contracting group. LHL has obtained approval for its Group Companies to assess and report their own energy use and opportunities.
2. Thiess is a leading mining, construction and services contractor with diverse operations throughout Australia and selected international markets. We are committed to achieving sustainable and profitable growth through ingenuity and innovation, thereby delivering better outcomes for our clients. This Report relates to Thiess Australian operations only, although cross sharing of any relevant efficiency opportunities is standard business practice.
3. During the baseline year of 2005-06 greater than 80% of Thiess' Australian energy use occurred within its Australian Mining operations. Approval was obtained from the Department of Resources, Energy and Tourism (DRET) for formal EEO Act processes to be restricted to the mining division. Due to the common processes applied to all mining projects and frequency of contracts commencing and ceasing the EEO assessment was conducted using a representative assessment methodology that was developed in close consultation with the DRET, ensuring that it met the intent and key requirements of the EEO Program. While this representative assessment was completed between March and December 2008 and meets the requirement for the five year EEO cycle, we will continue to investigate the opportunities and incorporate them into our business plan as appropriate. Further information on the assessment process can be found in the Thiess case study available on the DRET website at www.ret.gov.au/energy.
4. Thiess does not own the fixed infrastructure on its mining projects and therefore our energy efficiency efforts focus on our mobile fleet of plant and equipment. Thiess maintains a modern mining fleet that is maintained in accordance with, or in excess of, original equipment manufacturers' requirements. Many of the energy efficiency opportunities relate to the way the equipment is utilised, with the focus on maximising productivity, and therefore the energy efficiency. This type of project is often also dependent on employee behaviours for success and often requires continual reinforcement of correct behaviours through training and monitoring and therefore does not have a



definitive completion time. It should be noted that optimising productivity, and therefore energy efficiency, is fundamental to maintaining profitability in contract mining and that there is a continual focus on measuring and improving operational performance.

5. In 2010-11, Thiess Australian Mining operations consumed 74% of the Australian contribution to the Thiess Pty Ltd energy use. The increase in the proportion of non-mining use over previous years was due to two large infrastructure projects, which will substantially be completed in the next 12 months. At the 30 June 2011 Thiess had 10 operating mining projects. Thiess only operates mining projects under fixed term contracts on behalf of the mine owners and does not own any mining projects. The findings of the representative assessment conducted in 2008 continue to apply to the mining projects and further assessments were not conducted. Thiess' first EEO assessment period finished on 30 June 2011.
6. Thiess participated in a trial verification assessment of its EEO processes by DRET in 2009-10. The summary conclusion was that "Thiess has demonstrated a clear intention to comply with the Energy Efficiency Opportunities program's assessment and reporting requirements". Furthermore, "... conducting a representative assessment of the mining fleet used within Thiess' mining operations has been an effective and efficient approach to conducting an energy efficiency opportunities assessment". The verification assessment by DRET did not find any minor or major non-compliance. Recommendations for improvement are either currently being addressed through the business planning process, or will be addressed in the second assessment plan, which is to be finalised by the 31 December 2012.
7. The Thiess Assessment Plan covering the period 2006-11 was prepared under the initial EEO Regulation, whereby responsibility for assessments rested with the party which had financial control of the energy purchases. In order to increase consistency with the National Greenhouse and Energy Reporting Act, the EEO Regulation was changed in 2008 to transfer the assessment obligation to the party with operational control of the facility. As the Thiess assessment was completed prior to the change, implementation of opportunities and energy savings are based on all Thiess mining projects, irrespective of the operational control status. As stated above, the majority of the opportunities identified are first and foremost operational efficiency pre-requisites and any individual opportunity will have a varying degree of applicability to an individual project. The list of opportunities developed during the assessment process has been reviewed at the individual project level and the status of the opportunity adjusted accordingly. Elevating an opportunity from "under investigation" to the more active "to be implemented" or "implementation commenced" categories could mean that it has been implemented at one or more projects and should not be taken as meaning that implementation has occurred or is proposed to occur at all Thiess mining projects.



Part 1 – Information on assessments completed to date

Table 1.2 – Energy use assessed		
Group member and/or business unit and/or key activity and/or site (or part thereof) that has had an assessment completed by 30 June 2011 (Include all assessments completed to date for the current 5 year cycle).	Period over which assessment was undertaken	Energy use for the period 1 July 2010 to 30 June 2011 of the assessed entity (or part thereof) expressed in GJ
Thiess Australian Mining	March 2008 – December 2008 (Representative Assessment)	10,571,721
Total energy use of assessed entities (or part thereof)		10,571,721
Total energy use of the whole corporate group in the period 1.7.2010 to 30 June 2011 (Thiess Pty Ltd only)		14,269,731
Total energy use of assessed entities (or part thereof) for the period 1.7.2010 to 30.6.2011 expressed as a percentage of total energy use for the period 1.7.2010 to 30.6.2011		74%

Table 1.3 – Accuracy of energy use assessed data		
Entity	% achieved	Reasons for not achieving data accuracy to within ±5%
Thiess Australian Mining	<±5%.	
Thiess Pty Ltd	<±5%.	



Part 2 - Energy Efficiency Opportunities that have been identified and evaluated

Part 2A - New assessments completed or not reported since your last Public Report

No new assessments completed: Nil

Name of Group member or business unit or key activity or site: Not Applicable

Part 2A - New assessments completed during the reporting period (continued)

No new assessments completed: Nil

Name of Group member or business unit or key activity or site: Not Applicable

Part 2 - Energy Efficiency Opportunities that have been identified and evaluated

Part 2B - Update of assessments reported in previous Public Reports

Name of Group member or business unit or key activity or site: **Thiess Australian Mining**

Total energy use for the period 1.7.2010 to 30.6.2011 of the assessed entity (or part thereof) from which the opportunities identified below were generated (and is reported in Table 1.2).

10,571,721	GJ
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Table 2.3 – Opportunities assessed to an accuracy of better than or equal to (\leq) $\pm 30\%$

Status of opportunities identified		Total Number of opportunities	Estimated energy savings per annum by payback period (GJ)						Total estimated energy savings per annum (GJ)
			0 – < 2 years		2 – ≤ 4 years		> 4 years		
			No of Opps	GJ	No of Opps	GJ	No of Opps	GJ	
Business Response	Under Investigation	8	TBD ^A		TBD				
	To be Implemented	2	1	TBD	1	TBD			
	Implementation Commenced	19	13	128,300	1	7,900	5	0 ^B	136,200
	Implemented	6	5	39,040			1	0	39,040
	Not to be Implemented	13	ND ^C				13	ND	0
Outcomes of assessment	Total Identified	48							175,240

^A To be determined.

^B No savings are directly attributable to these opportunities as the benefits are reflected in other operational measures, such as idling time, payload and cycle time, or the opportunity is related to data capture.

^C Not determined as the opportunities were outside the reasonable scope of the EEOA process and could not be assessed in a meaningful manner.



Part 2B - Update of assessments originally reported in previous Public Reports (continued)

Name of Group member or business unit or key activity or site: **Thiess Australian Mining**

Total energy use for the period 1.7.2010 to 30.6.2011 of the assessed entity (or part thereof) from which the opportunities identified below were generated (and is reported in Table 1.2).

	GJ
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Table 2.4 – Opportunities assessed to an accuracy of worse than (>) ±30%

Status of opportunities identified		Total Number of opportunities	Estimated energy savings per annum by payback period (GJ)						Total estimated energy savings per annum (GJ)
			0 – < 2 years		2 – ≤ 4 years		> 4 years		
			No of Opps	GJ	No of Opps	GJ	No of Opps	GJ	
Business Response	Under Investigation	0							
	To be Implemented	0							
	Implementation Commenced	0							
	Implemented	0							
	Not to be Implemented	0							
Outcomes of assessment	Total Identified	0							

Part 2 - Energy Efficiency Opportunities that have been identified and evaluated

Part 2C - Details of at least three significant opportunities found through EEO assessments

Table 2.5 – Description of 3 significant opportunities

Opportunity 1 - Real Time Data Management System

Thiess has adopted the Nexis[®] mobile wireless platform to collect data that measures the performance and machine health of its mining fleet in real time. This system connects to the extensive array of on-board data capture points provided by the equipment manufacturers and that collect data on a machine's performance and health. This data is integrated with geographic positioning system co-ordinates and provides detailed equipment monitoring in a 4D view (with the fourth dimension being a time based analysis). From an energy efficiency point of view it links the production and performance data of the equipment to the operating environment, allowing a real, or near time, perspective. This provides the extensive data base needed to develop energy use and efficiency metrics, and a means to assess performance against those metrics. By providing this information directly to operators, supervisors and managers, performance can be continuously monitored. The system has been implemented on two mining projects to-date with installation on two further projects to commence in the near future.

Opportunity 2 – Operational Efficiency

Operational efficiency in mining requires that the optimum performance is obtained from the mining equipment. This means moving the maximum amount of material in the shortest time at the least cost. Energy efficiency is maximised by having the minimum number of plant operating at optimum efficiency. Examples of energy efficiency opportunities aimed at achieving optimum efficiency include:

- Maximising Truck Payload** – Operating trucks with a payload less than the rated payload is in most situations an inefficient use of the equipment. Ensuring the optimum amount of material is placed in each truck with the minimum number of loading tool movements is a function of matching of the equipment and operator skill. For a number of years Thiess has had a strong focus on monitoring payloads carried and reporting back to the workforce on performance. In 2010-11 the Thiess truck fleet on average carried 98.7% of target payload.
- Minimising Unproductive Equipment Idling Time** - High equipment idling times indicate that equipment is not being used in the most productive manner. Since monitoring of equipment idling times commenced, there has been a sustained improvement of 3.3% in reduced idling and improved productive use. This is resulting in an energy saving of approximately 15,000GJ per year.
- Haul Road Configuration and Maintenance** – Design of haul roads is constrained by the configuration of the mine. However



optimising haul road design and condition within those constraints so that length and grade of the haul is optimised and surface running conditions maintained to minimise rolling resistance will reduce equipment cycle times. Thiess monitors haul road conditions to identify and target road maintenance, thereby reducing equipment damage and minimising rolling resistance. A 1% reduction in rolling resistance, which is a realistic expectation from monitoring road condition, would result in an energy saving of approximately 47,000GJ per year. Real time data collection is increasing the ability to identify the need for and undertake maintenance in a timely manner.

- **Blasting Practices** – The use of electronic detonators for blast initiation is becoming more common, thereby producing more precise blasting results. This can reduce the required powder factor for a blast, resulting in less explosives being used to achieve an equivalent result. The use of electronic detonators for blast initiation also provides a greater degree of control over the blast resulting in a more uniformly fragmented material. This makes loading the blasted material faster and more precise. A 5% reduction in the powder factor would result in an approximate direct energy saving of 5,000GJ per year.

Opportunity 3 - Equipment Modifications for Operational and Energy Efficiency

A significant number of equipment related opportunities were identified in the 2008 EEO assessment. Many of these opportunities now represent business as usual practices with the need for modifications routinely assessed. Opportunities that are being adopted include:

- **Truck Bodies** - The objective in moving spoil by truck is to carry the rated load for the truck type without exceeding the maximum allowable load. The loose density of some material is such that the standard truck bodies have inadequate capacity to hold the rated load. In these situations larger sized bodies are used so that a higher payload can be carried. Alternatively, for some material it may be possible to reduce the weight of the body without compromising the required strength. This has the dual benefits of allowing the extra metal weight to be replaced by productive payload and reducing the vehicle weight when travelling empty. Thiess currently has 6 truck fleets modified with trays that carry an increased capacity or have a reduced weight.
- **Use of Larger Equipment** - Thiess has for many years run a large fleet of rear dump trucks of 220 tonne capacity. Larger ultra-sized trucks with a capacity of 363 tonne have recently been introduced. These trucks improve productivity by requiring less truck movements to move the same amount of material. Manufacturers also claim improved fuel efficiency with published data indicating a fuel saving of approximately 7% over the equivalent 220 tonne truck, all else being equal. Thiess currently has 18 such trucks.
- **Turbo Idle Down Time** - Thiess has worked with equipment manufacturers to reduce the turbo wind down time from 5 minutes to 3 minutes on the majority of its mining equipment fleet. During this time the engine remains at idle speed, which is designed to reduce the risk of damage to the turbo. Reducing idle down time has resulted in an estimated energy saving of 8,700GJ per year.



- **In-Tyre Pressure and Temperature Monitoring** - Tyre pressure directly affects fuel consumption through its impact on rolling resistance. Thiess is trialling real time in-tyre monitoring of tyre pressure and temperature at two mining projects and plans to extend the number of projects utilising this technology, subject to successful trial results. Fuel savings in the order of 4% have been reported as a result of maintaining optimum tyre pressure.

Part 3 - Declaration

Table 4.1 - Declaration of accuracy and compliance (mandatory information)

The information included in this report has been reviewed and will be provided to the board of directors in early 2012. To the best of my knowledge it is correct and in accordance with the *Energy Efficiency Opportunities Act 2006* and *Energy Efficiency Opportunities Regulations 2006*.

B. Munro Managing Director.

Date 23/12/2011