



# Energy Efficiency Opportunities Report

**Controlling Corporation**

**Brickworks Limited**

**Period to which this report relates**

**Start 1<sup>st</sup> July 2009      End 30<sup>th</sup> June 2010**

**Energy Efficiency**  
Opportunities

The Brickworks Group understands and accepts its responsibility for environmental protection which is integral to the conduct of its commercial operations. Brickworks' objective is to comply with all applicable environmental laws, regulations and community standards in a commercially effective way. We are committed to encouraging concern and respect for the environment and emphasising every employee's responsibility for environmental performance.

Reducing energy consumption, emissions and associated costs are key issues organisations are facing in a carbon constrained world with increasing energy prices. Brickworks actively participates in energy efficiency and greenhouse gas reporting schemes which have assisted in the improvement of systems and processes and led to significant reductions in energy consumption and greenhouse gas emissions. These programs include:

- Energy Efficiency Opportunities (EEO) Act 2006 – this programme encourages large energy users to implement management systems aimed at measuring and analysing energy usage within their plants and identifying and implementing energy reduction strategies. Brickworks have been measuring its energy consumption and emissions for over 15 years and this program has assisted Brickworks to streamline its processes for data capture, measuring, calculating and reporting. The data is subsequently collated and reported to Senior Management and the Board
- National Greenhouse and Energy Reporting (NGER) Act 2007 – this programme requires organisations to measure and report their energy consumption, production and greenhouse gas emissions under strict protocols.
- National Pollution Inventory (NPI) – The National Pollutant Inventory (NPI) provides the community, industry and government with free information about substance emissions in Australia including the source and location of these emissions.

Last year we reported that Austral Bricks NSW received 'Bronze Level Recognition' under the Sustainability Advantage Program administered by the NSW Department of Environment, Climate Change and Water for demonstrated commitment to sustainability and environmental improvements. It is pleasing to note that the company's continued commitment to environmental and sustainability improvement has led to Austral Bricks being the first company in its industry sector to achieve 'Silver Level Recognition' under the Program. To date, Silver Level Recognition is the highest level achieved by any participant, and Austral Bricks is one of only 9 companies awarded this level to date.

Brickworks incorporate sustainable practices and resource efficiency into all facets of its value chain which this year culminated in the release of an innovative lightweight product. The 'Boxer Light' Bricks with their unique core pattern design allows for 20% less raw material usage over a standard brick reducing our impact on natural resources. The project team developed and incorporated innovative process design parameters and manufacturing technologies to overcome production complexities. The outcome is a brick requiring less natural gas to fire, is manufactured using recycled water and due its reduced weight, pack sizes have been increased resulting in a reduction of at least 15% in the consumption of diesel for delivery to customers.

A continuing focus on improving energy efficiency in compressed air systems and lighting resulted in a number of improvements including the replacement of older plant with energy efficient technology. Preventative maintenance programs were developed to support such projects, for example air leak surveys which are essential for maintaining the efficiency gains. In NSW these initiatives resulted in the creation of Energy Saving Certificates (ESC) under the NSW Governments Energy Savings Scheme. A total of 1,212 ESC were created assisting in the financial justification of these projects.

Brickworks is actively working towards a sustainable future through its endeavours, not only in a manufacturing capacity but through its involvement with industry associations and working with industry participants to assist in the delivery of energy efficient homes. Brickworks and Ausbuild embarked on a product development program designed to explore how detached housing can become more energy efficient without adding extra expense or sacrificing the comforts expected by Australian Families. The result was an 8 Star (Building Energy Rating Service - BERS) Home in Queensland saving the average family 1,285kWh per annum. As a member of ThinkBrick, Brickworks supplied the clay bricks resulting in lower energy demand for heating and cooling due their thermal mass properties. Brickworks are a Housing Industry Australia (HIA) Green Smart Leader and support research on Thermal Performance and Life Cycle Analysis of Australian Housing in association with the University of Newcastle.

## 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

Brickworks Limited senior management established an EEO Steering Committee to assist the organisation meet its obligations under the EEO legislation. The primary role of the Committee is to ensure that the organisation meets the 6 key elements of the EEO program. The commitment by senior management in forming this committee forms the basis of meeting the “leadership element”.

Under the guidance of the Steering Committee Brickworks Limited has undertaken Energy Efficiency Opportunities Assessments for the following plants for the 2009 - 2010 period:

1. Bristle Roofing WA (Caversham Plant)
2. Austral Bricks WA (Malaga Plant)
3. Austral Bricks WA (Cardup Plant)
4. Austral Bricks WA (Bellevue Plant)
5. Austral Bricks SA (Golden Grove Plant)
6. Austral Bricks NSW (Punchbowl Plant)
7. Austral Bricks NSW (Bowral Plant)
8. Austral Masonry Qld (Wacol Plant)
9. Austral Bricks Qld (Rochdale Plant)
10. Austral Bricks Qld (Riverview Plant)

The result is that Brickworks have now assessed approximately 88.8% of its total energy consumption.

Brickworks Limited administered an independent Energy Consultancy to facilitate the undertaking of assessments of the above plants to identify where energy was being used and look for energy saving opportunities in compliance with EEO legislation.

The assessment of the above plants included the following process steps:

- Identifying an energy and production baseline;
- Conducting a site management review to identify current energy management policies and procedures;
- Conducting a site technical review to compile an energy mass balance, energy use by sub-activity, specific energy indexes by main energy use and efficiency and savings opportunities.
- The audits and management reviews were undertaken between July 2009 & June 2010

Brickworks Limited has set up a Cross Functional Team to address energy efficiency matters. This team incorporates managerial staff, operational managers, environmental managers, engineers and technical managers with appropriate skills and expertise to analyse energy and process data. This team meets the “people element” required under EEO regulations. The team interacts with Brickworks Limited’s alliance partners and onsite contractors.

The Cross Functional Team reviews recommendations made in the audits. Projects are ranked according to payback period and projects with a feasible internal rate of return are analysed in detail to ensure that management have sufficient information to make informed decisions as to whether or not a project has or will be implemented. The team also monitors the progress of the energy savings initiatives and undertakes a formal review process to evaluate projects post implementation. The team continually seeks energy efficiency ideas from the site to ensure the process is on going. The outcomes of its findings are reported to the EEO Steering Committee.

The EEO Steering Committee disseminates EEO and energy information to senior management and to the sites, with the aim of increasing energy efficiency awareness across the organisation.

The summary of the assessments and review process can be found below in the following sections:

**Table 1.2 – Energy use assessed**

Group member and/or business unit and/or key activity and/or site that has had an assessment completed by the end of this reporting period.	Period over which assessment was undertaken <sup>1</sup>	Energy use per annum in GJ <sup>2</sup> in the current reporting year
Bristle Roofing WA Caversham site	1/07/09-30/06/10	202,455
Austral Bricks WA Malaga site	1/07/09-30/06/10	323,414
Austral Bricks WA Cardup site	1/07/09-30/06/10	360,921
Austral Bricks WA Bellevue site	1/07/09-30/06/10	429,129
Austral Bricks SA Golden Grove site	1/07/09-30/06/10	236,593
Austral Bricks NSW Punchbowl site	1/07/09-30/06/10	78,809
Austral Bricks NSW Bowral site	1/07/09-30/06/10	425,725
Austral Bricks Qld Wacol site	1/07/09-30/06/10	10,512
Austral Bricks Qld Riverview site	1/07/09-30/06/10	202,204
Austral Bricks Qld Rochedale site	1/07/09-30/06/10	280,417
Austral Bricks VIC Craigieburn site	1/07/08-30/06/09	832,914
Austral Bricks VIC Summerhill Site	1/07/08-30/06/09	519,846
Austral Bricks VIC Wollert Site	1/07/08-30/06/09	544,979
Brickworks Limited Car Policy	1/07/08-30/06/09	47,179
Austral Bricks VIC Scoresby	1/07/06-30/06/08	0
Austral Bricks NSW Plant 1 Horsley Park	1/07/06-30/06/08	410,569
Austral Bricks NSW Plant 2 Horsley Park	1/07/06-30/06/08	8,437
Austral Bricks NSW Plant 3 Horsley Park	1/07/06-30/06/08	551,101
Eureka Tiles VIC Ballarat	1/07/06-30/06/08	54,071
<b>Total energy assessed</b>		<b>5,519,275</b>
<b>Total energy use of the group in the current reporting year</b>		<b>6,213,576</b>
<b>Total energy assessed expressed as a percentage of total current energy use</b>		<b>88.8%</b>

1. This should be the start and finish date (month and year) for the assessment (planned assessment dates were nominated in Table 3.1 of the approved ARS).
2. Energy Bandwidth may only be used if approved in the Assessment and Reporting Schedule.

**Table 1.3 – Accuracy of energy use data**

Entity	% achieved	Reasons for not achieving data accuracy to within $\pm 5\%$
Bristle Roofing WA Caversham site	+/- 5%	Not applicable
Austral Bricks WA Malaga site	+/- 5%	Not applicable
Austral Bricks WA Cardup site	+/- 5%	Not applicable
Austral Bricks WA Bellevue site	+/- 5%	Not applicable
Austral Bricks SA Golden Grove site	+/- 5%	Not applicable
Austral Bricks NSW Punchbowl site	+/- 5%	Not applicable
Austral Bricks NSW Bowral site	+/- 5%	Not applicable
Bristle Roofing QLD Wacol site	+/- 5%	Not applicable
Austral Bricks QLD Riverview site	+/- 5%	Not applicable
Austral Bricks QLD Rochedale site	+/- 5%	Not applicable
Austral Bricks VIC Craigieburn site	+/- 5%	Not applicable
Austral Bricks VIC Summerhill Site	+/- 5%	Not applicable
Austral Bricks VIC Wollert Site	+/- 5%	Not applicable
Brickworks Limited Car Policy	+/- 5%	Not applicable
Austral Bricks VIC Scoresby	+/- 5%	Not applicable
Austral Bricks NSW Plant 1 Horsley Park	+/- 5%	Not applicable
Austral Bricks NSW Plant 2 Horsley Park	+/- 5%	Not applicable
Austral Bricks NSW Plant 3 Horsley Park	+/- 5%	Not applicable
Eureka Tiles Victoria	+/- 5%	Not applicable

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

### Part 2A - New Assessments completed during the reporting period

Name of Group member or business unit or key activity or site:

**Bristle Roofing WA Caversham**

Energy use of the entity during the current reporting period

<b>202,455</b>	<b>GJ</b>
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**Table 2.1 – Opportunities assessed to an accuracy of ±30% or better**

Status of opportunities identified		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	
Outcomes of assessment*	Total Identified	5	20,055			20,055
Business Response*	Under Investigation					
	To be Implemented	4	19,839			19,839
	Implementation Commenced					
	Implemented	1	216			216
	Not to be Implemented					

Name of Group member or business unit or key activity or site:

**Austral Bricks WA Malaga**

Energy use of the entity during the current reporting period

<b>323,414</b>	<b>GJ</b>
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**Table 2.1 – Opportunities assessed to an accuracy of ±30% or better**

Status of opportunities identified		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	
Outcomes of assessment*	Total Identified	9	7,113	15,524		22,637
Business Response*	Under Investigation					
	To be Implemented	8	7,113	1,557 <sup>^</sup>		8,670
	Implementation Commenced					
	Implemented	1		13,967		13,967
	Not to be Implemented					

<sup>^</sup> One of these projects relate to lowering electrical demand (kVA) for the Crusher & Hammer Mill which results in zero energy savings in GJ

Name of Group member or business unit or key activity or site:

**Austral Bricks Cardup**

Energy use of the entity during the current reporting period

<b>360,921</b>	<b>GJ</b>
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**Table 2.1 – Opportunities assessed to an accuracy of ±30% or better**

Status of opportunities identified		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	
Outcomes of assessment*	Total Identified	6	7,411 <sup>#</sup>	344		7,755
Business Response*	Under Investigation					
	To be Implemented	6	7,411 <sup>^</sup>	344		7,755
	Implementation Commenced					
	Implemented					
	Not to be Implemented					

# One of these projects relate to introducing Peak electrical demand control (kVA) resulting in zero energy savings in GJ

Name of Group member or business unit or key activity or site:

**Austral Bricks WA Bellevue**

Energy use of the entity during the current reporting period

<b>429,129</b>	<b>GJ</b>
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**Table 2.1 – Opportunities assessed to an accuracy of ±30% or better**

Status of opportunities identified		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	
Outcomes of assessment*	Total Identified	8	7,841	681		8,522
Business Response*	Under Investigation					
	To be Implemented	6	7,440 <sup>^</sup>	681		8,121
	Implementation Commenced	1	180			180
	Implemented	1	221			221
	Not to be Implemented					

<sup>^</sup> This project relates to lowering electrical demand (kVA) for the Crusher & Hammer Mill which results in zero energy savings in GJ

Name of Group member or business unit or key activity or site:

**Austral Bricks SA Golden Grove**

Energy use of the entity during the current reporting period

<b>236,593</b>	<b>GJ</b>
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**Table 2.1 – Opportunities assessed to an accuracy of ±30% or better**

Status of opportunities identified		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	
Outcomes of assessment*	Total Identified	9	19,738	447	6,870	27,055
Business Response*	Under Investigation	3		177 <sup>^</sup>	0 <sup>#</sup>	177
	To be Implemented	2	807			807
	Implementation Commenced	3	18,931	270		19,201
	Implemented	1			6,870	6,870
	Not to be Implemented					

<sup>^</sup> This project relates to lowering electrical demand (kVA) for the Crusher & Hammer Mill which results in zero energy savings in GJ

<sup>#</sup> This project relates to Power Factor Correction and reducing electrical demand (kVA) of the site resulting in zero energy savings in GJ

Name of Group member or business unit or key activity or site:

**Austral Bricks NSW Punchbowl**

Energy use of the entity during the current reporting period

<b>78,809</b>	<b>GJ</b>
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**Table 2.1 – Opportunities assessed to an accuracy of ±30% or better**

Status of opportunities identified		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	
Outcomes of assessment*	Total Identified	7	394	231	1,882	2,507
Business Response*	Under Investigation	6	394	231	1,822 <sup>^#</sup>	2,447
	To be Implemented	0				
	Implementation Commenced	0				
	Implemented	0				
	Not to be Implemented	1			60	60

<sup>^</sup> One of these projects relate to lowering electrical demand (kVA) for the Crusher & Hammer Mill which results in zero energy savings in GJ

<sup>#</sup> One of these projects relate to Power Factor Correction and reducing electrical demand (kVA) of the site resulting in zero energy savings in GJ

Name of Group member or business unit or key activity or site:

**Austral Bricks NSW Bowral**

Energy use of the entity during the current reporting period

<b>425,725</b>	<b>GJ</b>
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**Table 2.1 – Opportunities assessed to an accuracy of ±30% or better**

Status of opportunities identified		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	
Outcomes of assessment*	Total Identified	8	12,900	208	4,157	17,265
Business Response*	Under Investigation	5	12,592	208 <sup>^</sup>		12,800
	To be Implemented	1	308			308
	Implementation Commenced	0				
	Implemented	1		0 <sup>#</sup>		0
	Not to be Implemented	1			4,157	4,157

<sup>^</sup> One of these projects relate to lowering electrical demand (kVA) for the Crusher & Hammer Mill which results in zero energy savings in GJ

<sup>#</sup> This project relates to Power Factor Correction and reducing electrical demand (kVA) of the site resulting in zero energy savings in GJ

Name of Group member or business unit or key activity or site:

**Bristle Roofing QLD Wacol**

Energy use of the entity during the current reporting period

<b>10,512</b>	<b>GJ</b>
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**Table 2.1 – Opportunities assessed to an accuracy of ±30% or better**

Status of opportunities identified		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	
Outcomes of assessment*	Total Identified	8	2,226	150	125	2,501
Business Response*	Under Investigation	3		0 <sup>^</sup>	125	125
	To be Implemented					
	Implementation Commenced	2	73			73
	Implemented	1	2,100			2,100
	Not to be Implemented	2	53 <sup>#</sup>	150		203

<sup>^</sup> This project relates to Power Factor Correction and reducing electrical demand (kVA) of the site resulting in zero energy savings in GJ

<sup>#</sup> This project relates to an electric motor optimisation program, and will not be implemented as a project relating to the replacement of all electric motors with super efficient motors will supersede it.

Name of Group member or business unit or key activity or site:

**Austral Bricks QLD Riverview**

Energy use of the entity during the current reporting period

<b>202,204</b>	<b>GJ</b>
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**Table 2.1 – Opportunities assessed to an accuracy of ±30% or better**

Status of opportunities identified		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	
Outcomes of assessment*	Total Identified	6	20,132	378	0	20,510
Business Response*	Under Investigation	2	351	378		729
	To be Implemented	2	450			450
	Implementation Commenced	1	19,331			19,331
	Implemented					
	Not to be Implemented	1	0 <sup>^</sup>			

<sup>^</sup> This project relates to lowering electrical demand (kVA) for the Crusher & Hammer Mill which results in zero energy savings in GJ

Name of Group member or business unit or key activity or site:

**Austral Bricks QLD Rochedale**

Energy use of the entity during the current reporting period

<b>280,417</b>	<b>GJ</b>
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**Table 2.1 – Opportunities assessed to an accuracy of ±30% or better**

Status of opportunities identified		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	
Outcomes of assessment*	Total Identified	8	27,554	1,176	195	28,925
Business Response*	Under Investigation	1	248			248
	To be Implemented					
	Implementation Commenced	6	27,306 <sup>^</sup>	1,176 <sup>#</sup>		28,482
	Implemented					
	Not to be Implemented	1			195	195

<sup>^</sup> One of these projects relate to lowering electrical demand (kVA) for the Crusher & Hammer Mill which results in zero energy savings in GJ

<sup>#</sup> One of these project relates to Power Factor Correction and reducing electrical demand (kVA) of the site resulting in zero energy savings in GJ

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

### Part 2B - Update of assessments originally reported in previous reporting periods

Name of Group member or business unit or key activity or site:

#### Austral Bricks VIC Craigieburn

Energy use of the entity during the current reporting period 

832,914	GJ
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**Table 2.3 - Opportunities assessed to an accuracy of ±30% or better**

Status of opportunities identified		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	
Outcomes of assessment*	Total Identified	6	1,356	120,376	0	121,732
Business Response*	Under Investigation					
	To be Implemented					
	Implementation Commenced					
	Implemented					
	Not to be Implemented	6 <sup>^</sup>	1,356	120,376	0	121,733

<sup>^</sup> The status of all projects have been changed to “not to be implemented” as Craigieburn will be shut down with the commissioning of Wollert II, a state of the art, energy and resource efficient plant which will incorporate the latest energy saving plant and technologies.

Name of Group member or business unit or key activity or site:

#### Austral Bricks VIC Wollert

Energy use of the entity during the current reporting period 

544,979	GJ
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**Table 2.3 - Opportunities assessed to an accuracy of ±30% or better**

Status of opportunities identified		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	
Outcomes of assessment*	Total Identified	3	0	412	0	412 <sup>#</sup>
Business Response*	Under Investigation	2	0	412	0	412
	To be Implemented					
	Implementation Commenced	1 <sup>^</sup>	0	0	0	0
	Implemented					
	Not to be Implemented					

<sup>^</sup> This opportunity relates to a business process change, namely the establishment of enhanced energy monitoring equipment and results in zero energy savings. This will assist the organisation in identifying and quantifying future efficiency improvements.

<sup>#</sup> Wollert is a purpose built, state of the art facility commissioned last year incorporating the latest energy saving plant and technologies and arguably one of the most energy efficient brick plants in the southern hemisphere, limiting the opportunity of identifying cost effective energy savings.

Name of Group member or business unit or key activity or site:

**Austral Bricks VIC Summerhill**

Energy use of the entity during the current reporting period

<b>519,846</b>	<b>GJ</b>
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**Table 2.3 - Opportunities assessed to an accuracy of ±30% or better**

Status of opportunities identified		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	
Outcomes of assessment*	Total Identified	6	1,356	119,048	0	120,404
Business Response*	Under Investigation					
	To be Implemented					
	Implementation Commenced					
	Implemented					
	Not to be Implemented	6 <sup>^</sup>	1,356	119,048	0	120,404

<sup>^</sup> The status of all projects have been changed to “not to be implemented” as Summerhill will be shut down with the commissioning of Wollert II, a state of the art, energy and resource efficient plant which will incorporate the latest energy saving plant and technologies.

Name of Group member or business unit or key activity or site:

**Brickworks Limited Corporate Car Policy**

Energy use of the entity during the current reporting period

<b>47,179</b>	<b>GJ</b>
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**Table 2.3 - Opportunities assessed to an accuracy of ±30% or better**

Status of opportunities identified		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	
Outcomes of assessment*	Total Identified	2	1,630			1,630
Business Response*	Under Investigation					
	To be Implemented					
	Implementation Commenced	1	1,630			1,630
	Implemented	1 <sup>^</sup>	0			0
	Not to be Implemented					

<sup>^</sup> This opportunity relates to a business process change, namely the implementation strategy and reporting database supporting our fuel savings initiative and results in zero energy savings. This will assist the organisation in identifying and quantifying efficiency improvement in the future.

Name of Group member or business unit or key activity or site:

**Austral Bricks Plant 1 Horsley Park**

Energy use of the entity during the current reporting period

<b>410,569</b>	<b>GJ</b>
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**Table 2.3 - Opportunities assessed to an accuracy of ±30% or better**

Status of opportunities identified		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	
Outcomes of assessment*	Total Identified	6	1,365	529		1,894
Business Response*	Under Investigation					
	To be Implemented					
	Implementation Commenced	1	1,365			1,365
	Implemented	2		173		173
	Not to be Implemented	3		356		356

Name of Group member or business unit or key activity or site:

**Austral Bricks Plant 2 Horsley Park**

Energy use of the entity during the current reporting period

<b>8,437</b>	<b>GJ</b>
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**Table 2.3 - Opportunities assessed to an accuracy of ±30% or better**

Status of opportunities identified		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	
Outcomes of assessment*	Total Identified	1	162,913			162,913
Business Response*	Under Investigation					
	To be Implemented					
	Implementation Commenced					
	Implemented	1 <sup>^</sup>	162,913			162,913
	Not to be Implemented					

<sup>^</sup> This opportunity relates to the shutdown of Plant 2. The energy savings reported are the plants energy use prior to closure less any energy required to maintain security, lighting and other essential services. The energy use for the current reporting period includes maintaining security, lighting and other essential services and ad-hoc maintenance related works.

Name of Group member or business unit or key activity or site:

**Austral Bricks Plant 3 Horsley Park**

Energy use of the entity during the current reporting period

<b>551,101</b>	<b>GJ</b>
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**Table 2.3 - Opportunities assessed to an accuracy of  $\pm 30\%$  or better**

Status of opportunities identified		Number of opportunities	Estimated energy savings per annum by payback period (GJ)			Total estimated energy savings per annum (GJ)
			0 – < 2 years	2 – $\leq$ 4 years	> 4 years	
Outcomes of assessment*	Total Identified	6	456	929	152	1,537
Business Response*	Under Investigation					
	To be Implemented					
	Implementation Commenced					
	Implemented	1	32			32
	Not to be Implemented	5	424	929	152	1,505

Name of Group member or business unit or key activity or site:

**Austral Bricks VIC Scoresby**

Energy use of the entity during the current reporting period

<b>0</b>	<b>GJ</b>
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**Table 2.3 - Opportunities assessed to an accuracy of  $\pm 30\%$  or better**

Status of opportunities identified		Number of opportunities	Estimated energy savings per annum by payback period (GJ)			Total estimated energy savings per annum (GJ)
			0 – < 2 years	2 – $\leq$ 4 years	> 4 years	
Outcomes of assessment*	Total Identified	1	555,558			555,558
Business Response*	Under Investigation					
	To be Implemented					
	Implementation Commenced					
	Implemented	1 <sup>^</sup>	555,558			555,558
	Not to be Implemented					

<sup>^</sup> This opportunity relates to the shutdown of Scoresby. As previously reported Scoresby was replaced by Wollert, a purpose built, state of the art facility commissioned last year and incorporating the latest energy saving plant and technologies and arguably one of the most energy efficient brick plants in the southern hemisphere.

Name of Group member or business unit or key activity or site:

**Eureka Tiles Victoria**

Energy use of the entity during the current reporting period

<b>54,071</b>	<b>GJ</b>
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**Table 2.3 - Opportunities assessed to an accuracy of  $\pm 30\%$  or better**

Status of opportunities identified		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	
Outcomes of assessment*	Total Identified	1			60,263	60,263
Business Response*	Under Investigation					
	To be Implemented					
	Implementation Commenced					
	Implemented	1			60,263 <sup>^</sup>	60,263
	Not to be Implemented					

<sup>^</sup> Production has dramatically reduced in the current reporting period resulting in lower energy consumption than previously implemented energy initiatives

## 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 – Wacol Kiln Efficiency
<p>An energy study was carried out as part of the EEO process to identify opportunities for energy savings at our Bristle Roofing Plant in Wacol Qld. The team focused on energy use within the kilns which is an integral aspect of the tile making process. After the roof tiles are manufactured, they are stacked in racks and placed within the kiln to effect the curing process. The tiles are left in the kiln for approx 12 hours to ensure their structural integrity and other characteristics are met.</p> <p>A heat loss analysis identified the doors as being the greatest opportunity to reduce loses within the kiln. The kiln doors were a sheet metal construction with foam insulation sandwiched in between and a sliding mechanism to open and close them. The sliding mechanism could not seal the doors effectively and it was calculated that a great proportion of heat was wasted through ineffective sealing of the kiln doors.</p> <p>The team scoured the industry to identify a new system to effectively seal the doors and provide for more efficient use of heat in the curing process. The team identified a type of “roll-up curtain door” which was low weight and would withstand both the humid environment and low curing temperatures. The team decided to trial one of the roll-up curtain doors in an attempt to reduce heat losses and identified that seal was far superior to the older style sliding door mechanism reducing heat losses and optimizing the curing process. It was then decided to replace all 16 kiln doors in the tile plant, with the project being completed in late 2009.</p> <p>The sole use of natural gas at the Wacol Plant is for the kiln boilers. It was therefore quite a simple process to quantify any improvements without the complication of other plant or processes effecting consumption. The result was a dramatic improvement in specific consumption (GJ per unit of production) with an annual reduction 2,100GJ of natural gas, equivalent to 108 tCO<sub>2</sub>e.</p> <div> </div>

### Opportunity 2 – Optimizing Natural Gas Consumption at Malaga Brick Plant

Energy Efficiency assessments carried out at the Malaga plant identified inefficiencies within the chamber driers resulting in excessive consumption of natural gas. The team monitored consumption prior to the implementation of the project to establish a baseline. The walls of the drier were replaced with materials minimizing heat transfer losses and fans were replaced with newer technology. At the same time, the technical team introduced increased coring from 32mm to 34mm, resulting in reduced raw materials usage in the manufacturing process and less energy required to dry and fire the bricks.

The reduced thermal mass of the highly cored bricks in combination with the energy efficiency improvements implemented within the chamber driers resulted in an overall reduction of natural gas usage of 13,967 GJ per annum and 717 tCO<sub>2e</sub>.



### Opportunity 3 – Kiln Car Replacement Golden Grove

The under car section of the kiln cars are constantly cooled with air at ambient temperature to minimize any adverse effects of the high firing temperatures on the rolling stock and the kiln cars in general. Damaged refractory and poor sealing was leading to under car cooling air seeping into the kiln chamber. This results in large volumes of “cold” air entering the kiln leading to the requirement of additional fuel to maintain the firing temperatures throughout the various heating zones. Additionally, such leaks cause variations in total air flow requirements to maintain the necessary pressure distribution throughout the kiln, which in turn results in difficulties in maintaining optimum combustion efficiencies.

With the projected energy savings, the team at Golden Grove was able to justify the replacement of the kiln cars and replace all refractory with a light weight product leading to further energy savings with its reduced thermal mass. Subsequent to the replacement of all kiln cars and refractory the savings have been measured and result in a reduction of 6,870GJ of natural gas per annum. This is equivalent to 353tCO<sub>2</sub>e and an 11% reduction in specific energy consumption in GJ/t.





## Part 4 – Declaration

The information included in this report has been reviewed and noted by the board of directors and is to the best of my knowledge, correct and in accordance with the *Energy Efficiency Opportunities Act 2006* and *Energy Efficiency Opportunities Regulations 2006*.

**Mr Lindsay Partridge**  
Managing Director  
Brickworks Limited