



Australian Government

Department of Resources, Energy and Tourism

Energy Efficiency
Opportunities

BRICKWORKS

LIMITED

Energy Efficiency Opportunities

Public Report 2013

Controlling Corporation

Brickworks Limited

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 and 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.

Preparing the Group for the carbon constrained future has been a critical issue facing Brickworks this year. The commencement of the Carbon Tax on 1 July 2012 impacted the Group for the entire year, firstly at a price of \$23 per tonne of carbon dioxide, escalating to \$24.15 per tonne from 1 July 2013. All facilities have the cost of carbon passed through by their suppliers on all relevant inputs except natural gas.

Brickworks has two facilities where emissions were expected to exceed the 25kT CO₂e threshold during 2013, being Wollert (Austral Bricks Vic) and Plant 23 (Austral Bricks NSW), which would make them directly liable to pay the Carbon Tax on their natural gas consumption under the scheme. Being a large natural gas consumer, Brickworks successfully applied for, received and utilised its Obligation Transfer Number (OTN) from the Clean Energy Regulator.

In order to reduce our environmental impact and costs associated with energy consumption and carbon emissions Brickworks is undertaking numerous initiatives. These include fuel-switching projects from natural gas to lower emissions intensity sources such as landfill gas, sawdust and other organic materials used as on-board "body fuels". At the same time our R&D team are introducing ways to reduce energy consumption and emissions through product re-engineering such as redesigning the bricks to reduce their mass and incorporating other waste streams and fluxes to reduce peak firing temperatures. A number of these projects were qualified and deemed successful by AusIndustry, and offered financial assistance under the stringent regulatory hurdles of the federal Government's Clean Technology Invest Program (CTIP). Contracts have been executed on three projects:

Brickworks actively participate in energy efficiency and greenhouse gas reporting schemes which have assisted in reducing costs, energy consumption, and greenhouse gas emissions. The programs have also led to measurable improvements of systems and processes for data capture and storage, measuring and calculating emissions and implementing energy saving initiatives. 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. All of the largest Brickworks sites covering over 90% of Brickworks total energy consumption have been assessed and had energy audits undertaken to Level 2 status;
- 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. Brickworks has been measuring its energy consumption and emissions for some 15 years and this program has assisted Brickworks to streamline its processes for data capture, measuring, calculating and reporting energy and emissions. The data is subsequently collated and reported monthly to Senior Management and the Board;

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- National Pollution Inventory (NPI) – the NPI provides the government, community and industry with information to substances and emissions estimates for 93 toxic substances. Brickworks continues to fulfil its mandatory reporting requirements under this scheme;
- Environment and Resource Efficiency Program (EREP) – this programme was established by the Environment Protection Act 2006 (Victoria only) to assist the state’s largest energy and water users to achieve financial benefits by assessing their resource use efficiency (energy, water and materials use and waste generation). While many of the energy saving projects are already covered in Brickworks’ EEO submission, water and resource saving and waste reduction initiatives have also been committed to; and
- Energy Saving Action Plans (ESAP) – this program is administered by the NSW Office of Environment & Heritage and requires large energy users in NSW to submit a detailed energy efficiency plan and subsequent annual progress reports.

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. Brickworks has been actively promoting the benefits of Bricks over lightweight competing products since the release of a publication based on 8 years of research and development with the University of Newcastle which concluded that houses built with Bricks and their inherent thermal mass properties have far superior energy efficiency performance compared to housing constructed from lighter weight materials.



PUBLIC REPORT TEMPLATE 2013

Part 1 - Corporation details

Controlling corporation

Brickworks Limited

Table 1.1 - Major changes to corporate group structure or operations

Table 1.1 – Major changes to corporate group structure or operations in the last 12 months

There were no major changes to the corporate structure during this period. However Brickworks acquired a masonry block plant in Prospect NSW and subsequently shut down its Port Kembla Masonry plant. The decision was also made to re-commence operations at our Roof-tile plant at Caversham WA. The impact of the current economic climate has meant most plants are operating at less than maximum capacity and this unfortunately reduces plant efficiency and increases energy intensity per unit of production.

Declaration

Declaration of accuracy and compliance

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*.


Lindsay Partridge – Managing Director

Date:

18/12/12

Part 2 - Assessment outcomes

Table 2.1 – Assessment details

Name of entity	Brickworks Limited	
Total energy use in the last financial year	4,423,339	GJ
Total percentage of energy use assessed when assessments were undertaken	45.9	%

The method used by Brickworks to carry out its assessment:

Assessments were carried out as per our Assessment Plan, utilising the experience of a cross functional team. This included members from Research & Development, the Major Projects & Engineering Team, National Fleet and Energy & Sustainability. This gave the team the breadth, scope and experience required to ensure the assessments were as effective as possible and tailored to Brickworks unique requirements and an ever changing regulatory and economic environment in which it operates in.

Brickworks senior management established an EEO Steering Committee to assist the organisation to 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 and ensure the focus and resources are available to adequately address the programs requirements. The commitment by senior management in forming this committee forms the basis of predominately meeting the “leadership & communications elements” of the program.

The Cross Functional Team reviews recommendations made in the audits. 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 will be implemented. Considering a number of projects identified during the current assessments include product re-engineering and alternate fuels, product quality and integrity are critical aspects that will be considered prior to deciding whether projects will be implemented. Environmental Protection Agency (EPA) approvals will also play a key role to the feasibility of some opportunities identified. 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.

A number of opportunities were identified which could not be quantified within +/- 30%. These opportunities will not be formally reported and paybacks are expected to be greater than 4 years. These projects can only be quantified through the undertaking of formal trials and are dependant on suppliers supporting the trial program, which Brickworks does not have any control over.

With the carbon tax in full swing and increases in natural gas prices due to LNG exports, a major focus for the company was reducing its carbon emissions via low carbon fuel sources and reliance on natural gas. A number of opportunities were identified by the assessments relating to substituting natural gas with bio-fuels. Some of these projects result in dramatic reductions in carbon emissions and in some instances cost, but have limited impact on resulting energy consumption. The same can be said for projects focussed on reducing electrical demand.

The assessments included a desktop analysis of energy and production usage in order to identify opportunities and trends. This included seasonality analysis, baseline reductions, Time of use (ToU) analysis, Demand resets, tariff re-assignment and low to high voltage review etc. The assessment



also included a review of projects carried over from the 1st round of the EEO program, Kiln Audits, and non energy related “fuels” which are used for process purposes such as Mould Oil and Glucose.

Brickworks has undertaken Energy Efficiency Opportunities Assessments for the following plants for the 2012 - 2013 period:

- Austral Bricks - Plant 21
- Austral Bricks - Plant 23
- Austral Bricks - Golden Grove
- Austral Bricks - Wollert

The result is that after the first assessment period of the 2nd five year cycle, Brickworks have assessed 45.9% of their total energy consumption.

Table 2.2 - Energy efficiency opportunities identified in the assessment

Austral Bricks – Plant 1

Status of opportunities identified to an accuracy of better than or equal to $\pm 30\%$		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	Implemented	2	1	0	1	0			0
	Implementation commenced	1			1	9,340			9,340
	To be implemented	1	1	12,015					12,015
	Under investigation	2	2	4,816					4,816
	Not to be implemented								
Outcomes of assessment	Total identified	6	4	16,831	2	9,340			26,171

Austral Bricks – Plant 3

Status of opportunities identified to an accuracy of better than or equal to $\pm 30\%$		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	Implemented	2	2	19,058					19,058
	Implementation commenced	1			1	0			0
	To be implemented	1	1	3,500					3,500
	Under investigation	3	2	321	1	8,834			9,155
	Not to be implemented								
Outcomes of assessment	Total identified	7	5	22,879	2	8,834			31,713

Austral Bricks – Golden Grove

Status of opportunities identified to an accuracy of better than or equal to $\pm 30\%$		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	Implemented	1			1	0			0
	Implementation commenced								
	To be implemented	2	1	1,800	1	0			1,800
	Under investigation	3	1	781	2	12,835			13,616
	Not to be implemented								
Outcomes of assessment	Total identified	6	2	2,581	4	12,835			15,416

Austral Bricks - Wollert

Status of opportunities identified to an accuracy of better than or equal to $\pm 30\%$		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	Implemented								
	Implementation commenced								
	To be implemented	1			1	413			413
	Under investigation	3	1	3,288	2	10,883			14,171
	Not to be implemented								
Outcomes of assessment	Total identified	4	1	3,288	3	11,296			14,584

Table 2.3 - Details of significant opportunities identified in the assessment

Description of opportunity No. 1	Voluntary Information	
<p>Landfill Gas Project - Austral Bricks Plant 1</p> <p>The project involves transporting landfill gas from a landfill adjacent to our site, conditioning the gas then burning it in the Kiln as a partial replacement for natural gas. Key aspects of the project include</p> <ul style="list-style-type: none"> • Modifications to existing flare at the Veolia site to enable landfill gas to be transported to Austral at a minimum set pressure. Any gas not taken by Brickworks will be flared • The construction of a buried gas pipeline to transports gas from Veolia to Austral • Gas conditioning plant at the Austral facility which includes; a Chiller to remove any residual moisture; a compressor to increase the pressure of the landfill gas to the correct pressure; an after-cooler to cool the gas to the required density • The landfill gas burner plant which comprises dedicated manifolds and dual fuel, un-supervised burners that will work in conjunction with existing natural gas manifolds. • The landfill gas is supplied to 4 burner groups in the furnace zone were temperatures range between 750 – 950C 	Equipment type	Gas compressor, gas conditioning equipment, stainless steel pipework & new burners
	Business response	Implemented
	Energy saved (GJ)	0
	Greenhouse gas abated (CO2-e)	6,437
	\$ saved	
	Payback period	2.4



Description of opportunity No. 2	Voluntary Information	
<p>OGM Biomass Project - Plant 3</p> <p>This project aims to introduce an alternative raw material (ARM) into the brick manufacturing process at Horsley Park Plant 3 to achieve a reduction in natural gas consumption and body weight.</p> <p>The proposed ARM is Organic Growth Medium (OGM) as supplied by Global Renewables Australia from their Eastern Creek facility. The OGM is a pasteurised soil conditioner that is derived from solid municipal waste (collected household and garden waste). It is sawdust like in nature, making it suitable as an additive to the existing raw materials, and also possesses a calorific value similar to that of traditionally used sawdust materials.</p> <p>Being organic in nature the OGM will oxidise during firing, releasing heat into the kiln that will result in a reduction in the volume of natural gas required to fire the product. As an added benefit, the oxidation of the organic material will create micro-pores in the brick that will ultimately reduce the fired weight of the product. This weight reduction has flow on cost benefits to the business in terms of transport and packaging savings.</p> <p>Equipment will include storage facilities, feeders, conveyors and odour masking initiatives. The success of this project will be subject to regulatory (EPA and Council) approvals and product quality.</p>	Equipment type	Processing, storage & feeding equipment
	Business response	To be implemented
	Energy saved (GJ)	3,500GJ/a
	Greenhouse gas abated (CO ₂ -e)	9,768
	\$ saved	
	Payback period	1.0



Description of opportunity No. 3	Voluntary Information	
<p>Re-design of brick coring to reduce mass – Golden Grove</p> <p>Reducing brick mass results in less energy (or reduced natural gas consumption) required to bring the kiln up-to the set temperatures. This project will be undertaken in close collaboration with R&D to ensure any weight reduction does not result in detrimental impacts to Brick strength and other properties as set out in Australian Standards and codes.</p> <p>The project involves modifying and replacing the die-set and bridge in order to modify the core pattern of the brick. The aim of the revised core pattern is to increase the size of the voids and reduce raw material usage and brick weight.</p>	Equipment type	New die-set
	Business response	Under investigation
	Energy saved (GJ)	6,284
	Greenhouse gas abated (CO ₂ -e)	323
	\$ saved	
	Payback period	2.7

Please note that the *Description of the opportunity* above should include information on the specific nature and type of opportunity as well as information on the type of equipment and/or process involved.

