

LyondellBasell Australia Holdings Pty Ltd
Energy Efficiency Opportunities Act
Public Report

Reporting Period July 2006 to June 2011

Part 1: Introduction

LyondellBasell Australia Holdings Pty Ltd, part of the LyondellBasell family of companies, is headquartered in Melbourne, Victoria, and is the principal of LyondellBasell Australia Pty Ltd, which is the sole manufacturer of polypropylene (PP) in Australia. Polypropylene resins are manufactured in Australia at two sites, Geelong, Victoria, and Clyde, New South Wales. Both sites obtain propylene and ethylene gas feedstock from local refineries and petrochemical plants.

LyondellBasell Australia Holdings is also a 50% shareholder in PolyPacific Pty Ltd, located in Dandenong, Victoria, which produces markets and sells polypropylene compounds used in specialised customer applications such as automotive door and instrument panels, bumpers and interior trim.

LyondellBasell Australia Holdings is a registered participant of the Energy Efficiency Opportunities Program and has conducted a number of assessments since registration in March 2007.

The following report details energy use per assessed site and the opportunities that have progressed during the past financial year.

The Melbourne site and PolyPacific are not included as part of the assessment process.

As of the date of this report, LyondellBasell Australia Holdings has met the intent and key requirements of the Energy Efficiency Opportunities legislation.

Reporting Period

This report relates to the following period: July 1, 2006 to June 30, 2011.

Part 1.1: Major Changes to Corporate Group Structure or Operation

There have been no major changes to the corporate group structure or operations during this reporting period.

Part 1.2: Aggregate Energy Assessed Covered in this Report

Total energy use covered by all assessments in this report	846,591	GJ
Total energy assessed as percentage of total energy use of the corporate group	97	%

All energy data has accuracy within +/-5 percent.



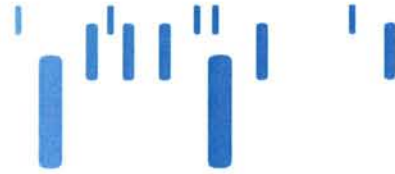
Declaration

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 Barry Kelly
Managing Director
LyondellBasell Australia Holdings Pty Ltd

20 December 2011

Date



Part 2 – Assessment Outcomes

Table 2.1 – Assessment Details

Name of Group member or business unit – Clyde

Total Energy Use in the last financial year	483598	GJ
Energy use assessed in this entity as a percentage of total entity energy use	100	%
Energy use assessed in this entity as a percentage of total corporate energy use	55	%

Period over which assessment was undertaken

The period in which assessments were undertaken was from July 2008 to June 2009.

Description of the way in which the entity carried out its assessments

Assessments have been conducted for the Clyde site and included the following actions:

- Allocation of an Environmental / Energy Efficiency Focal Point for each site
- Implementation of a Sustainability Policy which includes reference to energy efficiency
- Calculation of baseline data for energy usage
- Extensive energy assessments and mass balances to within +/-5 percent accuracy conducted by a qualified engineer
- Operational tracking of energy use against production
- Workshops were held to identify energy efficiency opportunities using cross-functional teams and external expertise
- Additional workshops to prioritise and agree on opportunities were conducted
- Benchmarking of energy use against other LyondellBasell plants
- Calculation of payback period to an accuracy of +/- 30 percent for opportunities identified as high priority or with high potential to generate savings
- Results of energy mass balance, assessments and opportunities identified presented to LyondellBasell staff, Manufacturing Management and Australian Management Team
- Identification of projects with payback periods of four years or less.
- Improvements have been made to our internal management of change process to incorporate a Sustainability and Environment questionnaire. Included in this section is an Energy Efficiency question, which assists in the development and awareness of new energy projects.
- Improved metering has been installed at the Clyde site. Substation 20 was previously not metered and electricity usage was calculated on a monthly basis. The metering currently installed allows for real-time readings and ongoing monitoring of the electricity usage.



Name of Group member or business unit – Geelong

Total Energy Use in the last financial year	362993	GJ
Energy use assessed in this entity as a percentage of total entity energy use	100	%
Energy use assessed in this entity as a percentage of total corporate energy use	42	%

Period over which assessment was undertaken

The period in which assessments were undertaken was from July 2008 to June 2009.

Description of the way in which the entity carried out its assessments

Assessments have been conducted for the Geelong site and included the following actions:

- Allocation of an Environmental / Energy Efficiency Focal Point for each site
- Implementation of a Sustainability Policy which includes reference to energy efficiency
- Calculation of baseline data for energy usage
- Extensive energy assessments and mass balances to within +/-5 percent accuracy conducted by a qualified engineer
- Operational tracking of energy use against production
- Workshops were held to identify energy efficiency opportunities using cross-functional teams and external expertise
- Additional workshops to prioritise and agree on opportunities were conducted
- Benchmarking of energy use against other LyondellBasell plants
- Calculation of payback period to an accuracy of +/- 30 percent for opportunities identified as high priority or with high potential to generate savings
- Results of energy mass balance, assessments and opportunities identified presented to LyondellBasell staff, Manufacturing Management and Australian Management Team
- Identification of projects with payback periods of four years or less.
- Improvements have been made to our internal management of change process to incorporate a Sustainability and Environment questionnaire. Included in this section is an Energy Efficiency question, which assists in the development and awareness of new energy projects.
- Bi-annual meetings are conducted to review environmental management systems, including energy efficiency opportunities projects.



Table 2.2 Energy Efficiency Opportunities Identified in the Assessment

Clyde Site

The following details the outcomes and business response to opportunities that have been identified at the Clyde Site.

Total energy use for the period 1.7.2010 to 30.6.2011

Clyde Site - Opportunities assessed to an accuracy of $\pm 30\%$ or better						
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 – \leq 4 years	> 4 years	
Outcomes of assessment*	Total Identified	12	20732		2052	22784
Business Response*	Under Investigation	0	0			0
	To be Implemented	2	6944			6944
	Implementation Commenced	2	2937			2937
	Implemented	6	7701			7701
	Not to be Implemented	2	3150		2052	5202

Notes:

1. An additional opportunity was added for the Clyde site in the 2008-2009 reporting period. The opportunity relates to the commencement of a full site steam survey and is explained in further detail in Section 6 of this report.
2. An opportunity that was implemented at the Clyde site was 'Improving the Reliability of Reactor 2 Cycle Gas Compressor K4302'. After implementation it was found that the reliability of the compressor did improve, however not to the extent previously envisaged. Powder was also found near the reactor which increased the risk of dangerous blockages. It was decided that this project would not continue and has been placed in the 'Not to be implemented' column.
3. The estimate energy savings per annum for implemented projects are based on calculated actual savings to date and not the estimated savings for period 1.7.2010 to 30.6.2011.



Geelong Site

The following details the outcomes and business response to opportunities that have been identified at the Geelong Site.

Total energy use for the period 1.7.2010 to 30.6.2011

Geelong Site - 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	8	6717		57	6774
Business Response*	Under Investigation	0				0
	To be Implemented	1	36			36
	Implementation Commenced	1	43			43
	Implemented	5	6638			6638
	Not to be Implemented	1			57	57

Note:

1. The estimate energy savings per annum for implemented and implemented commenced projects are based on calculated actual savings to date and not the estimated savings for period 1.7.2010 to 30.6.2011.



Part 2.3 Details of significant opportunities identified in the assessment

In total, 20 energy-saving opportunities were identified as part of the Energy Efficiency Opportunities Assessment process. Out of the 20 projects, 17 are to be implemented.

Below are details of six opportunities identified that have been implemented or are currently in the process of being implemented.

Opportunity 1 – Improved Design of the Extruder Process

The Geelong site has installed an improved design screen pack (polymer filter) holder on its two extruders. The design allows for a reduction in pressure drop, enabling lower extruder energy consumption and the elimination of variable product. A trial was conducted using a prototype which showed a considerable reduction in energy usage. A full production version of the newly improved design has recently been implemented and is currently operating on selected grades.

Opportunity 2 – Optimisation of the Splitter and De-ethaniser process

A project at the Geelong site to further improve distillation operations, including propylene splitting and de-ethanising, has resulted in significant energy reductions. The process was commissioned in 2006 and its energy usage tracked and reviewed monthly. A study was initially conducted to determine the optimum flow rate from the splitter's heat pump compressor to the bottom of the splitter during normal operation. This flow rate was found to be 320,000 kg/hr and ensures minimal propylene losses from the bottom of the splitter and the most energy efficient operation of the process. Also during extended site shutdown periods, it has been decided that the Splitter and De-ethaniser process will also be shut down as opposed to being operated in recycle mode. A Green Team was established at the Geelong site to co-ordinate these projects and consists of the Environmental Focal Point, Process Engineers and Operators.

Opportunity 3 – Steam Trap Audit

An extensive steam trap audit has been conducted at the Geelong site, and traps that were found to be leaking or blocked have been repaired and retested. Steam-trap audits will now occur at regular intervals to prevent further steam losses.

The Clyde site has also undergone a steam trap audit and the results found a quantifiable energy loss of 2874 GJ. Steam traps are in the process of being replaced and to date, 457 GJ of energy has been saved.

Opportunity 4 – Improved Control of Warehouse Lighting

By installing additional switches on the north side of the warehouse at the Geelong site, the warehouse lighting can now be turned on automatically when entry is required. Previously they were positioned in a location where access at night was unobtainable and for safety reasons the lights were left on all night.



Opportunity 5– Identify Equipment that can be turned off

The Clyde site has reduced energy consumption by turning off certain operating equipment when not in use. The polypropylene pellet drier, extruder water pump and shaker screen now only operate when required, which has resulted in significant energy savings. To date this project has resulted in energy savings of 463 GJ.

Opportunity 6 – Reduce Running of Ethylene Compressor (K4410)

K4410 is used during random polymer production (around 10 – 15 percent of total production) to boost the ethylene supply pressure into the reactor. With the removal and bypass of piping, vessels and instrumentation on the ethylene supply (no longer required due to quality of supply), the pressure drop between the supply line and the reactor has decreased, allowing operation without use of the compressor. To date this project has resulted in energy savings of 215 GJ.