

PUBLIC REPORT TEMPLATE

Controlling Corporation

Caltex Australia Limited

Period to which this report relates

Start

1 January 2009

End

31 December 2009

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

Caltex Australia Limited conducted energy efficiency assessments at its refining facilities in their entirety during the last reporting period. The Kurnell refinery site in NSW was assessed between February and May 2008; and the Lytton refinery site in Queensland was assessed in the June to September 2008 period. Although no assessments were carried out in reporting period, one new opportunity was identified for the Kurnell refinery (reported in table 2.1).

The assessment methodology considered all aspects of energy improvement - operational enhancements, capital investment planning and implementation, and operational management for long-term sustainable benefits. Nine potential energy savings opportunities were identified for Kurnell and twenty opportunities were identified for Lytton, to be further investigated.

During 2009, implementation of sixteen opportunities was commenced at Lytton refinery, and a new opportunity was identified and implemented at Kurnell Refinery. The remaining opportunities for energy savings identified during the assessments are under further investigation. All opportunities are processed through Caltex's business and capital planning, and production management procedures, so that they are embedded within the business.

Note: Previous EEO reports distinguished between the lubricating oil refining equipment and the fuels refining equipment at Kurnell. Energy data was split arbitrarily to allow this separation in reporting. Energy and production streams are in fact completely integrated at Kurnell, and so the lubricating oil refining and the fuels refining have been reported together as Kurnell Refinery in this report, consistent with other external reports Caltex makes.

To the best of its knowledge Caltex has met the intent and key requirements of the *Energy Efficiency Opportunities Act 2006* and *Energy Efficiency Opportunities Regulations 2006*.

Part 1 – Information on assessments completed to date (continued)

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 undertaken¹	Energy use per annum in GJ² in the current reporting year 1 Jul 2008 – 30 Jun 2009
Kurnell Refinery	February and May 2008	20,349,281
Lytton Refinery	June 2008 to September 2008	10,971,964
Total energy assessed		31,321,245
Total energy use of the group in the current reporting year		31,945,414
Total energy assessed expressed as a percentage of total current energy use		98.05%

Table 1.3 – Accuracy of energy use data		
Entity	% achieved	Reasons for not achieving data accuracy to within $\pm 5\%$
Kurnell Refinery	$\pm 5\%$	NA
Lytton Refinery	$\pm 5\%$	NA

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: **Kurnell Refinery**

Energy use of the entity during the current reporting period

20,349,281	GJ
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Table 2.1 – 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	401,152			401,152
Business Response*	Under Investigation					
	To be Implemented					
	Implementation Commenced	1	401,152			401,152
	Implemented					
	Not to be Implemented					

Note 1: No new opportunities were assessed for Lytton Refinery in the reporting period.

Note 2: No new opportunities were assessed with accuracy +/- 30% or worse

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: **Kurnell Refinery**

Energy use of the entity during the current reporting period

20,349,281	GJ
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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	9	76,804	620,179		696,983
Business Response*	Under Investigation	9	76,804	620,179		696,983
	To be Implemented					
	Implementation Commenced					
	Implemented					
	Not to be Implemented					

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

Part 2B - Update of assessments originally reported in previous reporting periods (continued)

Name of Group member or business unit or key activity or site: **Lytton Refinery**

Energy use of the entity during the current reporting period

10,971,964	GJ
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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	20	244,210	171,230		415,440
Business Response*	Under Investigation	4	12,406	171,230		183,636
	To be Implemented					
	Implementation Commenced	5	110,087			110,087
	Implemented	11	121,717			121,717
	Not to be Implemented					

Note 1: No existing opportunities were assessed with accuracy +/- 30% or worse

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

Reduction of fuel to emergency flare at Kurnell

Refineries operate an emergency flare to allow safe pressure release of flammable and explosive process gases during emergencies and unexpected process events. The flare is kept ready for emergencies with a flow of fuel gas acting as a pilot light. At Caltex's Kurnell refinery, the emergency flare is subject to a NSW Department of Environment and Climate Change environmental protection licence condition under which a minimum rate of fuel gas (2 tonnes per hour) must be maintained to the flare at all times.

An opportunity was identified during 2009 to save fuel gas by installing a smaller control valve to better control the flow of fuel gas to the flare. Better control allows the refinery technicians to maintain the flow much closer to the required minimum for environmental protection.

The new control valve was installed in mid-October 2009. An estimated saving of 0.897 tonnes fuel gas per hour is predicted, equating to a potential saving of approximately 400,000 gigajoules per year.

Opportunity 2

Reduction of fuel to emergency flare at Lytton

During the energy assessment completed in 2008, an opportunity was identified to upgrade control valves relieving to the Lytton emergency flare. These control valves are normally kept shut, but are opened during emergencies or unexpected process events when safe release of flammable and explosive process gases is required.

Seven leaking control valves were identified for replacement and to be upgraded from Class II or Class IV valves to Class V valves. Class V valves give a tighter seal than lower classes, whilst maintaining adequate durability and reliability for this use (even higher class valves are available but the soft seals are not sufficiently durable for these control valves).

Five valves have been replaced throughout 2009 and the last two will be replaced during a maintenance shutdown in April 2010. Once this is completed an approximate energy saving of 4,500 tonnes fuel gas per annum is estimated.



Opportunity 3

Saving waste heat on Lytton catalytic cracker

Flue gas from the fluidic catalytic cracker unit at Lytton is at approximately 700 degC and three waste heat boilers are used to recover some of the heat energy. A bypass valve is used to control the volume of flue gas to the waste heat boilers to ensure the boilers do not overpressure with too much flue gas. Excess flue gas is relieved through this bypass valve straight to atmosphere, where the heat is lost.

During the 2008 energy assessment at Lytton, an opportunity was identified to refurbish the bypass valve so that it may be set to allow less bypass (kept more closed) whilst maintaining adequate safety from over pressuring the waste heat boiler. Following refurbishment of the valve, trials were conducted on the unit to determine whether the reduced bypass rate could be safely maintained.

As a result, the average flow of flue gas bypassing the waste heat boiler has reduced from 32% in 2008 to 23% in 2008. The result is an energy saving of just under 100,000 gigajoules per annum, from the increase in waste heat recovered.

Part 3 - Voluntary Contextual Information

Table 3.1 – Contextual Information

Caltex Refining -

Caltex Australia Limited is the largest refiner and marketer of petroleum products in Australia with operations in all states and territories. Caltex owns and operates two petroleum refineries, producing fuels at Lytton and both fuels and lubricating oils at Kurnell.

The Kurnell refinery is located on the southern shore of Botany Bay in Sydney's south-east. The fuels refinery was commissioned in 1956. It is the largest refinery in NSW and the second largest of the seven operating oil refineries in Australia, based on a crude oil throughput capacity of 20 million litres per day.

The Lytton refinery is located at the mouth of the Brisbane River to the south of the Brisbane CBD. The refinery was commissioned in 1965 and with a crude oil throughput of 17 million litres per day, is the largest oil refinery in Queensland and fifth largest oil refinery in Australia.

Energy Use at the Refineries -

The Caltex refineries use over 30 petajoules of energy each year to produce petrol, diesel, jet fuel, fuel oil, LPG, butane and propane, bitumen, lubricating oil base stocks, waxes, process oils and sulfur.

Energy efficiency at the refineries varies significantly over time due to

- a) Variable operating rates - where reduced demand for products may limit throughput rates, or change the product mix,
- b) Variation in feed – where more than 20 different crude oil types are handled annually in our facilities, each requiring different energy intensity in processing, and yielding a different product mix,
- c) Shutdown of production units for inspection and maintenance – where individual unit are typically scheduled for a shutdown every 4-6 years and these take several months to complete in each case,
- d) Changing specifications of products – where changes to fuel quality specifications have increased the energy intensity of production over time, including higher octane fuels and clean fuels quality improvements to reduce benzene and sulfur in fuels.

Other Opportunities for Energy Efficiency at the Refineries -

Caltex has focussed attention on efficient energy use from the design and early operation of the refineries, and continues to do so today. As the refineries burn their own fuels derived from crude oil feed, as well as importing natural gas and electricity, savings in fuel use can result in a double saving as this will often yield additional product. Both the Kurnell and Lytton sites have an Energy Engineer appointed to optimise energy efficiency.




Table 3.2 – Energy use expressed in Greenhouse Gas emissions and as an energy use indicator

Period of energy use 1 July 2008 to 30 June 2009		
Name of group member/ business unit/ key activity/site	Energy use pa (GJ)	Energy use pa (GGE tonnes CO2eq)
Kurnell Refinery	20,349,281	1,288,709
Lytton Refinery	10,971,964	835,897
Non refining business	624,169	89,665
Total CAL	31,945,414	2,214,271

Part 4 - Declaration

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

<p>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 <i>Energy Efficiency Opportunities Act 2006</i> and <i>Energy Efficiency Opportunities Regulations 2006</i>.</p>	
	<p>Julian Segal, Managing Director and CEO</p>