

## Gladstone Ports Corporation Limited Energy Efficiency Opportunities 2<sup>nd</sup> Public Report

### INTRODUCTION TO THE ENERGY EFFICIENCY OPPORTUNITIES PROGRAM:

The Energy Efficiency Opportunities Program (EEO) is an Australian Government initiative to encourage large energy using businesses to improve their energy efficiency by requiring them to identify, evaluate and report publicly on cost effective energy saving opportunities. Gladstone Ports Corporation Limited (GPC) became a signatory to the EEO program in 2006-7.

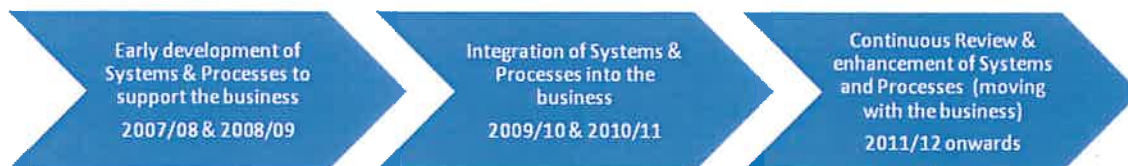
The EEO program is designed to lead to:

- improved identification and uptake of cost-effective energy efficiency opportunities;
- improved productivity and reduced greenhouse gas emissions; and
- greater scrutiny of energy use by large energy consumers.

The Australian Government Department of Resources, Energy and Tourism (RET) is administering the program under the Energy Opportunities Act 2006 and associated Regulations. As of May 2009, for the first reporting year ending 30<sup>th</sup> June 2008, 199 of 218 registered participants had completed their first assessments including GPC. The combined outcome of committed opportunities for implementation is an estimated 1% reduction in Australia's total energy use (June 2008). This equates to an annual reduction of 4 million tonnes of CO<sub>2-e</sub> gas emissions. Please visit [www.energyefficiencyopportunities.gov.au](http://www.energyefficiencyopportunities.gov.au) for further information.

As part of its obligations, GPC has submitted an Assessment and Reporting Schedule (A&RS) that has been accepted by DRET for the first five year improvement cycle. The key activities and assessment schedule from the A&RS commitment are shown below.

#### GPC's timeline of key activities:



#### Key business Centre Assessments:

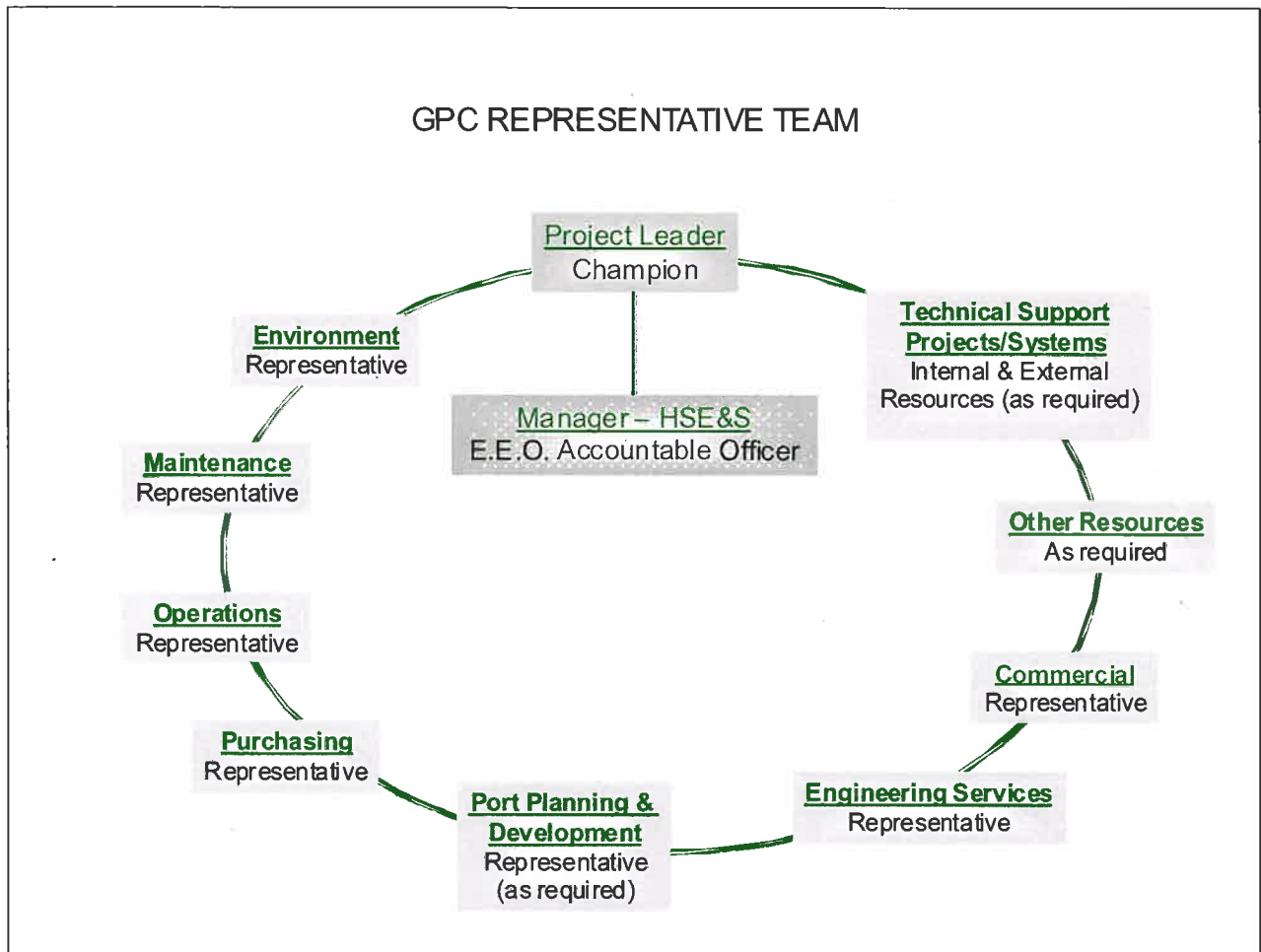
- 2007/08 – GPC Administration Building
- 2007/08, 2008/09, 2009/10 & 2010/11 – Marina, RG Tanna Coal Terminal

#### Business Context:

Since becoming one of the 200 plus mandatory participants in the EEO program, GPC and its Board have embraced the intent of this legislation. This includes providing funding as items in the annual operating and capital budgets, and forming an EEO project team to provide guidance and support in meeting the requirements of the legislation.

**EEO Team:**

The EEO team was formed with senior representatives from each of the main areas of operation (see diagram below). It is important to have a team that has a balanced view of the business, and involves key personnel to help overcome the obstacles that may impede GPC from meeting the intent of the EEO program.



**Systematic Approach:**

The first critical step for a successful outcome was the introduction of the EEO program to our employees. To ensure that a consistent message was given to all employees, the EEO team produced a video presentation which covered the following basic areas:

- An introduction to the EEO program and its objectives;
- The energy used by GPC in the financial year 2006/7;
- The EEO team structure and its members;
- The basic steps in performing an assessment and evaluating improvement ideas; and
- A central point for collecting ideas.

It is presented by at least one member of the EEO team, which enables additional context and more up to date information to be presented, and to answer any queries regarding either the legislative

requirements or GPC's intent. This video is planned to be updated in the coming year to reflect GPCs involvement in not only the EEO program, but other energy related government initiatives.

Key systems that are required for the EEO program to become sustainable are currently under development by the EEO team. These systems include:

- A common data repository that will collate the base data from the various systems within GPC. This will allow the reporting requirements for various legislative programs (e.g. National Greenhouse and Energy Reporting System, and National Pollution Inventory) to be met with consistent data.
- A system to enable all employees to register improvement ideas, including those related to energy efficiency opportunities, and to track each idea's progress.
- A system for analysing energy usage and assessing improvement ideas. This system also defines documentation that is required for auditing and the monitoring of implemented ideas to validate the achieved energy efficiency / cost savings.

In addition to addressing the current situations within GPC via assessments, the EEO team has been working to ensure that energy efficiency is addressed as the business moves forward, for example:

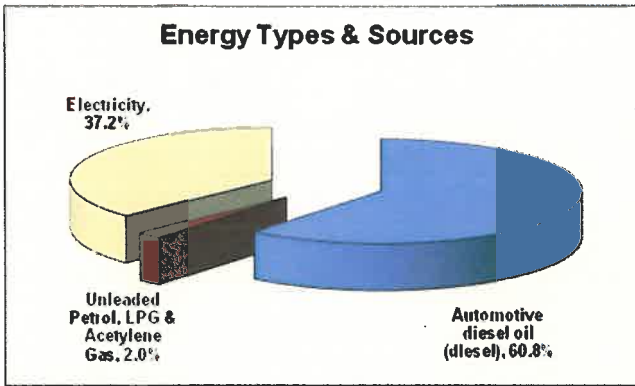
- Energy efficiency clauses have been added into all future equipment tender specifications.
- Energy efficiency considerations have been included in the new Capital Investment System.
- A comprehensive company policy has been drafted which covers both the Energy Efficiency Opportunities program as well as the National Greenhouse and Energy Reporting System.
- Energy efficient designs are being included in conveyor system electrical upgrades.
- Energy efficiency concepts are being included in the functional descriptions for new control systems.

The EEO team has also been involved with the Wiggins Island Coal Terminal (WICT) development team regarding the EEO program requirements. The WICT team have set up an internal team to consider energy efficiency opportunities during the design phase.

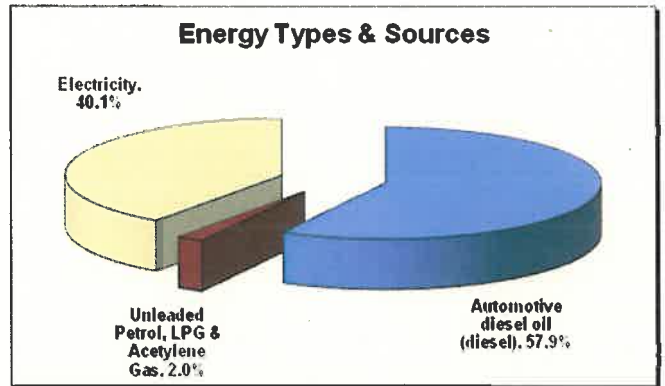
GPC is currently reviewing its vehicle policy to impose a stricter environmental performance standard for our future light vehicle fleet.

**ENERGY USE SINCE GPC'S TRIGGER YEAR 2005 - 2006**

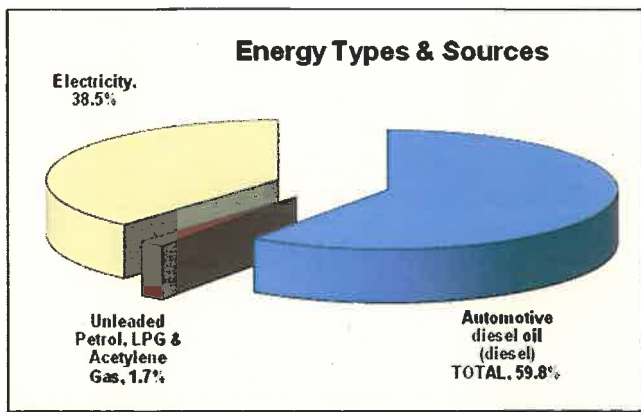
**2006-2007**



**2007-2008**



**2008-2009**



**Table 1.1** Summary of energy use since trigger year 2005-2006

	Coal Throughput <sup>1</sup> (Tonnes)	Energy (MJ)	Equivalent Households	Tonnes of CO <sub>2-e</sub>
2006-2007	51,500,000	640,848,093	12,817	88,160
2007-2008	54,100,000	682,074,432	13,641	97,402
2008-2009	55,900,000	723,257,627	14,465	101,373

**Notes**

1. While GPC also exports other products which consume energy, the primary energy consumer is the exporting of coal.

**SUMMARY OF ASSESSMENTS CONDUCTED 1 JULY 2008 TO 30 JUNE 2009****Assessment process:**

GPC is a single facility and as such we have endeavoured to commit some business centres to assessment time frames whilst continuing on-going assessments of our facility in the 5 year cycle.

In addition to the systems development work which will provide the necessary data for assessment, other ad-hoc opportunities have been identified and initial work has progressed.

Table 1.2 provides a summary of the energy use and the assessment status for GPC's business centres.

*On-going assessments at the time of reporting:*

Assessments on our dozer fleet, which is GPC's major consumer of diesel, is on-going. Three potential major opportunities have been identified. While one opportunity was rejected when the underlying assumptions proved invalid, the two other opportunities are progressing. Refer to the summary at the end of this report for further details.

The assessment of the Marina area has commenced. Early data analysis indicates that there are some discrepancies with the energy mass balance. Work is currently underway to identify these discrepancies and improve the metering to provide more useful data for analysis.

The operation of High Voltage (HV) motors at the RG Tanna coal terminal has also received some initial analysis. It has been identified that changing the philosophy of their operation has the potential to improve energy efficiency. However, this can only be implemented once the current control system upgrade project for the terminal has been completed. This is currently a five year project as it is associated with electrical upgrades that are occurring in our operating plant. The magnitude of the potential energy savings can not be calculated at this point as the final operating philosophy is still under review and the implementation of energy metering systems in the plant is still in progress.

**Table 1.2 – Energy use assessment summary**

Group member and/or business unit and/or key activity and/or site that has had an assessment by the end of this reporting period.	Assessment Status	Period over which assessment was undertaken	Energy use per annum in GJ in the current reporting year	% of total energy	Data accurate to ±5% Yes / No
APC	Complete	July 2007 to June 2008	17.9		Yes
YST1 (COM)	Complete	July 2007 to June 2008	2,764.1	0.4%	Yes
PRT	Complete	July 2007 to June 2008	838.5	0.1%	Yes
MAR - Marina	Ongoing	July 2008 to current	10,346.4	1.4%	Yes
RGT – RG Tanna Coal Terminal	Ongoing	July 2008 to current	621,575.0	85.4%	Yes
Others (total)	Not included this assessment cycle		91,802.1	12.6%	Yes
<b>Total energy use of the group in the current reporting year</b>			<b>727,344</b>		
<b>Total energy assessed</b>			<b>3,620</b>	<b>0.5%</b>	
<b>Total energy currently under assessment</b>			<b>631,921</b>	<b>86.8%</b>	

## PART 2. ENERGY EFFICIENCY OPPORTUNITIES THAT HAVE BEEN IDENTIFIED AND EVALUATED

For the purpose of participation in the Australian Government's Energy Efficiency Opportunities Program and Government and Public Reporting, GPC is one facility incorporating both Port of Gladstone and Port Alma.

Section 2A provides a summary of opportunities that have been identified in the current reporting period and their current status.

Section 2B provides an updated summary of opportunities that have been identified in previous reporting periods and their current status.

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

#### Table 2.1 – Opportunities assessed to an accuracy of less than $\pm 30\%$

This standard table has been deleted as no opportunities were assessed to an accuracy of less than  $\pm 30\%$  during the reporting year.

Table 2.2 – Opportunities assessed to an accuracy of greater than $\pm 30\%$					
Status of opportunities identified	Number of opportunities <sup>1</sup>	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					
Business Response	Total Identified	9	2,370	2,950	5,320
	Awaiting Investigation	4	1,560		1,560
	Under Investigation	2	810		810
	To be Implemented	1		2,950	2,950
	Implementation Commenced				
Implemented	2 <sup>1,2</sup>				
Not to be Implemented					

#### Notes:

- Opportunities included in the table that do not yet have an estimated energy savings.
- These projects have been implemented for operational reasons but have an impact on energy savings. Statistical analysis is required to determine the energy savings delivered by these projects.

### Part 2B. Updates of assessments undertaken in previous reporting periods

In the 2007/08 Public Report seven (7) opportunities were reported in Table 1.2. The opportunity listed as awaiting investigation under went a preliminary review in 2008/09. The outcome of this review was not to proceed because the basis of the opportunity was found to be invalid. Table 2.3 reports on the progress of the remaining six (6) opportunities.

The actual benefit of two (2) of these opportunities is higher than initially estimated. The revised values have been included in Table 2.3.

Table 2.3 - Opportunities assessed to an accuracy of $\pm 30\%$ or better					
Status of opportunities identified	Number of opportunities <sup>1</sup>	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	6	79.1 <sup>1</sup>		6,500.0 <sup>2</sup>	6,579.1
Business Response	Total Identified				
	Awaiting Investigation				
	Under Investigation				
	To be Implemented				
	Implementation Commenced	1			1,400.0 <sup>2</sup>
	5	79.1 <sup>1</sup>		5,100.0 <sup>2</sup>	5179.1

#### Notes:

1. Assessments completed 30 June 2008.
2. On-going assessments.

**SUMMARY OF SOME ENERGY EFFICIENCY OPPORTUNITIES IDENTIFIED****Opportunity 1 – Improved bulldozer fuel efficiency**

GPC has energy efficiency clauses included in its tender specifications for heavy machinery and as such energy efficiency forms part of the tender evaluation process.

The new D11T dozer from Caterpillar was claimed to have a 5% improvement in fuel economy compared with the previous D11R model. After taking delivery of the new D11T dozer, the fuel burn was monitored over a period of time and compared to the previous model D11R. The analysis indicated that there was a 7.16% reduction in the fuel used by the D11T dozer to perform the equivalent amount of work.

This equates to an annual reduction in fuel usage of 35,840 litres of diesel or 1,400,000 MJ (Mega Joules) of energy. This results in a reduction of 96.7 tonnes of CO<sub>2-e</sub> of gas emissions each year for every dozer that is replaced with a more efficient D11T dozer at our RG Tanna coal terminal.

GPC's RG Tanna coal terminal currently has a fleet of 23 D11 dozers. This fleet is currently under a long term replacement program which aims to typically replace two dozers per year with more modern fuel efficient equipment. The second D11T machine is due for delivery in the 3<sup>rd</sup> quarter of Calendar 2009.

**Opportunity 2 – Bulldozer reduced idle time**

The amount of time a dozer spends idling was identified early in the program as a potential opportunity for improvement. An onboard monitoring system is part of the requirements for new bulldozers. The new Caterpillar D11T received in January 2009 included an onboard monitoring system. Analysis of the data since early February 2009 (D11T operational) indicates the machine spent approximately 30% of its time idling.

This idle time was due to breaks in the coal flow due to inherent process delays or delays due to equipment issues. A significant portion of this engine idling time was solely to power the air conditioning system powered by the main engine, to maintain the operator's comfort in the dozer cabin.

A research and development project is currently in progress to develop a cabin air conditioning system that is powered from an alternative energy source, rather than directly from the main engine. The target for the project is to reduce the dozer idle time from 30% to 15% of the engine run hours.

The potential benefits from this project are:

- A reduction in the fuel consumed when not performing productive work (i.e. moving coal).
- Reduced greenhouse gas emissions.
- Reduced maintenance costs. Each dozer will be able to perform more productive work for the same amount of engine run hours. As maintenance schedules are based on engine run hours, the maintenance cost per tonne of coal handled should reduce.

### **Opportunity 3 – Reclaim tunnel lighting**

GPC has 21 coal stockpile reclaim tunnels at its RG Tanna coal terminal. Currently these tunnels are continuously illuminated. The estimated installed lighting capacity of these tunnels is approximately 187 kW of normal lighting and 4.7 kW of emergency lighting.

The normal lighting is only required when there are personnel inside the reclaim tunnel. If the normal lighting could be controlled to only illuminate when there are personnel inside the reclaim tunnel, then the following benefits could potentially be realised:

- Reduced electrical energy costs.
- Reduced greenhouse emissions from the reduction in electrical energy generation required.
- Reduced operating costs due the potential increase in the life of the luminaries by not running continuously.

While the analysis has not been finalised to fully quantify the benefits, this new functional requirement has been included in the functional specifications for reclaim tunnels.

With an electrical and control system upgrade currently in the design phase for the RG Tanna coal terminal, this improvement opportunity will be implemented over the next 5 years of the project.

### **Opportunity 4 – Data collection, management and reporting**

GPC is a diverse organization with activities that include:

- operating and developing port facilities;
- providing cargo handling services;
- providing and operating public marinas;
- providing and maintaining public areas such as park lands; and
- managing tenancies for GPC owned assets.

GPC also engages a variety of contractors to assist with its activities.

Currently there is no system to collect, manage, analyze and report on resources such as energy and water consumption. Work is currently underway in several main areas, including:

- The development of an integrated data capture and management system which will minimise the necessity for manual data collection and entry. This integrated system will enable the development of online analysis and reporting tools which will provide Key Performance Indicators (KPIs) to GPC in a timely manner to enable it to better manage its energy requirements.
- The implementation of a services network at our major coal terminal (RG Tanna coal terminal) to capture electrical energy data from both existing meters and future meters that will be required to perform the necessary energy assessments.

While this work itself does not directly reduce energy consumption, it will provide the foundations for:

- Analyzing energy consumption and assisting in the justification of potential energy efficiency opportunities.
- Providing a monitoring system to audit the outcomes of an implemented opportunity.
- Provide a reporting tool regarding energy performance not only for the EEO program but also for the National Greenhouse and Energy Reporting scheme (NGER).

**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*.



Chief Executive Office