Australian Government
Department of Resources, Energy and Tourism

Energy Efficiency Opportunities

2011-2012 PUBLIC REPORT

Part 1 - Corporation Details

Controlling Corporation

Insert the name of the Controlling Corporation exactly as it is registered with the EEO Program.

Resolute Mining 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
Early in the period, processing was downgraded from 5 Mtpa to 1.5 Mtpa as the processing of low grade Sarsfield ore stockpiles was completed. This ended the requirement for a surface mining fleet which was subsequently demobilised from site. The reduced processing rate facilitated a plant reconfiguration which included shutting down of one mill and replacement of the Sarsfield tertiary crushing system with a primary jaw crusher.

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*.	
	Peter Sullivan (CEO)
	Date 17/12/12

Part 2 - Assessment Outcomes

Table 2.1 – Assessment Details

It is compulsory to complete a separate table for each entity* that has been assessed

Name of entity	Nolans Processing Plant

Total energy use in the last financial year	522,897	GJ
Total percentage of energy use assessed when assessments were undertaken	29	%

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

In accordance with the approved assessment and reporting schedule (ARS), no further assessment work was undertaken since the Nolans Processing Plant assessment in 2011. An assessment of the Mt Wright operation is due to be conducted in the 2012-2013 financial year.

As per last year's annual report, the Nolans Processing Plant assessment was undertaken in the following manner.

In the 2010-2011 reporting period an Energy Efficiency Opportunities (EEO) Assessment of Carpentaria Gold's Nolans Process Plant was completed. Intech Engineers were engaged to facilitate and complete the detailed technical components of the assessment.

The Assessment used the following methodology:

1. **A site Energy Efficiency team was formed. The team consisted of technical staff from both mining and processing departments.**
2. **An over-arching energy mass balance was completed for the site. A further detailed energy mass balance was completed on the Nolans Processing Plant.**
3. **Intech Engineers facilitated an initial energy efficiency opportunities identification workshop on site.**
4. **Based on the results of the initial workshop, Intech Engineers completed a thorough assessment of the opportunities.**

A second meeting was held and opportunities that had been assessed in detailed by Intech Engineers were examined for any implications in terms of safety, environment, training, maintenance production and ongoing monitoring.

* Entity is group member, business unit, or key activity. Please note that, for individual sites that use more that 0.5PJ of energy, all energy use must be assessed (less a small proportion for non integral energy use).

Table 2.2 - Energy efficiency opportunities identified in the assessment

It is compulsory to complete a separate table for each entity that has been assessed

Status of opportunities identified to an accuracy of better than or equal to ±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	5	4	22,995	1	2,115	-	-	25,110
	Implementation Commenced	0	-	-	-	-	-	-	-
	To be Implemented	3	3	6,210	-	-	-	-	6,210
	Under Investigation	1	1	10,800	-	-	-	-	10,800
	Not to be Implemented	1	-	-	1	8,190	-	-	8,190
Outcomes of assessment	Total Identified	10	8	40,005	2	10,305	-	-	50,310

Please note that Corporate Groups **are not required** to report opportunities with a payback greater than 4 years. Reporting this data is voluntary.

Table 2.3 - Details of significant opportunities identified in the assessment

Corporate Groups are required to provide at least 3 examples of significant opportunities for improving the energy efficiency of the group that have been identified in assessments.

Description of Opportunity No 1	Voluntary Information	
Replace tailings pumps with high efficiency pumps Tailings thickener underflow pipe work was modified to use gravity flow regulated by pinch valves instead of the existing tailings pumps. A flow meter and density gauge were installed to convey information to the control room operators, allowing for underflow density to be maximised. This enabled improved water recovery to the overflow stream which is recycled throughout the plant with minimal power consumption.	Equipment Type	Pumps
	Business Response	Implemented
	Energy saved (GJ)	6,750 GJ/year
	Greenhouse gas abated (CO2-e)	3337.21 CO2-e/year
	$s saved	$150,000/year
	Payback period	6 months

Description of Opportunity No 2	Voluntary Information	
Compressed air equipment savings. The opportunity was taken to replace existing aged compressors with more efficient new equipment. The existing setup consisted of three 110kW compressors in a lead/lag configuration, with two duty compressors backed up by a third unit. This equipment was replaced with two new compressors with variable output air end and efficient spiral valves, resulting in similar air output for approximately 40% less power consumption.	Equipment Type	Air Compressors
	Business Response	Implemented
	Energy saved (GJ)	1,350 GJ/year
	Greenhouse gas abated (CO2-e)	333.72 CO2-e/year
	$s saved	$30,000/year
	Payback period	4 years

Description of Opportunity No 3	Voluntary Information	
Use reclaim heat exchanger for initial heat up The opportunity is to use waste heat contained in wash water to increase the temperature of the incoming process pregnant liquor saving heating required with the gas boiler.	Equipment Type	Heat Exchanger
	Business Response	To be implemented
	Energy saved (GJ)	1,800 GJ/year
	Greenhouse gas abated (CO2-e)	76 CO2-e/year
	$s saved	$40,000/year
	Payback period	2 years

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.

Energy Efficiency Opportunities

2011-2012 Review

Legislation

In 2006 the Australian Government's Department of Resources, Energy and Tourism began implementing the Energy Efficiency Opportunities (EEO) program under the *Energy Efficiency Opportunities Act 2006* (Act) and the *Energy Efficiency Opportunities Regulations* (Regulations). The intent of the program is to encourage large businesses to improve their energy efficiency by requiring businesses to identify, evaluate and report on cost effective energy saving opportunities identified within their company. The program is mandatory for all companies with an energy usage in excess of 0.5 petajoules per annum and voluntary for smaller energy users.

Background

Resolute Mining Limited became a signatory to the EEO program in 2009 after triggering the 0.5 petajoule threshold in the 2007-2008 financial year. An initial Assessment and Reporting Schedule (ARS) was submitted to the government in 2009 with the final version being submitted in 2010. In accordance with the ARS, an assessment of the Nolans Processing Plant was undertaken in 2011. The assessment included the development of an Energy Mass Balance for the site and a report detailing the energy Audit results, minutes of Energy Team meetings and identified Energy Efficiency Opportunities.

Processing Plant Assessment

The Nolans Processing Plant assessment included thorough analysis of a selected list of identified energy efficiency opportunities. The assessment identified the expected cost to implement each opportunity, its expected energy saving and the calculated payback period of each opportunity. In consultation with Carpentaria Gold site Managers, a number of these opportunities were chosen to be implemented. Table 1 displays a summary of each opportunity, its description and the status reported for each opportunity. Table 2 illustrates the annual energy saving assessed for each opportunity.

Table 1. Summary and description of opportunities chosen for consideration.

Opportunity Number	Opportunity Name	Description	Status	Details
1	Replace refrigerated chilling system cooling tower with evaporative system	The opportunity is to consider the replacement of the 100 kW Chiller with an existing 15 KW evaporative cooling unit.	Implemented	Further upgrades are currently in progress.
2	Replace tailings pumps with high efficiency pumps	The opportunity is to replace the existing tailings pumps with gravity flow to the pit.	Implemented	Tailings thickener underflow pipe work was modified to use gravity flow regulated by pinch valves instead of the existing tailings pumps.
3	Switch off mill 3 cyclone pumps	The opportunity is a process change. Mill 3 is to be switched off.	Implemented	Mill 3 was switched off in conjunction with the Processing Plant reconfiguration and downsizing in August 2011.
4	Optimise air / burner regulation by replacing burner	A new burner is recommended to be installed to improve burner efficiency. Inspection of the burner and investigation indicated that the existing burner is not operating efficiently.	To Be Implemented	Information is being sourced on most appropriate replacement burners.
5	Compressed air losses	The opportunity is to correct compressed air leaks and save power.	Implemented	Air leaks repaired in conjunction with Opportunity Number 9 (Compressed Air Equipment).
6	Use reclaim heat exchanger for initial heat up	The opportunity is to use waste heat contained in wash water to increase the temperature of the incoming process pregnant liquor, saving heating required with the gas boiler. Shortening the heating time has the potential to improve elution of gold and achieve a higher recovery.	To Be Implemented	Trials have been undertaken and further investigation and planning is required to determine the most effective method to implement this opportunity.
7	Recovery of water from thickener	The opportunity is to recover the maximum volume of water and reagents from the thickener to the process pond, saving the electricity used to pump water from the pit.	To Be Implemented	Was to be implemented in April 2012 however it was determined that further planning is required before this opportunity can be realized.
8	Correct power factor	The opportunity is to adjust the power factor by installing power factor correction equipment and provide savings in power usage.	Under Investigation	Electricity supplier contract discussions have determined that this may be required in the near future. Investigations are ongoing.
9	Compressed air equipment savings	The opportunity is to replace existing compressors with more efficient new equipment. Modern compressors are powered by variable speed motors, providing matched capacity to demand and increasing efficiency.	Implemented	Existing three compressors were replaced with two new compressors, capable of providing the same amount of air for 40% less electricity consumption.
10	Ox / air plant has high usage	There is an opportunity to save power by using the rented BOC oxygen plant rather than the company owned ox / air plant.	Not To Be Implemented	This was determined to be contradictory to Opportunity Number 1 and uneconomical to run as a hire plant.

Table 2. Assessed annual energy saving of each opportunity.

Opportunity Number	Opportunity Name	Implementation Cost ($)	Annual Energy Saving		Operating Cost Per Year ($)	Greenhouse Gas Abated (CO2-e)	Payback Period (months)
			($)	(GJ)			
1	Replace refrigerated chilling system cooling tower with evaporative system	20,000	47,000	2,115	5,000	522.83	6
2	Replace tailings pumps with high efficiency pumps	100,000	150,000	6,750	0	1668.60	6
3	Switch off mill 3 cyclone pumps	0	300,000	13,500	0	3337.21	0
4	Optimise air / burner regulation by replacing burner	20,000	28,000	1,260	(Unknown)	53.30	9.25
5	Compressed air losses	30,000	14,000	630	2,000	155.74	26
6	Use reclaim heat exchanger for initial heat up	104,000	40,000	1,800	Minor	76.15	24
7	Recovery of water from thickener	130,000	70,000	3,150	(Unknown)	778.68	24
8	Correct power factor	300,000	240,000	10,800	10,000	2669.77	15
9	Compressed air equipment savings	120,000	30,000	1,350	15,000	333.72	24
10	Ox / air plant has high usage	0	182,000	8,190	547,000	2024.6	0

Energy Use Summary

The EEO assessments target electricity, diesel and LPG use and these have been identified as the main energy sources consumed by Resolute. Table 3 and Figure 1 show a summary of Carpentaria Gold's energy use over the 2010-2011 and 2011-2012 financial years.

Table 3. Carpentaria Gold's energy use.

Energy Used (Location)	Units	2010-2011	2011-2012
Electricity			
- Nolans	kWh	50,944,868	44,607,905
- Mt Wright	kWh	13,064,008	14,231,155
- Sarsfield	kWh	49,246,791	18,868,915
TOTAL	kWh	113,255,667	77,707,975
TOTAL (from NGERS report)	GJ	408,179	261,626
Diesel			
- Nolans	kWh	129,655	98,319
- Mt Wright	kWh	3,271,190	4,982,384
- Sarsfield	kWh	2,380,985	989,113
TOTAL	kWh	5,781,830	6,069,816
TOTAL (from NGERS report)	GJ	236,230	245,635
LPG			
TOTAL (from NGERS report)	GJ	9,963	7,047
Total Energy Use	**GJ**	**642,407**	**514,308**

Electricity use dropped significantly in August to September 2011, in line with the cessation of Sarsfield ore rehandle and the Nolans Processing Plant reconfiguration. The most significant factors in reducing the total electricity use include the shutdown of the Sarsfield Crusher and Mill 3. Since this time and the implementation of a number of energy efficiency opportunities focused on reducing electricity consumption, electricity use has continued a slow downward trend.

The increase in diesel use reflects the change in Mt Wright mining method, as a larger number of trucks were required to haul a greater volume of ore. The reduction in Sarsfield diesel use reflects the demobilization of the Sarsfield mining/rehandle haul fleet.

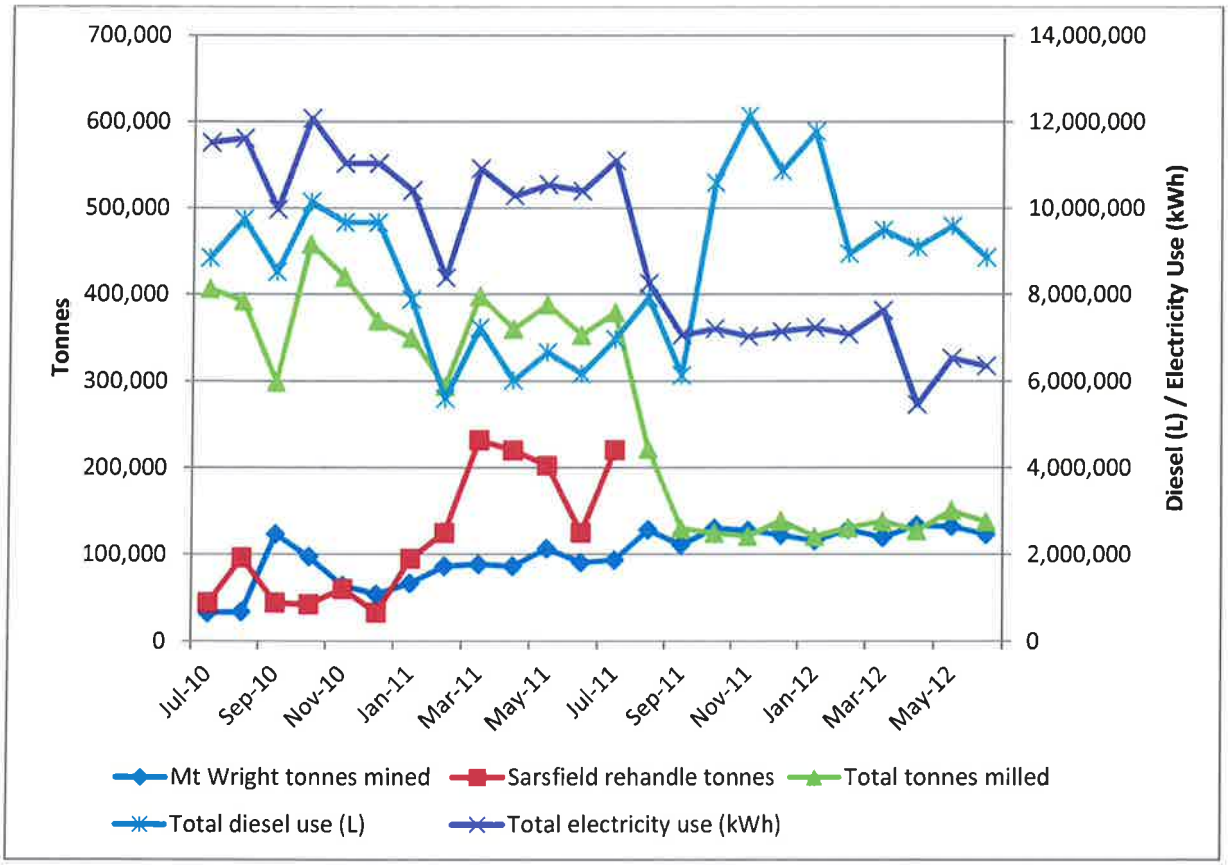

Figure 1. Line graph of tonnes mined and milled as well as total diesel and electricity use.

Mt Wright Assessment

In accordance with the ARS and the Act and Regulations, Carpentaria Gold's Mt Wright operation will undergo and EEO assessment in 2012-2013. A specialist consultant has been commissioned to undertake the required works and data collection has commenced to inform the assessment. A final report is expected for completion in 2013.

Reporting

As listed in the ARS and the Act and Regulations, Resolute is required to publish a number of reports relating to the EEO process over the coming years. Two reports must be submitted to the Department on 31/12/2010 (submitted) and 31/12/2013. Public reports must be published on the Resolute website on the 31st of December each year up to and including 2013. After this time, the company will have completed the required five-year assessment cycle and must begin the entire EEO assessment process again.