

# ENERGY EFFICIENCY OPPORTUNITIES

## PUBLIC REPORT FOR ALCOA OF AUSTRALIA (Year 2007)

### Introduction

Alcoa of Australia has two mine sites and three refineries in Western Australia, and two smelters and a Power station in Victoria. The corporation's operations have made significant improvements in energy efficiency since the commencement of production and in particular in the last 10 years. Energy performance particularly in the Power Houses have been far better than Industry guidelines for equipment of a similar age.

Total energy usage in Refining & Mining was between 82 and 87PJ.

During the year detailed Strategic or Operational analyses were carried out at each of the three WA refineries – Pinjarra, Kwinana & Wagerup and also the Mining operations associated with these refineries. Of the locations assessed – Pinjarra used between 29PJ and 32PJ (35.5% of Alcoa WA's total energy consumption); Kwinana used between 24PJ and 27PJ (31% of Alcoa WA's total energy consumption); Wagerup used between 25PJ PJ and 28PJ (32% of Alcoa WA's total Consumption & Mining used between 1PJ and 1.5 PJ (1.5 % of Alcoa WA's total consumption). During these reviews the performance of the plants was compared to theoretical best energy usage and best practice using current technology. A team of energy experts conducted each of the assessments over a period of 10 working days and involved many of the technical & operational personnel from the location. The studies identified a few opportunities for further improvement at each location.

These events followed previous energy assessments conducted by The Alcoa Energy Efficiency Network, Knoxville, USA – a team of contracted experts in the field of energy reduction. The Knoxville team confirmed some of the opportunities earlier identified and recommended actions that would reduce the gap between actual performance and theoretical best. The Knoxville team were very complimentary on the location's energy management systems and focus on energy reduction.

During the 2007 reviews and assessments the teams and location personnel identified the following opportunities to further reduce energy intensity and subsequent green house emissions.

### Summary of Opportunities

*The list below does not include opportunities which had been identified prior to 2006, most of which have been completed (listed in the GH Challenge database and provided to the Green House Office – summary of which is presented in sustainability reports) It also does not include routine maintenance activities which have an energy benefit when performed to expected standard. This includes replacement of lagging, heater cleaning etc. which are performed as part of the standard activities required to operate the plants efficiently.*

**WEST AUSTRALIAN REFINERIES, PINJARRA, KWINANA & WAGERUP -  
PROJECTS WITH PAYBACK OF LESS THAN 4 YEARS ONLY**

Status of opportunities	Number of Opportunities	Estimated Energy Savings by payback GJ/year		Total estimated energy savings GJ/year	Accuracy range
		<2Yrs	2 – 4 Yrs		
Identified in assessments	13	1433537	511000	1944537	+/- 30%
Under investigation	11	1318562	511000	1829562	+/- 40%
To be implemented	2	114975		114975	+/- 30%
Implementation commenced					
Implemented					
Not to be implemented					

**WESTERN AUSTRALIA MINES  
PROJECTS WITH PAYBACK OF LESS THAN 4 YEARS ONLY**

Status of opportunities	Number of Opportunities	Estimated Energy Savings by payback GJ/year		Total estimated energy savings GJ/year	Accuracy range
		<2Yrs	2 – 4 Yrs		
Identified in assessments	3	36372		36372	+/- 30%
Under investigation	3	36372		36372	+/- 40%
To be implemented					
Implementation commenced					
Implemented					
Not to be implemented					

**TOP OPPORTUNITIES – SOME WITH PAYBACK GREATER THAN 4 YEARS**

- 1. Cogeneration facility Condensate heat recovery** – joint activity with Alinta  
 Projected benefit from project – 0.2 GJ/t of alumina. Project is to use heat in condensate from steam generated by Cogen plant to warm boiler feed water.  
 Status - Engineering completed. Funds approved. Construction planned for September 07 with commissioning by November 2007.
- 2. Installation of larger CRD heaters in Digestion at Pinjarra**  
 Projected benefit from project – 0.1 GJ/T. The plan is to replace smaller heaters with larger more energy efficient ones.  
 Status – Preliminary engineering work being undertaken to firm up costs and potential benefits.
- 3. Installation of larger CRD heaters in Digestion at Wagerup**  
 Projected benefit from project – 0.13 GJ/t. Project is to replace old small heaters with larger more efficient ones.  
 Status – Preliminary engineering work undertaken – Capital allocation for 2008 approved.
- 4. Installation of new 25A vapour line at Kwinana**  
 Projected benefit from project – 0.1 GJ/t Project is install an additional vapour line to the desilication tank to use the waste heat from digestion vapour instead of rejecting it to the atmosphere.  
 Status – Engineering progressing.

- 5. New 35J causticiser heat exchanger installation at Pinjarra**  
Projected benefit of project is – 0.03 GJ/t. Project is to install a heat exchanger to indirectly heat caustic liquor in the causticisation plant and reduce the need for injecting steam.  
Status – Blitz to be raised
- 6. Insulation to be fitted on thickeners at Pinjarra**  
Project benefit from project – 0.01 GJ/t. Project is to install insulation on the tanks to prevent heat loss and reduce energy required to keep the liquor hot.  
Status – Funds allocated through maintenance budget – Blitz to be raised.
- 7. Insulation to be fitted on 35J Causticiser at Wagerup**  
Project benefit from project – 0.01 GJ/t. Project is to install insulation on the tanks to prevent heat loss and reduce energy required to keep the liquor hot.  
Status – Funds allocated through maintenance budget – Blitz to be raised.
- 8. Improved Heater cleaning** utilising new technology and equipment – best Practice from the US. Allows heater tubes to be cleaned quickly and efficiently saving energy through better heat transfer. Project nearing completion.
- 9. Investigate alternative heating units to replace existing diesel heaters in Arundel Heavy Vehicle Workshop (UI)**  
By converting existing Diesel heater (4 units) to Electric heater (6 units) could result in a saving of 348 GJ/day of use.  
Status – Investigation under way, though no budget or funds allocated at this point in time.
- 10. Investigate diesel burn rates higher than the average burn rate (>91.48 L/hr) for 730E haul trucks at Huntly (UI)**  
Ensuring diesel burn rates do not exceed the average ( $\leq 91.48$  L/hr) will save on average 20.4 L/hr at Huntly (over 5 haul trucks).  
Projected Benefit = 1416 GJ/yr  
Status – Investigation underway by maintenance crew.

## **Outcomes of the Verification Process**

Alcoa in December 2007 participated in a trial of the Energy Efficiency Opportunities program's verification procedure. Alcoa was commended for its efforts in driving energy use improvement and integrating it into its everyday operating systems processes and practices, and for its willingness to take part in the trial. The Department will release early in 2008 a case study of Alcoa's recent assessment results and better practices in energy management.

Alcoa also uses a rigid self assessment program and periodic internal audits to ensure that the plants are working on reducing energy intensity projects and operating in the most energy efficient manner possible.

**ATTESTATION OF BOARD REVIEW**

**PUBLIC REPORT ON ASSESSMENT FOR ALCOA WA REFINERIES & MINING OPERATIONS**

The information included in this report has been reviewed and noted by the board, and is to the best of my knowledge, correct and in accordance with the *Energy Efficiency Opportunities Act 2006 and Energy Opportunities Regulations 2006*.

The report will be published on the ALCOA Internet Web Site as part of the Corporation's Sustainability Reporting.

Yours sincerely

Alan Cransberg

*Managing Director  
Alcoa of Australia &  
President Alcoa World Alumina, Australia*