

# ***Energy Efficiency Opportunities***



**Australian Government**  
**Department of Resources  
Energy and Tourism**

***Alcoa Trial Verification Report***

***Verification Visit: December 2007***

***Report Drafted: August 2008***

***Report Finalised: February 2009***

## Summary

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### ***Scope of Company Visit***

The Department of Resources, Energy and Tourism (the Department) is responsible for administering the Energy Efficiency Opportunities Act 2006 and the Energy Efficiency Opportunities Regulations 2006. An important part of its responsibilities is the use of company visits to verify that corporations have undertaken rigorous and comprehensive assessments to identify energy efficiency opportunities with up to a four year payback and accurately reported to the public on the outcomes of these assessments and the business responses.

A trial verification was undertaken to verify Alcoa's overall compliance as a corporation against the Energy Efficiency Opportunity legislation, using the Pinjarra Alumina Refinery as the main focus. The trial verification was conducted by a team of two departmental officers and an external energy expert. In December 2007, the verification team spent a total of two and a half days at Alcoa's head office in Booragoon, the Kwinana Alumina Refinery and the Pinjarra Alumina Refinery. During the company visit, interviews and discussions were conducted with Alcoa staff and evidence demonstrating compliance with the Energy Efficiency Opportunities legislation was analysed and gathered.

Following the company visit, Alcoa were provided with an opportunity to provide further information as evidence of compliance against the Energy Efficiency Opportunities program's legislative requirements. This report has been formulated based on the information collected throughout the duration of the company visit and the documentation provided after the visit.

### ***Overall Conclusion***

Alcoa has demonstrated a clear intention to comply with the Energy Efficiency Opportunities program's assessment and reporting requirements and displayed a number of leading practices in undertaking effective energy assessments. Overall, Alcoa has:

- Strong leadership commitment for improving energy efficiency through the setting, monitoring and public disclosure of energy intensity improvement targets.
- Involved a wide range of skilled people to identify, evaluate and develop business cases for energy efficiency opportunities.
- Very good systems and processes for collecting and analysing data, understanding energy use, and identifying and evaluating energy efficiency opportunities.
- Used a variety of assessment processes and data analysis approaches to identify energy efficiency opportunities and undertaken whole of business evaluations of these.
- Utilised its project management, approval and tracking systems to ensure that

investment quality information on energy efficiency opportunities is presented to management.

- Regularly communicated via reports to its board on its energy use.

On the evidence presented, Alcoa is assessed as Compliant in all Material Aspects with the Energy Efficiency Opportunities Act 2006 and Energy Efficiency Opportunities Regulations 2006.

### ***Accuracy and Reliability of Reporting***

Alcoa has in place extensive and mature data collection systems. These systems are supported by Alcoa's project approval, decision making, project management and tracking systems. Based on the evidence provided, it is concluded that the data collected on total energy use and to support the evaluation of opportunities, decision making and publishing of public reports is reliable and accurate.

### ***Advisory Recommendations***

1. Key Requirement 2.2 requires that a broad cross section of people is involved in the energy efficiency opportunity identification, evaluation and business case development process. Given the number and range of assessment processes Alcoa undertakes, Alcoa should record the names, role, skills and agreed responsibilities of the people involved in each assessment process, for example, through the use of meeting minutes.
2. Key Requirements 4.2 and 4.5 requires that recommendations are made for each energy efficiency opportunity with a four year payback or better and the reasons for not pursuing an opportunity are documented. Alcoa should include in its *Enabler database* a data field to record reasons for not pursuing a specific energy efficiency opportunity and a data field to record for specific recommendations for each opportunity.
3. Key Requirement 6.2 requires that the board review and note the information to be included in the public report. Alcoa should determine who are the board members in Australia and make the board reviews and notes the information in the public report.

### ***Identified Better Practices***

1. Alcoa has in place mature and comprehensive systems for setting energy efficiency improvement targets, regularly monitoring progress against these targets, and reporting performance to senior management.
2. Alcoa has provided substantial resources to its Technology Delivery Group to undertake research aimed at improving resource efficiency. This Group is focused on developing and implementing innovative and breakthrough energy efficiency improvement projects,
3. Alcoa displayed considerable depth and quality of skills and expertise in analysing energy and process data. These skills include those in the Technology Delivery Group and additionally, the engineers at operational

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sites whose role includes regularly analysing, monitoring and reporting on energy and process data, regular comparison of performance to theoretical and actual energy use benchmarks, and the progress of various projects.

4. On a monthly basis, Alcoa reviews its energy balance to ensure that its data is accurate, that it can account for its energy use and optimise its energy performance.
5. Alcoa produces a range of reports on a weekly, monthly and annual basis to understand its energy use, identify potential opportunities and to track the performance of each site. Alcoa has developed its own analysis tools, such as the Energy Bridge and comparison to best available technology. These are excellent methods of displaying and analysing energy performance at each site. Under this approach energy analysis, and more broadly energy use improvement, is integrated into standard business practices.
6. Alcoa's assessment processes are integrated into the day-to-day operation and regular business cycles of the company. This ensures that energy use improvement is maintained as a continuing priority for the business and its staff.
7. Alcoa provides feedback to its staff on the energy efficiency opportunities through its staff suggestion scheme, including the status of the opportunity, the outcomes of the decision making process, and the reasons for this decision. This feedback supports learning in the organisation and highlights to all personnel the importance to the business of energy use improvement.

**Summary of Assessment Rating Conclusions against EEO Compliance Rating Scale**

	KR	Insufficient information	Non-compliant – major discrepancies	Non-compliant – minor discrepancies	Compliant – future risk of non-compliance	Compliant in all material aspects	Leading Practice
Key Element 1 – Leadership	1.1						
	1.2						
Key Element 2 – People	2.1						
	2.2						
	2.3						
Key Element 3 – Information, Data & Analysis	3.1						
	3.2						
	3.3						
Key Element 4 – Opportunity Identification & Evaluation	4.1						
	4.2						
	4.3						
	4.4						
	4.5						
Key Element 5 – Decision Making	5.1						
	5.2						
	5.3						
Key Element 6 – Communicating Outcomes	6.1						
	6.2						
	6.3						

## Corporation Comment

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## Detailed Findings

### Key Element 1 – Leadership

<b>Intent</b>				
<ul style="list-style-type: none"> <li>▪ Visible leadership and commitment from senior management provides clear direction to the assessment through the setting of energy use and assessment objectives aligned with business priorities.</li> <li>▪ Senior management support, motivate and provide value to the efforts of staff and other stakeholders involved in the identification and implementation of energy efficiency opportunities.</li> </ul>				
<b>No</b>	<b>Key Requirement</b>	<b>Evidence / Supporting Documentation</b>	<b>Identified Gaps in Compliance</b>	<b>Compliance Assessment Rating &amp; Recommendations</b>
1.1	Energy assessment or energy use improvement objectives are established and communicated by senior and operational management to all personnel who are responsible for or have an influence on energy use and the energy assessment.	<p>Alcoa has developed a <i>2020 Framework</i>. This is found on its website and includes public targets to:</p> <ul style="list-style-type: none"> <li>▪ reduce energy intensity from the base year 2000 by 10% across its business by 2010, and</li> <li>▪ reduce greenhouse gas emissions from the base year 1990 by 25% by 2010.</li> </ul> <p>Targets are cascaded through the business, with each site having a specific measurable energy intensity target to achieve by 2010. Targets are regularly reported against at a site (weekly, monthly, annually), senior management</p>		<b>Leading Practice</b>

		<p>(monthly, annually) and Board (monthly, annually) level.</p> <p>The Managing Director, just prior to his appointment, communicated to staff via a series of PowerPoint presentations at sites the strategic importance of energy efficiency in reducing costs and keeping Alcoa competitive in the aluminium industry.</p>		
<p><b>1.2</b></p>	<p>Resources (people, time and money) are made available to meet energy assessment or energy use improvement objectives.</p>	<p><i>Energy Management Organisational Chart</i> shows that Alcoa has a Global Technical Manager, Energy and Raw Materials appointed to promote energy performance at each of Alcoa's sites. The organisation chart shows for each site a Technical Manager and a person or single point of accountability (SPA) is responsible for each refinery's site energy performance. <i>Position Description</i> for the Global Technical Manager, Energy and Raw Materials shows energy is a key function of role. <i>Energy Savings AWA Refineries</i> identifies people allocated to investigating energy efficiency projects.</p> <p><i>Pinjarra Energy Organisation Chart</i> identifies nine key site personnel responsible for energy and provides</p>		<p><b>Leading Practice</b></p>

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		<p>brief job descriptions for each role.</p> <p><i>TDG (Technology Delivery Group) Monthly Report</i> shows that about 80 scientists are responsible for developing resource (including energy) efficiency projects from concept to commercialisation. The TDG has an annual budget in the order of \$20 million dollars to research and develop resource efficiency projects.</p>		
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**Key Element 2 – People**

<b>Intent</b>				
<ul style="list-style-type: none"> <li>▪ Skilled and knowledgeable people and people with direct and indirect influence on energy use, are involved in the assessment to effectively identify and evaluate energy efficiency opportunities, provide fresh perspectives and make the business case for identified energy efficiency opportunities.</li> <li>▪ Responsibilities and accountabilities are suitably allocated and team diversity is encouraged.</li> </ul>				
<b>No.</b>	<b>Key Requirement</b>	<b>Evidence / Supporting Documentation</b>	<b>Identified Gaps in Compliance</b>	<b>Compliance Assessment Rating &amp; Recommendation</b>
2.1	Personnel with appropriate skills and expertise are involved in the analysis of energy and process data.	<p>Meetings with Global Technical Manager, site Technical Managers, site Single Point of Accountability and other engineers demonstrated extensive experience in undertaking energy and process data analysis, detailed knowledge of the process, and familiarity with conducting regular analysis (e.g. monthly energy reconciliation and regular reporting on energy performance).</p> <p>A meeting and presentation made by the Technology Delivery Group (TDG) identified the qualifications (degrees, PhD's, etc) and extensive industry experience of its scientists. The TDG are responsible for</p>		Leading Practice

		identifying, developing and commercialising resource efficiency projects including energy.		
2.2	<p>The energy efficiency opportunity identification, evaluation and business case development process involves a broad cross section of people, including:</p> <ul style="list-style-type: none"> <li>▪ People from various levels of the site or business unit who have direct or indirect influence on energy use (e.g site managers, operators, sub contractors, tenants, finance, marketing, production);</li> </ul>	<p>Energy Efficiency Single Point of Accountability List, Meeting Minutes of Mining Energy and Greenhouse Reduction Lead Team, Mining Energy and Greenhouse Reduction Lead Team, Email on Western Australia Operations Heater Assessment Workshops, AWA Manufacturing and Technology Council, and Pinjarra Strategic Analysis Report indicate that a large number and range of people from various levels of the site were involved in assessment activities, including engineers, environment managers, scientists, community relations officers, supervisors, operators, production planners, operations managers, managing director, and other senior corporate roles.</p> <p>Site meetings with key energy engineers and Technology Delivery Group personnel, and discussions with operators, shift leaders, and senior management also reinforced the range</p>	<p>Documentation of the people involved and the roles performed in identifying, evaluating and developing business cases was not evident across <u>all</u> assessment processes.</p>	<p><b>Compliant – future risk of non-compliance</b></p> <p><b>Recommendation:</b> Alcoa should consider recording the names, role, skills and agreed responsibilities of the people involved in each assessment process, for example, through the use of meeting minutes.</p>

		of people involved in improving energy efficiency across Alcoa.		
	<ul style="list-style-type: none"> <li>People from within the corporation but external to the site who can integrate business objectives and assist with making a business case for identified opportunities (e.g. Chief Financial Officer, procurement, business case analysis, senior corporate management, public relations, strategic planning, operational excellence);</li> </ul>	<p>Business cases (A3's) show that a range of people are involved in energy efficiency improvement depending on the nature of the opportunity. A3's may be developed by operators, engineers, site technical managers and the global technical manager. A3's are reviewed and approved by site Accountant Manager, site and corporate senior management including the Director of Finance.</p>		<b>Compliant in all Material Aspects</b>
	<ul style="list-style-type: none"> <li>Internal and external people with energy, technology and process expertise (e.g. suppliers of current and alternative equipment and technologies, systems modelling experts, engineers); and</li> </ul>	<p><i>Pinjarra Strategic Analysis Report</i> (a significant assessment process) lists the direct involvement of overseas technical energy specialists and global technical manager, technical managers, energy champions and engineers to identify, investigate and evaluate energy efficiency opportunities.</p> <p><i>Quotes</i> from equipment suppliers highlight the involvement of specialists in evaluation of</p>		<b>Compliant in all Material Aspects</b>

		opportunities.		
	<ul style="list-style-type: none"> <li>People external to the site who can provide alternative perspectives, question assumptions and practices, and encourage innovation</li> </ul>	<p><i>Pinjarra Strategic Analysis Report</i> (a significant assessment process) lists the direct involvement of overseas technical energy specialists and global technical manager.</p> <p>Alcoa's Energy Efficiency Community of Practice, a global network, provides avenue for new ideas and information sharing.</p>		<b>Compliant in all Material Aspects</b>
<b>2.3</b>	Clear roles, responsibilities and accountabilities are attributed to people involved in the assessment and the business response.	<p>Business cases (A3's) may be developed by operators, engineers, site technical managers and the global technical manager. The person that develops the A3 is responsible for carrying the project through its evaluation and approval stages.</p> <p><i>Brad Peaker's</i> (Pinjarra chemical engineer) <i>Performance Objectives</i> documents his role and responsibilities and associated performance criteria with respect to specific energy objectives including energy efficiency opportunities, energy efficiency projects, assessment processes, and energy reporting.</p>		<b>Compliant in all Material Aspects</b>

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		<p><i>Energy Efficiency Single Point of Accountability List</i> makes known across the sites who is accountable for energy efficiency.</p> <p>A presentation on the Alcoa Business System highlighted that everyone in the company is encouraged to be responsible for improving the energy efficiency as well as other business priorities.</p>		
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**Key Element 3 – Information, Data and Analysis**

<b>Intent</b>				
<ul style="list-style-type: none"> <li>▪ Sufficient data, in suitable forms, is used to quantify and understand energy use, identify and quantify energy saving opportunities, and to track performance and outcomes (where actions are implemented).</li> <li>▪ Energy data is analysed from different perspectives to understand relationships between activity and consumption, and to identify energy efficiency opportunities.</li> </ul>				
<b>No</b>	<b>Key Requirement</b>	<b>Evidence / Supporting Documentation</b>	<b>Identified Gaps in Compliance</b>	<b>Compliance Assessment Rating &amp; Recommendation</b>
<b>3.1</b>	Business contextual information that influences energy use is identified and documented, including: <ul style="list-style-type: none"> <li>▪ The key business priorities and plans (e.g. relocation, expansion) and how these influence or impact on energy use and the energy assessment; and</li> <li>▪ The key site processes and activities that use energy.</li> </ul>	<p><i>WA Operations 2008 Plan Presentation</i> includes the annual priorities and plans for the business across a range of areas including safety, legal environmental, product quality, sales, finances, energy and raw materials and major capital projects, and includes the planned initiatives to improve each of these performance areas.</p> <p>Presentations on <i>Pinjarra's strategic plans</i>, reports on <i>Pinjarra's Technical Analysis</i> and Alcoa's business case development (A3's) include information on energy usage by site, energy using processes and equipment, rising energy costs,</p>		<p><b>Compliant in all Material Aspects</b></p>

		<p>capacity constraints, possible cost increases through pricing greenhouse gas emissions, product quality considerations, government approvals, business risks, key business costs, water constraints and staff turnover.</p> <p><i>Meeting Minutes of Mining Energy and Greenhouse Reduction Lead Team</i> show that discussions are held on developing issues such as the recent election and Kyoto Protocol signing.</p>		
<p><b>3.2</b></p>	<p>A data collection process is identified, documented and implemented, including:</p> <ul style="list-style-type: none"> <li>▪ Energy consumption and cost data for each energy source. Data should be entered at the frequency that bills and other records are received (typically monthly) for a total of 24 months. The accuracy of data must be within <math>\pm 5\%</math>. A less accurate level may only be used if this was approved in the Assessment Schedule;</li> </ul>	<p>The monthly <i>Technical Data Summary, Pinjarra Refinery – Energy Intensity, and Energy Report WA Operations</i> documents show 24 months of data on energy consumption and energy types, production levels, production inputs and process parameters that impact on energy use. The length and variety of reports produced and the regularity of reporting strongly suggests that all data is accurate.</p> <p><i>Western Australian Operations RAW MATS USAGES</i> shows 12 months of</p>		<p><b>Leading Practice</b></p>

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	<ul style="list-style-type: none"> <li>▪ Production data for a total of 24 months. Data should be entered at the same frequency and timing as the energy consumption and cost data;</li> <li>▪ Data on other process parameters that impact on energy use e.g. ambient temperature, geology (mining), production inputs;</li> </ul>	<p>energy and other process data for every Alcoa refinery.</p>		
	<ul style="list-style-type: none"> <li>▪ The energy and material flows through the site or fleet (e.g. through using an energy-mass balance or similar technique);</li> </ul>	<p>A detailed site <i>Energy Reconciliation Summary</i> (energy balance), which is reviewed each month.</p> <p><i>Materials Reconciliation Pinjarra Excel Spreadsheet</i> is a detailed mass balance, which is reviewed each month.</p>		<b>Leading Practice</b>
	<ul style="list-style-type: none"> <li>▪ The impact of the operating profile of the site / fleet on energy use;</li> </ul>	<p><i>Site reports</i> include monthly operating profiles of energy intensity (GJ/t). Data collection system has capability of providing instantaneous, daily, weekly, monthly and annual operating profiles.</p>		<b>Compliant in all Material Aspects</b>
	<ul style="list-style-type: none"> <li>▪ Measures being undertaken to ensure the accuracy and completeness of the energy</li> </ul>	<p>Monthly review of <i>Energy Reconciliation Summary</i> and <i>Materials Reconciliation Pinjarra</i></p>		<b>Compliant in all Material Aspects</b>

	<p>data;</p> <ul style="list-style-type: none"> <li>▪ Measures being undertaken to identify and resolve material data gaps and anomalies; and</li> <li>▪ Assumptions used in the data collection process and their associated uncertainties.</li> </ul>	<p><i>Excel Spreadsheet</i> highlights measures to maintain and improve accuracy of data.</p> <p><i>Pinjarra Technical Analysis</i> includes actions to improve site monitoring.</p>		
<p><b>3.3</b></p>	<p>An energy analysis process to assist in the identification of energy efficiency opportunities is identified, documented and implemented, including:</p> <ul style="list-style-type: none"> <li>▪ Energy use performance indicators established by activity and energy source, considering variations over time and major factors that affect energy performance;</li> </ul>	<p>Alcoa produces a range of reports that assist in the ongoing identification of opportunities, including:</p> <ul style="list-style-type: none"> <li>▪ <i>Pinjarra Technical Data Summary</i> includes indicators for site energy use, gas use, and electricity use.</li> <li>▪ <i>Pinjarra Technical Report</i> includes indicators for energy use in digestion, calcination and power house energy use.</li> <li>▪ <i>Energy Reconciliation</i> includes a site breakdown of energy efficiency by key process areas and even sub-process areas.</li> <li>▪ <i>WA Operations Presentation</i> includes indicators for all alumina sites on energy intensity, Bayer Energy Intensity, Evaporator</li> </ul>		<p><b>Leading Practice</b></p>

		<p>Economy (steam usage), Digestion Steam Usage, and Calciner Energy Intensity.</p> <ul style="list-style-type: none"> <li>▪ <i>Energy Report for WA Operations</i> includes indicators for overall energy efficiency, gas efficiency, diesel efficiency, transportation efficiency, and compressor gas efficiency.</li> </ul>		
	<ul style="list-style-type: none"> <li>▪ Application of a range of methods of data analysis (e.g. energy-mass balance, review of graphs and charts) to explore relationships between energy use and variables that may influence it, using data collected at appropriate time intervals; and</li> </ul>	<p><i>Pinjarra Strategic Plan, WA Operations Presentation, Energy Report for WA Operations, Energy Reconciliation Report, APEX Presentation and Pinjarra Technical Data Summary</i> have a range of analyses including gap analysis, benchmarking, pie charts, energy bridge analysis, energy mass balance, and analysis of possible actions ('enablers') to achieve targets at key energy using process and site levels.</p>		<b>Leading Practice</b>
	<ul style="list-style-type: none"> <li>▪ A comparison of performance to theoretical and actual energy use benchmarks, at the relevant level (process, technology, site, or indicator). Where</li> </ul>	<p><i>Australian Aluminium Council</i> benchmarking of energy performance for alumina refineries.</p> <p><i>WA Operations Presentation</i> benchmarks against potential, practical and theoretical energy use by</p>		<b>Leading Practice</b>

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	appropriate, other detailed numerical analysis or the application of indicators and other comparative techniques are used to fully understand energy consumption, including its variability.	key energy using processes. <i>Refining System Energy Intensity Performance Report</i> benchmarks energy efficiency of each alumina site in Alcoa.		
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**Key Element 4 – Opportunity Identification and Evaluation**

<b>Intent</b>				
<ul style="list-style-type: none"> <li>▪ An effective process is undertaken so that all potential energy efficiency opportunities are identified. This process is broad, open-minded and encourages innovation.</li> <li>▪ Opportunity areas are documented and analysed to a level sufficient for informed evaluation up to a 4 year payback.</li> <li>▪ A whole of business evaluation is undertaken to enable decision makers to make good business decisions about energy efficiency opportunities.</li> </ul>				
<b>No.</b>	<b>Key Requirement</b>	<b>Evidence / Supporting Documentation</b>	<b>Identified Gaps in Compliance</b>	<b>Compliance Assessment Rating &amp; Recommendations</b>
<b>4.1</b>	A process to identify potential opportunities is implemented and documented. The process should involve review of information, data and analysis and use of necessary people, and result in a comprehensive list of opportunity areas.	<p>Alcoa has multiple processes to identify energy efficiency opportunities ranging from regular maintenance and shift reviews and technology focused investigations to major analyses and research and development activities. All the assessment processes undertaken include:</p> <ul style="list-style-type: none"> <li>▪ <i>Pinjarra Strategic Analysis</i></li> <li>▪ <i>Pinjarra Refinery Review</i></li> <li>▪ <i>Pinjarra Refinery Assessment</i></li> <li>▪ <i>High Efficiency Motor Upgrade Procedure</i></li> </ul>		<b>Compliant in all Material Aspects</b>

		<ul style="list-style-type: none"> <li>▪ <i>Western Australia Operations Heater Assessment Workshop</i></li> <li>▪ <i>Technology Delivery Group</i></li> <li>▪ <i>Equipment Delivery Group</i></li> <li>▪ <i>Staff Suggestion Scheme</i></li> <li>▪ <i>Management initiatives for Alcoa Refineries</i></li> <li>▪ <i>Alcoa's Heater Care and Process Energy Reduction Community of Practice</i></li> <li>▪ <i>Daily and shift operations reviews (observed)</i></li> <li>▪ <i>Maintenance activities (observed)</i></li> </ul> <p><i>Pinjarra Strategic Analysis</i> includes a list of the team members involved, types of data analysis undertaken to identify and evaluate energy efficiency opportunities, and a list of major (large energy saving and/or high capital cost) energy efficiency opportunities identified.</p> <p><i>Pinjarra Refinery Assessment Report</i> and <i>Wagerup Refinery Assessment Report</i> include a brief description,</p>		
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		<p>list and simple payback calculation of both major and minor (low cost and or low energy saving) energy improvement projects broken down by key area e.g. compressed air, steam system.</p> <p>Energy Saving – AWA Refineries Report and AWA Energy Project Reports include a list of major energy improvement projects.</p> <p>Presentation made by the Transformational Technology Group, which is part of the Technology Delivery Group, demonstrates the company's encouragement to develop a comprehensive list of energy efficiency opportunities through research, development and blue-sky thinking.</p> <p><i>Meeting minutes</i> outlining who was involved in community of practice.</p> <p>Observance during site visit of daily and shift operations reviews while on site.</p> <p>Various data analyses, such as energy bridge diagrams, identifying enablers and actions to monitor</p>		
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		<p>performance and improve energy efficiency.</p> <p>An <i>Enabler database</i> has been recently set up to capture all the energy efficiency opportunities identified through all assessment processes by site. This includes for each opportunity a title, description of how saving will be achieved, status, specific actions required to realise the benefit, person responsible, capital required and financial savings, priority, and origin of idea.</p>		
<p><b>4.2</b></p>	<p>All the opportunity areas with potentially a 4 year payback or better are categorised into “opportunities for implementation” or “opportunities for further investigation”. The opportunity areas in each category are documented and business criteria are applied to rank them. Reasons for not pursuing specific opportunity areas are documented.</p>	<p>Standard business cases (A3’s) for several energy efficiency opportunities including project scope, project aim, link to business priorities, estimates of the costs and benefits (including energy) of the project and recommendation.</p> <p>Pinjarra Strategic Analysis, Pinjarra Refinery Assessment Report and Wagerup Refinery Assessment includes projects with estimates of up to a 4 year payback.</p> <p>An <i>Enabler database</i> has been</p>	<p>Documentation outlining the reasons for not pursuing specific energy efficiency opportunities.</p>	<p><b>Compliant – future risk of non-compliance</b></p> <p><b>Recommendation:</b> Alcoa should include in its <i>Enabler database</i> a data field that records the reasons for not pursuing a specific energy efficiency opportunity.</p>

		<p>recently set up to capture all the energy efficiency opportunities identified through all assessment processes by site. This includes for each opportunity a title, description of how saving will be achieved, status, specific actions required to realise the benefit, the person accountable for the project, capital required and financial savings, priority, and origin of idea.</p>		
<p><b>4.3</b></p>	<p>Detailed investigation is undertaken of opportunity areas to enable the credible identification, costing and evaluation of the costs and benefits of opportunities to within <math>\pm 30\%</math>. Detailed investigation includes sub-metering or real time metering to a sufficient level of detail to understand the energy use of major systems and items of equipment (see box).</p> <p>Where an opportunity cannot be evaluated to within <math>\pm 30\%</math>, an indication is given in 5.3 of how the accuracy level will be</p>	<p><i>Project Management Front End Process (FEP)</i> outlines the evaluation and business approval process. Opportunities go through a series of approval points to accurately make decisions and determine the value of the opportunity more accurately. All capital projects are to be analysed according to this procedure.</p> <p>Standard business cases (A3's), <i>Project Work Requirements Brief</i>, <i>Request for Authorisation</i>, and <i>PIN Engineering Admin Assistants with Final Authorisation</i> show that opportunities undergo a credible evaluation process, that a range of</p>		<p><b>Compliant in all Material Aspects</b></p>

	<p>achieved, including further investigation and sub-metering.</p>	<p>costs and benefits are considered and that the accuracy of evaluation reaches at least <math>\pm 30\%</math>.</p> <p>Alcoa has commented that it is quite easy to determine the benefits and particularly energy savings to within <math>\pm 30\%</math> for every project through its extensive modelling and data collection processes at each site. It is, however, quite difficult and very time intensive to get the costs of a project to within <math>\pm 30\%</math> as the cost of labour and materials is currently undergoing significant inflation in Western Australia.</p>		
<p><b>4.4</b></p>	<p>A “whole of business” evaluation is undertaken of the likely costs and benefits for each opportunity identified in order to calculate a payback period. The evaluation must:</p> <ul style="list-style-type: none"> <li>▪ Consider relevant business costs and benefits, including direct energy-related costs and benefits (e.g. energy savings and costs) and other quantifiable financial costs and benefits, for example</li> </ul>	<p>Standard business cases (A3's), <i>Project Work Requirements Brief</i>, <i>Request for Authorisation</i>, and <i>PIN Engineering Admin Assistants with Final Authorisation</i> show that whole of business evaluations are undertaken, including quantifiable costs such as safety, environment, risk, operating and maintenance costs, production capacity, operability, maintainability, availability, product quality, water, and energy. <i>The Blitz Compliance</i></p>		<p><b>Compliant in all Material Aspects</b></p>

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	<p>avoided capital investment, OH&amp;S costs and benefits, reduced maintenance, reduced or increased waste and water usage costs and improved productivity; and</p>	<p><i>Statement</i> included in the Request for Authorisation provides a structured approach to whole of business criteria.</p>		
	<ul style="list-style-type: none"> <li>▪ Evaluate and investigate to a level of detail and accuracy appropriate for the size of investment and consistent with core-business investment decision making within the corporation. Where an opportunity will require approval for significant capital expenditure, the costs and benefits should be evaluated to within <math>\pm 10\%</math>.</li> </ul>	<p><i>Request for Authorisation Report</i> shows that whole of business evaluations are undertaken, including quantifiable costs such as safety, environment, risk, operating and maintenance costs, production capacity, operability, maintainability, availability, product quality, water, and energy. Cost estimates achieved an accuracy of <math>\pm 10\%</math>.</p>		<p><b>Compliant in all Material Aspects</b></p>
<p><b>4.5</b></p>	<p>For all the opportunities with up to a four year payback make recommendations based on business criteria. Recommendations should include whether the opportunities should undergo further investigation, be implemented, or not be implemented.</p>	<p><i>Project Management Front End Process (FEP)</i> outlines the evaluation and business approval process. Recommendations on projects are made throughout the phases of the project evaluation process.</p> <p><i>Request for Authorisation Report</i> shows that there is a defined approvals and recommendation</p>	<p>Documentation showing the recommendation for each opportunity.</p> <p>Documentation outlining the reasons for not pursuing specific energy efficiency opportunities.</p>	<p><b>Compliant – future risk of non-compliance</b></p> <p><b>Recommendation:</b></p> <p>Alcoa should include in its <i>Enabler database</i> a data field to record reasons for not pursuing a specific energy efficiency opportunity and a data</p>

	<p>Reasons for not pursuing opportunities are documented.</p>	<p>process. Recommendations may include, depending on the evaluation phase, to investigate further, implement or not implement.</p> <p><i>Project List</i> for all Refineries and some of the identified opportunities shows the payback of each opportunity. This included projects with estimated paybacks of up to 2 years.</p> <p>An <i>Enabler database</i> has been recently set up to capture all the energy efficiency opportunities identified through all assessment processes by site. This includes for each opportunity a title, description of how saving will be achieved, status, specific actions required to realise the benefit, the person accountable for the project, capital required and financial savings, priority, and origin of idea.</p>		<p>field to record for specific recommendations for each opportunity.</p>
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**Key Element 5 – Decision Making**

<b>Intent</b>				
<ul style="list-style-type: none"> <li>▪ Management responsible for resource allocation make informed decisions on the assessment based on investment quality information.</li> <li>▪ Clear lines of accountability, appropriate resources and timeframes are developed for all energy efficiency opportunities that a corporation decides to implement or investigate further.</li> <li>▪ Mechanisms for reviewing, monitoring and reporting on outcomes are established to learn from experience and allow public reporting.</li> </ul>				
<b>No</b>	<b>Key Requirement</b>	<b>Evidence / Supporting Documentation</b>	<b>Identified Gaps in Compliance</b>	<b>Compliance Assessment Ratings &amp; Recommendations</b>
<b>5.1</b>	<p>Management responsible for investment / resource allocation decision making is presented with key background information and the outcomes of the assessment. Information presented to management includes:</p> <ul style="list-style-type: none"> <li>▪ Total energy use and energy cost relative to variable operating costs and profit;</li> <li>▪ Energy savings identified for each opportunity;</li> <li>▪ The costs and benefits based on a whole of business evaluation including payback for each of the opportunities;</li> </ul>	<p><i>Pinjarra Technical Data Summary</i> provides monthly updates on energy use and energy costs to decision makers.</p> <p><i>Energy Report WA Operations</i> highlights costs of energy each month to the business.</p> <p><i>Request for Authorisation (RFA)</i> clearly shows potential energy benefit, whole of business evaluation, payback and recommendation of each project.</p> <p>Staff said that a <i>White Book</i>, which contains sensitive financial information including profitability, energy costs and operating costs is</p>		<p><b>Compliant in all Material Aspects</b></p>

	<ul style="list-style-type: none"> <li>▪ The business recommendation for each opportunity; and</li> <li>▪ Recommendations to improve data and evaluation accuracy (if required).</li> </ul>	provided and utilised by decision makers to inform where opportunities exist and how the business can capitalise on these.		
5.2	Management responsible for investment / resource allocation determine the business response including which opportunities are to be implemented, which are to be further investigated (including improvements in data and evaluation accuracy) and which are not to be implemented.	<i>Request for Authorisation (RFA)</i> process includes a section on decision making where decisions regarding implementation are documented, comments are made and progress of a project's approval is tracked.		<b>Compliant in all Material Aspects</b>
5.3	Timelines, resources and accountabilities are allocated for the business response to the assessment, including: <ul style="list-style-type: none"> <li>▪ All energy efficiency opportunities that a corporation decides to implement or investigate further (including improvements in data and evaluation accuracy); and</li> <li>▪ Reviewing and monitoring to learn from experience and</li> </ul>	<p><i>Request for Authorisation (RFA)</i> process documents the amount of resources required, timelines and milestones, and accountability for each project. Once approved a project is allocated the resources outlined in the RFA.</p> <p>RFA process provides feedback to the personnel on the business decision regarding each energy efficiency project.</p> <p><i>Project Performance Assessment</i></p>		<b>Leading Practice</b>

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	support public reporting.	shows that once implemented, a project's performance is reviewed to determine the real value of the opportunity to the business.		
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**Key Element 6 – Communicating Outcomes**

<b>Intent</b>				
<ul style="list-style-type: none"> <li>▪ Senior management and the members of the board are aware of the outcomes of the assessment in a strategic business context (risk management, corporate social responsibility and major investment decisions).</li> <li>▪ The board reviews and notes the public report in the context of relevant business information.</li> <li>▪ Increased awareness of the benefits of improved energy efficiency and the outcomes achieved by the assessment within an organisation.</li> </ul>				
<b>No</b>	<b>Key Requirement</b>	<b>Evidence / Supporting Documentation</b>	<b>Identified Gaps in Compliance</b>	<b>Compliance Assessment Rating &amp; Recommendations</b>
<b>6.1</b>	<p>For each relevant business unit or key activity, the board and the senior officer responsible for signing the public report are presented with:</p> <ul style="list-style-type: none"> <li>▪ Total energy use and energy cost relative to variable operating costs and profit;</li> <li>▪ Total energy savings identified and business’s response;</li> <li>▪ Total whole of business costs and benefits of the opportunities identified and business’s response;</li> <li>▪ Recommendations for major investments; and</li> </ul>	<p><i>Weekly reports</i> on the general performance of each site are circulated to Alcoa sites around the world – this may include various energy issues.</p> <p><i>Western Australia Operations RAW MATS USAGES</i> is an annual report to the Board on energy use.</p> <p><i>Energy Report WA Operations</i> highlights costs of energy each month to the business, which is issued to the board.</p> <p><i>Request for Authorisation (RFA)</i> process provides energy savings, whole of business costs and benefits and recommendations on specific</p>		<p><b>Compliant in all Material Aspects</b></p>

	<ul style="list-style-type: none"> <li>▪ The information to be included in the public report prior to public release.</li> </ul>	<p>projects that are greater than \$50,000 in value to the Managing Director in Australia.</p> <p><i>Alcoa's Public Report</i> meets all information as required under the Energy Efficiency Opportunities Act and Regulations and was signed off by the Managing Director in Australia – the board in Australia.</p> <p>Staff said that a <i>White Book</i>, which contains sensitive financial information including profitability, energy costs and operating costs is provided and utilised by senior management and the board to inform where opportunities exist and how the business can capitalise on these.</p>		
6.2	<p>The board reviews and notes the information to be included in the public report.</p>	<p>Alcoa's public report was signed off by the Managing Director in Australia – the board in Australia.</p> <p>Emails showing that the Managing Director and other senior managers had reviewed the information to be included in the public report.</p>	<p>It is uncertain if the senior managers that reviewed the content of the public report are the actual board members in Australia.</p>	<p><b>Compliant – future risk of non-compliance</b></p> <p><b>Recommendation:</b> Alcoa should determine who are the board members in Australia and make sure each member reviews and notes the information in the public report.</p>

<p><b>6.3</b></p>	<p>A clear message on the outcomes of the assessments, in the context of the objectives set in leadership is communicated from senior management and operational management to relevant staff in the organisation.</p>	<p>Site and regional newsletters to celebrate the outcomes and successes achieved at an individual, site, regional or business level.</p> <p>Alcoa's intranet and internet provide information to employees on Energy Efficiency Opportunities public reports, performance against specific energy and greenhouse targets, and relevant case studies.</p> <p>Alcoa also undertake other communication activities such as Make an Impact to promote greater staff awareness on greenhouse, energy and water issues.</p>		<p><b>Compliant in all Material Aspects</b></p>
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## Background – Summary Corporation Information

Name of Controlling Corporation	Alcoa
Participant Code for Energy Efficiency Opportunities	AAL 000
Trading Name(s)	Alcoa World Alumina Australia
ABN	93004 879 298
Head Office Address	Booragoon, WA
Company Type (ANZIC, GICS codes)	272
Estimated Total Energy Use of Corporation (PJ)	131.46 PJ
Contact Person Title Address Phone Fax Email	Mr Winston Rennick Global Technical Manager Energy & Raw Materials PO Box 161, Kwinana, WA 6167 08 9410 3194 08 9410 3800 Winston.rennick@alcoa.com.au
Dates of Corporate Level Discussions	6 <sup>th</sup> December 2007
Interviewees	Wayne Osborn Winston Rennick Tim McAuliffe Dave Olney Patrick Coffey
Dates of Operational/Site Level Discussions	6 <sup>th</sup> & 7 <sup>th</sup> December 2007
Site	Pinjarra Refinery and Kwinana Refinery

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Interviewees	Winston Rennick Patrick Coffey Peter Rolls Chris Phillips Peter Hay David McDonald Brad Peaker Technology Delivery Group (Kwinana Refinery) Dr Ian Harrison Professor Gordon Parkinson Dr Dean Ilievski
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## Glossary

<b>Term</b>	<b>Description</b>
<b>Leading Practice</b>	<p>Compliance - Key Requirement has been met and the approach to meeting the Key Requirements represents a leading practice approach.</p> <p>Company approach to resourcing, monitoring and reporting are considered leading practice. Internal information matches externally reported information. Systems in place to internally check accuracy and completeness of the compilation of information from site level are considered leading practice and/or information is externally verified.</p>
<b>Compliant in all material respects</b>	<p>Compliance - Key Requirement has been met and the company demonstrates sound practices.</p> <p>Resourcing, monitoring and reporting systems are in place. Internal information matches externally reported information. There are systems in place to check accuracy and/or completeness of the compilation of information from site level.</p>
<b>Compliant – future risk of non-compliance</b>	<p>Compliance - Key Requirement has been met, however, there are significant opportunities to improve company practice.</p> <p>There is a risk of the company failing to meet future deadlines due to inadequate resourcing, monitoring and reporting mechanisms. Internal information matches externally reported information, however, there are no systems in place to check the accuracy or completeness of the compilation of information from site level.</p>
<b>Non compliant - minor discrepancies</b>	<p>Non-compliance - Key Requirement has not been met and there are minor discrepancies between company performance and the meeting of the Key Requirements or there is a minor lack of documentation to support company response.</p> <p>There are minor discrepancies between internal information and reported information.</p>
<b>Non-compliant – significant discrepancies or failure to meet key requirements</b>	<p>Non-compliance – Key Requirement has not been met and there is a significant gap between company performance and the meeting of the key requirement or there is a significant lack of documentation to support company response.</p> <p>There are significant discrepancies between internal information and reported information.</p>
<b>Insufficient information</b>	<p>Insufficient information to determine whether company is compliant or non-compliant. Further investigation required.</p>