Additional Information to the Energy Efficiency Opportunities Public Report 2011

Rio Tinto Limited

The public report of Rio Tinto Limited, prepared under section 22 of the Energy Efficiency Opportunities Act 2006 (Cth) for the period 1 January 2011 to 30 June 2011, contains information that has been prepared at the business unit level. The following information comprises the site level information that underlies this Business Unit level information.

David Peever, Managing Director
Rio Tinto Australia
Authorised representative of the Chief Executive Officer of Rio Tinto Limited

Date 2/11/2011

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: **Hope Downs Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	1,859,300	GJ

Table 2.3a – Opportunities assessed to an accuracy of ±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	3	21,300	0	2,400	23,700
Business Response**	Under Investigation	2	13,700	0	2,400	16,000
	To be Implemented	0	0	0	0	0
	Implementation Commenced	0	0	0	0	0
	Implemented	1	7,600	0	0	7,600
	Not to be Implemented	0	0	0	0	0

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
The implemented opportunity's payback period was revised following updated cost savings information.

Name of Group member or business unit or key activity or site: **Hope Downs Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	1,859,300	GJ

Table 2.4a – Opportunities assessed to an accuracy of ±30% or worse

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	16	44,500	1,500	4,700	50,700
Business Response**	Under Investigation	13	37,900	1,500	1,500	40,900
	To be Implemented	0	0	0	0	0
	Implementation Commenced	0	0	0	0	0
	Implemented	0	0	0	0	0
	Not to be Implemented	3	6,600	0	3,200	9,800

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
The evaluations for the three *Not to be Implemented* opportunities were not completed because two of the opportunities falls outside the greater than the four year payback period and the other opportunity was found to be technically not feasible.

Name of Group member or business unit or key activity or site: **Mesa J Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	640,100	GJ

Table 2.3b – Opportunities assessed to an accuracy of ±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	3	6,900	2,300	0	9,100
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	0	0	0	0	0
	Implementation Commenced	0	0	0	0	0
	Implemented	3	6,900	2,300	0	9,100
	Not to be Implemented	0	0	0	0	0

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Name of Group member or business unit or key activity or site: **Mesa J Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	640,100	GJ

Table 2.4b – Opportunities assessed to an accuracy of ±30% or worse

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	19	30,300	27,300	4,400	61,900
Business Response**	Under Investigation	19	30,300	27,300	4,400	61,900
	To be Implemented	0	0	0	0	0
	Implementation Commenced	0	0	0	0	0
	Implemented	0	0	0	0	0
	Not to be Implemented	0	0	0	0	0

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Name of Group member or business unit or key activity or site: **Brockman No 2 / Nammuldi Mines**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	1,002,100	GJ

Table 2.3c – Opportunities assessed to an accuracy of ±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	1	400	0	0	400
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	1	400	0	0	400
	Implementation Commenced	0	0	0	0	0
	Implemented	0	0	0	0	0
	Not to be Implemented	0	0	0	0	0

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Name of Group member or business unit or key activity or site: **Brockman No 2 / Nammuldi Mines**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	1,002,100	GJ

Table 2.4c – Opportunities assessed to an accuracy of ±30% or worse

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	15	55,200	3,200	200	58,600
Business Response**	Under Investigation	8	26,400	3,200	0	29,700
	To be Implemented	0	0	0	0	0
	Implementation Commenced	3	13,300	0	0	13,300
	Implemented	0	0	0	0	0
	Not to be Implemented	4	15,500	0	200	15,700

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
The evaluations for the four *Not to be Implemented* opportunities were not completed because three of the opportunities fall outside the greater than the four year payback period and the other opportunity was found to be technically not feasible.

Name of Group member or business unit or key activity or site: **Cape Lambert Port Operations**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	1,351,300	GJ

Table 2.4d – Opportunities assessed to an accuracy of ±30% or worse

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	11	6,900	3,000	4,700	14,700
Business Response**	Under Investigation	9	5,500	3,000	3,500	12,000
	To be Implemented	1	1,500	0	0	1,500
	Implementation Commenced	0	0	0	0	0
	Implemented	0	0	0	0	0
	Not to be Implemented	1	0	0	1,200	1,200

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Cape Lambert Port Operations undertook its assessment in the second half of 2010. At 30 June 2011 costing of opportunities (±30% accuracy) had not been completed.
Table 2.3 is not applicable for Cape Lambert Port Operations. All opportunities are yet to be evaluated to ±30% accuracy.
The evaluation for the *Not to be Implemented* opportunity was not completed because the opportunity falls outside the greater than the four year payback period.

Name of Group member or business unit or key activity or site: **Dampier Port Operations**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	841,300	GJ

Table 2.4e – Opportunities assessed to an accuracy of ±30% or worse

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	14	26,000	3,700	8,700	38,400
Business Response**	Under Investigation	10	24,500	3,700	2,500	30,800
	To be Implemented	1	1,500	0	0	1,500
	Implementation Commenced	0	0	0	0	0
	Implemented	0	0	0	0	0
	Not to be Implemented	3	0	0	6,200	6,200

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Dampier Port Operations undertook its assessment in the second half of 2010. At 30 June 2011 costing of opportunities (±30% accuracy) had not been completed.
Table 2.3 is not applicable for Dampier Port Operations. All opportunities are yet to be evaluated to ±30% accuracy.
The evaluations for the three *Not to be Implemented* opportunities were not completed because these opportunities fall outside the greater than the four year payback period.

Name of Group member or business unit or key activity or site: **Pilbara Iron Rail Operations**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	6,517,900	GJ

Table 2.4f – Opportunities assessed to an accuracy of ±30% or worse

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	726,300	85,500	1,225,600	2,037,400
Business Response**	Under Investigation	13	726,300	85,500	0	811,800
	To be Implemented	0	0	0	0	0
	Implementation Commenced	0	0	0	0	0
	Implemented	0	0	0	0	0
	Not to be Implemented	7	0	0	1,225,600	1,225,600

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Pilbara Iron Rail Operations undertook its assessment in the second half of 2010. At 30 June 2011 costing of opportunities (±30% accuracy) had not been completed.
Table 2.3 is not applicable for Pilbara Iron Rail Operations. All opportunities are yet to be evaluated to ±30% accuracy.
The evaluations for the seven *Not to be Implemented* opportunities were not completed because the opportunities fall outside the greater than the four year payback period. Following the initial EEO assessment workshops, further analysis was undertaken on these opportunities which demonstrated payback periods of greater than four years.

Name of Group member or business unit or key activity or site: **West Angelas Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	2,486,500	GJ

Table 2.4g – Opportunities assessed to an accuracy of ±30% or worse

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	18	77,300	153,800	9,200	240,300
Business Response**	Under Investigation	13	44,500	141,700	0	186,300
	To be Implemented	1	7,800	0	0	7,800
	Implementation Commenced	2	25,000	12,100	0	37,100
	Implemented	0	0	0	0	0
	Not to be Implemented	2	0	0	9,200	9,200

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
West Angelas Mine undertook its assessment in the second half of 2010. At 30 June 2011 costing of opportunities (±30% accuracy) had not been completed.
Table 2.3 is not applicable for West Angelas Mine. All opportunities are yet to be evaluated to ±30% accuracy.
The evaluations for the two *Not to be Implemented* opportunities were not completed because the opportunities fall outside the greater than the four year payback period.

Name of Group member or business unit or key activity or site: **Yandicoogina Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	1,938,400	GJ

Table 2.3h – Opportunities assessed to an accuracy of ±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	3	25,600	3,800	0	29,400
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	1	4,700	0	0	4,700
	Implementation Commenced	2	20,900	3,800	0	24,700
	Implemented	0	0	0	0	0
	Not to be Implemented	0	0	0	0	0

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Name of Group member or business unit or key activity or site: **Yandicoogina Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	1,938,400	GJ

Table 2.4h – Opportunities assessed to an accuracy of ±30% or worse

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	19	106,300	10,900	14,600	131,900
Business Response**	Under Investigation	13	45,600	9,000	14,600	69,100
	To be Implemented	3	16,000	2,000	0	17,900
	Implementation Commenced	2	44,800	0	0	44,800
	Implemented	0	0	0	0	0
	Not to be Implemented	1	0	0	<50	<50

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
The evaluation for the *Not to be Implemented* opportunity was not completed because of changed business conditions which made it not technically viable.

Name of Group member or business unit or key activity or site: **Tom Price Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	2,989,000	GJ

Table 2.3i – Opportunities assessed to an accuracy of ±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	10	46,200	4,500	3,300	54,100
Business Response**	Under Investigation	2	13,000	0	0	13,000
	To be Implemented	1	0	4,500	0	4,500
	Implementation Commenced	1	400	0	0	400
	Implemented	3	32,800	0	600	33,400
	Not to be Implemented	3	0	0	2,700	2,700

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
One project was reclassified from better than ±30% to worse than ±30% due to the identification of an additional cost, which is yet to be estimated to the required accuracy.

Name of Group member or business unit or key activity or site: **Tom Price Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	2,989,000	GJ

Table 2.4i – Opportunities assessed to an accuracy of ±30% or worse

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	6	35,900	3,300	0	39,200
Business Response**	Under Investigation	4	35,900	0	0	35,900
	To be Implemented	0	0	0	0	0
	Implementation Commenced	1	0	100	0	100
	Implemented	1	0	3,200	0	3,200
	Not to be Implemented	0	0	0	0	0

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Name of Group member or business unit or key activity or site: **Marandoo Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	783,200	GJ

Table 2.3j – Opportunities assessed to an accuracy of ±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	8	5,200	19,500	1,800	26,500
Business Response**	Under Investigation	4	2,900	19,500	0	22,400
	To be Implemented	0	0	0	0	0
	Implementation Commenced	2	2,000	0	1,700	3,700
	Implemented	1	400	0	0	400
	Not to be Implemented	1	0	0	100	100

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Name of Group member or business unit or key activity or site: **Marandoo Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	783,200	GJ

Table 2.4j – Opportunities assessed to an accuracy of ±30% or worse

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	9	5,000	5,100	0	10,100
Business Response**	Under Investigation	6	5,000	5,100	0	10,100
	To be Implemented	0	0	0	0	0
	Implementation Commenced	0	0	0	0	0
	Implemented	0	0	0	0	0
	Not to be Implemented	3	0	0	0	0

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
The evaluations for the three *Not to be Implemented* opportunities were not completed because one of the opportunities falls outside the greater than the four year payback period and the other two opportunities were found to be technically not feasible.

Name of Group member or business unit or key activity or site: **Hail Creek Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	3,305,400	GJ

Table 2.3k – Opportunities assessed to an accuracy of ±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	8	51,900	0	0	51,900
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	1	1,000	0	0	1,000
	Implementation Commenced	1	200	0	0	200
	Implemented	4	47,900	0	0	47,900
	Not to be Implemented	2	2,800	0	0	2,800

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Name of Group member or business unit or key activity or site: **Hail Creek Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	3,305,400	GJ

Table 2.4k – Opportunities assessed to an accuracy of ±30% or worse

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	2	2,300	0	0	2,300
Business Response**	Under Investigation	1	1,800	0	0	1,800
	To be Implemented	0	0	0	0	0
	Implementation Commenced	0	0	0	0	0
	Implemented	1	500	0	0	500
	Not to be Implemented	0	0	0	0	0

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Name of Group member or business unit or key activity or site: **Kestrel Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	419,500	GJ

Table 2.3l – Opportunities assessed to an accuracy of ±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	8	34,600	4,200	0	38,800
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	0	0	0	0	0
	Implementation Commenced	3	1,700	2,900	0	4,600
	Implemented	4	32,800	1,300	0	34,200
	Not to be Implemented	1	0	0	0	0

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Table 2.4 is not applicable for Kestrel Mine. All opportunities have been evaluated to an accuracy of ±30% or better.
The evaluation for the *Not to be Implemented* opportunity was not completed because the opportunity falls outside the greater than the four year payback period.

Name of Group member or business unit or key activity or site: **Bengalla Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	1,179,000	GJ

Table 2.3m – Opportunities assessed to an accuracy of ±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	8	28,100	0	14,800	42,900
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	0	0	0	0	0
	Implementation Commenced	0	0	0	0	0
	Implemented	4	26,300	0	14,800	41,000
	Not to be Implemented	4	1,800	0	0	1,800

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Two of the opportunities were reclassified from *To be implemented to Not to be implemented* as they are no longer technically viable due to changed business conditions.

Name of Group member or business unit or key activity or site: **Bengalla Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	1,179,000	GJ

Table 2.4m – Opportunities assessed to an accuracy of ±30% or worse						
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	1	3,000	0	0	3,000
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	0	0	0	0	0
	Implementation Commenced	0	0	0	0	0
	Implemented	0	0	0	0	0
	Not to be Implemented	1	3,000	0	0	3,000

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
The evaluation for the *Not to be Implemented* opportunity was not completed because it was not technically viable on account of changed business conditions.

Name of Group member or business unit or key activity or site: **Hunter Valley Operations**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	4,364,100	GJ

Table 2.3n – Opportunities assessed to an accuracy of ±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	8	39,400	12,900	0	52,300
Business Response**	Under Investigation	2	9,900	0	0	9,900
	To be Implemented	2	5,800	0	0	5,800
	Implementation Commenced	1	0	12,900	0	12,900
	Implemented	2	23,600	0	0	23,600
	Not to be Implemented	1	0	0	0	0

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Table 2.4 is not applicable for Hunter Valley Operations. All opportunities have been evaluated to an accuracy of ±30% or better.
Following completion of the opportunity evaluation which resulted in no energy savings, one opportunity was categorised as *Not to be Implemented* with no estimated energy savings reported.

Name of Group member or business unit or key activity or site: **Mount Thorley Warkworth Operations**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	3,817,600	GJ

Table 2.3o – Opportunities assessed to an accuracy of ±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	10	158,900	100	8,100	167,100
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	1	3,700	0	0	3,700
	Implementation Commenced	4	116,900	100	5,100	122,100
	Implemented	4	35,600	0	2,900	38,600
	Not to be Implemented	1	2,600	0	0	2,600

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Name of Group member or business unit or key activity or site: **Mount Thorley Warkworth Operations**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	3,817,600	GJ

Table 2.4o – Opportunities assessed to an accuracy of ±30% or worse

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	1	0	0	1,000	1,000
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	0	0	0	0	0
	Implementation Commenced	0	0	0	0	0
	Implemented	1	0	0	1,000	1,000
	Not to be Implemented	0	0	0	0	0

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Name of Group member or business unit or key activity or site: **Blair Athol Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	397,800	GJ

Table 2.3p – Opportunities assessed to an accuracy of ±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	7	4,700	2,200	7,400	14,300
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	0	0	0	0	0
	Implementation Commenced	0	0	0	0	0
	Implemented	4	1,800	400	7,400	9,600
	Not to be Implemented	3	2,900	1,700	0	4,700

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Name of Group member or business unit or key activity or site: **Blair Athol Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	397,800	GJ

Table 2.4p – Opportunities assessed to an accuracy of ±30% or worse

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	2	300	0	600	900
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	0	0	0	0	0
	Implementation Commenced	0	0	0	0	0
	Implemented	2	300	0	600	900
	Not to be Implemented	0	0	0	0	0

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Name of Group member or business unit or key activity or site: **Argyle Diamond Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	1,634,300	GJ

Table 2.3q – Opportunities assessed to an accuracy of ±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	11	600	<50	3,100	3,700
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	2	100	0	100	100
	Implementation Commenced	2	300	0	900	1,200
	Implemented	5	200	<50	2,000	2,200
	Not to be Implemented	2	0	0	100	100

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Energy use includes energy losses from the generation of electricity.

Name of Group member or business unit or key activity or site: **Argyle Diamond Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	1,634,300	GJ

Table 2.4q – Opportunities assessed to an accuracy of ±30% or worse

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	9	14,200	100	3,500	17,800
Business Response**	Under Investigation	1	1,900	0	0	1,900
	To be Implemented	0	0	0	0	0
	Implementation Commenced	2	4,300	0	0	4,300
	Implemented	0	0	0	0	0
	Not to be Implemented	6	8,000	100	3,500	11,600

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Energy use includes energy losses from the generation of electricity.
The evaluations for four of the *Not to be Implemented* opportunities were not completed because the opportunities fall outside the greater than the four year payback period, one opportunity because of safety concerns, and one opportunity due to technical concerns.

Name of Group member or business unit or key activity or site: **Dampier Power Station, Paraburdoo Power Station, Cape Lambert Power Station**

Amount of energy assessed which generated the results below (and is reported in Table 1.2) | 9,539,700 | GJ

Table 2.4r – Opportunities assessed to an accuracy of ±30% or worse

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	13	284,200	0	55,400	339,600
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	0	0	0	0	0
	Implementation Commenced	3	0	0	0	0
	Implemented	1	0	0	0	0
	Not to be Implemented	9	284,200	0	55,400	339,600

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Table 2.3 is not applicable for Dampier Power Station, Paraburdoo Power Station, Cape Lambert Power Station. All opportunities are yet to be evaluated to ±30% accuracy.
Energy use includes energy losses from the generation of electricity.
Dampier Power Station, Paraburdoo Power Station, Cape Lambert Power Station undertook three assessments in a combined approach with one assessment report with each site developing its own opportunity list.
For the *implemented* opportunity, further evaluation of the cost and associated savings is being undertaken. Two of the three *implementation commenced* opportunities are at an operation that is scheduled for closure in Q1 2012 thereby limiting the practicality of continued access to the equipment for continued implementation of the opportunity and evaluation of its actual savings. Further evaluation for the third *implementation commenced* opportunity is required.
Four of the nine *not to be implemented* opportunities are at the operation that was closed in August 2010, two of the nine are at the operation that is scheduled for closure in Q1 2012, an additional two opportunities did not generate any efficiency benefits and the remaining one opportunity was technically not feasible.

Name of Group member or business unit or key activity or site: **Boyne Smelters Limited**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	31,501,600	GJ

Table 2.3 – Opportunities assessed to an accuracy of ±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	22	165,700	31,600	3,600	200,800
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	1	27,800	0	0	27,800
	Implementation Commenced	1	36,200	0	0	36,200
	Implemented	15	70,400	27,200	0	97,700
	Not to be Implemented	5	31,200	4,300	3,600	39,200

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Boyne Smelters Limited reported energy use excludes energy associated with the consumption of anodes which embody an additional 8,475,000GJ of energy. Some opportunities relate to the anode process and may have energy reduction and / or net carbon benefits.
Two opportunities that had commenced implementation in 2010 were *implemented* in Q1 2011 for two months. Previously reported energy savings were estimated on an annual basis, whereas the savings for these opportunities in this report have been pro-rated for the two months that the opportunities were *implemented* thereby reducing the reported energy savings.

Name of Group member or business unit or key activity or site: **Boyne Smelters Limited**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	31,501,600	GJ

Table 2.4s – Opportunities assessed to an accuracy of ±30% or worse

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	1	4,300	0	0	4,300
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	0	0	0	0	0
	Implementation Commenced	0	0	0	0	0
	Implemented	0	0	0	0	0
	Not to be Implemented	1	4,300	0	0	4,300

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Boyne Smelters Limited reported energy use excludes energy associated with the consumption of anodes which embody an additional 8,475,000GJ of energy. Some opportunities relate to the anode process and may have energy reduction and / or net carbon benefits.
The evaluation for the *Not to be Implemented* opportunity was not completed because of changed business conditions that resulted in the project not being viable.

Name of Group member or business unit or key activity or site: **Rio Tinto Alcan Yarwun**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	17,538,800	GJ

Table 2.3t – Opportunities assessed to an accuracy of ±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	11	152,200	<50	0	152,200
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	1	17,800	0	0	17,800
	Implementation Commenced	1	75,000	0	0	75,000
	Implemented	8	56,900	<50	0	56,900
	Not to be Implemented	1	2,400	0	0	2,400

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Rio Tinto Alcan Yarwun's assets were transferred from Rio Tinto Aluminium Limited to RTA Yarwun Pty Ltd 1st March 2010, therefore RTA Yarwun Pty Ltd is now a separate group member of the Rio Tinto Limited Group.

Name of Group member or business unit or key activity or site: **Rio Tinto Alcan Yarwun**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	17,538,800	GJ

Table 2.4 – Opportunities assessed to an accuracy of ±30% or worse

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	13	1,148,600	2,800	900	1,152,300
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	0	0	0	0	0
	Implementation Commenced	0	0	0	0	0
	Implemented	10	592,600	2,800	900	596,300
	Not to be Implemented	3	556,000	0	0	556,000

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Rio Tinto Alcan Yarwun's assets were transferred from Rio Tinto Aluminium Limited to RTA Yarwun Pty Ltd on 1st March 2010, therefore RTA Yarwun Pty Ltd is now a separate group member of the Rio Tinto Limited Group.
The evaluations for the three *Not to be Implemented* opportunities were not completed because the opportunities were found to be technically not feasible.

Name of Group member or business unit or key activity or site: **Ranger Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	1,359,000	GJ

Table 2.3u – Opportunities assessed to an accuracy of ±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	8,800	99,900	29,400	138,100
Business Response**	Under Investigation	5	5,400	94,900	800	101,100
	To be Implemented	0	0	0	0	0
	Implementation Commenced	5	3,400	1,000	16,200	20,600
	Implemented	6	0	4,000	5,900	9,900
	Not to be Implemented	4	0	0	6,500	6,500

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Energy use includes energy losses from the generation of electricity.

Name of Group member or business unit or key activity or site: **Ranger Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	1,359,000	GJ

Table 2.4u – Opportunities assessed to an accuracy of ±30% or worse

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	12	0	1,900	96,000	97,900
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	0	0	0	0	0
	Implementation Commenced	0	0	0	0	0
	Implemented	2	0	1,900	0	1,900
	Not to be Implemented	10	0	0	96,000	96,000

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Energy use includes energy losses from the generation of electricity.
The evaluations for the additional two *Not to be Implemented* opportunities were not completed due to one of the opportunities falling outside the greater than the four year payback period and the other being technically not feasible.

Name of Group member or business unit or key activity or site: **Paraburdoo Mine, Channar Mine and Eastern Ranges Mine**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	1,865,800	GJ

Table 2.3v – Opportunities assessed to an accuracy of ±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	26	113,000	23,100	2,200	138,300
Business Response**	Under Investigation	1	7,700	0	0	7,700
	To be Implemented	7	14,000	0	0	14,000
	Implementation Commenced	2	8,700	4,900	0	13,500
	Implemented	13	31,400	18,300	0	49,600
	Not to be Implemented	3	51,200	0	2,200	53,400

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Table 2.4 is not applicable for Paraburdoo Mine, Channar Mine and Eastern Ranges Mine. All opportunities have been evaluated to an accuracy of ±30% or better.

Name of Group member or business unit or key activity or site: **Northparkes Mines**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	901,600	GJ

Table 2.3w – Opportunities assessed to an accuracy of ±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	40	86,800	13,700	125,900	226,400
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	10	5,200	1,500	200	7,000
	Implementation Commenced	0	0	0	0	0
	Implemented	16	67,100	12,200	49,200	128,500
	Not to be Implemented	14	14,500	0	76,500	91,000

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Table 2.4 is not applicable for Northparkes Mine. All opportunities have been evaluated to an accuracy of ±30% or better.
Estimated energy savings have been revised following updated energy and cost information.

Name of Group member or business unit or key activity or site: **Rio Tinto Alcan Weipa**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	1,990,800	GJ

Table 2.3x – Opportunities assessed to an accuracy of ±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	38	125,800	80,800	54,200	260,800
Business Response**	Under Investigation	2	6,900	16,600	0	23,500
	To be Implemented	0	0	0	0	0
	Implementation Commenced	4	16,000	5,900	0	21,900
	Implemented	14	42,200	900	3,500	46,700
	Not to be Implemented	18	60,700	57,400	50,600	168,700

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Energy use includes energy losses from the generation of electricity.
Rio Tinto Alcan Weipa's assets were transferred from Rio Tinto Aluminium Limited to RTA Weipa Pty Ltd on 1st November 2010, therefore RTA Weipa Pty Ltd is now a separate group member of the Rio Tinto Limited Group.
During the reporting period one opportunity was reclassified from *To be implemented to Not to be implemented* due to unforseen technology availability issues making the opportunity not technically viable.

Name of Group member or business unit or key activity or site: **Rio Tinto Alcan Weipa**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	1,990,800	GJ

Table 2.4x – Opportunities assessed to an accuracy of ±30% or worse

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	17	41,700	0	<50	41,700
Business Response**	Under Investigation	1	26,200	0	0	26,200
	To be Implemented	0	0	0	0	0
	Implementation Commenced	0	0	0	0	0
	Implemented	3	15,400	0	<50	15,400
	Not to be Implemented	13	0	0	0	0

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Energy use includes energy losses from the generation of electricity.
Rio Tinto Alcan Weipa's assets were transferred from Rio Tinto Aluminium Limited to RTA Weipa Pty Ltd on 1st November 2010, therefore RTA Weipa Pty Ltd is now a separate group member of the Rio Tinto Limited Group.
The evaluations for the thirteen *Not to be Implemented* opportunities were not completed because all thirteen opportunities fall outside the greater than the four year payback period.

Name of Group member or business unit or key activity or site: **Rio Tinto Alcan Bell Bay**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	10,532,000	GJ

Table 2.3 – Opportunities assessed to an accuracy of ±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	40	33,400	69,500	19,300	122,200
Business Response**	Under Investigation	5	500	<50	0	600
	To be Implemented	0	0	0	0	0
	Implementation Commenced	3	0	1,200	2,700	3,800
	Implemented	13	27,200	1,900	3,700	32,800
	Not to be Implemented	19	5,600	66,400	13,000	85,000

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Rio Tinto Alcan Bell Bay reported energy use excludes energy associated with the consumption of anodes which embody an additional 2,797,000GJ of energy. Some opportunities relate to the anode process and may have energy reduction and / or net carbon benefits.
The reduction in reported energy savings when compared to the 2010 EEO Public Report is due to rationalisation of overlapping projects so as to remove the potential for double counting of projected savings; savings verification of implemented projects and further refinements to project evaluations.

Name of Group member or business unit or key activity or site: **Rio Tinto Alcan Bell Bay**

Amount of energy assessed which generated the results below (and is reported in Table 1.2)	10,532,000	GJ

Table 2.4y – Opportunities assessed to an accuracy of ±30% or worse

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	9	2,000	0	100	2,100
Business Response**	Under Investigation	0	0	0	0	0
	To be Implemented	0	0	0	0	0
	Implementation Commenced	0	0	0	0	0
	Implemented	2	1,200	0	0	1,200
	Not to be Implemented	7	800	0	100	900

* Any discrepancies are related to rounding errors to the nearest 100GJ.
** The number of opportunities in each row of the business response section total to the number of opportunities assessed to this level of accuracy in the 'Total Identified' row. This is the business response as at 1 July 2011.

Note:
Rio Tinto Alcan Bell Bay reported energy use excludes energy use associate with consumption of anodes which embody an additional 2,797,000GJ of energy. Some opportunities relate to the anode process and may have energy reduction and / or net carbon benefits.

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 a – Description of significant opportunities at Hope Downs Mine
Apply XIR type film to heavy vehicle cabin glass to reduce internal heat load *(Under Investigation)*
A significant amount of heavy vehicle fuel is used for operating cabin air conditioners. The load on an air conditioner is increased by unnecessary heat gains. The heat gained through windows can be reduced by installing highly solar reflecting films (eg XIR). As a result of running the air conditioners at a lighter load, a fuel saving will be achieved. **Progress update:** Evaluation of this project has been completed. Further review will be undertaken prior to a proposed implementation.
Haul truck light weight trays *(Implemented)*
This project proposes that the entire Hope Downs haul truck fleet be converted to Light Weight Trays. The increase in tray capacity and reduced tray weight is expected to allow 5% more material to be moved each load, for the same amount of fuel. The total fuel burnt is not expected to decrease. However, the material moved in relation to the fuel use will increase, ie tonnes per litre. The decrease in fuel consumption compared to Total Material Moved (TMM) is to be confirmed. **Progress update:** As they have worn out, all original truck trays have now been exchanged for light weight trays. The saving in tray costs has been realised and the payload vs fuel data to date has indicated an improvement. Monitoring of changes in fuel/payload is ongoing to confirm successful implementation.
Utilise waste oil in blasting *(Under Investigation)*
Filtered waste oil can be used in blasting by displacing diesel fuel in ammonium nitrate fuel oil (ANFO) slurry. Typically, diesel use in ANFO accounts for approximately 2% of all diesel used on site. The current investigation assumes that not all of the diesel fuel can be displaced - instead, a mixture of diesel fuel and recycled waste oil is to be used in ANFO. Additional capital expenditure will be required to construct the required filtering process infrastructure. **Progress update:** Evaluation of this project has been completed. Estimated energy savings is to be reviewed business decision made.

Table 2.5 b – Description of significant opportunities at Mesa J Mine
Reduce carry-back in haul trucks (*Implemented)*
The unusually high clay content at the Mesa J mine leads to clay deposits remaining in Haul Truck trays after dumping. Such deposits are referred to as ‘carry-back’ and limit a truck’s effective payload. Thus, more load/haul cycles are required to move the same amount of material. To reduce carry-back, a truck’s hot engine exhaust can be mechanically diverted into and under the truck’s tray. The heated tray causes the clay to dry out sufficiently

Table 2.5 b – Description of significant opportunities at Mesa J Mine
that during off-loading the entire payload will be removed. The average amount of carry back per truck was 1%. This percentage translates to running one truck continuously for approximately nine months. All Haul Trucks on site have now had their engine exhaust mechanically diverted into the tray and the reported incidence of carry-back has been very low.
Reduction of diesel use in the lighting plants (*Implemented)*
Historically lighting plants are operated for 18 hours per day, however the lighting plants are needed only during night-time hours (10-14 hours maximum per day). The objective of the project is to reduce the running time of diesel lighting plants by ~six hours per day by installing timers which will automatically switch towers off when not required. This opportunity has now been implemented. All lighting towers at the mine have had timers fitted which ensure lighting towers only operate for 10-14 hours maximum per day.
Surge Stockpile Development *(Implemented)*
This opportunity involves the construction of a 'surge' stockpile adjacent to the train loadout. Prior to formation of the stockpile, when a train was not in position and the reclaim washed ore stockpiles at Production Plant 1 (PP1) and Production Plant 2 (PP2) were full, washed ore was moved by loader and haul truck to the 'triangle' (stockpile). When a train arrived, ore was transported from the triangle to the train loadout by loader and haul truck. The objective of this project is to create a surge stockpile closer to the train loadout with the result that only loaders will be required to load trains. The energy savings are the result of not requiring haul trucks to load trains. The implementation of the surge stockpile has been completed and energy savings have been demonstrated.

Table 2.5 c – Description of significant opportunities at Brockman No 2 / Nammuldi Mines
Ammonium Nitrate (AN) Shed power supply *(Under Investigation)*
The AN shed is located 1 km away from the mine site and uses a diesel generator for its power supply. The energy savings potential of connecting this facility to the main power supply will be further investigated to confirm and justify implementation. At this stage, project completion should result in a reduction in diesel use for both the generator and the service truck required for regular fuelling. This project is pending capital funding – once approved a project implementation plan will be developed.
Implement Mine-care and tailor for site *(Implementation Commenced)*
Currently, there is no real time data flow to drivers to track driver performance and equipment fuel consumption. The use of Mine-care, a software package for the mining fleet, will improve optimisation by generating functional reports that will be available for use by drivers and operations management in order to improve real time scheduling. This should result in increased fuel efficiency. Mine-care has been implemented onsite and is now waiting on results from fuel efficiency trials that are currently underway. When these results are available, any energy reduction findings will be implemented at Brockman 2/Nammuldi with the assistance of Mine-care.

Table 2.5 c – Description of significant opportunities at Brockman No 2 / Nammuldi Mines
Lightweight dump bodies on haul trucks *(Implementation Commenced)*
Haul trucks at site currently have standard trays installed. This opportunity involves the further investigation and justification of carrying a higher payload by replacing the heavier standard trays with lighter weight trays on all haul trucks. Tray replacement is expected to result in improved diesel efficiency through having an increased payload per truck for approximately the same fuel requirement ie less fuel used per tonne. Lightweight truck trays are on site. An implementation plan and schedule is still to be agreed.

Table 2.5 d – Description of significant opportunities at Cape Lambert Port Operations
LED lighting for substations *(To be Implemented)*
Currently fluorescent tubes are installed in all electrical substations. Compared to Light-Emitting Diode (LED) tubes florescent tubes are more energy intensive and have shorter life span which requires more frequent replacement. This project will involve replacing the fluorescent tubes with LED tubes which should result in energy and maintenance cost savings due to the lower power requirements and extended life of LED tubes. **Progress update:** A trial of the LED lighting in one of the Cape Lambert electrical substation has been initiated. A lighting survey will be conducted to ensure that sufficient lighting is provided from the new lights. Based on the outcomes of the lighting survey and cost benefit analysis a recommendation will be presented for management approval before the end of 2011.
Synthetic oils *(Under Investigation)*
This project will involve the change from using conventional mineral lubricants to using synthetic hydraulic fluid. The supplier claims to have a product that will improve energy efficiency by 5% when using this alternative. **Progress update:** A short term trial is planned that will use synthetic hydraulic fluid in selected load out area equipment. The trial will commence in early 2012 when the specialised power monitoring equipment is available. It is expected the trial will run for a few months and the resultant data will be analysed. Depending on the amount of energy saved and the associated costs, the original evaluation will be updated and a decision made on converting from mineral oil to synthetic fluid across the rest of the site. This recommendation will be presented for management approval by the end of Q3 2012.
Trip management – Tug boats *(Under Investigation)*
As this opportunity's saving is applicable to both RTIO Port operations sites, progress will only be reported via the RTIO Dampier Tugs - Trip Management opportunity in order to avoid reporting duplication.

Table 2.5 e – Description of significant opportunities at Dampier Port Operations
LED lighting for substations *(To be Implemented)*
Currently fluorescent tubes are installed in all electrical substations. Compared to Light-Emitting Diode (LED) tubes florescent tubes are more energy intensive and have shorter life span which requires more frequent replacement. This project will involve replacing the fluorescent tubes with LED tubes which should result in energy and maintenance cost savings due to the lower power requirements and extended life of LED tubes. **Progress update:** A trial of the LED lighting in one of the Cape Lambert electrical substations has been initiated. A lighting survey will be conducted to ensure that sufficient lighting is provided from the new lights. If the outcomes of Cape Lambert's trials are successful the initiative will be replicated at Dampier Operations. This initiative will be presented for management approval before the end of 2011.
Tugs - trip management *(Under Investigation)*
For tug boats there is an exponential relationship between the speed of the vessel and the fuel burn due to the effect of the standing wave it creates. The opportunity here is to introduce a speed governance process to aim to limit the speed of the tugs where speed is not required. This will be done by a combination of monitoring, reporting and feedback. As this opportunity's saving is applicable to both RTIO Port operations, progress will only be reported via the RTIO Dampier Tugs - Trip Management opportunity in order to avoid duplication. **Progress update:** The investigation has been initiated and currently data are being collated to verify the relationship between vessel speed and fuel burn for the Coastal Operations fleet. The findings of this analysis will provide the baseline of the potential energy savings or costs associated with governing tug speed and aims to determine the optimal tug speed. A recommendation regarding the introduction of a speed governance process will be presented for management approval by the end of Q3 2011.
Water Pump Control *(Under Investigation)*
Dampier's Parker Point port process water system uses control valves to regulate the plant line water pressure. The pumps run continuously at maximum speed consuming maximum power and deteriorating the regulating valves. Installation of a VVVF (Variable Voltage Variable Frequency) drive will allow finite control of the water pressure making the control valves obsolete. This will give the pumps the functionality of being able to reduce speed and therefore power output when demand allows. **Progress update:** The investigation into refining the analysis of the energy and cost savings for the VVVF drive is underway. Vendor quotes for equipment have been sourced. It is expected the findings and analysis of the energy costs and savings will be completed by the end of Q3 2011. Based on this analysis a recommendation will be presented for management approval.

Table 2.5 f – Description of significant opportunities at Pilbara Iron Rail Operations
Improve driving strategy using information from locomotive download system *(Under Investigation)*
Currently there is no system available to feedback locomotive performance indicators per cycle to drivers, controllers or supervisors. Installation of a data download and reporting system that takes data from the locomotive download system and creates a trip report is under investigation. Subsequent improvements in locomotive performance data will enable driving strategies to be analysed in order to develop optimal efficient strategies which will result in reduced diesel consumption. **Progress update:** Stage 1 of this project (data collection) has been completed. Stage 2 (data analysis) in now in progress.

Table 2.5 f – Description of significant opportunities at Pilbara Iron Rail Operations
Remote operation and communication between lead, middle and trailing locomotives to reduce unnecessary idling *(Under Investigation)*
The middle and trailing locomotives in a group of three head-end locomotives are left idling in situations when they are not required to provide traction effort. This fuel use is unnecessary. The selection and installation of suitable technology that will switch off unneeded locomotives whilst idle and/or whilst running is under investigation. Expected energy savings will eventuate from the reduced fuel use from unnecessary idle running. **Progress update:** The Rail Systems Engineering group have completed a report outlining two possible technical solutions. They are currently investigating the cost and fuel savings under both options.
Revise Rules and Operating Procedures regarding the use of Automatic Engine Stop/Start (AESS) system *(Under Investigation)*
In order to maintain the air conditioning running in the engine cab, the AESS can be overridden by revving the engines while stationary. This results in increased fuel use in three head-end locomotives. A standard operating procedure is to be introduced to ensure that the AESS two hour override button is used rather than the throttle Notch setting. This will ensure air conditioning remains on in the front carriage without unnecessary engine operation therefore reducing fuel consumption. **Progress update:** This project is currently in the early stages of investigation.

Table 2.5 g – Description of significant opportunities at West Angelas Mine
Diesel Filtration *(Implementation Commenced)*
A requirement to install a filtration system on the fuel tank farms was identified during the 2010 assessment. Fuel is currently not filtered on site after delivery causing potential operating inefficiencies from any contained impurities. Installing filtration on the fuel farm will be further investigated for implementation in order to reduce impurities in the fuel; provide improved operating engine efficiency; and related energy savings.
Use Water from In-pit dewatering for Dust Suppression *(To be Implemented)*
The proposed change-over to the use of water from in-pit dewatering for dust suppression will reduce the additional travel distance of 2km for filling water trucks from existing water truck fill-stand thereby reducing fuel usage. This conversion will also allow potable water to be used only as an emergency supply should in-pit water supplies fail to meet demand. The majority use of in-pit water will reduce the energy used for the filtration of the potable water providing additional savings.
Village Expansion Energy Efficiency *(Implementation Commenced)*
Energy efficiency standards are to be implemented for new accommodation buildings. The 400 room upgrade to the West Angelas Village accommodation incorporates energy efficient lighting and water delivery that will provide significant savings in these areas. Units will also have double glazing, increased insulation and external shading (trees) combined with correct orientation contributing to these savings. Actual savings will be assessed on completion of the upgrade.

Table 2.5 h – Description of significant opportunities at Yandicoogina Mine
Improved stemming material in blast holes *(Implementation Commenced)*
The application of high quality stemming material in blast holes, prior to blasting, acts as a plug to the underlying explosive and forces the explosive energy from a blast into the surrounding rock. This results in improved fragmentation. Expected energy savings from a changeover to higher quality stemming material include a reduction in diesel energy (3,216 GJ) as a result of less explosives and diesel used in each blast hole. There is also a reduction in plant electricity (558GJ) required for downstream crushing resulting from the improved ore fragmentation. Energy savings will be reviewed and assessed on completion. **Progress update:** The first blast with the higher quality stemming material is scheduled for early July 2011.
Lighting tower - remote switching *(To be Implemented)*
Lighting plants are run for 18 hours per day. The lighting plants are needed only for night-time hours (10-14 hours maximum per day). The objective is to reduce the running time of diesel lighting plants by ~6 hours per day through the installation of remote switching. Energy savings will be reviewed and assessed on completion. **Progress update:** This programme is scheduled to start in Q4 2011.
Waste oil in blasting *(Implementation Commenced)*
Filtered waste oil can be used in blasting by displacing diesel fuel in ammonium nitrate fuel oil (ANFO) explosive. Typically, diesel use in ANFO currently accounts for approximately 2% of all diesel used on site. A mixture of diesel fuel and recycled waste oil is to be used in a 50/50 ratio saving the amount of diesel needed on site, as well as the transport to remove waste oil from site. A waste oil filtering system is already operating at Yandicoogina. Additional capital works will be required to increase the concrete pad size to accommodate the ANFO delivery trucks and, as expected, upgrade the pumping equipment. **Progress update:** The trial first blast using waste oil was conducted in mid June 2011 and was considered a success. Energy savings will be reviewed and assessed on completion of the trials and application.

Table 2.5 i – Description of significant opportunities at Tom Price Mine
Replace Direct Current Tails Pumps in the concentrator *(Implemented)*
Tom Price plant utilises variable speed drive units controlled by obsolete direct current (DC) technology. DC variable speed drive technology is inefficient and, in comparison, modern variable speed drives allow for greater efficiency in electric motor and process control. Plant Operations have undertaken a program to replace all DC variable speed drives with modern variable speed drive equipment. Tailings Pump Set A has been modified and commissioned. It is now operating more efficiently than the original configuration which included a DC drive on the second stage. Validation of actual energy savings is being investigated. **Progress update:** All tails pumps have now been converted to modern AC variable speed drives. Energy savings are currently being evaluated and results are expected by the end of the 2011 calendar year.

Table 2.5 i – Description of significant opportunities at Tom Price Mine
Application of light weight haul truck trays *(Implemented)*
The entire Tom Price haul truck fleet is expected to be converted to Light Weight Trays. The increase in tray capacity and reduced tray weight allows more waste to be moved each load. However, the fuel burn rate will increase slightly due to extra tonnage transported. The opposite will occur when hauling empty because the fuel burn rate will be reduced slightly due to the lighter trays. The net effect of the trays will have minimal impact on total fuel burnt; the impact will be seen in the fuel burnt/Total Material Moved (TMM) ratio, which will be reduced. The tray changeover provides for a seven per cent increase in TMM without a corresponding increase in diesel usage. **Progress update:** All haul trucks have now had the lighter weight trays fitted. The benefit of the light weight trays will potentially yield a net benefit of ~10Mt of additional total material moved. Energy savings are currently being evaluated and results are expected by the end of the 2011 calendar year.
Variable Speed Drives on pumps from the low grade ore processing areas *(Implemented)*
This project will investigate increasing the energy efficiency of pumps and other ancillary drives in the Tom Price concentrator by optimising variable speed drive performance. Savings will be realised by adjusting variable speed drive settings (the flux optimisation parameter). A trial conducted on the tailings set pump installation has indicated a potential 5 -10 per cent reduction in electricity consumption. Making this adjustment across other variable speed drives in the plant is expected to deliver savings of approximately 629,000 kWh a year. **Progress update:** All variable speed drives used in suitable applications for this change have been adjusted. Energy savings have been calculated on test installations and assumptions made for remaining drives. Findings are currently being collated and are expected to be available by the end of the 2011 calendar year.

Table 2.5 j – Description of significant opportunities at Marandoo Mine
Install new Variable Voltage Frequency Drives *(Under Investigation)*
The fitting of variable voltage variable frequency drives (VVVF), to enable the introduction of motor speed control on conveyors within the plant, were scheduled to be formally assessed for feasibility during 2010. This project was identified by site production personnel during the 2009 EEO assessment. Expected benefits will be reduced energy usage resulting from running motors at slower speed. Savings were to be assessed during 2010. **Progress update:** Savings were not assessed during 2010 because measurement is reliant on the prerequisite initiation of power metering, a non EEO opportunity. The Power Metering Project was approved in Q1 2011 and procured equipment has arrived on site. Planned installation works for power metering will take place in Q3 2011. Marandoo Mine Phase 2 has also been approved and awaiting details of Fixed Plant upgrades. Energy savings for this opportunity will be able to be determined once the power metering project has been implemented.

Table 2.5 j – Description of significant opportunities at Marandoo Mine
Train load out optimisation *(Implemented)*
At Marandoo ore trains are loaded from stockpiles by reclaimers. The reclaimer operating code has been updated. This operational improvement to the reclaimer has eliminated air digging and enabled constant cutting into the stockpile. This project was identified by senior production personnel involved in the EEO assessment. The optimisation is expected to improve energy efficiency. Measurement and follow up analysis will be conducted to determine energy savings. **Progress update:** Capital works for further optimisation of the Train Load Out (TLO) operations have been successfully completed. Work relating to reclaimer operating codes and TLO PLCs has been completed, and installation and commissioning of onsite Weightometers were successful. The upgraded system is now in full usage with minor ongoing modifications. The Reclaimer Bucket wheel turnaround pressure setting was increased to reduce 'air-cuts' and also speed up bench1 (top bench) changes. Modification to TLO chute and clam timing is under study. Estimated gain of 2 tonnes per car or 468 tonnes per train against current target is anticipated. The completion of the Power Metering Project will enable the site to collect data and confirm energy savings associated with this opportunity. The Power Metering project has been approved in Q1 2011 and procured equipment has arrived on site. Planned installation works for power metering will take place in Q3 2011.
Use the VVVFs to control motor speed *(Under Investigation)*
The cost of implementing variable speed operation is very low where motors already have variable voltage variable frequency (VVVF) drives. A recent two hour trial of conveyor 8 on the stacker demonstrated that operating at half speed provided positive benefits when run with no ore feed. A 45 per cent reduction in voltage was observed with no additional current. In addition, no increase in motor temperature was observed, which is a potential risk when motors operate at half speed. Based on the significant trial observations, the impacts and energy savings of slower speed operation will be reviewed in detail in 2010. **Progress update:** The completion of the Power Metering Project will enable the site to collect data and confirm energy savings associated with operating the drives at slower speeds. The Power Metering project has been approved in Q1 2011 and procured equipment has arrived on site. Planned installation works for power metering will take place in Q3 2011. Marandoo Mine Phase 2 has also been approved and awaiting details of Fixed Plant upgrades.

Table 2.5 k – Description of significant opportunities at Hail Creek Mine
Optimise truck tray size to match fleet *(Implemented)*
This project is aimed at increasing the tray size of the mine's fleet of 960 haul trucks to maximise their payload. By aligning tray volumes with capacity volumes, annual diesel savings of more than 450,000 litres may be possible. This opportunity requires the design, fabrication and installation of new truck trays. This project commenced implementation in 2010, with older truck trays being progressively replaced with optimised trays. Confirmation of estimated energy savings is yet to be carried out.

Table 2.5 k – Description of significant opportunities at Hail Creek Mine
Waste oil for blasting *(Implemented)*
This project consisted of undertaking a trial mixing a 50/50 blended waste oil and diesel product with ammonium nitrate to determine its feasibility for use in blasting activities. Two 28,000 litre waste oil storage tanks were installed on site to facilitate the trials, and the trials were aimed at obtaining a better understanding of the risks and opportunities associated with the use of the waste oil blend. The trials were completed during 2010, and reports received some benefit to using the waste oil mixture. Full evaluation of savings will be undertaken by June 2012. It is planned that further investigation, and a business case, will be developed to consider whether rolling out the use of waste oil across site is feasible.
Improve excavator productivity to achieve plan dig rate *(Not to be Implemented)*
This project aimed to increase productivity rates, utilisation and operating efficiencies to increase material movements on the EX5500 and RH170 excavators. In theory, by achieving planned dig rates and increasing excavator productivity, more material can be moved for the same amount of effort, i.e. fuel used and machinery hours. Energy reductions of up to ten per cent were initially expected based on the excavators' fuel consumption rates. However, the purchase of the XPC and use of RH340's (i.e. change in mix of plant on site) mean the productivity improvement for the EX5500's is not required (or achievable given they now focus on the wedge area). The productivity improvement of the RH170 is also in question due to variability between crews, with weather etc, and there are no long term data sets able to be provided as to the "starting" bcm/hr and productivity changes over time. As a result of these implementation constraints, this project has no practical path to completion and will therefore not be implemented.

Table 2.5 l – Description of significant opportunities at Kestrel Mine
Replace existing diesel air compressors with two electric air compressors *(Implemented)*
Progress update: Kestrel Mine has replaced three diesel run air compressors with two electric compressor units in order to achieve net energy savings and reduce operating and hire costs. The commissioning of these units was completed in 2010. Operating on a continuous basis to provide sufficient compressed air to support mining operations, the 160kW electric compressor units are estimated to achieve annual energy savings in the order of 29,000GJ.
Improve locomotive loading efficiency of product coal *(Implementation Commenced)*
Progress update: This project aims to reduce train loading times per tonne of coal through improving weighbridges and providing more accurate and timely feedback to train load out operators. Streamlining and managing load out times will lead to significant energy savings and productivity benefits. An in-motion weigher has been purchased, and an application for permission to have it installed along the Queensland Rail railway corridor has been submitted. Based on this application QR have completed a preliminary geotechnical investigation. Kestrel mine will continue to work with QR to progress the project in 2011.

Table 2.5 l – Description of significant opportunities at Kestrel Mine
Reduce underground conveyor belt speeds when full belt capacity is not required *(Implementation Commenced)*
Progress update: Elements of the Kestrel Mine underground operation, coal handling and preparation plants, such as conveyors, may continue to run when not required. This project aims to safely reduce the electricity used by conveyor belts when full capacity is not required. The option chosen for implementation involves reducing the development conveyor belt speed from 50 to 30 per cent by using Variable Speed Drives, developing various modes of operation and improving the belt control sequence. It is anticipated that the project will be completed in late 2011.

Table 2.5 m – Description of significant opportunities at Bengalla Mine
Payload management *(Implemented)*
This project aims to optimise the amount of material transported by haul trucks to reduce the number of truck movements and diesel consumption. In 2009, improvements in reliability and reporting of the payload monitoring systems were completed on all haul trucks. These data will provide feedback to vehicle operators and allow for improved performance. This project has the potential to reduce greenhouse gas emissions by more than 550 tonnes of carbon dioxide per annum through reduced diesel consumption. **Progress update:** This implemented project remains ongoing. The effectiveness of the project is to be tracked until expected energy savings are confirmed. Relevant data collected during 2009 and 2010 are to be analysed by the end of 2011.
Strip 19 high wall ramp - reduce haul cycle *(Implemented)*
A review of mine plans, equipment layout and an analysis of energy and production data has led to the development of the opportunity to reduce truck haul distances and cycle time. By relocating the run of mine (ROM) coal hopper and one of the main pit access ramps, the haul trucks have less distance to travel. The reduced haul distance means less diesel is used. Significant ongoing diesel savings, maintenance and productivity benefits are expected from this project. **Progress update:** The strip 19 high wall ramp has been completed and is in use. This project is closed. The relevant data, collected during 2009 and 2010, for the reduced haul cycle are to be analysed and the expected significant ongoing diesel savings confirmed by the end of 2011.
Throw blasting frequency *(Not to be Implemented)*
This project involves investigating an alternative blasting technique known as throw blasting to reduce material moved by the dragline. Using this approach, overburden material is moved to its final location by the blast, as opposed to just fracturing and remaining in-situ and requiring other equipment to move it to its final location (as occurs with other blasting techniques). The opportunity will increase productivity and generate energy savings in the future where the technique can be used. **Progress update:** As a result of the modification to the pit highwall design, the opportunity to implement this project no longer exists. This project will therefore not be implemented.

Table 2.5 n – Description of significant opportunities at Hunter Valley Operations
Effective Dragline Deployment - Goat Island *(Implemented)*
This one-off opportunity aims to generate energy efficiencies by excavating the 180 metre Goat Island box cut using a dragline instead of a shovel and supporting truck fleet. If implemented, this project will reduce operating costs and generate energy savings due to reduced truck hours and diesel consumption. This outweighs increased electricity consumption due to the dragline's operation. A business case is currently being developed to undertake the required work. **Progress update:** Project implemented in 2010 delivering 21,386GJ energy savings with a value of $1.36M. These savings are not ongoing, instead are in relation to a specific plan that was deployed over a set period of time.
Install Hungry Boards to increase coal payload *(Under Investigation)*
This project involves installing hungry boards on seven coal trucks which will potentially increase the payload for each truck from 201 tonnes to 213 tonnes. Increasing payload will improve the efficiency of moving coal and reduce energy costs. Currently, different trays are used for overburden and coal and this project will result in enhanced matching of truck-tray type to specific tasks. The project was identified in 2009 and may progress in 2011. **Progress update:** This project has been deferred to 2013. HVO is currently trialling increased speed on the trucks, which will continue through 2011. Following the trials, payload optimisation will be re-evaluated because the resultant truck operating parameters are expected to be significantly different to those in 2009 when the opportunity was identified. The project will then be under investigation to determine if the Original Equipment Manufacturer (OEM) requirements can be met with increased speed, increased payload and reduced fuel consumption per tonne moved. This is anticipated to be a more significant engineering exercise than planned previously.
Strip Design - Upper Liddell seam *(Not to be Implemented)*
Specific mine planning for the Upper Liddell seam has identified that by lowering the pad area (a key work zone) dozer time will be reduced for each seam pass. The project was identified in 2009 and represents an annual efficiency improvement (from reduced dozer usage) for both cost and energy. This work is currently planned to progress in 2011. **Progress update:** Investigations were completed in 2010. These showed that, based on more up-to-date assumptions than used for the assessment, there is no payback for this project. The key findings were the requirement for increased dozer hours, rather than the decrease in hours that the project was initially estimated to deliver, and no energy savings.

Table 2.5 o – Description of significant opportunities at Mount Thorley Warkworth Operations
Effective dragline deployment - West Pit opportunity (Battleaxe extension) *(Implemented)*
This opportunity involves moving bulk material (rock and dirt) using a dragline instead of a shovel and supporting truck fleet. Energy savings will result from using a single efficient dragline in place of up to ten trucks working under a shovel. The project is underway and tracking well. Benefits from this strategy will be quantified in the second quarter of 2010. Realised energy savings will be calculated at the end of the project. **Progress update:** The project is implemented with an estimated energy saving of 16,703 GJ. This saving is not ongoing; instead it is in relation to a specific plan that was deployed over a set period of time.

Table 2.5 o – Description of significant opportunities at Mount Thorley Warkworth Operations
Spiral replacement (coal processing plant upgrade) *(Implemented)*
This project was implemented in July 2009 and involved installing new coal processing equipment to recover coal previously lost to waste. The new spiral equipment recovers more coal for the same amount of energy used and was completed December 2009. Benefits of the project have been validated by product and waste sampling. Realised energy savings will be determined at the end of 2010. **Progress update:** Energy savings of 2595 GJ per annum were assessed for this project.
Woodlands Dragline - increase dragline pre-strip to enable greater dragline utilisation in battleaxe zone *(Implementation Commenced)*
The opportunity to increase dragline pre-strip has commenced with the redevelopment of the dragline operating horizons strategy within a particular zone of the mine area. This new strategy aims to take advantage of dragline availability and provide additional dragline access to the mine area. Additional work on energy savings accuracy may be required as the specific nature of the work progresses. Realised energy savings will be calculated at the end of the project. Progress update: This project is approximately 75% completed and will be completed during Q3 2011. Project scope includes • Additional 500m (approx) of pit strike length created in West Pit. • 18Mbcm (approx) of prime waste material required for removal to enable pit extension to be completed. This material was all originally scheduled for removal via pre-strip means (truck and shovel). Of the 18Mbcm of prime waste to be removed for this extension, the target was for 40% of this to be moved by Dragline. It is now anticipated that the project is likely to move a total of 5 to 6Mbcm of prime waste with the Dragline fleet. Energy savings will be realised and clearly demonstrated, however only a portion (to be determined) of the energy savings originally forecast for the project will be delivered.

Table 2.5 p – Description of significant opportunities at Blair Athol Mine
Improve dragline hardware to achieve greater productivity *(Implemented)*
This project aims to save energy by maximising the capacity of Blair Athol Mine's dragline, therefore reducing the need to operate additional heavy mobile equipment. Increased dragline energy use will be more than offset by savings through reduced diesel consumption by mobile equipment. Energy savings estimates equate to more than 7,000GJ. The decision to proceed with this opportunity will be based on the operational requirements of the mine and requires a detailed capital evaluation and risk assessment. **Progress update:** Capital expenditure and the upgrades to hoist motors have been completed. Measurement of energy consumption versus material movement has shown substantial improvement when measured against prime material movement from the base line in 2008. During the first 5 months of 2011 a deterioration in this metric has been observed as a result of several above average wet seasons, but as the dragline moves into drier material in the coming months, it is expected that efficiency gains will again be realised.

Table 2.5 p – Description of significant opportunities at Blair Athol Mine
Increase coal plant feed rate *(Not to be Implemented)*
An investigation is underway to maximise the feed rate at Blair Athol mine's coal plant to reduce its total annual coal processing rates. By increasing the feed rate through special plant management practices and some plant modifications, the plant will be able to process the required tonnage in less time, which will reduce electricity consumption. This opportunity is dependent on the operational requirements of the coal plant as overall product coal tonnages reduce. System constraints caused by managing additional product from the Clermont mine may also need to be considered when assessing this opportunity. **Progress update:** This project will not be implemented. The operating efficiency of the coal plant has been reduced due to a decrease in Blair Athol's mining rate from 10Mtpa to 3Mtpa as well as other operational constraints associated with the dual feeds from Blair Athol and Clermont Mine to the stacker/reclaimers. Mining operations and crushing windows are not always aligned and as a result, less than optimal feed rates to the plant have been seen since the downsizing of the operation. During the period from 2009 and 2010 when the plant was being run at or above the target feed rate, improvements to energy efficiency were observed, however these are unable to be sustained at the lower feed rate.
Improve load and haul efficiency *(Not to be Implemented)*
This project aims to reduce truck idle times and improve the energy efficiency of the mine's haul fleet by eliminating unnecessary delays and reducing hauling distances. With changes to the mine's coal resource underway, proposed modifications to improve the current load and haul operations include improving efficiency by reducing wait times, improving planning/scheduling, better equipment matching and interacting with the coal preparation plant to improve scheduling of coal haul routes. This opportunity may result in annual diesel savings of more than 50,000 litres. However decisions regarding fleet structure and mining sequence to access the next, deeper, Seam 4 coal resource are required for this project to progress. **Progress update:** This project will not be implemented due to energy savings not able to be realised at the lower 3Mtpa mining rate. In 2009 and 2010 fuel consumption for load and haul was about 0.3L/tonne whereas in 2011 with reduced efficiencies of scale, consumption was averaging 0.38L/tonne. Even through optimising and continued operator performance training, the savings associated with this opportunity cannot be realised with the loss of economies of scale through reduce mining rates.

Table 2.5 q – Description of significant opportunities at Argyle Diamond Mine
Reduce wear plate thickness in non wear zones *(Implementation Commenced)*
Dump truck trays are fitted with heavy duty wear plates to enhance tray longevity. Mine maintenance staff involved in the EEO assessment had observed uneven wear in tray liners. The trays have been redesigned using thinner plate in low wear sections. This has resulted in a weight reduction of approximately 10 tonnes/tray without impacting on tray longevity. The benefits of this project are reduced diesel usage, reduced maintenance costs and increased payload capacity. The new tray liners will be progressively installed as new tray liners are required on dump trucks. Action plans for project implementation are being developed. **Progress update:** This project has two phases. Phase 1 has been implemented and Phase 2 is ongoing. Phase 1: a 1000kg weight reduction has been achieved on all trucks with the reduced height of the tray headboard. Phase 2: from January 2011, whenever the Cat 789 truck trays are to be refurbished, the thickness of dove tail liners will be reduced from 25mm to 20mm plate. This will result in a further 530kg weight reduction. Given that the ADM 789 haul truck trays weigh approximately 45 tonnes each, when fitted with the appropriate wear material, these EEO measures account for a 3.4% overall tray weight reduction. Approximately 80% of haul truck trays have been completed. 100% are scheduled to be completed by end of year. The actual costs and energy savings will be tracked through Jul – Dec 2011.
Generator efficiency *(Implemented)*
Electro Motive Diesel (EMD) generators, provide Argyle site with power. EMD generators indicate that the flue gas losses are significant. During the assessment, monitoring of the exhaust gas temperatures demonstrated that the exhaust gases of some generators were significantly hotter than manufacturer specifications. The generators will be progressively overhauled and tuned. Through improved combustion efficiency, diesel savings will be achieved and it is expected that there will be fewer breakdowns which will assist in controlling excess air and ultimately, will improve combustion efficiency. An action plan for project implementation is being developed. **Progress update:** This opportunity has been implemented. The planned upgrade of four generators was completed in June 2010 and commissioned with all planned upgrades in operation. Improvements were realised by the replacement of existing parts with more efficient components. Test trial runs were completed in Aug 2010. The improvements have resulted in an overall reduction in specific fuel consumption from 277L/MWh to 272L/MWh. Fuel efficiency improvement achieved is 1.5% leading to annual savings of 102000 L diesel (3937 GJ per year).
Install VSD on one of the centrifugal compressors *(Under Investigation)*
The centrifugal compressor provides Argyle site with compressed air. A standard drive will be replaced by a variable speed drive sequencing will be installed on the programmable logic controller (PLC). Improved matching of the compressor speed to the load will lead to energy savings. An action plan is being developed for project implementation. **Progress update:** This project is to be modified because, during 2010, the proposed installation of variable speed drives (VSD) on the compressors was found to be against the manufacture's recommendations. The proposed modification is not technically feasible. Therefore, an alternative opportunity of upgrading the existing control panel on the units was submitted by the manufacturer for review. However, further investigations into this alternative opportunity have determined that it is also not technically feasible. Jan – Jun 2011 No action completed. Compressors operate currently under standard loading and unloading cycles and the improvement by VSD will be insignificant and has been ruled out. Consultation with original equipment manufacturer is underway to understand further action.

Table 2.5 r – Description of significant opportunities at Dampier Power Station, Paraburdoo Power Station, Cape Lambert Power Station
Clean condensers *(Not to be Implemented)*
Cleaning of condensers at the Cape Lambert power station resulted in energy savings of approximately 40 KJ/kWh. This initiative will also be implemented at the Dampier Power Station. A redesigned maintenance program is expected to likewise improve the performance of these heat exchangers by cleaning condenser tubes which will lower the water (condensate) temperature and improve turbine efficiency. **Project update:** Implementation of this opportunity was discontinued and reclassified from 'Implementation commenced' to 'Not to be implemented' as Dampier power station was closed on 27 August 2010.
Generation Master Services Agreement *(Not to be Implemented)*
The master services agreement establishes maintenance and operational strategies for the Gas Turbines at the Paraburdoo Power Station to reduce gas consumption, by reducing burn rate, and improve generator efficiency. The agreement with IHI Corporation (gas turbine package manufacturer) will utilise that company's expertise in this activity. Scheduled maintenance has begun. Realised energy savings will be determined during 2010. **Project update:** Following a review, it was determined that there is no achievable savings from any single improvement item, as the contract scope is for routine maintenance, rather than 'improvement' actions for this opportunity. This opportunity was therefore discontinued and reclassified.
Improve Boiler Efficiency: Boiler #3 *(Not to be Implemented)*
Energy efficiency opportunity identification during 2009 determined that a streamlining of operational and routine maintenance activities at the Cape Lambert Power Station would enable enhanced detection and then repair of steam leaks. This would result in optimal performance of the steam turbines, reduced water consumption and a reduction in associated auxiliary power requirements. Realised energy savings for this opportunity will be established following analysis of data. **Progress update**: 1. Boiler tubes at Cape Lambert Power Station were replaced during the last over-haul. 2. Further 'non-destructive' testing showed boiler-tubes to be working satisfactorily. 3. Water-flow transmitters will not be installed; given the power-station will be closing in March 2012. 4. The station is currently islanded. 5. We cannot gain access to boilers, to repair any future steam-leaks. 6. The station being 'islanded', and it's closing in March 2012, has removed the feasibility for savings to be achieved. Thus, this opportunity will not be implemented.

Table 2.5 s – Description of significant opportunities at Boyne Smelters Limited
S230 anode bottom chamfers *(Implemented)*
The existing S230 anode has square bottom edges. During the life of an anode these edges burn away and the anode adopts a rounded shape, resulting in reduced process efficiency. The project scope is to provide anodes with chamfered edges in order to improve the anode profile. This will save gross carbon used on each anode and allow the anode to release bubbles more effectively during the first four days of operation. **Progress update:** The project was executed in conjunction with the S230 Anode Slot Forming Trial. Modifications to the green anode mould have been trialled to achieve an anode with chamfers and slots pre-formed in it before the anodes are baked. A trial was implemented in Q1 2011 for two months. Previously reported energy savings were estimated on an annual basis. These savings have now been pro-rated for the two months that the trial was in place. Further trials are expected to be implemented in conjunction with the commissioning of the new carbon bake furnace.
S230 Anode Slot Forming Trial *(Implemented)*
This project builds on the lessons learnt from modelling and trial work at Boyne Smelters that demonstrates the benefits of venting process generated gases from the underside of the anode. The subsequent reduction in cell resistance improves energy efficiency. **Progress update:** A two-month trial was completed in conjunction with the S230 Anode Bottom Chamfers modifications. A capital project has been completed to enable 100mm slots. Previously reported energy savings were estimated on an annual basis. These savings have now been pro-rated for the two months that the trial was in place.
Optimisation of compressed air systems *(Implemented)*
Following the success of three previous compressed air efficiency projects, additional projects will be implemented. These improvements are: conduct an air leak reduction programme tiers one and two and implement control system improvements in the compressor house. These projects will also significantly improve the reliability of the compressed air system. **Progress Update:** Compressed air projects for air leak reduction programmes and predictive maintenance philosophy for compressed air filters have been implemented in late 2009 and early 2010. The control systems improvement project has now been superseded by Line 1 and 2 compressor replacement project. The savings from the implemented projects have now been confirmed.

Table 2.5 t – Description of significant opportunities at RTA Yarwun
Improve production throughput through achieving nominal nameplate capacity *(Implemented)*
Improving process control and stability should realise an efficiency improvement in the energy consumed per tonne of alumina refined. **Progress update:** The commencement of commissioning activities associated with the Yarwun 2 expansion has seen the expected impact on energy performance. The idling of a boiler until steam demand increases with the completed commissioning of Yarwun 2, and improvements in insulation quality in the refinery during 2011 are expected to improve specific energy consumption. A recent change is that during periods of increased demand we are now matching the steam demand by use of duct firing of the heat recovery steam generator (HRSG). The duct firing is proving to be much more efficient at producing high pressure steam than the boilers are at reduced load on gas, for example the HRSG would use less gas than the boilers to produce extra high pressure steam.
Dust collection improvements – dust load control *(Implementation Commenced)*
This project involves improving the fines collection and disposal system in the calciners to increase calciner efficiency. Fines loads incur an energy loss as they are circulating within the calciners. Improved control and management of fines loads should lower the energy intensity of this process. **Progress update:** The results from the last trial were promising however other proven technology dust calciners are to be explored. The project is currently on hold due to priority on Yarwun 2 commissioning.
Reduction in number of online vacuum pumps *(To be Implemented)*
Vacuum pumps are used to provide vacuum for removal of liquor from slurry in the hydrate area. These pumps are a significant user of electricity. There is a possibility of reducing the number of online pumps (8 available) without significantly impacting on refinery operations. Plant trials of the impact of lower vacuum on refinery yield commenced in 2010 and are ongoing. Test work on the effect of vacuum pressure moisture has been conducted to compare the trial's conclusions to the estimated potential savings from reduced electricity consumption. These results now need to be run in the plant model to determine the impact on precipitation yield.

Table 2.5 u – Description of significant opportunities at ERA - Ranger Mine
Compressed Air Optimisation *(Implementation Commenced)*
In 2009, an engineering audit was carried out across the mine to identify projects to improve compressed air quality, energy efficiency and reduce power and maintenance costs. In 2010, a series of projects, such as air leak maintenance will be implemented and the energy savings and other benefits will be quantified. **Progress Update:** Air compressor system optimisation is still under implementation.

Table 2.5 u – Description of significant opportunities at ERA - Ranger Mine
Replace Calciner Lining and Install Improved Burner System *(Implemented)*
Replacement of the Calciner refractory lining and the installation of an improved burner system have reduced Calciner energy usage. The replacements and commissioning were completed in September 2010. Preliminary data show an improvement of approximately 10% in Calciner efficiency with annualised savings of approximately 5,000 GJ and $120,000 based on 2010 production. **Progress Update:** Due to temporary suspension of processing activities and changes in operating parameters Calciner energy usage data collected in 2010 is considered to be the best available data. The project is complete and savings have been confirmed.
Replace site building air conditioners with new technology *(Implemented)*
Replacement of the Administration Building air conditioning system has commenced. The old unit was undersized relative to the cooling demand. The replacement system incorporates improved design features including relocation of the condenser coils external to the plant room and the installation of high efficiency split ducted units. Implementation commenced in 2010 and commissioning is planned to be completed by Q1 2011. The new installation is expected to reduce the Administration Building's air conditioning electricity consumption. **Progress Update:** Replacement of the Administration Building air conditioning system has been completed. Energy savings are to be confirmed.

Table 2.5 v – Description of significant opportunities at Paraburdoo Mine, Channar Mine and Eastern Ranges Mine
Shutdown of tailings line during off-peak hours *(Implementation Commenced)*
Investigate the possible shutting of the tailings disposal system during off-peak hours to save power. Effects on tailings bed level and density must be analysed before this can be implemented. This will be investigated further in 2009. Realised energy savings will be assessed on completion. **Progress update:** This project stalled in 2010. The original scope considered pumping tails to the tailings dam northern cell. Production requirements have the Paraburdoo plant currently piping tails to the southern cell. These pipes have a smaller diameter which means the line is hardly ever closed and the pumps are used almost continuously. To reassess potential energy savings, some instruments that were connected to the tailing lines need to recalibrated or replaced to give proper readings so evaluation and modelling can be done to calculate how much energy would be saved in the long run. The project will be reassessed in mid-2011 for potential completion in 2011/2012.
Truck Payload Program *(Implemented)*
By optimising the amount of material that is transported by haul trucks, diesel consumption per equivalent flat haul can be reduced. In 2009, payload monitoring systems were installed on all haul trucks. The project was implemented in 2010. Trucks are now continuously reporting payloads through to Modular Mining and there are plans in place to ensure the system is maintained and accurate. Regular feedback is reported to production teams which include dig unit operators. Along with a light weight tray replacement project, a significant increase in total material moved per truck haul has been allowed. Targets for waste have increased from 184 to 210 tonnes per truck run. Targets for ore have increased from 205 to 210 tonnes per truck run. In combination with operator education, this project has seen the average payload increase from 94% to 101% of the targets with 79% (up from 61%) of the loads within the target range. Some estimates show a saving of at least 10L for every kilotonne of material moved.

Table 2.5 v – Description of significant opportunities at Paraburdoo Mine, Channar Mine and Eastern Ranges Mine
In-pit maintenance team at refuelling location *(Implemented)*
The project was implemented in 2010. The frontline Paraburdoo truck fleet is serviced on a 750 hour interval with running maintenance and inspections completed in the pit during refuelling delays. The project has reduced the number of services and therefore the number of times trucks must be delivered to the workshop by two-thirds. The development (Cat 785C) truck fleet is in the process of adopting the 750 hour service regime. Conservative estimates have seen (across the 22 large trucks on site) a reduction in the number of services by 18 per truck per year. Previous reports have estimated the trucks burn 140L per trip which equates to a saving of 55,000L per year.

Table 2.5 w – Description of significant opportunities at Northparkes Mines
E48 secondary crusher optimisation *(Implemented)*
Install and optimise a secondary surface crusher at underground operations which can crush ore to 80mm. The size reduction should enable less energy-intensive downstream processing. **Progress update:** Commissioning of the secondary crusher was finalised in February 2011 but to date has had some technical issues which is reducing its availability and utilisation. There is currently an external project underway aimed at identifying strategies to fully utilise the secondary crusher, which will maximise its efficiency. Savings have been confirmed for this project.
E48 surface conveyor route optimisation *(Implemented)*
Optimise surface conveyor route from underground operations to the mill to decrease energy required for conveying ore. **Progress update:** Commissioning of the overland conveyor was finalised in February 2011 with the commissioning of the E48 secondary crusher. This project has been implemented successfully with good utilisation to date. Savings have been confirmed for this project.
Open-cut/tailings dam material scheduling *(Implemented)*
Reducing double-handling of open-cut waste rock material for use in tailings storage facility construction. **Progress update:** This project was completed during quarter four 2009. Savings confirmed on the best available data at the time.

Table 2.5 x – Description of significant opportunities at RTA Weipa
Rail compressor upgrades *(Implementation Commenced)*
The diesel compressors mounted on ore wagons run unnecessarily on the trip between load station and dump station. By only operating the compressors during loading and dumping, as well as improving the design of the system, diesel savings can be achieved. **Progress update:** A standard design for compressor cars has been completed and an upgrade of the telemetry system has been formulated. These improvements commenced in 2010 with the first three new compressors and telemetry controls procured in the first half of 2010. The remaining compressor cars are to be addressed in 2011 and 2012. Savings in diesel consumption will be confirmed by the end of 2012.
Better utilisation of Run-of-Mine stockpile at Andoom *(Implemented)*
The Run-of-Mine stockpile at Andoom was not effectively used or large enough to allow the plant to be fed through a full hopper as designed. Improving co-ordination between plant and mine resulted in improving this situation and thus increasing plant efficiency. The energy cost of running the Andoom plant without ore was assessed to be three times greater than running the East Weipa plant in a similar state. Consequently, a new operating procedure for the operation of the dozer on the stockpile was developed. Reported savings were direct calculations from electronically recorded improved plant performance.
Reducing moisture in shipped bauxite *(Not to be Implemented)*
Controlling the moisture within shipped bauxite has the potential to reduce shipping energy and costs. **Progress update:** This project continues to be an important goal for the Weipa operation. Studies continued with trials of processing practices that were modified to introduce less water to the bauxite. The results showed that there are other upstream influences which may be more significant in impacting resulting moisture in shipped bauxite. The scope of this project has been reviewed and since the target moisture reduction is being achieved for most of the year, no further work is planned in the short term.

Table 2.5 y – Description of significant opportunities at RTA Bell Bay
Efficient air conditioning units *(Implementation Commenced)*
Twenty new air conditioning (A/C) units equipped with environment friendly R410A gas were installed in 2010. These replaced the old R22 filled A/C units. The total installed A/C unit power capacity was reduced by 36.6kW. This equates to annual energy savings of 160MWh and 37 tonnes of CO_2-e annual abatement. **Progress update:** In 2011, a capital expenditure application for replacement work has been submitted and approved by management.
Improve street lighting *(Implementation Commenced)*
Replace existing street lighting with high efficiency street lighting across site. **Progress update:** The capital expenditure application for street lighting upgrade was approved in May 2011. The project is currently in implementation phase and is scheduled to be completed by the end of 2011.
Compressor control system and operation mode *(Implemented)*

Table 2.5 y – Description of significant opportunities at RTA Bell Bay
The aim of this project was to increase energy efficiency of air compressors. **Progress update:** The three stage compressed air optimisation project has been implemented. In stage one the compressed air control and monitoring system was upgraded. This led to stage two where data collection and detailed analysis of compressed air usage was undertaken. As a result of the stage two analysis, a new project to upgrade the back-up compressor with a more energy efficient unit is under review. For stage three, the investigation to implement variable speed drives (VSD) on existing compressors as an energy reduction opportunity was undertaken. This study showed that implementation of VSD on existing compressors is technically unviable.
Optimisation of Metal Products gas usage *(Implemented)*
Heating demand for holding furnaces is variable. Furnaces are often pre-heated for extended periods of time in preparation for metal processing. When they rise above the desired holding temperatures they are opened in order to cool. **Progress update:** Metal products gas usage has been optimised on the furnaces through a combination of scrap charge optimisation and the development of a programmable logic controller (PLC) for the scrap remelt function. The project has been implemented and savings validated.
Potlines Southern Bay Lighting upgrade *(Implementation Commenced)*
In 2009, the economic viability and technical characteristics of upgrading lighting in the Potlines Southern Bay was investigated. High Intensity Discharge (HID), High Pressure Sodium lamps mounted in a standard Eco Indy High Bay luminaire equipped with electronic control (Active Reactor) system were tested. As well as measuring energy savings the investigation included a review of maintenance costs for the previous three years. The main component of the maintenance cost was found to be unplanned repairs and replacement of failed ballast/luminaires due to ageing of the lighting system components and cabling. This in turn leads to increase in voltage drops and poor lamp starting conditions. **Progress update:** The first part of the project is now completed. Three hundred new energy efficient high bay lights are installed and functional in three production bays. The second part of the project for further installations is currently in progress and expected to be completed by the end of 2011.