

## PUBLIC REPORT

### Controlling Corporation

Bega Cheese Limited

### Period to which this report relates

Start

1 July 2007

End

30 June 2009

### Part 1 – Information on assessments completed to date

Bega Cheese Limited's energy use increased in F08-09 due to the acquisition of two entities. The Bega Cheese Corporate Group now consists of the Bega site, Coburg site, Strathmerton site and Tatura Milk Industries for which it is the controlling corporation.

Tatura Milk completed its first assessment in June 2009. Tatura Milk assessed MSD2 plant as stated in the reporting and assessment schedule. The assessment was conducted with experienced internal individuals with extensive plant knowledge, as well as external individuals with extensive energy management experience. The assessment highlighted several areas where opportunities to reduce energy usage may exist within the plant. Since the assessment a meeting was held with members of Tatura Milk's management group to determine the feasibility of potential opportunities identified as a result of the assessment.

How the key elements were addressed.

Leadership; As stated in the original assessment and reporting schedule leadership was demonstrated by targeting large areas of the factory first (MSD2) and involving operators and manufacturing managers in the assessment process. The assessment was conducted with an experienced operator in MSD2 whereby sharing of knowledge of the plant and ideas on possible opportunities were discussed. After the assessment an energy efficiency meeting with manufacturing managers and engineers obtaining support for the EEO program and receiving feedback from opportunities identified in the assessment.

People; Tatura Milk has continued with methods of addressing this element by drawing on internal and external expertise to communicate outcomes of the first assessment as well as prioritising projects and calculating costs savings and efficiency gains. Meetings have been held and assessments documented, stating where project responsibilities lie.

Information, data and analysis; Tatura Milk calculated a high level energy mass balance (Refer to appendix 1 for a graph of the mass balance results) after undertaking an assessment in MSD2. Two main meters exist in the plant, these meters were monitored, recording energy and production data over a week, which allowed enough time to capture what would be considered a normal activity week in MSD2. Figures for chilled water demand quantities in the plant were obtained from Tatura Milk's engineering team and incorporated into the mass balance. The installation of additional metering or purchase of a portable

meter for MSD2 did not seem feasible due to the fact that Tatura Milk received information in 2009 that funds have been granted by DAFF and the Gardiner foundation for \$462,000 for metering to be installed in one plant within Tatura Milk's factory. The installation of additional metering in this plant is likely to result in a more detailed mass balance being constructed and additional opportunities for energy reduction to be identified. Tatura Milk has used experienced internal and external individuals to estimate all costs and savings associated with energy efficiency projects. Costs and savings were determined using engineering knowledge as well as case studies.

Opportunity Identification and evaluation; Tatura Milk has continued to use methods of opportunity identification and evaluations as stated in the original assessment and reporting schedule. Tatura Milk representatives attend the Dairy Manufacturers Sustainability Council meetings where programs such as EEO and other energy initiatives were discussed. Projects that have been identified with costs and savings quantified have been put into Tatura Milk's action list.

Decision making; Opportunities identified which are categorised as "to be implemented" will be presented to senior management for approval and support. Accountability, resources and timeframes will be developed for approved projects. For all projects that are categorised as "to be implemented" or "implemented" all associated costs and timelines will be constructed and put in an action list. For all actions identified as a result of the EEO program that are categorised as "to be implemented" progress meetings will be held to review, monitor completion and provide updates on any changes made to the project for internal use and reporting.

Communicating outcomes; The board of directors and senior management will be presented with the final version of each EEO report and their review documented. An abstract will be written to accompany the public report. The abstract as well as the public report will be published on Tatura Milk's website. Completion of assessments and successful submission of public and government reports will also be noted in monthly internal reports. Assessment outcomes will be communicated to relevant staff to raise awareness of the benefits of improved energy efficiency.

Group member and/or business unit and/or key activity and/or site that has had an assessment completed by the end of this reporting period.	Period over which assessment was undertaken <sup>1</sup>	Energy use per annum in GJ <sup>2</sup> in the current reporting year
Tatura Milk Industries	January 2009-June 2009	153608
<b>Total energy assessed</b>		<b>153608</b>
<b>Total energy use of the group in the current reporting year</b>		<b>1,295,210<sup>3</sup></b>
<b>Total energy assessed expressed as a percentage of total current energy use</b>		<b>11.9%</b>

1. This should be the start and finish date (month and year) for the assessment (planned assessment dates were nominated in Table 3.1 of the approved ARS).
2. Energy Bandwidth may only be used if approved in the Assessment and Reporting Schedule.



3. Since commencing the assessment cycle, Bega Cheese Limited acquired two entities. Total energy use of 1,295,210 GJ for the Bega Cheese Limited group includes 12 months of consumed energy for Tatura Milk Industries and the Bega site, plus energy consumed since acquisition for the Strathmerton and Coburg entities (acquired in March 2009 and Nov 2008 respectively). Source: NGER F08.09 analysis 141209.xls.

### Part 1 – Information on assessments completed to date (continued)

Entity	% achieved	Reasons for not achieving data accuracy to within $\pm 5\%$
Tatura Milk Industries	$\pm 5\%$	Tatura Milk achieved $\pm 5\%$ accuracy for total overall energy use data as this data is retrieved from meters on site.

## Part 2 - Energy Efficiency Opportunities that have been identified and evaluated

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

Name of Group member or business unit or key activity or site: Tatura Milk Industries

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

153608	GJ
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Part 2A - New Assessments completed during the reporting period						
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	5	17098	13060		30158
Business Response*	Under Investigation	1 (Plant use optimisation)				
	To be Implemented	2 (Boiler efficiency) (Compressed air review)	14671			14671
	Implementation Commenced	2 (Loss declarations system) (Mechanical motor drives)	2427	13060		15487
	Implemented					
	Not to be Implemented					

Name of Group member or business unit or key activity or site: Tatura Milk Industries

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

153608	GJ
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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			4608	47112

Business Response	Under Investigation	1 (MJN5 batch trial) <sup>1</sup>				42504
	To be Implemented	1 (Metering in MSD2)			4608	4608
	Implementation Commenced					
	Implemented					
	Not to be Implemented					

1. Associated capital costs for the MJN5 are unable to be quantified at present, capital costs and a payback period will be calculated if the project moves into the “to be implemented” category.

## 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: \_\_\_\_\_

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

	GJ
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Part 2B - Update of assessments originally reported in previous reporting periods						
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					
Business Response*	Under Investigation					
	To be Implemented					
	Implementation Commenced					
	Implemented					
	Not to be Implemented					

**N/A - This is Bega Cheese Limited's first report**

Name of Group member or business unit or key activity or site: \_\_\_\_\_

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

	GJ
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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					
Business Response*	Under Investigation					
	To be Implemented					
	Implementation Commenced					
	Implemented					
	Not to be Implemented					

**N/A - This is Bega Cheese Limited's first report.**

## Part 2 - Energy Efficiency Opportunities that have been identified and evaluated

### Part 2C - Details of at least three significant opportunities found through EEO assessments

#### Opportunity 1

##### Plant use optimisation

During the MSD2 assessment it was identified that the MSD2 drier and evaporator spends some time sitting idle on air or water. This occurs because run times are often scheduled close together thus making it unfeasible to shut the evaporator and drier down and go through the lengthy process of re-start.

At a post assessment meeting involving senior management and engineering staff it was agreed that it would be a worth while project to measure the amount of time that MSD2 spends running idle on air and water to determine if there are opportunities to shut down plants between runs. Monitoring will be conducted through the use of the current Exaquantum system, data will be collected and graphed which will provide an accurate determination of how much energy is being used by whilst plants are running on air and water and the associated costs for energy usage during these times.

#### Opportunity 2

##### Review of boiler systems

Whilst conducting the MSD2 assessment it was also noted that there may be some opportunities for improved steam management. The boiler in MSD2 as well as the 4 boilers located in the main boiler house appeared to be running at fairly low capacity. There may be an opportunity to reconfigure the loads of the boilers and strengthen communication between them to decrease energy use whilst still generating sufficient steam for all processes on site.

This project involves two major components;

1. The PLC system in the boiler house has been set up to control and monitor the load sharing between boilers on site. In its current set up this system is not allowing for the best possible load sharing between boilers. This project will involve the PLC system being reprogrammed to allow for it to make these changes. The estimated capital cost for this part of the project is; \$30,000.
2. Conduct stream trap and distribution review, leaking joints, glands, safety valves and pipe insulation quality. The estimated capital cost of this is \$60,000.

Total estimated monetary savings per year associated with this project are; \$61,858

Total estimated energy savings per year are; 12914 gigajoules or 663 tonnes of CO2 a year.

The payback period for this project is 1.45 years.

Energy savings associated with this project are site wide yet were identified as a result of the energy assessment in MSD2 plant.

### Opportunity 3

#### Review of compressed air systems

Whilst assessing MSD2 plant all processes that consume energy were considered including compressed air systems. It was noted that it may be worth reviewing these systems. This possibility was then reported at energy efficiency with middle management after the assessment had been conducted. It was highlighted here that a survey for loss of compressed air had recently been conducted in the CD2 plant of the factory, this project was successful in identifying areas where energy gains could be made. The group proposed that a similar study could be conducted in MSD2 and other parts of the factory aiming to achieve similar efficiency gains.

This project has two components.

1. The first component involves air loss identification analysis in MSD2 plant as well as other parts of the factory.
2. The second component of the works is to determine how effectively air compressors are scheduled. The compressor systems in plants are physically connected and monitored via the Yokogawa system so that the operating mode can be tracked within Exaquantum. Compressors can then be scheduled by pressure settings to ensure all compressor units are operating at or near their highest efficiencies.

The total cost of this project is estimated at being \$26,000 with annual energy savings per year equating to \$47,849.

It is estimated that after commencement of this project around 1757 gigajoules will be saved each year, equivalent to a saving 596 tonnes of CO2 each year.

This project has a payback period of 0.54 years.

### Opportunity 4

#### Mechanical/Motor drives

Whilst assessing MSD2 plant all processes that consume energy were considered including mechanical/motor drives. It was noted that it may be worth reviewing these systems.

This project will formalise the decision making process when selecting and/or replacing electric motors. TMI already has an extensive motor data asset base. This could be extended to allow for full life cycle analysis to determine the most effective motor replacements. The current data base is to be reviewed and a system put in place to ensure motor efficiency is to be considered in future replacement decisions.

The data base will also have the facility for Maintenance staff to include data on drive conditions. This will enable enhanced ongoing maintenance of motor drive systems to ensure drive losses are minimised (e.g. losses due to drive mis-alignment, incorrect belt tensioning, voltage imbalance, motor mount soft foot, over sizing, excessive pump/ fan throttling, etc).

It is estimated that the total cost of this project would be approximately; \$175414

Projected yearly savings are \$66072 and energy savings equating to 2427 gigajoules or 823 tonnes of CO2 per year.

The payback for this project is 2.65 years.

#### **Opportunity 5**

##### Loss declarations system

The below project was not identified during the EEO assessment, however has been formalized and had specific costs and associated savings calculated as a result of the EEO and EREP program.

The loss declarations system project has two main components associated with it. The first component involves energy tracking and environmental awareness program.

This project involves developing specific energy consumption data for energy performance monitoring. This work will include establishment of ongoing energy tracking, development of a single line diagram for electricity and natural gas internal distribution and an upgrade motor asset list, this is to be incorporated into the company's existing overall Loss Declaration project. It is proposed to use existing metering systems and SCADA data to establish these energy performance indicators.

The awareness program will focus on all staff members adopting a sustainable frame of mind. Savings through improved awareness will typically include identification of lights left on when not required, motors left running during production downtime periods, air conditioning set points and inefficient operation of office equipment. This program will also raise awareness with maintenance staff to highlight inefficiencies such as poorly maintained electric motor drive systems, equipment and process settings.

The awareness program has already commenced with over half of Tatura Milk's staff members having attended the program and with remaining employees to undertake the program on Tatura Milk's e-learning system over the next year.

The total capital cost of this project is estimated to be; \$65,000.

The financial benefits on an annual basis are estimated at being; \$ 135 969 and energy savings per annum are estimated at being; 103060 GJ's or 1584 tonnes of CO2.

The payback period for this project is 0.46 years.

#### **Opportunity 6**

##### Metering in MSD2

MSD2 is the largest producing plant within Tatura's factory. The plant largely produces infant formula for two major customers. As part of process improvement TMI is installing high level metering in MSD2. The increased metering will provide real time feedback and greater determination of the cost of electricity and gas; this will allow for transparent cost model for the customer and operators to improve energy efficiencies going forward. Savings associated with this project have been estimated at being a 3% reduction of the total overall energy in MSD2 plant. This is a conservative estimate that is based off existing case studies and extensive engineering knowledge.

Capital costs associated with this project are estimated at being; \$210,000.

Savings associated are estimated at being; 4608 gigajoules per year or 232 tonnes of CO2 per year, \$35,768 per year.

The payback period for this project is 5.8 years.

#### **Opportunity 7**

##### MJN5 batch trial.

A potential opportunity for energy reduction has been identified in MSD2 not as a result of the EEO assessment but may receive more focus in future years as a result of the legislation. For the production of infant formula MSD2 runs at duration of 21.6 hours with 4 batches of infant formula being made during this time. A possible opportunity to extend this to a 27 hour run incorporating an extra batch has been identified as a potential opportunity in MSD2. A trial has been run as the first step of determining feasibility for the project. Energy savings associated with this project are estimated at being 39816 Gigajoules per year, this has been calculated based on the estimation that 840 hours will be gained per year whilst the energy usage in the plant would remain the same. Therefore if the project goes ahead the energy baseline will not be reduced, however the amount of energy consumed per unit of output will decrease.

Savings associated with this project if it is undertaken are estimated at being; 42504 gigajoules per year. Capital costs and other associated savings have not been quantified at present as project plans require more clarification regarding when and how additional trials will be run. If this project moves into the "to be implemented" category then associated costs and savings will be calculated.

### Part 3 - Voluntary Contextual Information

Tatura Milk Industries manufactures Australian dairy ingredients for the global market. Approximately 70,000 tonnes of manufactured products are produced per annum using state of the art technologies and systems. Tatura Milk uses four spray driers to produce powdered milk s , infant milk formulas and dairy nutritionals for overseas export. Spray driers used on site are especially energy intensive and thus energy management is of particular importance to Tatura Milk.

Tatura Milk's has many systems in place to identify areas where energy efficiency gains can be made. Three energy meetings have been run in the past year to gain management support for the program and to discuss the direction for future energy management. Meetings with Tatura Milk's management group have proved to be an effective means of decision making and prioritisation of energy efficiency projects.

Tatura Milk environmental representatives have also continued to attend the Dairy Manufacturing Sustainability Council over the past year whereby industry examples and approaches to the Energy Efficiencies Opportunities program was discussed. Tatura Milk has also continued to use existing systems in place to track energy use patterns on site. These systems include the use of; budget tracking systems which also monitor the quantity of energy used in different sections of the factory as well as the use of a KPI spreadsheet which measures energy to product ratio. These systems provide an effective means of tracking the responsible use of energy within the factory and identifying opportunities of where processes can be improved to increase sustainability of resources.

**Table 3.2 – Energy use expressed in Greenhouse Gas emissions and as an energy use indicator**

Period of energy use July 2008 to June 2009			
Name of group member/ business unit/ key activity/site	Energy use pa (GJ)	Energy use pa (GGE)	Energy use as an indicator*
Tatura Milk Industries 08 - 09	917608	93149	8.69 GJ per tonne of product
Bega Cheese Limited, Bega Sites 08 - 09	328430	18711	3.78 GJ per tonne of product
Bega Cheese Limited, Strathmerton**	17962	5629	2.51 GJ per tonne of product
Bega Cheese Limited, Coburg**	31210	5007	8.32 GJ per tonne of product
<b>Total</b>	<b>1,295,210</b>	<b>122,496</b>	<b>5.825 GJ per tonne</b>

\* Bega Cheese Limited's assessment and reporting schedule stated that 'energy use as an indicator' would be reported in MJ/tonne of product (table 2.1); however this has been change to GJ/tonne to enable consistency with National Greenhouse and Energy Reporting data.

\*\* Energy & production data summarised from the date of transfer of ownership to Bega Cheese and does not represent the full financial year (July 08 to June 09).

**Table 3.3 - Opportunities assessed to an accuracy of ±30% or better (\$ value)**


Status of opportunities identified		Number of opportunities	Estimated energy savings per annum by payback period (\$)			Total estimated energy savings per annum (\$)
			0 – < 2 years	2 – ≤ 4 years	> 4 years	
Outcomes of assessment*	Total Identified	5	\$311,748			\$311,748
Business Response*	Under Investigation	1 (Plant use optimisation)				To be assessed after data collected
	To be Implemented	2 (Boiler efficiency)	\$61,858			\$109,707
		(Compressed air review)	\$47,849			
Implementation Commenced		2 (Loss declarations system)	\$135,969			\$202,041
		(Mechanical motor drives)	\$66,072			

### Part 3 - Voluntary Contextual Information (continued)

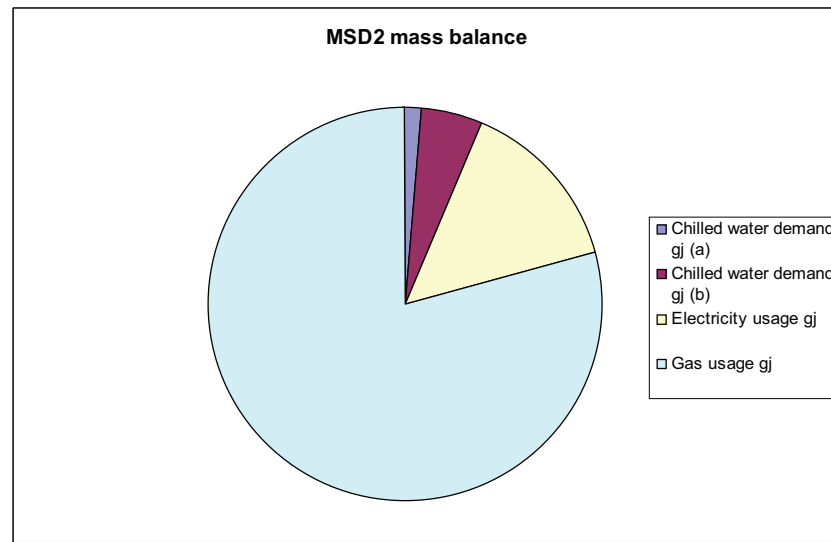
Name of group member/ business unit/ key activity/site	Current energy use as an indicator	Previous energy use as an indicator	Reasons for change
Tatura Milk Industries	8.69 GJ per tonne of product (2008-2009)	7.9 GJ per tonne of product (2006-2007)	Tatura Milk has seen a slight increase in the energy use indicator over the base year. This is due to the increase in production between the 07-08 and the 08-09 periods. The increase in production is likely to be for dried milk powders. As this process is highly energy intensive it is probable that this has caused the slight increase in the energy use indicator.
Bega Cheese Limited, Bega	3.78 GJ per tonne of product (2008-2009)	4.40 GJ per tonne of product (2006-2007)	The Bega sites show a reduction in the energy use indicator. This is due mainly to increase in production through the Ridge Street site. The impact would be due to an increase of circa 9000 tonnes of natural cheese vs. an increase of 4500 tonnes for processed cheese. The energy requirement for the manufacture of processed cheese is significantly higher than for processed cheese.
<b>Average</b>	6.24 GJ per tonne	6.15 GJ per tonne	As above

'Energy use as an indicator' values were not provided in Bega Cheese Limited's assessment and reporting schedule, however they have been calculated and provided here for comparison.

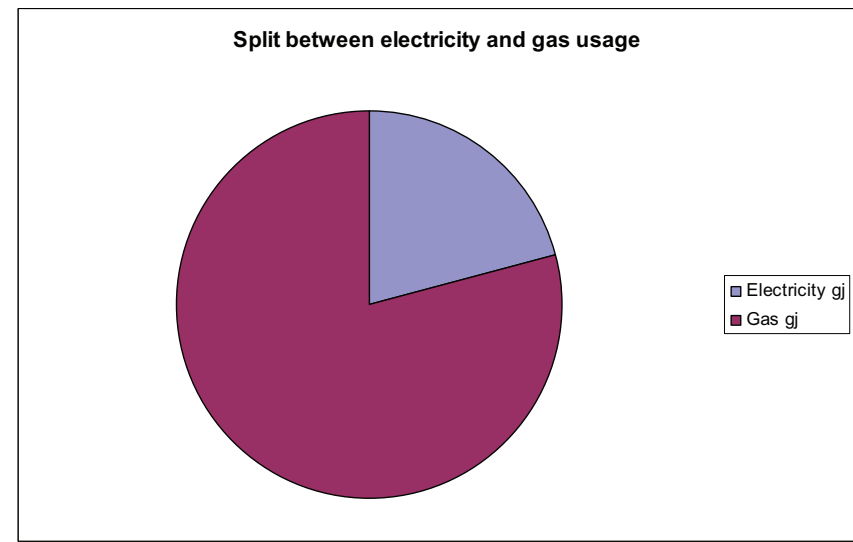
### Part 4 - Declaration

<p>The information included in this report has been reviewed and noted by the board of directors and is to the best of my knowledge, correct and in accordance with the <i>Energy Efficiency Opportunities Act 2006</i> and <i>Energy Efficiency Opportunities Regulations 2006</i>.</p>	
	<p><b>Chairman of the Board of Directors</b></p>
	<p><b>Date: 22/12/2009</b></p>

## Appendix 1.



**Figure 1. MSD2 Energy Consumption**



**Figure 2. MSD2 Energy usage Breakdown**

Figures 1 and 2 show results from the MSD2 mass balance study. Calculations for electricity and gas usage were done via the use of readings from existing meters in the plant as well as run hours in the plant per year. Chilled water demand in figure 1 was calculated by an experienced engineer for the two main types of product produced.