

## Dairygold Food Ingredients

*Total demonstrated savings of €871,234 (Euro) while also offsetting 5822 tCO<sub>2</sub> over a period of 29 months*



Dairygold's anaerobic digestion plant at Castlefarm, Mitchelstown, Co. Cork

### **Business Benefits Achieved:**

- International customers have actively engaged with Dairygold due to our commitment to energy efficiency and sustainability
- Novel approach was taken to integrate energy management through the use of Lean Manufacture which has delivered significant operational efficiencies.
- Carbon footprint of the business has been significantly reduced through Biogas recovery from anaerobic digestion project improves
- Energy efficient culture reducing our operating cost and improves our return per tonne of product manufactured
- Total demonstrated savings of €871,234 (Euro) while also offsetting 5822 tCO<sub>2</sub> over a period of 29 months. These Energy savings have been

delivered from both capital projects and effective energy management practices

“ISO 50001 has enabled us to improve our understanding and optimise how we use energy.”

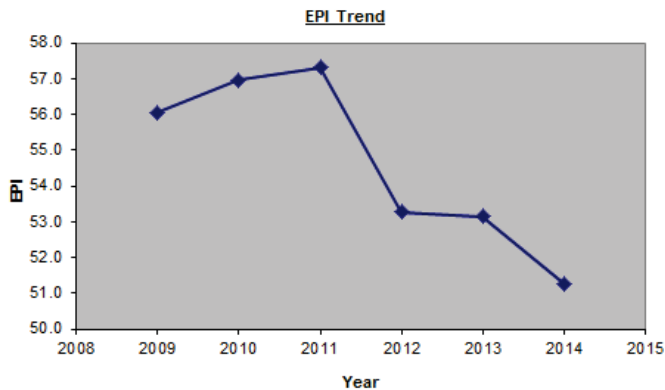
- Gabriel Kelly, Group Environmental, Health and Safety Manager



### **Case Study Snapshot**

<b>Industry</b>	Food and Dairy Ingredients
<b>Location</b>	Mitchelstown, Co. Cork, Ireland
<b>Energy Management System</b>	ISO 50001
<b>Product/Service</b>	Cheese and Milk Powder Manufacture
<b>Energy Performance Improvement (%)</b>	10.5%
<b>Annual energy cost savings</b>	€407,090
<b>Cost to implement</b>	€272,838
<b>Payback period</b>	1.5 years

## Energy Performance Improvement



The graph above shows the trend of our Energy Performance Indicator since initially implementing an energy management system in 2011. The EPI is based on kWh per tonne of product manufactured. This Energy Performance Indicator is taken from the annual report published by the Sustainable Energy Authority of Ireland:

<http://www.seai.ie/LIEN-Report/company/Dairygold/>

### Company (or Facility) Profile

Dairygold Food Ingredients is one of Ireland's leading dairy manufacturing companies with a workforce of over 400 employees. DFI operates two milk processing plants situated in Mitchelstown, Co Cork. The Castlefarm processing facility is one of the biggest powder manufacturing plants of its kind in Europe processing milk in to whey powder, rennet casein powder, skimmed milk powder and concentrate and whey concentrate and powder. DFI's Mitchelstown Clonmel Road facility is now the biggest single line cheddar plant in the European Union. The annual output from both Mitchelstown facilities is in excess of 100,000 tonnes.

### Business Case for Energy Management

- DFI have been members of the Sustainable Energy Authority of Ireland Large Industry Energy Network since 1995 and has always tried to implement energy efficient measures across the organisation
- DFI has set targets to reduce energy usage and carbon footprint through projects, capital investment monitoring and awareness campaigns
- Ending of milk quotas in 2015 and anticipated increase in milk volumes required Dairygold to plan for significant increase processing capacity in the most energy efficient manner
- The awareness of the need to comply with the energy efficiency directive and SI426 has led to a senior management reevaluation of the Society's approach to energy management

### Keys to Success:

- Developing a program to get all members of staff involved and aware of the Energy Policy, Dairygold offered home energy audits to get staff engagement
- Putting a significant focus on identifying the organizations energy baseline or 'starting point'
- Back to work training which included energy efficiency worked well in Dairygold
- Effective Operational Energy Performance Indicators are very important to delivering a successful ISO 50001 Energy Management System – boiler efficiencies, Refrigeration COP, etc.
- Appointment of energy champions
- Energy efficiency should become a subject matter at all management and operational meetings

## EnMS Development and Implementation

DFI has had a long commitment to Energy Management. We installed CHP as part of our management strategy in the 1990's and adopted the predecessor to ISO50001, EN16001. This coupled with other energy projects has improved the Society's energy performance. In recent years the Society embarked on the lean manufacturing journey. Since then systems have been developed to improve the manufacturing, problem solving and communication processes. These systems include visual management meetings and workgroups which are used to communicate essential business information in a visual manner. Lean is now part of the Society's everyday culture. ISO50001 has been integrated in to this system.

**1.1 Business Benefits** - as detailed previously under 'Business Benefits Achieved'

### 1.3 Organizational

- Senior management supported the energy management agenda in Dairygold from day 1 which made it such a success
- Resources were allocated both financial and human resources to deliver successful outcomes
- Energy champions were appointed in all key production and facilities departments
- An energy management representative was appointed to focus specifically on energy efficiency
- Visual Management meetings which are used as an operational tool now include energy related decisions. These meetings occur weekly and involve all site management personnel to include key Energy information by Area.

### 1.4 Energy Review and Planning

Dairygold carries out an Energy Review annually to analyse energy performance. The review looks at energy consumption over the previous period in line with the key energy drivers which is largely milk volumes. The performance of the companies significant energy users are reviewed in detail during this process. Dairygold also reviews all relevant energy related legislation to ensure compliance. The Energy Review acts as a vehicle towards identifying potential energy savings opportunities for the following period. All opportunities are entered into the Dairygold Energy Savings Opportunities Register. The opportunities are then reviewed based on potential energy savings, ease of implementation, capital cost, etc. and the most advantageous projects are selected as Objectives & Targets.

### 1.5 Development of professional expertise, training and communications

Dairygold has benefited through professional expertise and training and communications since adopting ISO 50001 as described below:

- Use of official external auditor to carry out energy audits and identify opportunities for improvement
- Employee awareness of ISO 50001 through back to work training
- Employees motivated through development of programme to offer free energy home audits to all employees in 2015/16
- Management system communicated through VM (Visual Management) meetings and workgroups which are used to communicate essential business information in a visual manner and incorporate energy at a specific time every week
- Utilise Sustainable Energy Authority of Ireland rep to assist with development and continual

improvements to the energy management systems.

continually improving in terms of energy efficiency

**1.6 Tools and Resources**

- Lean Manufacture used to improve the manufacturing, problem solving and communication processes
- Hoshin kanri (strategy development) was used to capture and cement strategic goals as well as flashes of insight about the future and develop the means to bring these into reality – this step allows for senior management approval for projects
- Weekly Visual Management (VM) meetings were redesigned with the aid of an external consultancy and launched in January 2015 through Dairygold’s back to work training. This include target setting based Energy unit consumption, Utilities and usage.

**1.7 Steps taken to maintain operational control and sustain energy performance improvement**

- Training programme through Dairygold’s back to work process
- Operational control procedures were established to ensure energy consumption is optimised through effective procedures detailing specific parameters for optimal energy efficiency

**1.8 Approach used to:**

1) Determine whether energy performance improved

- Energy performance improvements and results are verified through on-going effective metering of electricity, natural gas & steam consumption.
- The external auditing process by our certification body also verifies Dairygold are

**1.9 Cost – Benefit Analysis**

Dairygold are currently delivering annual energy savings of over €400,000 per year. This is as a result of ISO 50001 management and design review identification.

The anaerobic digestion plant was a technology choice for treatment of waste products from the Mitchelstown site. Biogas energy savings are as a result of a decision which would not have been realised if a new energy intensive aerobic treatment plant was to be built. Biogas produced on site can be used as a replacement for natural gas and therefore increase savings.

MVR Technology instead of TVR technology was installed in the Evaporator in Niro 3, Castlefarm. This choice of technology cost €1,625,000 and is expected to provide significant energy savings which are awaiting verification.

“The ISO 50001 Energy Management Systems are key to Dairygold’s sustainability as our business sector continues to expand in the years to come.”

– Daire McKiernan, Energy Engineer

**2.2 Lessons Learned**

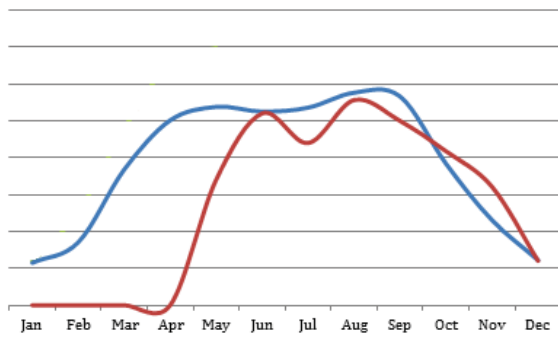
Dairygold have learned a number of positive lessons since embarking on a structured energy management system almost 5 years ago:

- Continual year on year improvements in energy efficiency when compared with production volumes
- The management system approach forced us to look at larger projects such as the anaerobic digester which delivered significant improvements in energy efficiency

- The system is scalable to any enterprise within the Society as it adopts a forensic analysis of the energy consumption to develop the baseline (ISO 50001) and reports for the VM meetings while at the same time it has a direct consequence developing engagement and communication in the business (ISO 50001 and Lean).
- Energy savings have resulted from capital expenditure.
- ISO 50001 management system is to be rolled out to the newly commissioned processing facility in Mallow, Co. Cork in 2016
- ISO 50001 management system is awaiting verification for the Mogeely Speciality cheeses site.

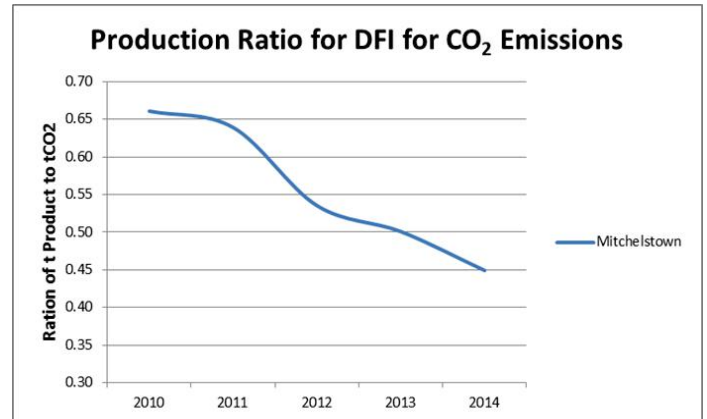
2.4 Visuals

Biogas Production Profile for DFI Castlefarm



Graph showing the production of biogas over a two year period since the anaerobic digester was first commissioned. The biogas generation in Dairygold is seasonal and therefore peak milk production generates

peak biogas production. However, with the removal of milk quotas in 2015, it is expected that the milk season will inevitably lengthen and therefore the biogas generation quantity will correspondingly increase.



The graph above shows the reduction in CO<sub>2</sub> emissions since the implementation of energy management systems in Dairygold. Our goal at Dairygold is to maintain our carbon dioxide emissions levels at similar levels to 2013 while at the same time increasing manufacturing capacity by 15% in 2014.

	Cost (€)	Savings (€)
Biogas	150,000	272,090
Economizers	122,838	135,000
<b>Total</b>	<b>272,838</b>	<b>407,090</b>

The table above shows the savings achieved per year along with the costs associated with the installation of the biogas boilers at Castlefarm and the economizers at Clonmel Road. The biogas cost saving are through biogas replacing natural gas and being used to produce steam for production purposes.

Through the Energy Management Working Group (EMWG), government officials worldwide share best practices and leverage their collective knowledge and experience to create high-impact national programs that accelerate the use of energy management systems in industry and commercial buildings. The EMWG was launched in 2010 by the Clean Energy Ministerial (CEM) and International Partnership for Energy Efficiency Cooperation (IPEEC).

For more information, please visit [www.cleanenergyministerial.org/energymanagement](http://www.cleanenergyministerial.org/energymanagement).

