

## CASE STUDY

# The New Irish Energy Management Standard The Aughinish Alumina Experience



**Aughinish Alumina (AAL)** is the first Irish company to become certified to a formal energy management Standard. The Standard ensures a fully strategic approach to energy management, which leads to a cost effective reduction in operating costs and an improvement in profitability. The company has already benefited from the Standard, identifying several major efficiency opportunities. It expects to continue to reap the reward of signing up to the Standard, as energy management becomes a higher priority.

Aughinish Alumina (AAL) is Europe's largest alumina refinery, producing more than 1.6 million tonnes of alumina annually by treating bauxite ore, which is then exported to smelters for processing into aluminium.

The plant, located on the 1,000 acre island of Aughinish in Co Limerick, is one of Ireland's largest energy users. Alumina refining is an energy intensive process, with energy accounting for about 30% of the total cost.

Given that even small gains in energy efficiency could have a significant impact on its operating costs, AAL responded positively to a suggestion by SEI that it might consider implementing a formal energy management system. The system chosen was the Danish DS 2403, the best available at the time. It is the Standard on which the new Irish energy management Standard, IS 393, is largely based.



The main advantage of the proposed energy management Standard was that it would guarantee delivery of a systematic and structured approach to improving energy efficiency and reducing energy-related emissions and costs.

In March 2004, a firm of Danish consultants carried out a preliminary review and pre-assessment audit on the Co Limerick site. AAL and the consultants agreed that the Standard could be implemented and that it would bring benefits. A gap analysis of what would be required to meet the Standard was undertaken, and a road map to certification was set out.

AAL appointed a full-time energy manager dedicated to developing the systems necessary to implement the Standard. AAL already had extensive metering in place, so the emphasis was on making better use of available data and instigating formal review and reporting procedures to highlight problems and identify opportunities.

In October 2004, AAL received confirmation of its certification to the Standard – becoming the first company outside Denmark to do so. The key elements of the Standard are a requirement to have an energy policy in place, coupled with a requirement to set energy efficiency targets. These targets are incorporated into rigorous action plans, which are specifically designed to achieve continual improvements in the form of more efficient and sustainable use of energy.

Although energy efficiency was always a high priority at AAL, the introduction of a formal Standard brought a more structured approach. An initial energy review led to a set of challenging targets for the coming year and a programme to achieve them. Monthly energy reviews assess performance against target and, if this differs by more than an allowable deviation, it constitutes a non-conformance in the system. A non-conformance requires a report explaining what happened, why it happened, and what steps will be taken to prevent a recurrence. AAL's Energy Manager, Brendan Thorne, was charged with overseeing the implementation of the Standard. According to Brendan, "this approach resulted in a more thorough analysis and faster resolution of problems than would otherwise have been the case".

The Standard also has a fundamental impact on all AAL project design and purchasing decisions, with evaluation of energy efficiency factors now automatically incorporated into the decision-making process.



Brendan points out that day-to-day implementation and maintenance of the Standard requires the involvement of a large number of individuals who must incorporate it into their normal work routine – in the same way that they assume responsibility for safety, environmental management and quality Standards. Getting people to think about energy management in that way, and change their behaviour accordingly is absolutely crucial. Indeed, it is at the core of the whole philosophy, and the reason why so much benefit can be derived from implementing the Standard.

The fact that the energy management Standard is very similar to ISO 14001 was of major benefit for AAL when it was considering the logistics of the implementation process. In fact, it required little more than shaping it to fit with existing ISO 14001 procedures. All engineers, maintenance, and purchasing personnel whose work was directly affected by the requirements of the Standard were given a one-day training course on its operation. The remaining 400 employees were given a one-hour Energy Awareness presentation covering more general points.

AAL's MD, Damien Clancy, says that even in the short time since the Standard has been implemented, its benefits have been clear:

*'While it is hard to put an actual number on it, there have been individual areas of progress and those results have been quite dramatic. Undoubtedly, there will be further cost reductions associated with these items in the future – delivering anything up to six-figure cost savings. Energy costs are absolutely paramount to us, and the Standard will certainly make an important contribution to their reduction.'*

In conclusion, the implementation of a formal energy management Standard has enabled AAL to manage their energy in a more efficient and effective way leading to new opportunities for improved efficiency and associated cost savings. A formal energy management Standard ensures that you have the best possible energy management system in place. It will result in the identification of opportunities for savings, investments in energy/emissions solutions based on sound financial criteria and the development of longer term strategies to manage your firm in the face of the energy and emissions challenge.

*For more information on the Energy Management Standard and support which SEI has to offer, contact Anne-Margaret Saunders on 01- 8082544 [anne-margaret.saunders@sei.ie](mailto:anne-margaret.saunders@sei.ie).*

## *Impact of the Energy Management System*

The requirement of the Standard to set challenging targets and investigate non-conformances provided the spur to resolve several energy related problems in 2005.

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### *Improved Heat Recovery*

A series of shell and tube heaters use regenerative steam to heat boiler feed water to 120 deg C before it enters the deaerators. The performance of the heaters was poor for some time, due to scaling in the steam lines. This led to non-conformances, which in turn initiated a more focused program of troubleshooting to identify how best to resolve the problem. Thermographic analysis and pressure surveys identified possible regions of high-pressure drop in steam lines. This information, coupled with detailed calculations to identify what pressure drops were tolerable, indicated that AAL should make specific modifications in one area at the annual plant shutdown. The analysis proved correct and the modifications resulted in a significant improvement in energy efficiency. The approach was successfully applied in another location and further improvements are expected when other areas are modified later this year.

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### *Higher Feed Temperature for Input Stream*

Lime slurry must be added to the digester to control extraction. The slurry temperature must be as high as possible; otherwise the digester will require more steam from the boilers to achieve its target temperature. Operating problems early in 2005 resulted in low slurry temperatures and non-conformances. The resulting investigation identified a simple, low cost method of resolving the problem; it is unlikely that this would have happened without the Standard. Although the saving was small in the context of AAL's overall energy bill, it was nonetheless real and also improved operation of the lime slaker.

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