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Energy Agreements

ENERGY EFFICIENT DESIGN SPECIAL WORKING GROUP

01

Case Study: Astellas

EED Challenge extended to equipment supplier

Astellas Ireland Co. Ltd, Killorglin, Co. Kerry.

New line, new design

Astellas signed up to the Sustainable Energy Ireland (SEI) Energy Agreements Programme as part of its corporate policy to improve site energy efficiency and to reduce associated CO_2 emissions, and has since achieved certification to IS393.

As part of this programme, it has engaged in many of the special working groups run by SEI in support of the programme. The Energy Efficient Design (EED) special working group appealed to Astellas since it was designing a new process line that it hoped would be its most energy-efficient yet.

The EED Methodology 3-step approach

The installation of a new Blister Packaging Line at the Killorglin plant presented an opportunity to optimise the energy use of a new process line, based on the learnings from the operation of an existing line.

Astellas recognised that the existing process line on which the new line's design was based had potential for energy-efficiency improvements. It had already begun to optimise its design before engaging the EED working group advisors. It had documented an energy-efficient user requirement specification (URS) which it furnished to prospective suppliers as a means to engage them in the process and had identified in this URS a number of opportunities for efficiency improvements.

In addition to this exceptional site initiative, the EED special working group provided an EED expert to carry out an EED review of the initial stages of the project, using the EED three-step methodology. This EED expert was independent of the site project team and reported directly to an EED owner at the site with the site responsibilities to progress any opportunities identified. In this way, barriers such as cost and schedule could not be put forward as barriers to success, unless fully warranted.

The three EED steps carried out by the energy expert in conjunction with the site project team on this project were:

STEP 1 – FACILITY ENERGY BALANCE

An energy balance of the blister packaging line was calculated using information about the operation of the existing process line.

STEP 2 – ANALYSE & CHALLENGE

The proposed design was analysed and challenged with a view to identifying energy-saving opportunities, using the energy balance as a means to focus on the significant energy-using elements of the line.

STEP 3 – IMPLEMENTATION

The energy-saving opportunities with the greatest potential benefit were agreed for implementation.

The importance of data

Data is the key to a successful energy balance. Astellas had a large quantity of relevant data since the new process line was to be largely based on the previous line. The EED expert used this data to calculate the projected running costs of the new process line.

In the energy-efficiency initiative at Astellas, some alterations had already been made to the new line's design, such as low-energy lighting and a production auto shutdown. This reduced the operational energy use of the proposed new line, compared to that of the old line.

Agreed target areas

Once the energy balance was complete, a number of target areas became apparent by virtue of their energy-intensive operations. The ancillary support services had been included in the energy balance as the process could not take place without them.

The HVAC and lighting service requirements of the new line were identified as being significant energy users (SEUs). A high-quality digital inline printer which had been specified for the new process line was also unexpectedly identified as an SEU. This 29kW rated unit was extremely energy-intensive and would be examined during the next step in the EED process.

These three focus areas represented over 60% of the process line's operational energy use. Following the Pareto principle of focused effort to maximise success, they were agreed as target areas for identifying further energy-saving opportunities.

The miscellaneous process energy use which constituted 18% of the process line's energy use was made up of a large number of smaller users. It would thus have required significant resources to interrogate and reduce this. It was not ignored, however; as previously mentioned, Astellas had engaged suppliers to include an out-of-production setback mode, as well as more energy-efficient components.

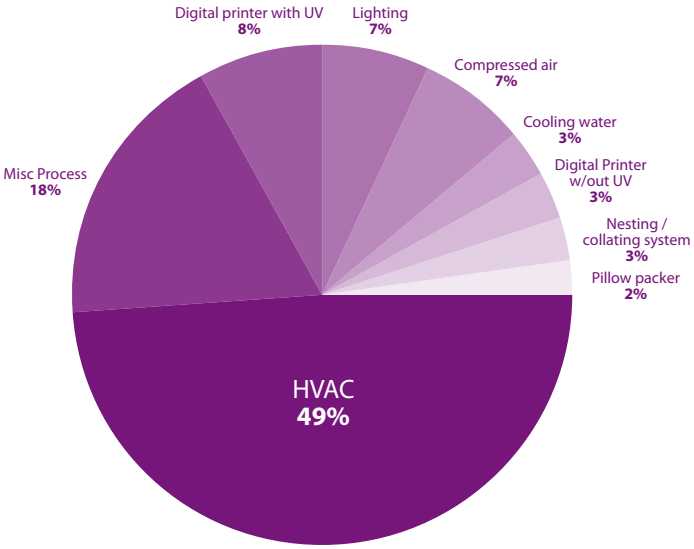

Figure 01. BL5 Energy Balance

Energy savings register

In brainstorming sessions with the project team, a number of opportunities for energy reduction became apparent.

The **HVAC energy service requirement** was discussed. The requirements for 10 air changes per hour (ACPH) in the primary packaging area and for 8 ACPH in the secondary packaging area were queried, as was the requirement to operate the HVAC at maximum output when no production was taking place.

As well, the energy expert analysed the **lighting end-user requirements**. Good-practice operation in similar facilities was put forward as an example – at 15 lux/m^2, compared to the levels at Astellas of 40 lux/m^2. A number of remediation actions, such as a reduced number of fittings, were put forward to reduce energy use. The savings were calculated at approximately €8,500 per annum.

Finally, ways to optimise the **operation of the new digital inline printer** were examined. The printer in use on the older line was less energy-intensive, but the need for production quality meant that the new one could not be replaced with a less energy-intensive alternative.

It was decided to encourage the supplier of the unit to optimise its energy use. This is an extremely beneficial exercise that should be undertaken in all new projects.

The request by Astellas to optimise the operation of a standard piece of equipment met with initial reluctance. However, through further communication the supplier has since committed to implementing changes to its operation to reduce energy use as they now see that this will improve the product they offer.

The benefits of EED

Based on the work carried out by Astellas in-house in conjunction with the expert-led EED review of the project, it is projected that the new process line (when compared to the existing line) will bring quantified energy savings of approximately 19%. As well, a number of unquantified opportunities for improvement were put forward. These, through further analysis outside the scope of this project, will reap further benefits.

Many of the savings achieved in this project were identified with little or no capital investment. This was made possible by specifying them from the outset and by learning from past experience. This illustrates the benefit of EED if applied early in the project lifecycle.

Clear lessons

This case study highlights a number of important lessons. The **energy balance** is a necessity in order to arrive at informed decisions as to which areas of a project to focus on in order to reduce energy. In this project, if the energy balance had not been carried out, the digital inline printer might not have been highlighted as a significant user.

This project also shows **the importance of data**. Astellas was in a strong position here, since the new process line was largely based on an existing line from which much data had been collected.

The energy balance is not a definitive data-mining exercise which will reap extremely accurate projections of future operational energy usage. It is simply a tool used to focus efforts on the most energy-intensive operations, with a view to identifying energy-saving opportunities.

Finally, and most importantly, the importance of **supplying a URS to the equipment suppliers** can not be emphasised enough. Without clear direction to the supplier as to the end-use requirements of the project, an efficient solution will not be found.

The URS also serves the purpose of documenting the decisions made during the EED process, thus ensuring that energy-saving opportunities agreed for implementation are carried through the project from design to construction. **Within Astellas this is tracked through the project lifecycle by means of a Traceability Matrix.** A URS should at minimum document:

- The energy service requirements of the project, i.e. temperature setpoints, process requirements etc.
- A description of the project systems.
- The level of control expected.
- The minimum acceptable energy efficiency of components.

Driving a culture change

In an increasingly competitive economy, clients focus more and more on energy efficiency. This puts pressure on equipment suppliers to offer energy-efficient solutions as standard. It is up to companies such as Astellas to drive this culture change by issuing to suppliers energy-efficient URSs based on sound EED reviews. The benefits are clear.

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Sustainable Energy Ireland
Glasnevin, Dublin 9, Ireland
Glas Naíon, Baile Átha Cliath 9, Éireann
T. +353 1 8082100
F. +353 1 8372848
info@sei.ie
www.sei.ie

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