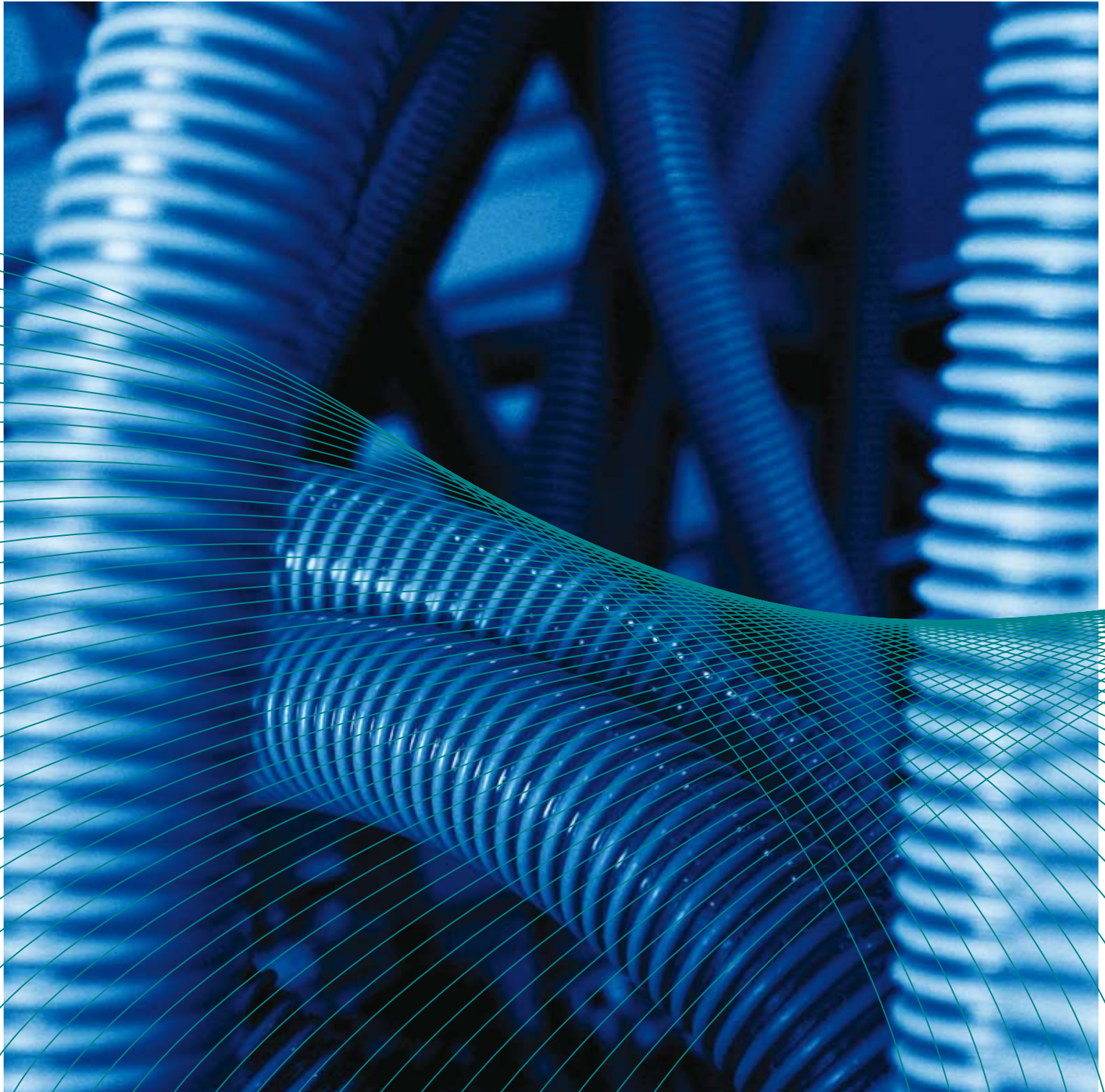


Energy Management Action Programme Training – Plastics Ireland

A CASE STUDY



Energy MAP Workshops for Plastics Ireland (PI)

SEI recently developed the Energy Management Action Programme (Energy MAP) to help organisations manage their energy more effectively. The application of Energy MAP by companies in the plastics industry is outlined in this document.

Sustainable Energy Ireland (SEI) was established as Ireland's national energy authority under the Sustainable Energy Act 2002. SEI's mission is to promote and assist the development of sustainable energy. This encompasses environmentally and economically sustainable production, supply and use of energy, in support of Government policy, across all sectors of the economy including public bodies, the business sector, local communities and individual consumers. Its remit relates mainly to improving energy efficiency, advancing the development and competitive deployment of renewable sources of energy and combined heat and power, and reducing the environmental impact of energy production and use, particularly in respect of greenhouse gas emissions.

Plastics Ireland, the representative body for the Plastics Industry in Ireland, is a central business sector within the Irish Business and Employers Confederation (IBEC).

Visit www.ibec.ie

Membership of Plastics Ireland includes both suppliers of raw material, services and equipment to the industry as well as the leading plastics processors in Ireland. The Association's principal role is to enhance the competitive position of its members by influencing the business environment in which the industry operates.

Plastics Ireland promotes, supports and encourages the further development of the multinational and indigenous plastics sector in Ireland. Plastics Ireland achieves this by building and maintaining excellent relations and a positive profile with Government, public agencies, other representative organisations and international bodies.



Energy Management Action Programme

The Energy Management Action Programme (Energy MAP) was developed by SEI to help Irish SMEs manage their energy use more effectively and maintain their competitiveness in the ever-growing global market. It provides a 20-step framework for a more strategic approach to energy management and is based on the five pillars of energy management: Commit, Identify, Plan, Take action and Review.

Energy MAP combines the use of a website and a supporting series of workshops through which SEI works with participant companies to help them implement the programme in their businesses.

The website

The Energy MAP website provides practical information and advice to those responsible for energy management and also non-technical people who wish to reduce business energy use and cut costs. Visit the Energy MAP website for further details:

www.sei.ie/energymap

The screenshot displays the Energy MAP website interface. At the top left is the SEI logo (Sustainable Energy Ireland) and the 'Energy MAP' title. A search bar is located at the top right. Below the header, a green banner contains the text: 'Energy MAP (Energy Management Action Plan) is a web-based tool to help you decrease energy use and therefore costs, thus increasing your competitive edge in local and global markets. Energy MAP explains the best practice process in 20 easy to follow steps.' To the right of this text is a button that says 'Learn more about Energy MAP >'. Below the banner is a diagram of the 5-step process: 1. Commit, 2. Identify, 3. Plan, 4. Take Action, and 5. Review. At the bottom of this diagram is a button that says 'View all the Energy MAP steps >'. On the right side of the interface, there are two yellow buttons: 'Transport EnergyMAP' and 'Your Energy MAP Sign-in Find out the benefits of registering'.

The workshops

The Energy MAP workshops are designed to help companies follow a structured path to energy management. SEI's goal is to provide companies with all the necessary information, guidelines, and tools to allow them to achieve substantial savings in energy use. This new approach to delivering training provides participants with the opportunity to interact with each other and share their energy knowledge and experience.

The workshops are delivered over an extended period and focus on the 5 pillars and 20 steps of the Energy MAP. Practical 'homework' actions are assigned and tailored to the needs of the workshop participants. The results of the homework assignments are presented at the subsequent workshop and the experiences – problems, progress, performance and any savings made by the participating firms – are examined and discussed.

Guest presenters

Guest presenters, expert in the business types and/or subject matter of a particular workshop, give practical information and real-world evidence of savings achieved.

Site visits

A site visit by an SME advisor is an invaluable part of the Energy MAP workshop programme. Each participating company is provided with mentoring support specific to their business processes and requirements.

Core Criteria for Participation

Vital to the success of the Energy MAP workshop programme is commitment and dedicated participation – savings cannot be guaranteed to those companies with an indifferent approach. The following criteria must be satisfied by participating companies:

1. Release of a senior company representative to attend the workshops
2. Attendance at all workshops
3. Completion of all assignments and implementation of all elements of the Energy MAP on an ongoing basis

Energy MAP in Action

The plastics industry in Ireland is reaping the benefits of adopting a strategic approach to energy management, thanks to the implementation of SEI's Energy MAP. A series of Energy MAP workshops over a period of six months was started by SEI in 2006 with nine companies from Plastics Ireland.

Plastics Ireland

Plastics Ireland (PI) is the representative body for the Irish plastics processing industry and is a core business sector within IBEC. Gerry Farrell is the Director of Industrial Products within IBEC. According to Gerry, *"The principal reason for running with an energy management programme specifically tailored to meet the demands of the plastics industry was the fact that energy cost increases have been the single most important item on the Association's agenda over the past two years"*.

"The fact that the industry is so energy-intensive means that the ability of the Irish plastics industry to compete in the marketplace is being severely hampered by energy cost increases. Therefore the key objective was to increase the awareness of the importance of effectively managing energy costs and the impact this could have on the bottom line. Many manufacturers in the past tended to view its energy costs as simply another bill to be paid. However, the programme has clearly shown that relatively simple adjustments in energy management can achieve real savings for member companies. Nine of our member companies participated in the programme and attendance was high at all workshops. The structure of the programme, with one-day workshops at regular intervals, was suitably flexible to ensure company buy-in. The networking and sharing of information at the workshops was also a key benefit."

Sarah Coughlan, Executive of Industrial Products with PI agrees, *"The multi-day structure played a big part in subsequent frank discussion. There was a tangible benefit from networking and information sharing, and at the end of the day this generated new interest in identifying new ways of cost savings. The sector approach worked very well and was very important. People around the table knew what others were talking about regarding technology and plant issues and this promoted discussion and information sharing. The Energy MAP website is very user friendly and the presence of various case studies is very helpful."*

What Next?

IBEC intends to communicate the benefits of the plastics industry workshops to other sectors.

Other sectors now participating:

- Irish Medical Devices Association (IMDA)
- PharmaChem Ireland (PCI)
- Food and Drink Industry Ireland (FDII)
- Industrial Products

Gerry Farrell acknowledged the support of SEI in the Energy MAP workshop series,

“This is an example of organisations with different mandates working together to benefit business.”

12

Athlone Extrusions Ltd

Location: Westmeath

Activity: Sheet Extrusion

Employees: 170

Participant: Martin Hanley,

Energy and Training Manager

Martin Hanley's main objective in participating in the Energy MAP workshops was to gain a greater understanding and awareness of his company's energy use. He admits that his expectations were not high, but was happy to be proved wrong.

"I was very positively surprised. The atmosphere was relaxed with good contributors and 'plain speaking' guest speakers brought proof that it is possible to make savings. I found the Awareness workshop to be excellent."

A key tool of Energy MAP is a Register of Opportunities (ROO) that allows companies to list their identified savings opportunities and keep track of progress on implementing them.

Martin knows this will be invaluable.

"I'm finding it difficult time wise to use the ROO but I can see the benefits. However, procurement processes now have energy efficiency as one of the main criteria of purchase. We use AC drives because of their low maintenance costs and are considering lighting occupancy sensors. Five large and nine small granulators are now switched off if not in use. In our industry there are only so many things we can switch off, but we wouldn't have even considered this before the Energy MAP workshops. Our greatest barrier in the past was awareness which has now been rectified. Our future plans include trebling air receiver capacity and the heat recovery to dry materials in silos."

Martin has not yet calculated savings made from actions taken, but expects them to be substantial.

"I don't think there was a major magic formula to the workshops, but what impressed me were the speakers' abilities, guest presenters, and the networking opportunities. I also find the Energy MAP website to be excellent – there is a world of information in there."



Automatic Plastics

Location: Tinahely, Co. Wicklow
Activity: Plastic Injection Moulding

Participant: Michael Fitzgerald,
Maintenance Technician

Automatic Plastics is a small firm faced with meeting the day to day production demands of their customers, and doing so in an energy efficient manner. The aim is to implement energy saving opportunities while maintaining production activity uninterrupted.

"Time to do things is a barrier", according to Maintenance Technician, Michael Fitzgerald, but in spite of this they have successfully targeted lighting and other areas that are easy to tackle without halting the production process.

From interacting with the other participants in the workshops, Michael has learned that actions can achieve savings but he would like more time to implement further energy saving measures.

By looking at the *'energy requirement'* of activities, processes and installations, Automatic Plastics hopes to identify savings opportunities without compromising production activity. Weighing up the pros and cons is definitely the right way to start and is in itself a key energy management action.



Cork Plastics Manufacturing

Location: Cork

Activity: Extrusion and Injection Moulding

Employees: 150

Participant: Tom Maguire,

Project Manager

As Project Manager, Tom Maguire took part in the Energy MAP workshops to learn about cutting energy costs at his manufacturing plant. *"We had done other work on lighting but wanted more structure on our programme for energy efficiency linked in with production processes. We have now begun a Register of Opportunities with detection of air leaks, energy monitoring system technology and a reduction in compressed air discharge pressure."*

There are more opportunities in the pipeline, *"Other projects include the replacement of a 55kW pump with one of only 30kW, heat recovery for space heating. A Voltage Regulator unit which brings voltage down is currently being used in cross site tests but we are expecting to achieve an 8% reduction with a 27 month payback period. We are examining the use of a step up transformer in conjunction with the Voltage Regulator which would increase the savings to 12%. At a cost of €250k, with a payback period of 17 months the combination of the Voltage Regulator and the step up transformer, the projected savings over five years amounts to €850k."*

Tom has not yet calculated the savings made to date but states, *"Our shut down periods are in July and August and it is at this time that we will implement a lot of what we have learned during the Energy MAP workshops. Although time is tight, it has been shown from the Energy MAP workshops that if we invest time in the area of energy management, significant savings can be made."* This is particularly important at the design stage, *"We are currently involved in a plant expansion and energy efficient design is being incorporated into the expansion including intelligent lighting controls and waste heat recovery."*

Tom realises that he has more to gain by sharing ideas with others. *"I would recommend that other firms avail of the opportunities that the workshops provide, especially that of networking with similar companies and getting new ideas as a result."*



Ferrero Ireland Ltd

Location: Cork

Activity: Confectionery Manufacturer

Employees: 185

Participants: Victor O'Halloran, Head of Technical Department; Noel Field, Packaging Department Engineer

Prior to the Energy MAP workshops Ferrero had started to examine energy saving possibilities at their plant and had introduced measures to improve energy efficiency. Two representatives from Ferrero, attended the workshops, which provided significant additional knowledge and resources to boost their campaign. The company has an advanced system of performance indicators on site. Noel Field, Packaging Department Engineer said they attended the workshops to *"see what other companies are doing with respect to reducing energy bills and to speak openly. We have performance indicators on site to monitor our manpower levels, power consumption and production output. These are reviewed on a weekly basis at production meetings."*

They are very effective tools in managing energy consumption, *"If a machine is left on inadvertently during non-production periods then it will be detected and flagged at the production meetings."*

The performance indicators are applied to the various business units including moulding, manufacturing and packaging and are reported in the form of a *'traffic light system.'*

When asked about management commitment Victor O'Halloran, Head of Technical Department, acknowledged the importance of support from management to ensure that energy projects get the priority and resources necessary to implement the energy saving projects. *"Senior management are always striving to improve the energy performance of the organisation."*

This is the key to implementing an effective energy management system as Ferrero had begun to examine energy savings possibilities and implement actions before the Energy MAP workshops commenced, but learned significantly more from their participation.

Both Victor O'Halloran and Noel Field are now able to bolster the energy expertise within the company, ensuring that energy management does not rely on the enthusiasm of just one person – a common failure in many companies.



Gem Plastics

Location: Cavan

Activity: Extrusion Blow Moulding

Employees: 65

Participants: Pat Geoghegan,

Production Engineering Manager

In an effort to reduce energy costs and to obtain a wider perspective of energy use in the plastics industry in Ireland, Gem Plastics availed of the opportunity to participate in the Energy MAP workshop series. *"Our objective was to network for ideas and also to get a better understanding of electricity billing systems"* says Pat Geoghegan, Production Engineering Manager. *"Extrusion blow moulding is a fairly rigid process and very little can be done to change that. We didn't expect to slash our energy bill, but we wanted to find ways to increase efficiency and reduce our energy consumption per tonne of product. We have definitely made improvements and have developed the process to achieve our objectives as a result of participation in the Energy MAP workshop series."*

The Energy MAP workshops assisted Gem Plastics in other ways. Information gained during the workshops was very useful in terms of trying to get a better price for their electricity. Gem Plastics are currently trialling an inverter which is programmed to straddle back voltage to reduce load. It is still too early to quantify actual savings, so, *"...the jury is still out on that and we will need three months before we can make a decision regarding permanent use. Since our participation in the Energy MAP workshops we have also changed our lighting and that should further reduce our energy use."*

Pat was very pleased with the information he gained from the workshop series, *"I would certainly encourage other companies to get involved in the workshop programme because you'll always get two or three main ideas that will improve how your processes use energy."*

Nonetheless, in spite of gains made, challenges still remain to be met and overcome. Pat's primary responsibility is production, as opposed to energy management, so finding time to concentrate solely on energy is always a challenge. This is an issue for many firms and should be addressed early to ensure that savings are sustained.



Tech Group Europe Dublin

Location: Dublin West

Activity: High-end moulding applications

Employees: 180

**Participant: Keith Henderson,
Facilities Manager**

"My new role as Facilities Manager necessitated a training course so we chose the Energy MAP workshops as recommended by Plastics Ireland of which we are a member." says Keith Henderson, the Facilities Manager at Tech Group Europe. "We had also done previous work on lagging and had been involved in an SEI case study on all electric V hydraulic moulding machines. I had a look at the Energy MAP website and from that I expected to optimise what had already been put in place in our facilities."

"During the period of the workshops, we identified phenomenal savings and as part of the ongoing 'homework' assignments, which were invaluable, we implemented approximately €35,000 worth of savings actions." Keith adds.

These actions included installing a new air receiver, leak repairs, and reducing pressure from 9 bar to 8.5 bar which amounted to savings of €15,000. Keith has targeted other savings, *"In our air handling units we have installed filters with an initial saving of €8,000. There is a potential saving of €60,000 in this area. The units operate seven days a week but if we shut down two at weekends we can make a saving of €9,000."*

For Keith some opportunities were a bonus, *"Two other elements that we would not have considered examining were power factor control and maximum import capacity. The former, at no cost to us, saved €10,000 and for the latter, an upgrade will save €28,000 p.a."*

The Energy MAP workshop series certainly provided a boost to the Tech Group as Keith relates, *"Last year our (energy) bill was €1.3 million. Without implementation of what we learned at the Energy MAP workshops this year's estimate was approximately €1.8 million however, having taken on the Energy MAP recommended actions that estimate has been cut to between €1.5 million and €1.65 million. This is a 17% saving! My advice to other companies participating in the workshops would be to send the right people. There should be an engineering representative but also and crucially a member of senior management. Also, do the homework!"*



Trend Technologies

Location: Mullingar, Co. Westmeath

Activity: Injection Moulding and Finishing

Employees: 110

Participant: Michael McCormack,

Maintenance Manager

Trend participated in the Energy MAP workshops to save money on their energy bills and to exchange experience on good and bad practice in plastics-specific processes. They also wanted to learn how to set up an energy saving protocol.

Maintenance Manager, Michael McCormack recalls, *"Our expectations were completely met because we have identified savings and we are still in contact with other people who participated in the workshops which is invaluable for the continued exchange of information and experiences."*

When asked about changes, Michael cites the fact that real progress has been made in Trend because the Energy MAP workshops stressed the need to allocate time resources to energy management. As a result they have taken on a student for the summer. *"This is due to the fact that it was driven home that time needs to be allotted to work specifically on energy management projects and now I can do that."*

Networking was an invaluable source of ideas for Michael; *"The main barrier to advancing energy efficiency in our firm has always been capital costs, however, as a result of the experience and findings of one of the other companies at the workshops we have purchased four electric moulding machines to replace the hydraulic ones we have used to date. They will be in place in the near future and we should have data on their performance by autumn 2007. We expect the payback period to be less than 36 months."*

Michael also made good use of the site visit, *"In addition to the moulding machines we have identified savings through more efficient use of compressors. This would not have been identified but for the site visit of the SEI advisor which came as part of the workshops."*

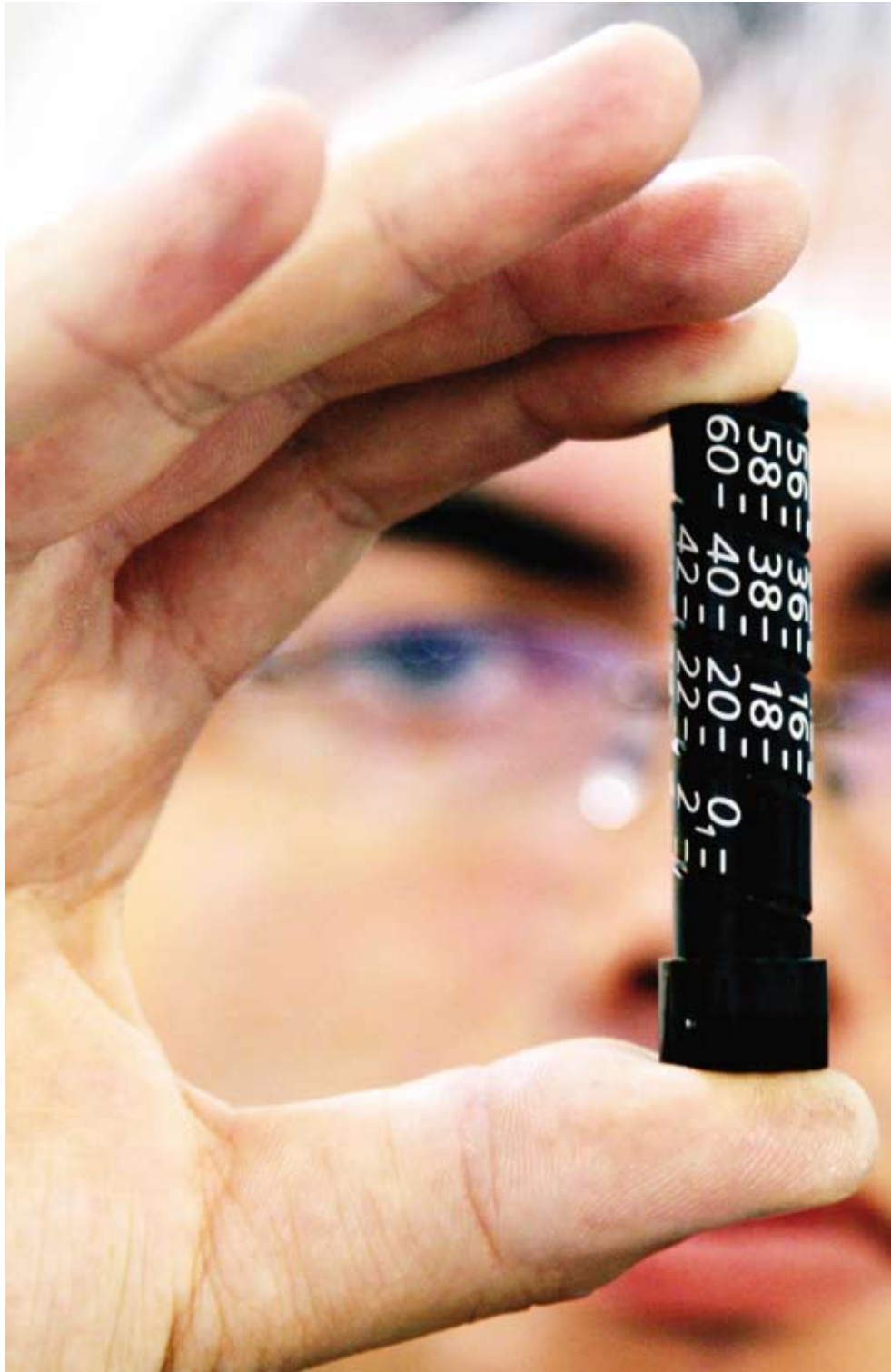
Michael highly recommends that other firms take part in the Energy MAP workshops but only if they are serious about implementing identified savings. Otherwise, he says, *"...it is a waste of time to just go through the motions."*



Other participants in the course were
Tool and Plastic Ltd and **Wavin Ltd**.



Energy MAP Achievements



The workshop series underpinned the fact that a structured approach to energy management, as provided by Energy MAP, can deliver and sustain the sort of energy and cost savings that companies need for survival in today's competitive market-place, whilst addressing environmental concerns.

Based on data received from five of the nine participating firms, the following results have been achieved:

- 24 energy projects implemented during the workshop series, with savings of €110,000 at an average saving of €4,583 per project;
- 47 projects in progress or identified with potential savings of €215,400;
- The total estimated savings for the five firms that provided data is €325,400.

Extrapolating from the results of the twenty-four projects completed by the five firms that provided data, the estimated savings for the sixty Plastics Ireland member firms is a substantial €3.9 million (see figure 1).

The plastics companies have begun to imbed the energy-saving drive into the overall business process, as shown by the results of an ongoing assessment by SEI of the implementation of Energy MAP (see figure 2). During the first workshop of the series, companies were asked to complete an energy management assessment based on the 'five pillars' of Energy MAP. This was repeated at the final session of the series in February 2007 and again during follow up site visits in August 2007.

All participants showed significant improvement in their scores from the initial to the final assessment, particularly in the area of planning. The progression was distributed across all five pillars of Energy MAP, showing that the culture of energy management is being embedded across the organisation.

Figure 1: Savings from Energy MAP workshops

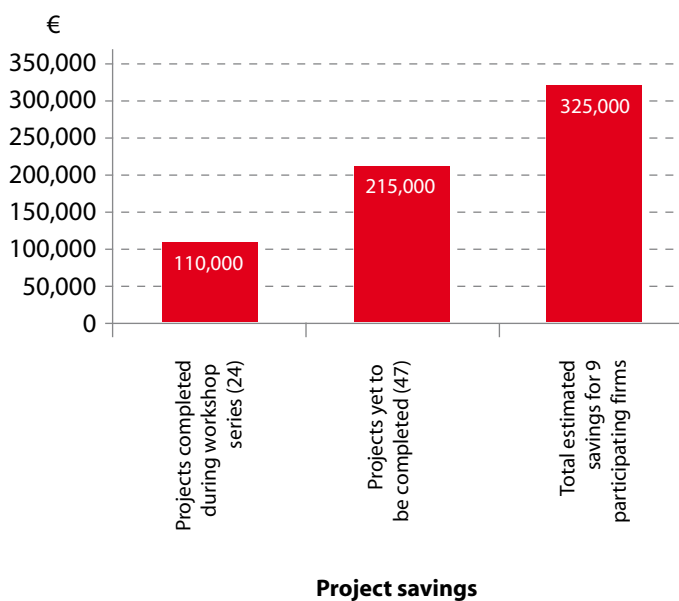
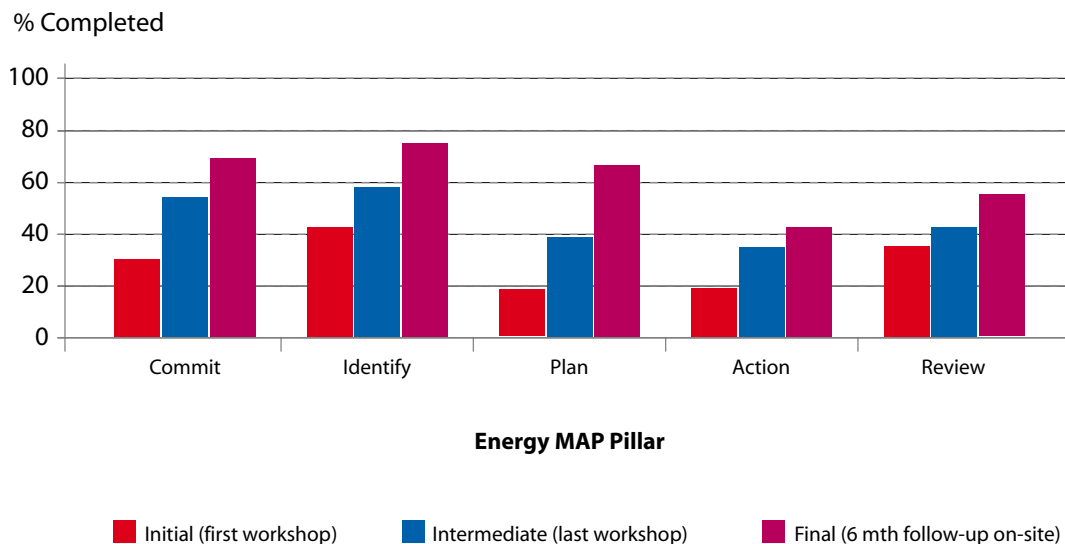


Figure 2: Assessment by Pillar of Energy MAP



Conclusion

The participant companies are aware that significant savings in energy use can be achieved through Energy MAP, if they commit time to implement what is learned in the workshops. In spite of time constraints faced by participants, the companies identified savings ranging from 7% in one company to 17% in another. With the assistance of the Energy MAP workshops and website tools, these savings are made possible through a dedicated focus from the participants and their senior management.

The Energy MAP workshops demonstrate that time invested in energy saving projects yield significant savings that go straight to the bottom line. To realise the full potential of energy management, enterprises should adopt a more structured approach whereby managing energy becomes part of the business process.

Further information on Energy MAP workshops can be found on the SEI website: www.sei.ie/business or phone: 01 808 2067

Top 10 Energy Saving Opportunities completed by the Plastics Companies

	System / Opportunity Description	Indicative Benefits
1	Moulding Machines <ul style="list-style-type: none">• Replace hydraulic moulding machines with electric machines• Insulate moulding machine barrels	50% to 70% of machine operating cost with electric moulding machines
2	Energy Bills Analysis <ul style="list-style-type: none">• Management of bills• Reduce Maximum Import Capacity (MIC)• Power factor correction charges eliminated• TUOS charge reductions	5% to 15% saving on Energy Bills
3	Develop Energy Performance Indicators for production <ul style="list-style-type: none">• Site energy performance indicator kWh/kg• Individual line EPI kWh/kg	Management tool for performance monitoring and production line benchmarking
4	Optimise Compressed air generation and distribution systems <ul style="list-style-type: none">• Replace fixed speed air compressor with VSD driven compressor• Decrease compressor discharge pressure to minimum acceptable value• Repair compressed air leaks• Utilise compressed air heat recovery for space heating• Install no-loss automatic drain for air receivers	Up to 15% saving on Compressed air Generation Costs
5	Run Energy Awareness Campaign <ul style="list-style-type: none">• Staff motivation• Energy saving opportunity identification	Staff involvement critical for effective energy management
6	Lighting Review <ul style="list-style-type: none">• Install occupancy sensors on lighting systems• Install photo cells on lighting systems• Replace light fittings with intelligent light fixtures• Install lighting plans for production areas	Up to 15% saving on lighting costs
7	Cooling Systems <ul style="list-style-type: none">• Increase cooling water distribution temperature• Decrease chiller discharge pressure• Install VSD on distribution pumps• Isolate end users when not required	Up to 10% saving on cooling costs
8	Housekeeping <ul style="list-style-type: none">• Switch off equipment when not in use• Improve insulation on thermal systems	Up to 5% savings on operating costs
9	Plant Expansion <ul style="list-style-type: none">• Design review of new installations for energy efficiency• Reduce cleanroom air changes to minimum value• Locate machine melt-feed barrel, heaters and rams external to cleanroom• Minimise cleanroom space heat loads	Up to 50% savings on capital and operating costs
10	Thermal Systems <ul style="list-style-type: none">• Zone control of office space heating• Weather compensating temperature controls• Utilise waste heat from production in other areas• Close external doors in winter	Up to 10% saving on heating costs



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