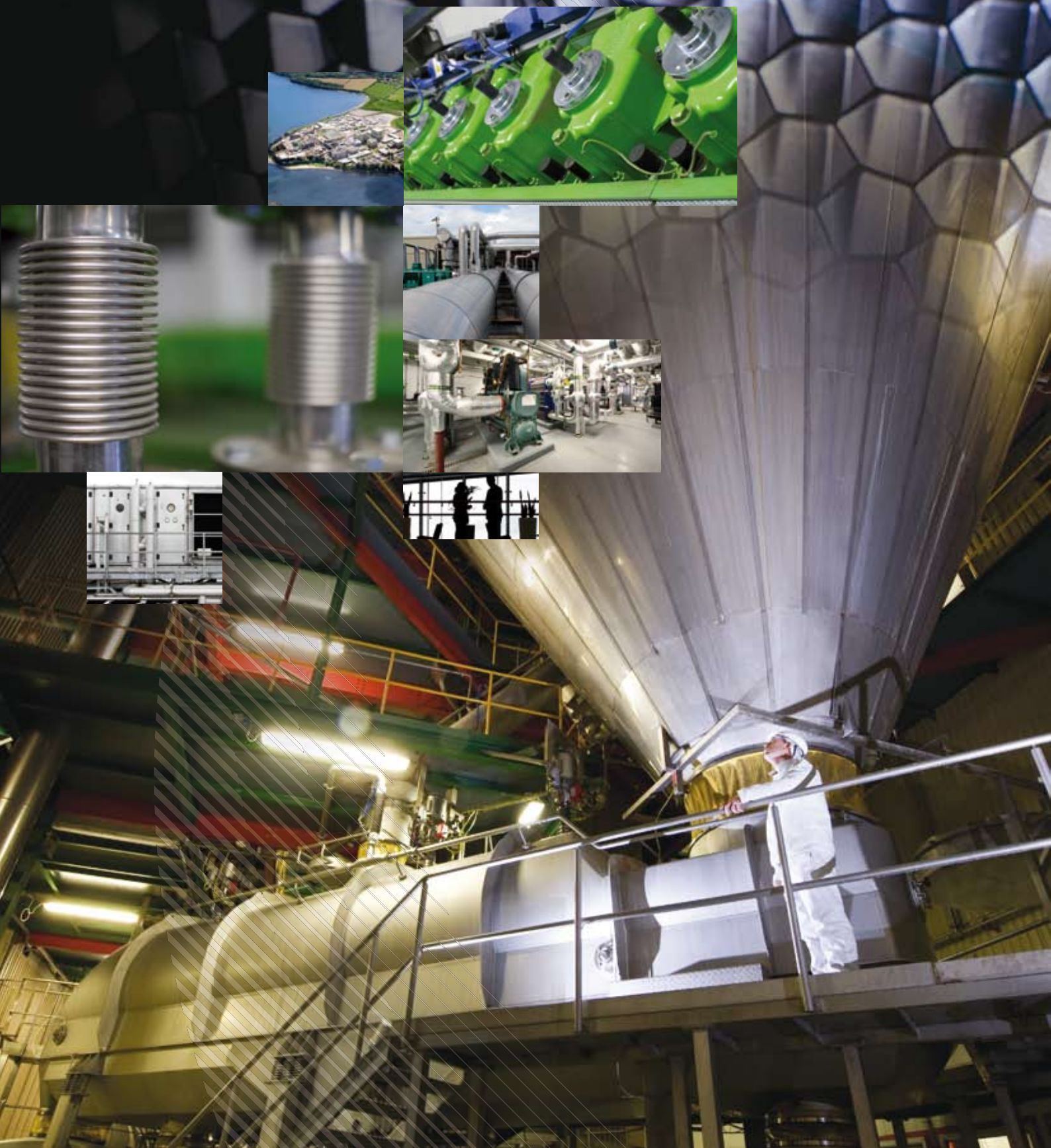


# Large Industry Energy Network

Annual Report 2010





# Large Industry Energy Network

## Success is built on the efforts of individuals

### WHO WE ARE

THE Large Industry Energy Network (LIEN) is a voluntary network, facilitated by Sustainable Energy Authority of Ireland, of companies working to maintain strong energy management and environmental protection practices.

LIEN members recognise the benefits of collaborating with like-minded organisations on best practice and new technologies in energy management.

Membership of the LIEN is open to organisations which are part of the Energy Agreements programme and/or those which have annual energy spend in excess of €1m.

### WHAT WE DO

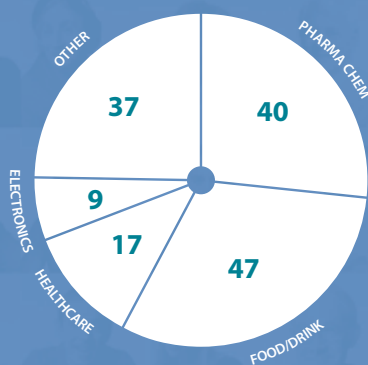
LIEN's core aim is to support participants' goals for reducing the cost of energy. There are also wider benefits, not least the environmental gains of energy efficiency, which have social benefits and also improve firms' relationships with their stakeholders.

Workshops and seminars are organised throughout the year for LIEN members, providing them with a forum to learn from energy experts and other specialists, as well as from other energy managers.

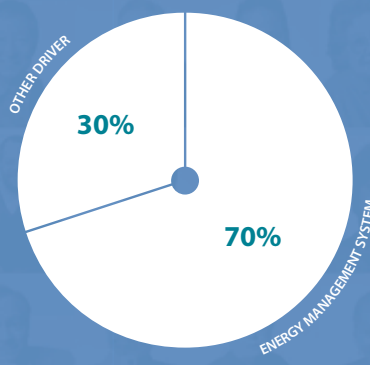
### WHERE WE ARE GOING

There are strong government priorities and targets for improving energy efficiency and the use of renewable energy. Achievements by LIEN companies are recognised and contribute to national energy objectives ranging across efficiency, competitiveness, energy security and environmental protection.

### NUMBER OF MEMBERS BY SECTOR IN 2010



### DRIVER FOR ENERGY-SAVING PROJECTS IN 2010



### 2010 OVERALL ENERGY PERFORMANCE

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**25,500**

LIEN Total Primary Energy Requirement 2010 (GWh)

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**1,300**

Energy Savings/Loss due to Energy Performance Gains/Losses 2010 (GWh)

---

**5.3%**

Energy Performance Improvement

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**175,490**

National Total Primary Energy Requirement (TPER) 2010 (GWh)

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**14.5%**

LIEN as Percentage of National TPER (%)

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**5,840,400**

Total CO<sub>2</sub> Emissions 2010 (tonnes)

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**298,900**

CO<sub>2</sub> Avoided due to Energy Efficiency Gains

For more information on LIEN and Energy Agreements, visit our website:

**[www.seai.ie/largeindustry](http://www.seai.ie/largeindustry)**

## LIEN HIGHLIGHTS IN 2010

- The energy performance improvement of the LIEN was 5.3% from 2009 to 2010, providing an energy avoidance equivalent of €45million in 2010.
- A 7% performance variation between LIEN-only and Energy Agreements companies highlighting the higher performance of companies committed to the energy management system approach.
- Energy Agreements companies are achieving a higher level of energy performance change since the introduction of the programme in 2006.
- Output activity has increased across all sectors in 2010, showing a recovery after the dramatic decline in output in 2009. This recovery contributed to energy performance from 2009.
- Project activity trends highlight maturing energy programmes that are extracting deeper savings.
- The LIEN has grown to 150 companies in 2010, from 135 in 2009, and now represents 14.5% of national TPER.

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ABOUT SEAI



## THE LIEN SUCCESS STORY

### Network boosts Irish competitiveness and supports enterprise



By improving energy performance, LIEN members reduce operating costs and increase cost-competitiveness, while also improving other business processes.

The LIEN/SEAI work on energy efficiency has helped to stimulate the emergence of the professional energy manager and the development of energy services, leading to new business opportunities in Ireland and abroad.

### World-leading energy efficiency network shows 16-year record of performance and benefits

The LIEN has led the way in cutting energy and operating costs, while amassing a huge range of energy expertise and resources.

Long-term members improved energy efficiency by 33% between 1995 and 2010.

The LIEN has established itself as one of the world's leading energy efficiency networks.

Introduction of Energy Management systems from 2006 has intensified progress.

Energy Agreement Programme (EAP) companies have achieved average annual energy savings of 3.6% and additional non-energy-related savings.



### The LIEN Success Story



### Ireland is now a global leader in energy- management systems

The SEAI/industry partnership has turned Ireland into an international leader in energy management.

Ireland has the highest take-up of EnMS in the world.

The Irish Energy Management Standard ultimately helped to shape the new international standard, while Irish experts are leading energy-management projects globally.



## LIEN builds up world-class body of knowledge and resources



Working with SEAI, LIEN and Energy Agreements members have led the way in applying best practice in resource management.

A test-bed for new solutions, the network has built up and is disseminating a major body of knowledge and resources, which can be widely replicated.

The LIEN, with SEAI support, is committed to continuous improvement over the long term.

Plans include: increasing LIEN membership by one-third by 2013, fully transitioning to international standard ISO50001, and taking energy efficiency to the next level through a Maturity Model.

The LIEN will continue to be a key actor in Ireland's drive to cut energy waste and emissions, ensure security of supply, and improve competitiveness.



## LIEN leads drive towards sustainable energy future

Please read on (pages 6 to 15) in order to:

- Find out more about the network's achievements over the past 16 years
- Hear what a small selection of network members have to say about their energy efficiency projects and achievements, including details about the remarkable savings that resulted

## THE LIEN SUCCESS STORY

# World-leading energy efficiency network shows 16-year record of performance and benefits

Over 16 years, the LIEN has become a powerhouse for continually improving energy performance, identifying and harnessing new opportunities, and disseminating resources and information.

### LIEN leads the way in achievements and expertise

- Accounts for 60% of total industrial energy usage in Ireland, whilst also including other non-industrial sectors
- Continues to cut energy and operating costs as well as CO<sub>2</sub> emissions
- Has built up a huge range of energy expertise and knowledge

Overall, the network is a model of government and business cooperating to build an energy-efficient economy.

### Members shows remarkable energy improvement over 16 years

- Improved energy performance by 33% between 1995 and 2010 (long-term members)
- Translated every €1m of taxpayer money into €12m worth of energy-saving benefits in the productive business sector

### Network speeds progress and amplifies benefits

- Best practice is identified and widely shared
- Many years of research time are saved through sharing knowledge

The benefits of info sharing and performance benchmarking are magnified as network membership grows.

### Energy Management System intensifies progress

Energy Agreements Programme (EAP) companies achieve particularly strong results by using the Energy Management System (EnMS) approach:

- Average energy performance improvement of 3.6% yearly. High performers reduced energy costs by 30% over a 4 year period.
- Non-energy benefits are gained through further improvements in process efficiency, productivity and product quality

The EnMS process drives up to 70% of savings as energy service and process challenges reveal deeper opportunities.

### LIEN identifies new opportunities year after year

The network is defying the perceived law of diminishing returns by continuing to identify new saving opportunities year after year.





## MEMBER SUCCESS STORIES



### The Lisheen Mine

*"The Lisheen Mine, a LIEN member since 2000, operates in a competitive global market where commodity prices for lead and zinc change regularly. It is thus essential to maximise energy efficiency. We have continuously improved our energy performance, which is reflected in our LIEN EPI. The LIEN provides a forum for us to discuss common issues and hear how various initiatives may be relevant to us.*

*Under 'Operation Survival', which began in 2009, we achieved our target of reducing underground power consumption by 5% within 90 days. Since then, we've maintained the momentum of this project. Average underground power consumption is 18% lower than in January 2009."*

**JIM DUNNE, ENERGY MANAGER,  
THE LISHEEN MINE**



### Dairygold

*"Dairygold's initial certification to EN16001 in 2010 proved invaluable for us. Our relationship with SEAI strengthened the EnMS we implemented and paved the way for energy savings in year 1 that exceeded our expectations. In year 2, we increased the scope of target saving areas. Energy awareness and management are now embedded in our everyday performance. Our impending transition to ISO50001 will give our system greater recognition and hone even further the focus on energy usage and efficiency on-site."*

**RUTH CLANCY, GROUP ENERGY  
MANAGER, DAIRYGOLD FOOD  
INGREDIENTS**



## THE LIEN SUCCESS STORY

# Network boosts Irish competitiveness and supports enterprise

By engaging in a process of continually improving energy performance, LIEN members:

- Have substantially reduced operating costs and increased cost competitiveness
- Were more prepared for the recession and can gain further advantage when there is an economic uplift
- Regularly unlock non-energy benefits or by-products, through energy-driven projects, that add to energy savings

### Members embed energy in strategic planning

Organisations include energy in their long-term strategic planning – setting goals to save CO<sub>2</sub>, fulfil corporate social responsibility (CSR), address their obligations and targets, and ensure sustainability.

### Energy management leads to business improvement

LIEN companies have found that the initial focus on energy management leads to improvements in other business processes, demonstrating the intrinsic link between energy use and productivity gains.

### Network spurs emergence of world-class energy managers

The LIEN and SEAI work on energy efficiency not only benefits from the expertise of outside consultants, but also deepens the expertise of these consultants and has helped to stimulate the emergence of the professional energy manager.

### Energy efficiency means business

The demand for energy-related analysis in projects has stimulated a market need for energy services. Delivery models for these have evolved and are maturing. The energy services market and entrepreneurs have developed new business opportunities in Ireland and are winning business abroad.

Meanwhile, the wide-ranging achievements of SEAI and the LIEN in the field of energy efficiency and best practice contribute strongly to promoting Ireland as an attractive location for sustainable business.





## MEMBER SUCCESS STORIES

**Kerry Ingredients**

*"Kerry Ingredients & Flavours, Charleville has been focusing on reducing energy consumption for many years. Since teaming up with SEAI, initially through the LIEN and more recently the EAP, we have reduced our electricity and gas consumption significantly. Implementing an EnMS gave us a solid platform for continued energy savings. As we make the transition to ISO50001, we are confident we will benefit from significant energy savings in the years ahead."*

**ERIC FLYNN, ENERGY MANAGER,  
KERRY INGREDIENTS & FLAVOURS,  
CHARLEVILLE**

**Glanbia**

*"At Glanbia Consumer Foods we have reduced our energy consumption by 31% in the past five years. During this time after initial scepticism we transitioned from SEAI's LIEN to the EAP. This led to our implementation of a certified EnMS which embedded a structured, systematic approach to saving energy throughout the organisation. This, coupled with our own internal focus on benchmarking, will ensure energy savings long into the future throughout the Glanbia Consumer Foods division."*

**RICHARD HOGAN, ENVIRONMENTAL  
MANAGER, GLANBIA CONSUMER  
FOODS**



## THE LIEN **SUCCESS STORY**

# Ireland is now a global leader in energy-management systems

The SEAI/industry partnership has been pivotal in turning Ireland into an international leader in energy-management best practice, solutions and systems.

### **Country plays leading role in shaping energy standards**

- 11% of national primary energy is managed and controlled by Energy Management Systems – the highest take-up of EnMS globally – and will increase further.
- The Irish Standard for Energy Management, IS 393, was the model for the European standard EN16001 which shaped the development of the new international standard, ISO50001.

### **Irish expertise now in global demand**

- Irish experts are leading energy management programmes globally and transferring knowledge developed in Ireland within their multinational organisations.
- The development of expertise is reflected in SEAI's participation in international projects relating to energy management and energy management standards.

With world-class energy expertise being developed in Ireland, the country has become a venue for major international workshops and conferences, such as the International Conference on Energy Management that SEAI hosted at Farmleigh House, Dublin in November 2009.



## MEMBER SUCCESS STORIES

**Abbott Ireland  
Pharmaceutical  
Operation**

*"AIPO implemented an EnMS to IS 393 and has since migrated to EN16001 and then to ISO50001. Recently the benefits of a certified EnMS were shared with other global Abbott companies when the Irish experiences at AIPO were presented through an Abbott webinar conference. There was significant interest and many are seriously considering implementation."*

**RICHARD HARRINGTON,  
ENERGY TEAM LEADER, AIPO**

**DePuy**

*"DePuy were among the first companies to be certified to EN16001 in Sept 2009. We have since transitioned and are now certified to ISO50001. The energy challenge is seen as a priority for DePuy and as a healthcare provider DePuy understands that climate change can negatively affect human health. We have therefore taken sustained, long-term action to address this challenge from a cost usage and sustainability point of view. DePuy Ireland, with its key industrial partners in the I2E2 centre, provides leadership, support and direction and, along with Irish academic excellence, is driving embedded research and innovation within our facilities."*

**DÓNAL ÓG CUSACK,  
ENERGY MANAGER, DEPUY**



## THE LIEN SUCCESS STORY

# LIEN builds up world-class body of knowledge and resources

The network has built up a major body of knowledge and resources. The dissemination of these is stimulating increased saving activity.

### Wide range of new methods and solutions tested

The LIEN and EAP special working groups (SWGs) serve as a test-bed for new methods and solutions in areas such as Energy-Efficient Design (EED), HVAC and Alternative Methodologies, as well as in new technologies and specific sectors.

Through such testing, for example, the Food & Dairy SWG has identified the main opportunities for energy reduction and savings across the sector. It estimates that additional energy savings of up to 30% are possible.

### LIEN's accumulated knowledge invites wide replication

The LIEN has developed tools, techniques and methodologies into a world-class Energy Management Body of Knowledge, which can be adapted on a much wider scale. Successful energy-efficiency retrofit projects, for example, can be widely replicated.

### Best practice – network shows the way

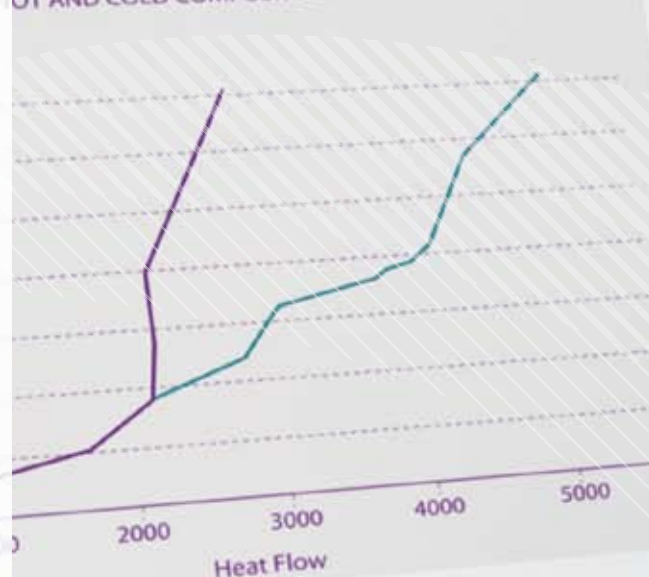
Working with SEAI, the LIEN and Energy Agreements members have led the way in applying the kind of best practice in resource management needed in all sectors of the Irish economy.

By following their example, a huge number of businesses can share in the tremendous benefits of energy efficiency and achieve the kind of savings that are crucial in harsh economic times and ensure strong advantage in periods of economic growth.

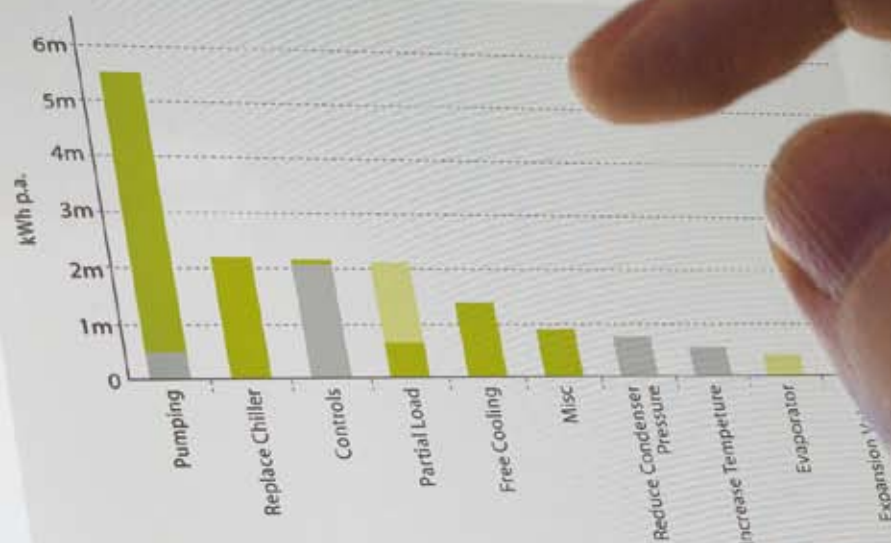
TONNE OF SALES PER MONTH



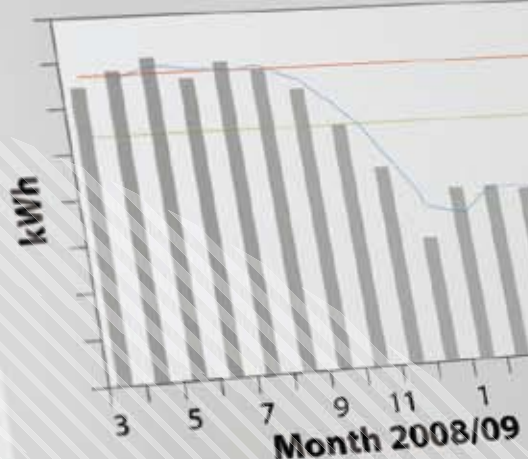
HOT AND COLD COMPOSITE CURVES







kWh Energy Usage



## MEMBER SUCCESS STORIES



## Allergan

"At Allergan, Westport we have reduced our relative electricity and gas use since 2009 by 7%. Much of our success is due to joining SEAI's EAP and implementing an effective EnMS on-site. By improving the operation of our Significant Energy Users, we have substantially reduced associated consumption and cut CO<sub>2</sub> emissions. This, coupled with our Lean Six Sigma business management strategy, will ensure continual energy savings long into the future."

**RICHARD O'DONOVAN, ENERGY + ENVIRONMENTAL SYSTEMS ENGINEER, ALLERGAN, WESTPORT**



## HJ Heinz

"HJ Heinz, Dundalk was replacing an old, inefficient 12-tonne steam boiler. Experts recommended a like-for-like replacement but our SEAI Agreements Support Manager alerted us to SEAI's EED Methodology. Our Energy Team, using the EED approach, found the site's steam profile no longer compatible with a 12-tonne peak supply.

Two new on-demand steam boilers are 13.3% more efficient than the old boiler. Estimated gas savings are 1.3GWh. Estimated payback period is four years.

The EED approach has been incorporated into the Heinz EN16001 EnMS. Energy efficiency will be taken into account in the design of all future energy-consuming projects."

**MOHAMED HAMOUDA, ENERGY MANAGER, HJ HEINZ**

## THE LIEN SUCCESS STORY

# LIEN leads drive towards sustainable energy future

The LIEN, with the support of SEAI, has made tremendous progress over the last 16 years, but is committed to continuous improvement over the long term.

Government and agency support will be targeted at LIEN & EAP work that promises the greatest benefits.

The LIEN aims to support energy performance improvements leading to approximately 4,070GWh PEE of energy savings in 2020.

### Drive to increase LIEN membership by one-third

It is planned to increase LIEN membership from the current 150 to 200 by 2013, and extend the LIEN share of industrial and non-industrial energy usage. Online technologies and platforms will be enhanced to further develop the network.

### Members to fully transition to new world energy standard

Through the LIEN's pioneering work, 70% of Ireland's largest energy users are committed to EN16001. The next step will be to fully transition to the international standard, ISO50001.

### Maturity Model will raise energy efficiency to next level

We have developed a Maturity Model to ensure EnMS effectiveness and take energy efficiency to the next level. It will help in the continuous improvement of the Energy Management System and will be a means to develop the energy master planning process.

The LIEN/EAP will adopt and standardise the methods and resources developed and continue to discover new opportunities.

### Network to lead the way both nationally and internationally

The LIEN will continue to be a key actor in Ireland's drive to cut energy waste, ensure security of supply, improve competitiveness and reduce CO<sub>2</sub> emissions. It will progressively strengthen its position as one of the leading energy networks globally and further establish Ireland's position as a world leader in energy efficiency.



## MEMBER SUCCESS STORIES

**EMC**

*"EMC is a market leader in cloud computing (2,500 people employed in Ireland, 50,000 worldwide). Efficiency measures have achieved a 19% reduction in energy use across two sites, in Ovens and Ballincollig, Co. Cork.*

*We implemented IS 393 in 2008, transitioned to EN16001 in 2010, and are now looking at ISO50001. As a result, we have saved over 20 GWhs and €1.5m over the past four years."*

**MICK HENNESSY, FACILITIES MANAGER,  
EMC INFORMATION SYSTEMS  
INTERNATIONAL**

**Google**

*"Google Ireland has had a formal energy management system since it was certified to IS 393 in 2009. It was certified to EN16001 in 2010 and ISO50001 in 2011.*

*Google Ireland, Google's EMEA HQ, achieved these standards with SEAI support. The EAP consultation process helped us to develop our considerable energy management expertise. Our Dublin team is leading the expansion of the ISO50001 programme by integrating it in several offices across EMEA. Six more Google offices in Europe have achieved ISO certification. Google intends to implement systematic energy management throughout our European locations."*

**JAMES BOWEN, FACILITIES MANAGER,  
GOOGLE IRELAND**

## A MESSAGE

FROM THE MINISTER FOR COMMUNICATIONS,  
ENERGY AND NATURAL RESOURCES

Ireland's National Energy Efficiency Action Plan (NEEAP) has set the target of a 20% energy efficiency improvement by 2020, relative to 2005. This target not only reflects an EU policy target, but there is clear evidence that energy efficiency also makes real business sense.



In particular, the track record of our largest industrial energy users reflects a growing recognition of energy efficiency as a key competitiveness factor. Businesses have limited control on the price they must pay for fuel, but their own management practices can play a major role in reducing their exposure to fluctuating energy bills.

With import dependency at more than 90%, Ireland needs to pursue a fast path to exploiting our indigenous renewable sources. Being energy-efficient not only buys us time in that transition; it represents good value for money. The returns on investment surpass those of most competing investment options. Investment in energy efficiency not only brings energy savings, it also supports jobs and indigenous product and service providers. Sourcing energy wisely, particularly in these difficult times, should be a national economic imperative.

The Large Industry Energy Network (LIEN), supported by SEAI, is playing a leading role in transforming Ireland into a society based on more sustainable energy structures, technologies and practices. The network spans all sectors and a wide range of industrial and commercial activities. This collaboration is a model of how government and business can work together to build our new economy. The LIEN now has over 150 member companies, representing up to 30,000 jobs. It accounts for 60% of national industrial energy use but, with some non-industrial energy users also within the membership, this figure extends to almost 70% of industrial energy use. In 2010, when the cost of energy for large users was relatively low, the annual energy expenditure of LIEN members was almost €1 billion. The positive impact of meeting the 20% savings target in this part of our business sector would be considerable. In this regard, the savings of €45M achieved by these companies in comparison to 2009 show the value of the efforts and progress being made.

By identifying and harnessing new energy efficiency opportunities, the network continues to grow in both achievement and influence. Members continue to cut energy waste and costs, and are making a significant contribution to meeting national CO<sub>2</sub> emission targets. Moreover, this energy management approach has led to other non-energy benefits such as greater process efficiency, capacity and capabilities that strengthen the contribution to cost-competitiveness. In the process, these companies have built up world class energy expertise and knowledge.



In May 2011, I launched Better Energy – The National Upgrade Programme. Managed by SEAI, the programme brings under one umbrella the schemes to upgrade homes and workplaces and to tackle energy poverty. Through the Better Energy: Workplaces initiative, the public, commercial, industrial and community sectors are receiving financial support to implement a wide range of energy efficiency upgrade projects. The additional €30 million allocated to Better Energy in 2011 will leverage at least another €30 million in private investment and yield lifetime energy savings worth €200 million.

Better Energy is also a major step forward as it involves energy supply and services companies as partners in delivering energy savings and starts the process of moving to new financial models, such as ‘energy performance contracts’ and ‘pay as you save’, which will foster sustained jobs and savings. Energy supply companies will have a growing role to play in this market. Given the squeeze on available capital in both the private and public sectors, such new business models in conjunction with third-party finance are especially important in order to unlock the numerous energy efficiency opportunities. I am very keen therefore to see projects coming forward and engaging such business models.

As energy costs continue to rise and EU directives and targets tighten, the demand for energy management solutions and services will grow. The LIEN continues to serve as an important proving ground for innovative solutions. Sustainable energy offers many opportunities for businesses in Ireland – both for companies bringing innovative energy-saving products and services to international markets, and those that have adopted energy efficiency as a core practice. The energy efficiency imperative offers exciting opportunities for Ireland to develop new markets for green technologies and services, and greatly improve the country’s economic competitiveness. Many companies are now seeing the opportunities that energy demands present for the next phase of growth for their products and services.

## €30M

THE ADDITIONAL €30 MILLION ALLOCATED TO BETTER ENERGY IN 2011 WILL LEVERAGE AT LEAST ANOTHER €30 MILLION IN PRIVATE INVESTMENT AND YIELD LIFETIME ENERGY SAVINGS WORTH €200 MILLION.

## €200M

TOTAL ENERGY SAVINGS WORTH €200 MILLION.

Happily, through the work of the LIEN, Ireland is well positioned and is now recognised as being a global leader in adoption of structured energy management. This is reflected in the number of companies committing to the international standard ISO 50001. We are seeing the emergence of the professional energy manager. Ireland is performing better than the European average in the industrial sector and has developed a global reputation for energy expertise, while many jobs have been created and sustained, and our competitiveness has been enhanced.

And now, thanks to that experience and expertise, specialist Irish service providers are gaining early mover advantage in securing new business abroad, as far afield as in Asia and the Middle East. SEAI is working closely with Enterprise Ireland and IDA Ireland, among others, to develop further this field of opportunity and contribute to our goal of making Ireland a smart green economy.

I congratulate all concerned for their continued commitment and achievements. They are showing the kind of professionalism, in saving energy, raising cost-competitiveness and cutting emissions, that is needed to transform Ireland into a truly sustainable economy and society.

**Pat Rabbitte, T.D.**

MINISTER FOR COMMUNICATIONS,  
ENERGY AND NATURAL RESOURCES

## INTRODUCTION

BY PROF. J. OWEN LEWIS

As we all know only too well, 2010 was another difficult year for Irish industry. While seeking to maximise cost-competitiveness and meet environmental obligations, large industrial operators faced the continuing pressures of unprecedented national and global economic forces.

In this context, it is heartening to see how the Large Industry Energy Network (LIEN) continued to make substantial progress and to contribute to the National Energy Efficiency Action Plan (NEEAP), which sets a target of 20% energy savings across the economy by 2020.

Supported by SEAI, the LIEN highlights the value of promoting a comprehensive energy management systems approach to improving business performance year on year. LIEN members, especially those within the Energy Agreements Programme, have achieved large additional savings beyond those gained through business-as-usual practices. The network engages members in ongoing relationships, including site visits, workshops and annual performance reporting. Members share information on successes and new initiatives to unearth further savings. By facilitating such engagements, through special working groups and through other supports, SEAI continues to apply its efforts to ensuring that energy savings are replicated within the network, and indeed beyond.

You will read in this report that the LIEN has accelerated progress in recent years. It has increased membership consistently, now having more than 150 members. The Energy Agreements Programme is a subset of the LIEN. This latter programme now covers those major businesses that not only account for 11% of national primary energy use but are also, importantly, committed to implementing the ISO50001 Energy Management Standard. The scale and pace of their energy performance improvement is exemplary in global terms.

In 2010, LIEN members reported an improvement of energy intensity equating to over €45 million in avoided energy compared with 2009. With its size, representation and record of success over its 16-year history, the LIEN is a shining example of how an energy efficiency network can evolve and contribute to knowledge and the dissemination of experience and best practice. Over that period, long-term LIEN members have attained an average energy saving improvement of 2% per year. And despite the long period in which those members have been active, they are still uncovering new savings opportunities, shown by the fact that those members have achieved an 18% performance gain since 2005 – a landmark year in terms of the new impetus given to this agenda by the first introduction of the Energy Management Standard IS 393 and the subsequent launch of the Energy Agreements Programme.





For a small country, we have made remarkable progress in this field. We have built up a substantial fund of skills and knowledge, and are now exporting that knowledge. We have played an influential role in the development of the new international standard ISO50001 and are the ISO appointed project manager to establish the ISO50004 Standard – Energy Management Systems – Guidance for the implementation, maintenance and improvement of an EnMS.

Indeed, the implementation rate of these standards in Ireland is among the very highest rates in the world. Those organisations that are already certified are leaders in the field. Irish experts are leading energy management programmes globally and transferring knowledge developed in Ireland within their multinational organisations. This development of expertise is also reflected in SEAI's participation in international projects relating to energy management and energy management standards.

We are now entering a new energy era. Resources are becoming scarcer, energy costs will continue to rise and EU directives and targets will tighten further. The challenges of climate-change mitigation, energy security and competitiveness are inter-related, and need to be tackled through transforming Ireland's economy from one based on fossil fuel dependence to a low-carbon economy based on energy efficiency, renewable energy and smart networks.

To meet our climate-change objectives, extremely ambitious energy efficiency programmes are essential. Reducing emissions by 20% by 2020 is only the start; much deeper long-term change will be required.

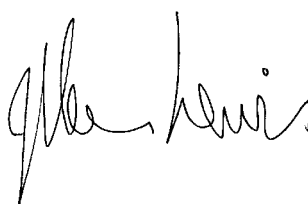
In March 2010, SEAI launched its five-year Strategic Plan, with the mission of helping in the transformation of Ireland to a society based on sustainable energy structures, technologies and practices. Our vision is to make Ireland a recognised global leader in sustainable energy. Sustainable energy practices are already leading to substantial savings for the Irish economy, including the lowering of business costs. The strategic plan envisages new savings worth €6 billion over their lifetime, while supporting up to 10,000 jobs every year.

The plan builds on strong foundations established to date, of which the LIEN is a powerful example. Our aim is to achieve further substantial gains, including through upgrading the efficiency of buildings, improving energy efficiency in business, and the use of renewable electricity. We also want to see strong export-led growth in sustainable energy products and services. We envisage Ireland establishing a global reputation for research and development, leading to new clean technology services and products. Along with the production and use of green electricity, these achievements will reduce our import dependence and emissions while creating jobs and enhancing competitiveness.

SEAI supports Ireland's business sector by encouraging the deep application of the best models of structured energy management. In this way, organisations can manage their energy professionally and systematically, while driving a cycle of continuous improvement. Given the immense challenges, it is imperative that we make further progress in energy management and efficiency, and the development of new levels of best practice. To meet these challenges, we need to combine realistically achievable short-term performance targets with stretch goals in order to inspire longer-term innovation.

A commitment from all levels of society is crucial in making the vision of our strategic plan a reality for Ireland. In this regard it is heartening to see how, in the industrial sector, LIEN and Energy Agreements members are blazing a trail that others must follow.

We look forward to our continued partnership with LIEN and all its resultant mutual benefits that are well set to contribute to the competitiveness of Irish enterprise, and ultimately to our national quality of life, and sustainability.



**Prof. J. Owen Lewis**

CEO, SEAI

## THE LARGE INDUSTRY ENERGY NETWORK AND ITS MEMBERSHIP

THE LARGE INDUSTRY ENERGY NETWORK (LIEN), ESTABLISHED IN 1995, IS AN SEAI-FACILITATED GROUP OF COMPANIES THAT COLLABORATES ACTIVELY IN ORDER TO DEVELOP AND MAINTAIN STRONG ENERGY MANAGEMENT PRACTICES.

Throughout the year, SEAI organises site visits, workshops and seminars for LIEN members. In this way, they can learn from energy experts, other specialists and fellow energy managers. The LIEN companies draw a wide range of benefits from hearing about the experiences of others. This saves research time and helps to ensure that any investments made will maximise returns. As well, publicising the achievements of members raises their reputation as environmentally responsible operators.

The member companies and organisations are also making a strong contribution to the CO<sub>2</sub> emission targets set out in the National Energy Efficiency Action Plan.

The LIEN network keeps growing thanks to its reputation as a unique, pragmatic energy forum for the country's leading industrial companies. In 2010, it welcomed 15 new members. The current membership of 150 companies accounts for 14.5% of the total primary energy requirement in Ireland.

While the LIEN consists of companies that engage in a wide range of industrial and commercial activities, members have a common goal: to tackle energy waste, related costs and CO<sub>2</sub> emissions. In these difficult economic times, energy management is seen not only as a necessary process in itself, but also as a cost-effective investment so as to reduce operating costs.

While support from industry peers contributes to in-house knowledge and expertise, SEAI continues to extend the range of support activity available. For example, the Energy Agreements Programme is creating a body of knowledge about a broad range of energy saving techniques and facilitating the replication of these at host sites.

The LIEN is expected to grow further during 2011. Up to 15 new members are anticipated to join the network. Membership is open to companies that have an energy bill of more than €1 million. In 2010 the current average energy spend of LIEN companies is around €6.5 million.

# 15

THE LIEN IS EXPECTED TO GROW FURTHER DURING 2011. UP TO 15 NEW MEMBERS ARE ANTICIPATED TO JOIN THE NETWORK.

# €6.5M

IN 2010 THE CURRENT AVERAGE ENERGY SPEND OF LIEN COMPANIES IS AROUND €6.5 MILLION.



Refrigeration compressor plant room, Green Isle Gurteen



## DEVELOPMENT OF THE NETWORK

THE LIEN, A NETWORKING AND INFORMATION PROGRAMME FOR LARGE INDUSTRIAL ENERGY USERS, HAS GROWN RAPIDLY OVER 16 YEARS AND NOW INCLUDES 150 OF IRELAND'S LARGEST INDUSTRIAL AND COMMERCIAL COMPANIES.

New members often come from the Energy Agreements Programme (EAP), launched in May 2006. The EAP centres on a commitment to adopt the Energy Management Standard ISO50001 as the means for continuous and sustained improvements in energy efficiency. In 2010, the accumulated energy performance improvement of the longest serving members of the LIEN is 33%. The LIEN companies have established an impressive track record, while the energy expertise and knowledge base gathered by the LIEN over the last 16 years is a huge resource for both current and new members.

In joining the LIEN, companies commit to:

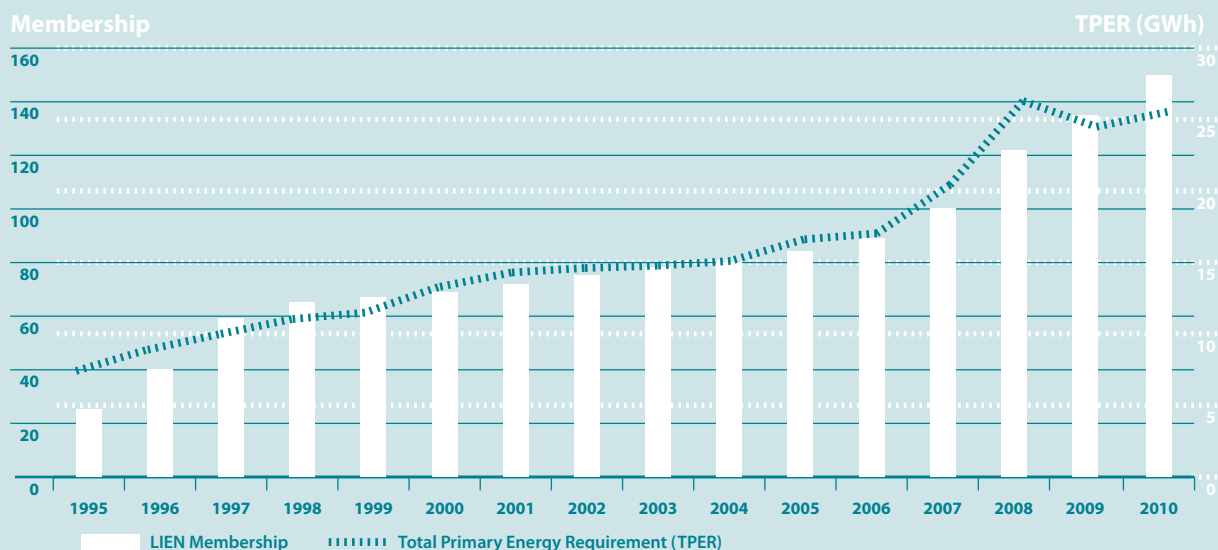
- Develop a management programme for energy use
- Set and review energy targets
- Produce annual statement-of-energy accounts

The following 15 companies joined the LIEN during 2010:

- |  |                                      |
|--|--------------------------------------|
| • Abbott Ireland Diagnostics Division* | • Dawn Meats (Grannagh)              |
| • BD Medical                           | • Fournier Laboratories Ireland Ltd* |
| • BT                                   | • Irish Pride*                       |
| • Celtic Anglian Water                 | • Meadow Meats                       |
| • Celtic Linen                         | • Nypro*                             |
| • Charleville Foods                    | • Recordati Ireland                  |
| • College Proteins Group               | • Taconic International Ltd          |
| • Connolly's Red Mills                 |                                      |

\* These companies are also members of the Energy Agreements Programme

FIGURE 2.1: THE INCREASE IN LIEN MEMBERSHIP 1995-2010, WITH PARTICIPATING COMPANIES' TOTAL PRIMARY ENERGY REQUIREMENT (TPER)



## NETWORK ACTIVITIES FOR LIEN MEMBERS

SEAI WORKS CLOSELY WITH LIEN MEMBERS TO ENSURE THAT THE SUPPORT ACTIVITIES IT PROVIDES REFLECT THEIR NEEDS AND THE PRACTICAL NEEDS OF INDUSTRY. SEAI PROVIDES AND CUSTOMISES EVENTS AND ACTIVITIES SUCH AS WORKSHOPS, SITE VISITS, SEMINARS AND CONFERENCES. THESE ACTIVITIES ARE CLOSELY INTEGRATED WITH SEAI'S WIDER ENERGY PROGRAMMES, WHILE NETWORK MEMBERS HOST MANY OF THE EVENTS, WHICH INCREASES THEIR IMPACT.

Some of the key events that took place in 2010 were:

### **TRANSITION FROM IS 393 TO EN16001 – MARCH**

The European Energy Management Standard EN16001 was published in July 2009. A transition timeframe of one year was established. Two additional workshops for EAP members were held in 2010.

The workshops detailed how companies should transition from IS 393 to EN16001. The key changes in the new standard were detailed and guidance provided on how best to deal with each of the new additions. The workshop provided feedback from companies that have successfully made the transition to EN16001. The workshop also provided guidance on integrating a standalone energy management system (EnMS) with existing management systems.

### **IMPLEMENTING AND MAINTAINING AN EFFECTIVE EN16001 ENERGY MANAGEMENT SYSTEM – MAY & OCTOBER**

Two workshops were held for EAP members on effectively implementing and maintaining the EN16001 standard. The emphasis was on ensuring that an EnMS is implemented with an engineering bias and is best placed to achieve continuous savings.

The workshop demonstrated the benefits of implementation and gave delegates a clear clause-by-clause understanding of the elements of EN16001.

The workshop included case-study exercises so as to increase understanding of the management system components, and provided an appreciation of how to implement and operate EN16001 effectively.

The May seminar was held in Portlaoise while the Pfizer Drug Product Plant in Loughbeg hosted the October seminar.

### **MONITORING ENERGY PERFORMANCE: MEETING THE REQUIREMENT OF EN16001 – JUNE**

This workshop was aimed at organisations with an interest in developing their ability to use energy data to improve performance.

The workshop featured speakers from industry who shared their Monitoring and Targeting (M&T) experiences and covered the following topics: energy factors, techniques for assessing relationships, data mining and energy management, development of a metering plan, justifying the financial case for M&T, and incorporating metering into energy-efficient design.

The HJ Heinz energy team hosted the workshop.

### **IRELAND'S ENERGY MARKET – JULY**

This annual seminar helps LIEN members to gain an up-to-date understanding of Ireland's energy market. It brought together some of the energy market's leading participants.

The seminar addressed topics of market development and infrastructure, including pricing trends for gas and electricity, and regulatory considerations.

The seminar was followed by a tour of the Synergen Dublin Bay Power Plant.

### **ENERGY AWARENESS – OCTOBER**

An energy awareness seminar was hosted by Roche Ireland to coincide with its energy awareness week.

SEAI provided case studies on effective energy awareness campaigns and practices. Change management in relation to energy initiatives was also addressed. Roche outlined its successes since implementing EN16001, with a particular focus on how energy awareness aided its process of energy reduction.



The theme of their energy awareness week was energy savings in the home, which also focused people's attention on energy efficiency at work. There were exhibits from a number of suppliers of energy efficiency products, including solar heat collectors, domestic wind generation, biomass domestic hot water boilers, insulation, electric bicycles & cars, and thermal imaging.

The seminar was followed by a site tour to highlight the measures undertaken to improve overall energy efficiency on site.

### MAKING ENERGY INVESTMENTS – OCTOBER

This energy investments seminar was developed for organisations interested in alternative procurement options for energy efficiency projects.

Industry speakers shared their experiences around topics such as financial appraisal techniques, common causes of failure for energy investment proposals, EScO experience and energy performance contracting, capital management and outsourcing model, and monitoring and verification.

Examples of project implementation and Capex approval were also provided to attendees.

The seminar was hosted by Abbott Ireland, Nutrition Division.

### LIEN 2009 ANNUAL REPORT LAUNCH / HVAC AND EED METHODOLOGY SPECIAL INITIATIVE PROJECTS – DECEMBER

This LIEN event launched the 2009 LIEN Annual Report, while a seminar was held to provide a detailed update on SEAI-sponsored HVAC and EED projects.

The seminar addressed how HVAC systems can be best optimised and integrated into an EnMS. A critical element of this, operational control, was dealt with in detail.

The Energy Efficient Design (EED) Methodology, developed by SEAI in collaboration with EAP members, engineering design companies and energy consulting service companies, was also presented. The EED approach is consistent with EN16001 and the results of case studies demonstrated how savings of 20% to 40% can be achieved.

Industrial speakers outlined their experiences and advised on the next steps required.

The seminar was hosted by the Pfizer Biotechnology manufacturing site in Grangecastle and followed by a site tour.

### THE SEAI SUSTAINABLE ENERGY AWARDS 2010 – NOVEMBER

This black-tie gala event for Irish industry grows each year in participation and significance. The cumulative energy cost savings achieved by projects which have entered the awards, since they were launched in 2004, are estimated at €358 million. The 2010 entrants to the awards reported energy savings of €17 million, based on the energy-management initiatives that they implemented.

#### Category C: Energy Efficiency Award – Major User

Finalists: Roche Ireland Ltd, Kerry Foods

#### Category D: Integrated Energy Management Award – Major User

Winner: Cordis Cashel

Finalists: Citi, Recordati Ireland

#### Category E: Energy Manager of the Year, Major User

Finalists: Abbott Ireland, Recordati Ireland

#### Category G: Energy Awareness Awards

Finalists: CITI, DairyGold

#### Category I: Sustainable Energy Innovation Award

Finalist: MSD Ireland



*Pictured at the 2010 SEAI Awards in the Radisson Hotel in Dublin was Brid Horan, Executive Director ESB Services and Energy Solutions and Brendan Halligan, Chairman of SEAI with the winner of the Integrated Energy Management Award, Major User - John Reardon and Niall Prendergast of Cordis Cashel (a Johnson and Johnson Company).*

## ENERGY AGREEMENTS PROGRAMME

### AN OVERVIEW OF THE STRATEGY TO DRIVE PERFORMANCE

THE ENERGY AGREEMENTS PROGRAMME (EAP) IS AIMED AT LARGE ENERGY USERS THAT WANT TO TAKE A STRONG, STRATEGIC AND SYSTEMATIC APPROACH TO ENERGY MANAGEMENT IN ORDER TO REDUCE ENERGY-RELATED COSTS AND EMISSIONS.

EAP members:

- Enter into an on-going relationship with SEAI
- Implement the Energy Management System ISO50001 as a way of ensuring continuous improvement and control of energy across all processes
- Pursue an aggressive programme of energy efficiency action and investment
- Complete on-going Special Investigations focusing on the viability of new energy-efficient technology or changes to core processes in energy-intensive areas

In return, SEAI provides tailored support, advice, networking and some financial supports. The programme has two tiers of engagement through those committed to the EAP and those to the LIEN only. The programme has an objective to stimulate additional activity within both groups. This is achieved through the continuous development of new solutions, applications and information with consideration of the appropriate mechanisms that could stimulate the action within the network. This activity, along with demonstration, develops a new body of knowledge for replication and standardisation.

Figure 3.1 provides an outline of this strategy for extracting greater performance than what may be achieved otherwise or at least not within the same timeframe. A key aspect is the promotion of best practices and the diffusion of new best practices into the programme.



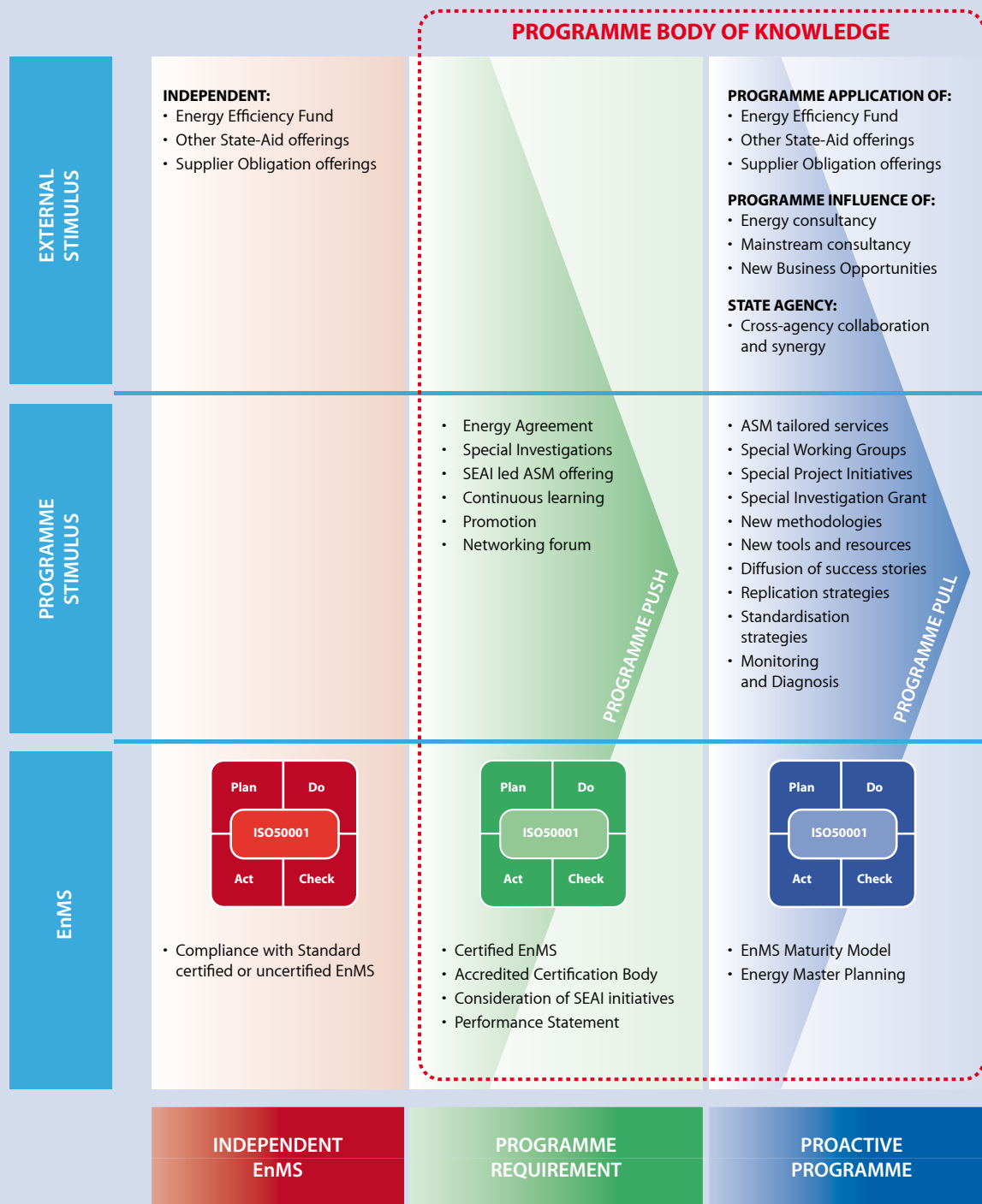
*Dairygold Food Ingredients, Mitchelstown, Co. Cork.*



*View of Digesters, Rusal Aughinish, Co. Limerick.*



FIGURE 3.1: PROGRAMME STRATEGY TO DRIVE PERFORMANCE IMPROVEMENT



## BODY OF KNOWLEDGE

### DEVELOPMENT & INTEGRATION

**SEAI UNDERTAKES SPECIAL PROJECT INITIATIVES ANNUALLY TO ACCELERATE SPECIAL INVESTIGATIONS ACTIVITY AND STIMULATE THE DRIVE FOR CONTINUAL IMPROVEMENT BY MEMBERS – AND ULTIMATELY BY ANY BUSINESS.**

These SEAI-led Special Project Initiatives take a variety of formats; the most common is a Special Working Group (SWG). The aim of Special Project Initiatives is to stimulate members' engagement in special investigations by combining programme supports with a focus on an energy use, new technologies, new methodologies or sector-specific projects. Efforts are made to develop the processes or methodologies that can uncover the opportunity, regardless of the nature of the business.

These follow a course of concept development, researching, testing, and the application of new or existing methodological approaches to energy efficiency. A body of knowledge is thus developed, while the desired outcome is to replicate and standardise whatever proves successful. Lessons learned from each project cycle are integrated into the objectives and scope of work for the next cycle. The network is then used to disseminate and standardise the successful actions.

Many stakeholders can benefit from the outputs of the programme initiatives, including energy users, energy service providers, energy and general consultancy companies, engineering design companies, enterprise-development companies, research groups and universities.

All activity by the programme is underpinned by an *Energy Management System* (EnMS) approach. SWG topics include Energy-Efficient Design, Alternative (Business Improvement) Methodologies, HVAC, and sector-focused projects such as Food & Dairy, Data Centres, and Commercial Buildings.

These experiences are developing a Body of Knowledge within the programme and the wider LIEN. The knowledge is built on energy management systems experiences, special project initiatives, developmental and demonstration projects derived by the programme. Through this work key opportunity areas are highlighted to be replicated and standardised further. The Agreements Support Managers have a critical role in embedding these opportunities into members' work programmes. Figure 3.2 provides this outline and also the role that external sources, such as energy service companies, may help to further replicate.

**FIGURE 3.2: BODY OF KNOWLEDGE DEVELOPMENT AND DISSEMINATION**

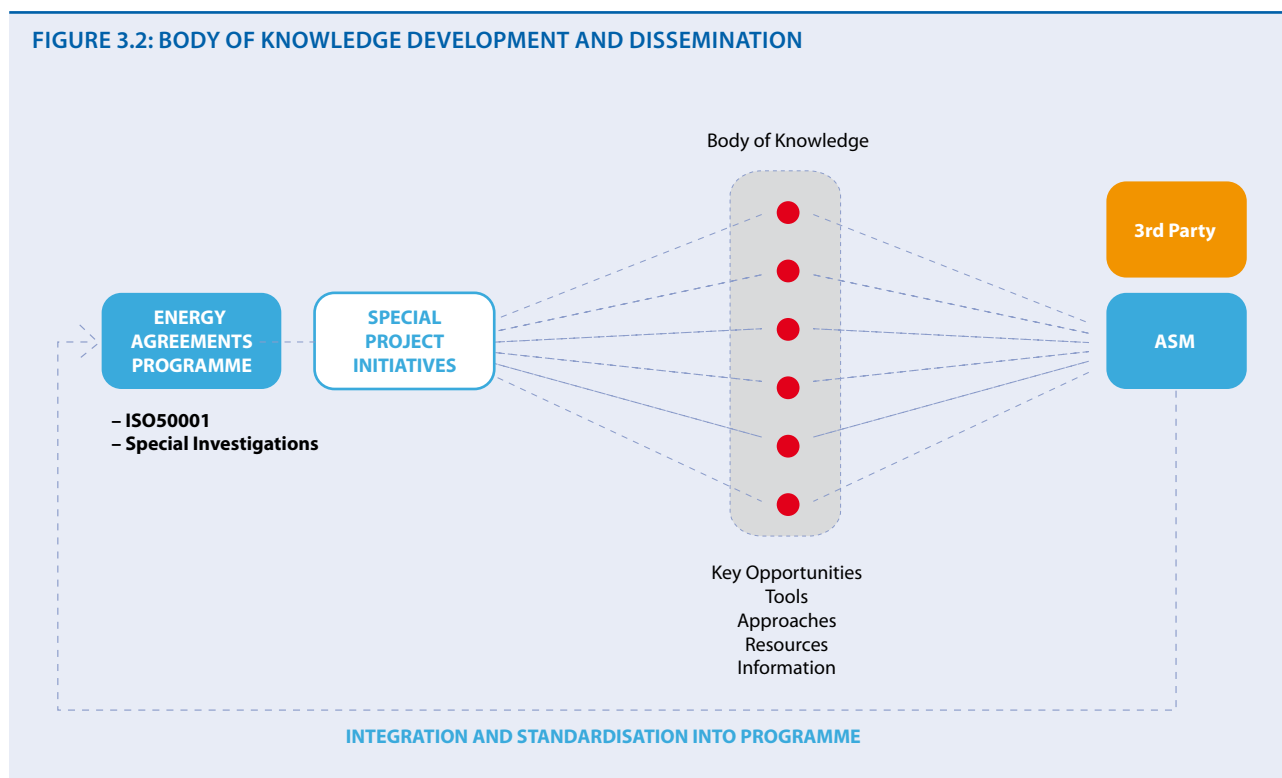




FIGURE 3.3: SPECIAL INITIATIVES FOCUS AREA

Year	Technology	Methodology	Sector Focus	Grant Scheme
2007	HVAC SWG Spin I	EED Workshop & diagnosis		Industrial Best Practice Initiative
	Compressed Air SWG Spin I			
2008-2009	HVAC SWG Spin II	EED SWG Spin I		Supports for Exemplar Energy Efficiency Projects
	Refrigeration SWG Spin I	Alternative Methodologies SWG Spin I		
	Compressed Air Benchmarking			
	HVAC Benchmarking			
2009-2010	HVAC SWG Spin III	EED SWG Spin II	Food and Dairy SWG Spin I	Energy Efficiency Fund (EEF)
		Alternative Methodologies SWG Spin II	Data Centres SWG Spin I	
			Commercial Buildings SWG Spin I	
2011	HVAC SWG Spin IV	Energy Management Maturity Model	Data Centre	Better Energy Workplaces (EEF)
			Food, Beverage & Dairy	
			Commercial Buildings	

## Special Initiative Categories

Special Working Group
  Specific Project
  Sectoral Energy Network
  Grant Scheme

## BODY OF KNOWLEDGE

### SEAI EED METHODOLOGY DEVELOPMENT

THE ENERGY-EFFICIENT DESIGN (EED) SWG, ESTABLISHED IN SEPTEMBER 2008, INCLUDED PROGRAMME MEMBERS, ENGINEERING DESIGN COMPANIES, ENERGY CONSULTANCY COMPANIES AND SEAI. THE KEY WEAKNESS IDENTIFIED WAS THAT DESIGN PROJECTS ARE NOT ORGANISED, NOR ARE THE DESIGN PROCESSES IN PLACE, TO DELIVER OPTIMUM EED.

#### HOW THE EED SWG CREATED AN URGENTLY NEEDED SOLUTION

At the opening meeting of the Energy-Efficient Design (EED) SWG, attendees were asked for their perspective on EED and their expectations for the work programme.

Almost all wanted to see more guideline documents, more best-practice documents and more case studies. Through discussion, it was realised that a large volume of this type of material was already available.

Why, then, were these energy efficiency design practices not achieving the improved performance that was believed to be possible?

It was concluded that design projects are not organised to deliver energy efficiency. It is not a core project success criterion as are quality, cost, schedule, or safety performance.

#### NEED FOR EED METHODOLOGY

It was agreed that a methodology was needed to help investors to design, construct and manage projects so that they consume the minimum quantity of energy during their subsequent operation.

The SEAI EED Methodology guideline document has two aspects: Project Organisation and Design Activities. An organisation is required to ensure that the design activities are correctly implemented. Two new project roles are recommended: EED owner and EED expert:

- The EED owner, a member of the investor organisation, is accountable to senior management for implementing EED Methodology within that organisation.
- The EED expert's responsibilities include the day-to-day execution, coordination and management of the EED activities during the project lifecycle.

EED activities comprise EED 3-Phase Process and Design for Energy Management (DfEM).

During the lifetime of the EED SWG, the importance of a lifecycle approach to energy management became apparent. In current project practices, energy management typically begins in the *operational* phase – i.e. when the project is handed over to the end user. However, the EED Methodology recommends that energy management begin in the *design* phase – by implementing a structured approach to EED, by planning for operational-phase energy management, and by formal handover of the EED activities from the design team to the operations team.

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## EED

THE SEAI EED METHODOLOGY HAS TWO ASPECTS: PROJECT ORGANISATION AND DESIGN ACTIVITIES.

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## NEW PROJECT ROLES

TWO NEW PROJECT ROLES ARE RECOMMENDED: EED OWNER AND EED EXPERT.



## IMPORTANT BODY OF WORK PRODUCED

The EED SWG has produced a very innovative and important body of work. Organisations implementing EED now have a robust solution that can be integrated into existing design and management systems.

The methodology has been presented at a number of both national and international conferences. It has always been well received.

*"I have presented the SEAI EED Methodology at conferences, e.g., International Society for Pharmaceutical Engineering (ISPE) and directly to clients of PM Group. People are sometimes caught off-guard. They expect to hear about new energy-efficient technologies. I believe they are hearing about something far more important: a methodology to assist them in ensuring all these good technologies are correctly applied in new projects."*

**CON LEDDY, PM GROUP –  
IRISH ENGINEERING DESIGN MULTINATIONAL**

## EED KEY BENEFITS

EED Methodology and its supporting documents assist compliance with numerous aspects of an Energy Management Standard such as ISO50001. Some of the more important aspects are:

- Considering the energy usage and control of new plant
- Generating energy saving ideas for the EnMS Opportunities Register
- Energy planning
- Developing an energy metering plan
- Supporting continuous improvement

The SEAI EED Methodology provides investors with a structure to achieve optimum energy efficiency in new developments. It also provides engineering companies with new business opportunities and a competitive advantage in terms of the maturity of its approach to energy management.

## EED ACTIVITIES

EED ACTIVITIES COMPRISE EED 3-PHASE  
PROCESS AND DESIGN FOR ENERGY  
MANAGEMENT (DfEM)



Astellas Ireland Co. Ltd, Killorglin, Co. Kerry

## BODY OF KNOWLEDGE

### ENERGY MANAGEMENT MATURITY MODEL

THE EAP WAS LAUNCHED IN MAY 2006. SINCE THEN MEMBERS HAVE BECOME MUCH MORE PROFICIENT IN THE USE OF ENERGY MANAGEMENT SYSTEMS (ENMS) AND SUBSTANTIAL SAVINGS HAVE BEEN ACHIEVED. ENMS'S CAN BE CONTINUOUSLY IMPROVED AND INTEGRATED FURTHER INTO AN ORGANISATION'S BUSINESS AND OPERATIONS MANAGEMENT ACTIVITIES. ITS BUSINESS CASE AND RETURN ON INVESTMENT SHOULD BE CONTINUOUSLY CHALLENGED.

Common questions are: *What's next now that we are certified? Can we do this work without the cost of certification? How can it be developed further?*

As a strategic response, SEAI developed an Energy Management Maturity Model to provide a roadmap for progressive energy management in large organisations whereby an EnMS can be developed and used more effectively. It is a means to impart knowledge to EnMS users within the overall energy master-planning process.

The Energy Management Maturity Model:

- Promotes the development of energy management as a strategic goal
- Complements and integrates with other activities such as corporate social responsibility and the carbon-reduction agenda
- Is applicable at all levels of energy-management engagement, from organisations starting out to those that have maintained certification to an energy-management standard for some years

- Examines the organisation as a whole and looks at how its practices not only affect its own energy performance but also that of the value stream and supply chain
- Complements EN16001 and ISO50001, and provides insights into how to improve further once good practices have been embedded

The assessment serves as a baseline to help the company to identify its current level of performance and to act as a reference for periodic review.

Over time, as the maturity model is deployed, a correlation will be tested between a level of maturity and the level of sustained energy-performance improvement. The model may be a very useful tool to benchmark and uncover new experiences on the use of EnMS across sectors and countries.

The management system maturity has five levels; their characteristics are outlined below.

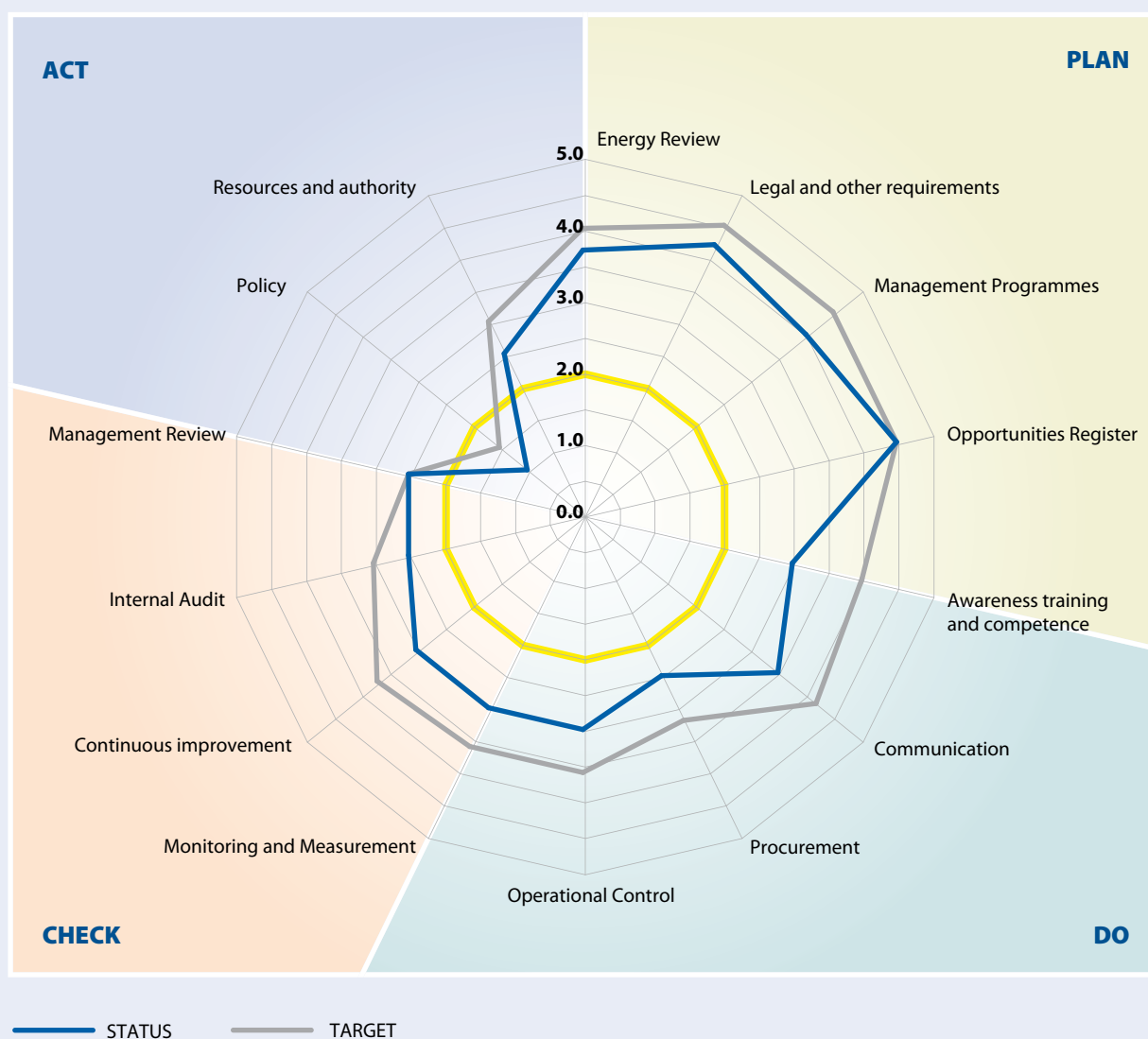
TABLE 3.1: ENERGY MANAGEMENT MATURITY MODEL – LEVELS OF MATURITY

Level	Characteristics
<b>1. Emerging</b>	Contemplating an Energy Management System. Might have elements of EnMS deployed. Unstructured or informal approach in place. Very few participating in Energy management with limited or no tools.
<b>2. Defining</b>	Structured system in place. Management aware of Energy policy with at least one senior manager with formal responsibility. There is an Energy Management team in place. EnMS complies with Energy Management Standard.
<b>3. Integrating</b>	Energy Management now mainstream across organisation. Proactive management of significant energy uses. Energy considerations span functional interests with evidence of tangible site benefits.
<b>4. Optimising</b>	Energy managed very effectively leveraging all functions, processes and infrastructure. Culture of Energy Management embedded. Evidence of existing practices challenged and some state of the art solutions deployed. Evidence of collaboration with other participants in the supply chain or other corporate functions
<b>5. Innovating</b>	Innovative promotion of energy management practices is evident.. Proactive Energy Management culture. External resources leveraged to develop state of the art /industry practices and solutions. Advocating Energy Management to external audiences and forming new Energy Management partnerships for innovation and R&D.



An organisation's EnMS progress can be facilitated and evaluated through the guidance and roadmap provided by outputs from the Maturity Model, as indicated below.

FIGURE 3.4: ENERGY MANAGEMENT MATURITY MODEL - OUTPUT EXAMPLE



## BODY OF KNOWLEDGE

### SECTOR-FOCUSED PROJECTS

THREE SECTOR-FOCUSED PROJECTS HAVE BEEN COMPLETED. THESE HAVE FOCUSED ON DEVELOPMENT OF KEY OPPORTUNITIES SPECIFIC TO SECTORS. SECTORS ARE SELECTED BASED ON ENERGY SAVING POTENTIAL, LIEN MEMBERSHIP SCALE AND PROGRAMME SUPPORT COMMITMENT. THE SWG'S HAVE NOW TRANSITIONED TO SECTORAL ENERGY NETWORKS THAT ARE A SUBSET OF THE WIDER LIEN.

#### FOOD & DAIRY SWG: UP TO €120M IN SAVINGS ESTIMATED

In September 2009, SEAI established the Food & Dairy SWG.

The food and dairy industry in Ireland represents around 20% of total industrial energy usage in the Republic of Ireland. The level of potential energy efficiency improvements achievable is estimated to be between 10% and 30%. This would translate into 550 GWh to 1,650 GWh and cost savings of €40 million to €120 million across the sector.

The Food & Dairy SWG's role was to support members in constantly improving energy performance through continuous improvement. Special investigations, conducted on an ongoing basis, have highlighted areas for improvement.

The SWG's specific outputs consist of:

- Sector analysis findings detailing the areas of focus that present the best opportunities for energy savings
- Opportunity lists in the key technical areas that present the best opportunities for energy efficiency improvements
- Commissioned member site investigation reports
- Strategic studies, including the Steam Reduction in Ireland Programme and Process Integration & Heat Recovery in the Irish Food Industry
- A guide to energy monitoring and targeting, in particular the establishment of KPI structures
- An introduction to site Energy Master Planning

This SWG intends to facilitate identification of new investigation opportunities that are most appropriate to the particular needs of the SWG members.

The site investigation reports indicate substantial scope for energy reduction across almost every element of the food and dairy production process. Almost every site visited could reduce process and utility energy requirements through, for example, improving heating or cooling methods, heat recovery, and training of operators.

Fundamental to this working group, and in line with other SWGs, was the auditing approach taken, based on the Energy Venn Diagram. This approach facilitates the application of a consistent methodology in carrying out a technical audit at a site and complements the EN16001/ISO50001 process.

In conclusion, it is estimated that energy savings of up to 30% are possible in the sector. The SWG outputs present the key opportunities for energy reduction across the sector and should be used by industry to stimulate the identification of new opportunities that should be investigated.

#### DATA CENTRE SWG DRIVES SERIES OF INITIATIVES

The Data Centre SWG was set up in September 2009 to highlight energy efficiency best practice and to drive energy efficiency projects in the Irish data-centre sector.

Given the variety of member backgrounds and energy efficiency priorities, the SWG took a phased approach:

- Phase 1 – Site Assessments: to evaluate each participant's energy consumption and use of cooling technology, and to identify potential saving opportunities
- Phase 2 – Demonstration Projects, based on the projects of participating companies, which will provide topical case studies for the data-centre industry

The outputs of five site assessments will drive a series of data-centre energy efficiency initiatives that will help to reduce energy usage and running costs.

In parallel to the site assessments, the SWG commissioned a set of practical guidelines on:

1. Increasing Energy Efficiency in Data Centres
2. Energy Efficient Design (EED) in Data Centres
3. EN16001/ISO50001 Certification for Data Centres



## COMMERCIAL BUILDINGS SWG PRODUCES WIDE RANGE OF OUTPUTS

SWG members included Bank of Ireland, Connacht Gold, Eircom, Google, Tesco and Irish Rail. They were facilitated by SEAI and supported by a panel of technical experts. Subject matter comprised: Benchmarking, Operations & Maintenance, Standard Solutions for Retrofit, Retro-commissioning, Energy Needs Auditing, and Change Management.

**Site audits & special investigations:** Each company selected a building and benefited from an energy audit specific to its interest. Being at different points of energy programme maturity, some wanted the audit to focus on key energy practices, while others wanted special investigations on 'out-of-hours' consumption, and occupancy-driven HVAC control. Case studies were produced as a result.

**Benchmarking in an Irish context:** Desktop research into typical KPIs and international energy benchmarking standards was carried out. The SWG commissioned an investigation to normalize benchmarks to the Irish environment. An Excel-based tool, where users can input annual operating hours and energy consumption per m<sup>2</sup>, resulted.

**Operations & maintenance (O&M):** This work focused on good maintenance and operational practices in respect of commercial buildings' lighting, space heating, hot water, control systems and devices, fabric, and elements. The materials were gathered into one reference document, which outlines the benefits of a systemic approach and gives guidance for analysing the O&M aspects of a building, setting reduction targets, and verifying results.

**Standard solutions for retrofit:** The main output was a comprehensive reference manual, which focuses on the design considerations for retrofitting standard solutions to commercial buildings.

**Change management:** A key question is why some energy projects don't get implemented even when savings are certain. Work involved researching within the group and reporting on the barriers to and drivers for implementation of energy initiatives, as well as a review of traditional change-management techniques and approaches. This work may be applied to any energy project.

**Retro-commissioning & user needs auditing:** Research was carried out into retro-commissioning, which is often seen as something that 'only happens in the USA'. For buildings requiring retrofit, an energy audit from a user needs perspective is imperative. An auditing tool/templates derived from the Energy Venn Diagram were developed. The templates were tested in a case study. A proposed retrofit 'project selection' tool is also included in the materials.

### Case studies:

Several case studies have been published:

- *Occupancy-driven HVAC control* – two examples, showing substantial energy savings. In one case the payback was in the order of months.
- *Out of hours* – demonstrating relatively high energy usage even when work activities have ceased. Again significant savings were identified.
- *Operations & maintenance* – Two large, functionally different commercial buildings were studied relative to the best practices suggested in the O&M materials developed by this group. Recommendations focused in particular on building operational management and controls, and improvements to the O&M materials.
- *User needs auditing:* The tools/templates developed by the group were tested on a building and upgraded, based on the experience. The importance of user and occupier questioning and feedback was highlighted as a key activity.

# 20%

THE FOOD AND DAIRY INDUSTRY IN IRELAND REPRESENTS AROUND 20% OF TOTAL INDUSTRIAL ENERGY USAGE IN THE REPUBLIC OF IRELAND.

# €120M

THE LEVEL OF POTENTIAL ENERGY EFFICIENCY IMPROVEMENTS ACHIEVABLE IS ESTIMATED TO BE BETWEEN 10% AND 30%. THIS WOULD TRANSLATE INTO 550 TO 1,650 GWH AND COST SAVINGS OF €40 MILLION TO €120 MILLION ACROSS THE SECTOR.

## BODY OF KNOWLEDGE

### NEW ENERGY MANAGEMENT TOOLS

NEW ENERGY MANAGEMENT TOOLS AND RESOURCES CAN BE DEVELOPED THROUGH THE VARIOUS PROJECT INITIATIVES UNDERTAKEN BY THE PROGRAMME. ONE SUCH TOOL IS THE OPERATIONAL CONTROL CHECKLIST DEVELOPED BY THE HVAC SWG PROJECT INITIATIVE.

#### OPERATIONAL CONTROL

The HVAC SWG is one of the most mature initiatives within the EAP. It made great advances in its work to help companies gain optimal performance from their HVAC systems.

Heating, Ventilation and Air Conditioning (HVAC) can account for as much as 80% of a site's total energy budget. Opportunities to ensure energy-efficient HVAC arise at the design, operation and maintenance stages of a system's lifecycle.

The first HVAC SWG (Spin I, 2007: 14 participating companies):

- Investigated the extent of potential savings
- Collected data and audited HVAC energy use
- Identified bad practices and quickly achievable measures
- Identified issues and obstacles needing more detailed investigation

It found that maintaining an energy-efficient HVAC system could reduce its operating costs by as much as 40% and that HVAC energy-saving projects could reduce a site's total energy usage by up to 16%.

New toolkits and methodologies were added to the suite of supports and these resources were aligned with EN16001 to ensure more effective operation.

Spin II (2008: 13 companies) investigated further and in greater detail the savings potentials. Its output included:

- Report on HVAC savings opportunities
- HVAC system audit guide
- Control strategy illustration of good and bad practice
- URS guidance document on including energy efficiency at project design stage
- Case studies
- Demonstration project in highly regulated facility

The potential opportunities identified were:

- Savings of around 134 GWh of electrical energy and 84 GWh of thermal energy
- Energy savings of €17.9 million
- Reduction of CO<sub>2</sub> emissions by 98,000 tonnes

#### THE MISSING LINK

The earlier spins focused on traditional areas such as technologies, controls, benchmarking and regulatory requirements. Spin III (2008: 13 companies) focused on pinpointing any gaps and on aligning all the resources developed to implementation within the framework of EN16001.

Improved operational control was pinpointed as the 'missing link'. Several operational control resources were developed, receiving excellent feedback from SWG members. This work centred on a HVAC EN16001 process-type gap analysis.

In the final phase, HVAC SWG Spin IV will standardise the resources and energy-management supports developed during the four-year programme.

#### OPERATIONAL CONTROL CHECKLIST

The potential for eliminating energy waste in the day-to-day activities of HVAC users is considerable. A generic spreadsheet, customisable for individual AHUs, was designed, tested and released. This resource targets full use of a building energy-management system (BEMS) and minimal field survey work.

#### SPECIAL INVESTIGATIONS

The SWG identified average energy savings of around €150,000 per facility. These savings are all the more remarkable as participating companies have been actively managing energy for years. The SWG thus clearly demonstrated how optimising HVAC systems can achieve substantial savings.

#### STANDARDISATION

As a result of energy savings, non-energy benefits and user testimonials, this concept of Operation Control Spreadsheets is being standardised. A project initiative is underway in 2011 to develop an Operational Control Spreadsheet for other common significant energy uses;

- Refrigeration and cooling systems
- Steam generation and distribution
- Compressed air generation and distribution

Standardisation efforts include demonstration projects, case study development and assistance for procedure development and training.

*"The practical and targeted nature of the Operational Control Checklist impressed upon us the potential energy savings that could be obtained with relative ease by using our BEMS more effectively."*

– MICHEÁL CASSIDY, ENERGY MANAGER, ASTELLAS

## Pfizer cut energy use by 30%



# 70%

HVAC ACCOUNTS FOR ALMOST 70% OF THE SITE'S OVERALL ENERGY CONSUMPTION, THEREFORE THIS HAS BEEN AN AREA THAT PFIZER LOUGHBEG HAS FOCUSED ON.

# 90%

DYNAMIC CONTROL OF AIR CHANGES PER HOUR (ACPH) IN WAREHOUSE WITH A REDUCTION IN ELECTRICAL CONSUMPTION OF 90%.

### ENERGY MANAGEMENT

In May 2006 Pfizer Loughbeg Drug Product plant signed up to SEAI's Energy Agreements Programme. In line with this the site successfully implemented and was certified to IS393 and transitioned to EN16001, the European Energy Management standard in September 2010. Throughout 2011 Pfizer Loughbeg improved and developed this energy management system. In October 2011 Pfizer Loughbeg was one of the first companies in Ireland to be certified to ISO50001, the International Energy Management standard.

HVAC accounts for almost 70% of the site's overall energy consumption. Pfizer Loughbeg has thus focused on this area and has had much success in reducing associated consumption.

### HVAC

Pfizer Loughbeg has addressed a number of areas in order to reduce HVAC energy consumption including:

- Dynamic control of Air Changes Per Hour (ACPH) in Warehouse with a reduction in electrical consumption of 90%
- Reduction in lab HVAC energy consumption of 50%
- Ongoing evaluation of set-back to HVAC at weekends
- HVAC energy reduction in selected GMP areas

### Operational Control of HVAC

In addition to implementing energy reduction projects the site has begun focusing in the past 12 months on improving operational control, particularly in relation to HVAC. Pfizer Loughbeg was informed by their Energy Agreements Support Manager of the potential benefits of a new HVAC Operational Control spreadsheet which was developed as part of the HVAC Special Working Group.

The site found that the Operational Control spreadsheet provides a structured systematic review of Air Handling Unit performance. The tool applies logical checks, with any unexpected outcomes highlighted for investigation.

The Operational Control spreadsheet was customised for each of the Air Handling Units on site. Pfizer Loughbeg identified further uses for the tool in the area of instrument calibrations. Since implementing the Operational Control spreadsheet the site has regularly identified parasitic losses that would not have previously been detected.

In the past 8 months since implementing the Operational Control spreadsheet Pfizer Loughbeg has seen associated savings of 1,000,000 kWh gas and 150,000 kWh of electricity. As a result Pfizer has started rolling this tool out to other sites here in Ireland, starting with Pfizer Grangecastle.

*"At Pfizer Loughbeg, we have reduced our electricity and gas use since 2009 by 30%. This is largely due to joining SEAI's Energy Agreements Programme and implementing an effective Energy Management System for the site. The adoption of EN16001 followed by our successful certification to ISO50001 forced us to focus on our significant energy uses. Our work to date in energy management has led us to seek out the most efficient operational profile that satisfies our regulatory and corporate quality standards."*

**PAUL FARRELL, SITE ENERGY LEAD, PFIZER LOUGHBEG DRUG PRODUCT PLANT**



## BODY OF KNOWLEDGE

### NEW METHODOLOGIES

IT IS IMPORTANT TO FOCUS ON THE BENEFITS OF COMBINING ENERGY MANAGEMENT WITH BUSINESS IMPROVEMENT METHODOLOGIES SUCH AS LEAN MANUFACTURING AND SIX SIGMA AND RELATED TOOLS. THIS WAS THE AIM OF THE ALTERNATIVE METHODOLOGIES SPECIAL WORKING GROUP WHICH GENERATED ENERGY PERFORMANCE IMPROVEMENTS THAT ARE CONNECTED TO QUALITY, PRODUCTIVITY AND WASTE MINIMISATION.

The Alternative Methodologies SWG:

- Carried out initial research to understand the toolsets available and how they might work together
- Investigated how an energy management system could be integrated into a Lean/Six Sigma environment and synthesised tools and workflows traditionally used in energy, quality and operations management so as to create more effective versions
- Developed a Value Stream Mapping with energy (VSMe) method for the Energy Review Process
- Completed a series of demonstration projects to showcase a number of the proposed alternative methodologies and, in particular, the synthesized tools

The output includes Value Stream Mapping with energy (VSMe) paradigm, demonstration projects, a project report and case studies.

#### COMBINING METHODS ENABLED MAJOR IMPROVEMENTS

The SWG clearly demonstrated the improvements possible through combining and integrating tools and techniques in energy, quality and operations.

The second cycle (Spin II) of the SWG further developed and enhanced analysis and improvement tools for energy management. A significant approach in Spin II for site assessment was the concept of blended experience and expertise, where an improvement expert was teamed up with an energy expert in facilitating the improvement work. This led to substantial benefits for member companies.

The SWG Spin II report describes the development of energy improvement techniques and in particular details of principles and processes applied in using VSMe and MUDAE for energy improvement projects. Additionally, some Lean concepts were explored in relation to their potential impact on energy management.

The case studies range from Kaizen and DMAIC improvement projects to VSMe and MUDAE applications. In addition, an Energy Management Maturity Model was designed, developed and piloted with a number of participant companies.

The SWG showed that mentoring and coaching by Energy and Lean/Six Sigma experts both helped companies to improve their energy performance and enhanced the improvement skills of project participants.

TABLE 3.2: MAIN OUTPUTS OF THE ALTERNATIVE METHODOLOGIES SWG

Key Outputs	Description
Alternative Methodologies SWG report	A report that explores the synergies with mainstream business improvement methodologies.
VSMe	Value Stream Mapping with Energy (VSMe) paradigm. Concepts of Current, Future and Ideal states are introduced to energy management.
Overall Equipment Effectiveness (OEE)	OEE is explored as an energy performance indicator.
Energy Management Maturity Model	A maturity model that facilitates development and improvement of the energy management process, leading to higher performance.
MUDAE concept	The concept of MUDA applied to energy waste in non-value-adding activities. Analogous to 7-Wastes in Lean manufacturing as prompts to diagnose wasted energy.
Further demonstration projects	Case studies of demonstration projects using Kaizen, VSMe, OEE and problem-solving methods.

## Six Sigma HVAC project brings Astellas breakthrough



Astellas Ireland Co. Ltd (Kerry Plant) serves a global market as the production base of immune-suppressant treatments for organ transplant patients. In 2007 it entered the Energy Agreements Programme and achieved IS393 certification in December 2008.

The Alternative Methodologies Special Working Group presented an opportunity for staff at Astellas's Killorglin facility to use Six Sigma to find the best solution for reducing energy consumed by HVAC (22% of total site consumption) without compromising product quality or employee working conditions.

Six Sigma identifies and systematically removes the causes of variation from a process. It improves control of processes through disciplined data-collection and analysis, finding the best means of satisfying business and customer requirements and minimising waste.

The team, led from within the engineering department, included personnel from quality/validation, safety, production, engineering and operational excellence. SEAI provided support by specialist HVAC and Six Sigma consultants.

### AFFINITY METHOD LEADS TO CONSENSUS

A Six Sigma brainstorming technique, the Affinity Group Method, secured the inter-departmental co-operation that was essential.

The output of the Affinity Group Method was converted to a Cause-and-Effect (C&E or fishbone) diagram based on the problem statement of 'Excessive Energy Use in Production HVAC Systems 3,4,5'.

# €40k

ANNUAL COST SAVINGS RELATED TO THERMAL AND ELECTRICAL ENERGY PERFORMANCE IMPROVEMENTS.

# 22%

PERCENTAGE OF TOTAL SITE ENERGY USED BY HVAC.

### OPPORTUNITIES IDENTIFIED

A walk-through of Systems 3, 4 and 5 was conducted by HVAC consultants and Astellas engineers. Their findings, together with the result of the C&E Analysis, identified three opportunities:

- Complete shutdown of System 3 (for employee comfort and duplicated by air-suit breathing air system) at weekends
- Turn-down of System 4
- Widening the setpoint bands for temperature control in System 5

A Design of Experiments (DoE) was prepared to assess the proposed improvements on System 3. The DoE revealed that turning off System 3 would have no adverse impacts on cGMP or other systems. Shutdown of System 3 at weekends will result in electrical energy savings of 230,000 kWh p.a. and thermal energy savings of around 340,000 kWh p.a., yielding effective cost savings of €40,000 annually.

Completing projects on systems 4 and 5, it is estimated, will save a further 108,000 kWh of electrical energy and 65,000 kWh of thermal energy.

This case was a breakthrough for Astellas in the way consensus among a varied group of internal stakeholders was achieved. The Six Sigma approach also:

- Promoted data-driven decision-making in energy management
- Demonstrated use of Six Sigma methodology outside the process areas of the facility where the technique is broadly applied
- Facilitated a cross-functional / cross-departmental approach to energy management

*"Astellas joined SEAI's EAP in 2007 and the next year we were certified to IS 393. The Alternative Methodologies SWG gave us the opportunity to use Six Sigma to find the best way of reducing HVAC energy consumption in our Killorglin facility. The Six Sigma approach has many benefits, but a key one for us was that it showed us how to achieve our aims through agreement among a wide range of internal stakeholders, with a variety of concerns. Overall, it was a breakthrough for us, and we've achieved substantial savings as a result."*

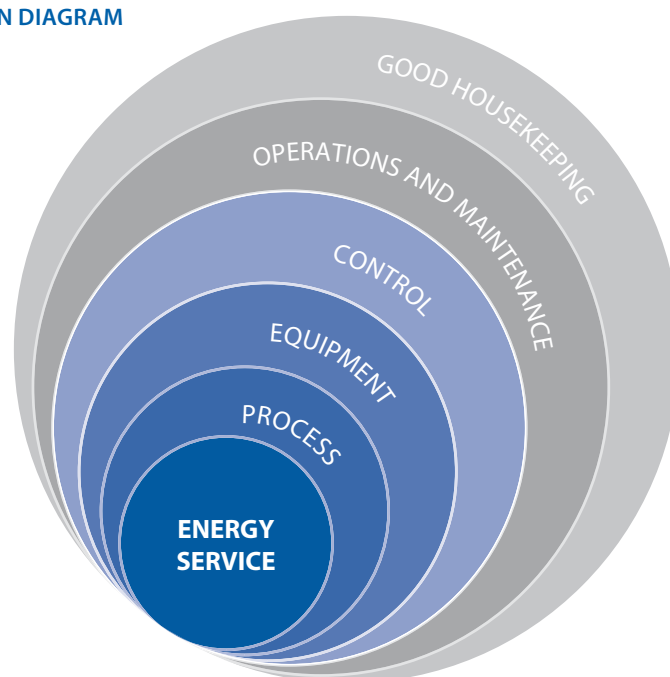
**MICHEÁL CASSIDY, ENERGY MANAGER, ASTELLAS IRELAND CO LTD (KERRY)**

## BODY OF KNOWLEDGE

### SEAI EED METHODOLOGY

THE SEAI EED METHODOLOGY WAS DEVELOPED TO ADDRESS THE COMMON BARRIERS TO ACHIEVING THE BEST ENERGY EFFICIENT DESIGN IN PROJECTS RANGING FROM NEW FACILITY INVESTMENTS TO SMALLER-SCALE NEW-PROCESS DESIGNS. THE METHODOLOGY ADDRESSES TWO MAIN ASPECTS: ORGANISATIONAL AND PROCESS.

FIGURE 3.5: ENERGY VENN DIAGRAM



Demonstration projects were implemented using the EED Methodology. Energy savings of up to 50% were achieved from baseline design.

The main principle of EED is to challenge design decisions at each layer of the EED Venn Diagram. New concepts introduced here are Design for Energy Management (DfEM) and Operation Optimisation Using the EED Methodology.

In DfEM, the energy management process is considered at the design phase. This requires better integration of the facility or process owner in the design process, an understanding of EPIs and Energy Factors, an Energy Review and other important energy-management considerations. The activity develops outputs such as energy metering plans, initiating the Register of Opportunities for which the owner takes responsibility after handover. DfEM also involves wider discussion of general design deliverables, meter selection, mechanical requirements and cost-benefit norms.

Operation Optimisation is developed on the principle that EED is not unique to the actual design stages; the business case may not be as attractive during the operation, but the project may still be justifiable. The process goes step-by-step, as defined by the EED Methodology, and complements the continuous-improvement process of an EnMS.

This method is an alternative to the traditional energy audit process. It has the added benefits of being a process that is data-driven and that leads to implementation of the most appropriate findings. As the data-collection and actions are consistent with an EnMS approach, it should help enterprises to consider further development to implement an EnMS.

The long-term objective in promoting EED is to influence project and design processes so that EED becomes the norm and is implemented at the earliest possible stage of industrial developments.



## Irish facility spearheads Nypro's global energy efficiency drive



# 23%

NYPRO ESTIMATES THAT IMPLEMENTING THE EED PROCESS WILL RESULT IN HVAC SYSTEM ENERGY SAVINGS OF 23% COMPARED TO EXISTING ISO CLASS 8 CLEANROOMS.

# ISO50001

IT WILL BE THE FIRST NYPRO MANUFACTURING FACILITY IN THE WORLD TO IMPLEMENT THE ISO50001 ENERGY MANAGEMENT SYSTEM.

Nypro Healthcare Ireland, a manufacturer of medical devices, is based in Bray, Co. Wicklow. The facility was established in 1980 and employs more than 250 people.

Nypro is an active member of SEAI's LIEN and Energy Agreements Programme (EAP). The Bray facility will be the first Nypro manufacturing facility in the world to implement the ISO50001 Energy Management System.

Energy-efficient design (EED) is one of the most cost-efficient ways to improve energy efficiency in industry, as well as in other major energy-consuming sectors.

With EED, the lifetime energy costs of processes, equipment and utility systems are assessed in the planning phase of a new plant or installation. At this stage, the saving potentials are higher and the investments needed to achieve the savings are much lower than when optimisation is carried out during commercial operation.

### EED CASE STUDY

Nypro proposed its Cleanroom 4 upgrade project as a case study for EED for HVAC in a cleanroom environment. This project involved upgrading a 5,000 sq ft whiteroom to an ISO Class 8 cleanroom.

The HVAC Special Working Group provided an expert to carry out an EED review of the initial stages of the project, using the EED 3-Phase methodology. This expert was independent of the site project team and matters such as cost and schedule could not be put forward as barriers to success, unless this was warranted.

The project management and reporting structure followed that recommended in SEAI's EED Methodology.

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

Phase 1 – Cleanroom Energy Balance

Phase 2 – Analyse & Challenge

Phase 3 – Implementation

The project qualified for SEAI's 2011 Better Energy Workplaces Grant Support Scheme. Nypro estimates that implementing the EED process will result in HVAC system energy savings of 23% compared to existing ISO Class 8 cleanrooms.

The estimated payback period on the additional design and capital costs arising from the EED process is calculated to be approximately 3 years. Furthermore as the EED activities ran parallel to the normal project design process, there were no project delays associated with the EED implementation.

The SEAI EED procedure will be standardised within Nypro's project design processes and the learnings concerning EED of ISO Class 8 cleanrooms are to be shared among all other Nypro sites worldwide.

*"Nypro Healthcare Ireland took active part in the HVAC Special Working Group. When we proposed our cleanroom upgrade project as a case study for EED, the SWG provided us with an expert who worked with our project team, using the EED 3-Phase methodology. We also benefited from a grant from SEAI's 2011 Better Energy Workplaces Scheme. We estimate that the EED process will result in HVAC energy savings of 23%. We're standardising the EED procedure in our design processes and sharing what we've learnt with Nypro sites globally."*

**CECIL BLACK, ENERGY MANAGER, NYPRO LTD**

# ENERGY AGREEMENTS PROGRAMME

## MEMBERSHIP ENGAGEMENT

SUPPORTS CAN BE AVAILED OF BY MEMBERS AND TAILORED ACCORDING TO THEIR YEARLY WORK PROGRAMMES.

**SPECIAL INITIATIVES:** The primary objective is to stimulate special investigation opportunities. Project initiatives may take alternative formats depending on the objective, but the most common and effective format has been through Special Working Groups (SWGs).

**LIEN ACTIVITIES:** SEAI works closely with members to ensure that support activities reflect the practical needs of industry. Activities include workshops, site visits, seminars and conferences.

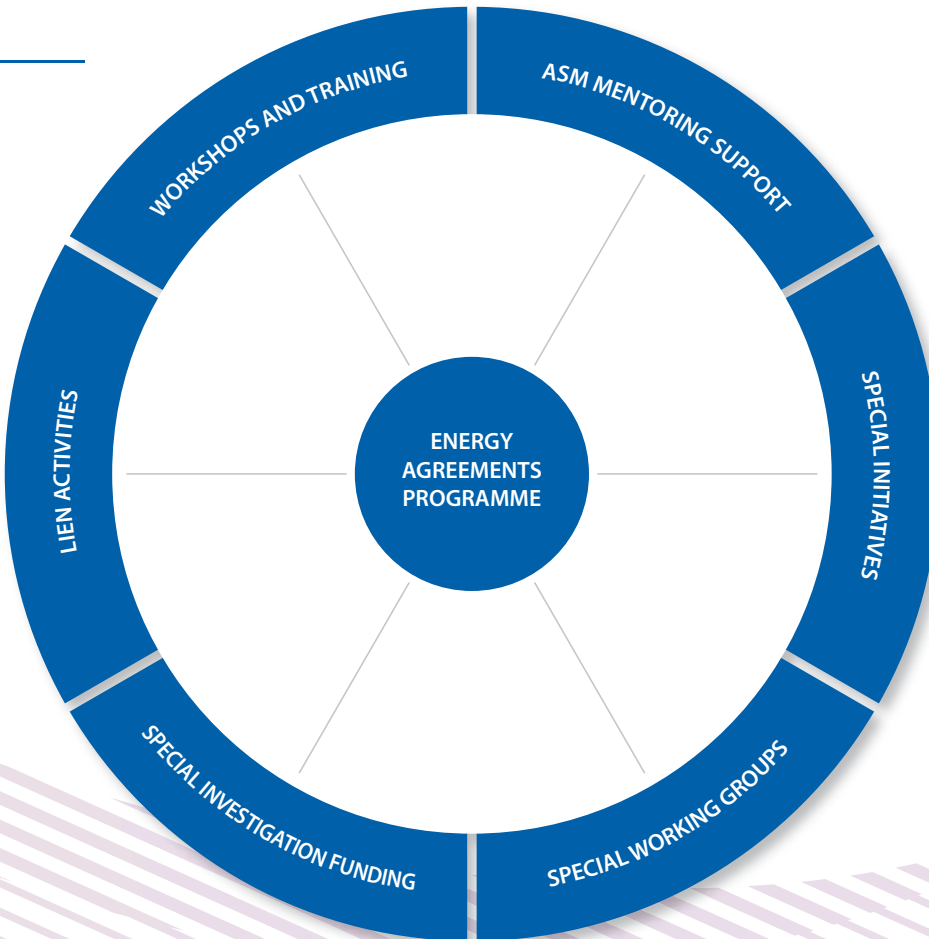
**WORKSHOP TRAINING:** SEAI provides tailored workshops and networking events as part of the EAP. The workshop schedule varies according to topical interest or programme needs.

**ASM MENTORING:** Agreement Support Managers (ASMs) advise on elements of the implementation, operation and maintenance of energy management systems, respond to energy management queries, help companies to meet energy management commitments and assist with appropriate usage of SEAI-developed resources.

**ENERGY AWARENESS & CULTURE:** A wide range of material and resources are available to programme members, including special initiative resources, reports, available benchmarking data, case studies, testimonials and workshop presentations. Additional resources are available through the Energy MAP resource.

**SPECIAL INVESTIGATIONS:** As part of the programme requirements, companies commit to carry out special investigations. The outcomes of the investigations are integrated into the Energy Management System to ensure continuous improvement. SEAI provides support via special initiatives and grant support.

FIGURE 3.6



## EMC achieves data-centre 'all-time best'



The contribution of the Energy Agreements Programme to members can be illustrated by the experience of EMC Information Systems International.

EMC, a LIEN member, entered the Energy Agreements Programme in 2006. It implemented IS 393 and transitioned to EN16001. It actively takes part in Special Working Groups and initiatives and has particularly benefited from participation in the HVAC, Refrigeration, and Data Centre Special Working Groups. EMC were able to integrate their SEAI initiative within the areas of their energy work programme.

The Data Centre Special Working Group explored opportunities that contribute to the improvement of data-centre efficiency or Power Usage Effectiveness (PUE). An opportunity pursued for improvement was to reduce mechanical cooling and to use free cooling where possible. The solution was to introduce fresh-air cooling.

SEAI supported a number of early demonstration projects in 2010 through the Energy Efficiency Fund (EEF). This free-cooling project was a good fit for the objectives of

# 19%

PROJECT COMPLETION WILL RESULT IN A 19% REDUCTION IN ELECTRICITY USAGE, YIELDING SAVINGS OF 10,074,364KWH PER YEAR.

# €500k

THE FREE FRESH AIR COOLING (FFAC) PROJECT OBTAINED THE MAXIMUM GRANT OF €500K, WHICH FACILITATED THE DELIVERY OF THE PROJECT.

the scheme in terms of scale, depth/multiple technologies, technical novelty, new financial/procurement/contractual delivery mechanisms, and replicability.

The Free Fresh Air Cooling (FFAC) Project obtained the maximum grant of €500K, which facilitated the delivery of the project. EMC converted 52,000 sq.ft of laboratory space to FFAC. Project completion will result in a 19% reduction in electricity usage, yielding savings of 10 GWh per year.

Monitoring & verification was an integral element of the project; a 12-month review period was required to fully evaluate the savings realised.

As a result, EMC has improved Data Centre Metrics (PUE) to an all-time best of 1.12.

The diagram below shows the life-cycle of EMC's relationship with SEAI. EMC is sharing the outcome of this project, including all lessons learned and next steps, with the LIEN.

*"EMC's facility in Co. Cork is EMC's largest manufacturing site outside the US. In 2010 we undertook a full retrofit project to implement energy saving technologies in our IT and data-centre site, using free cooling systems. We received €500,000 funding from SEAI's Energy Efficiency Fund. Through this retrofit, we've cut energy use by almost 20% and strengthened our cost-competitiveness, while supporting our environmental strategy. It's one of the most radical projects carried out at a hi-tech facility in Ireland and shows how retrofitting can be carried out on a major scale."*

**BOB SAVAGE, VICE-PRESIDENT OF EMC AND MANAGING DIRECTOR OF EMC IRELAND**

### EMC / SEAI RELATIONSHIP DEVELOPMENT

MEMBERSHIP	<ul style="list-style-type: none"> <li>Membership of LIEN</li> <li>Energy Agreements Programme</li> </ul>
SPECIAL INITIATIVES	<ul style="list-style-type: none"> <li>Member of Multiple SWGs</li> <li>Special Investigations</li> <li>Feasibility Study</li> </ul>
PROJECT IMPLEMENTATION	<ul style="list-style-type: none"> <li>Grant support from SEAI</li> <li>Project delivery</li> <li>Verification of savings</li> </ul>
INFORMATION SHARING	<ul style="list-style-type: none"> <li>Active participant in SEAI meetings and seminars</li> <li>Seminar Presentations</li> <li>Plant Tours</li> </ul>

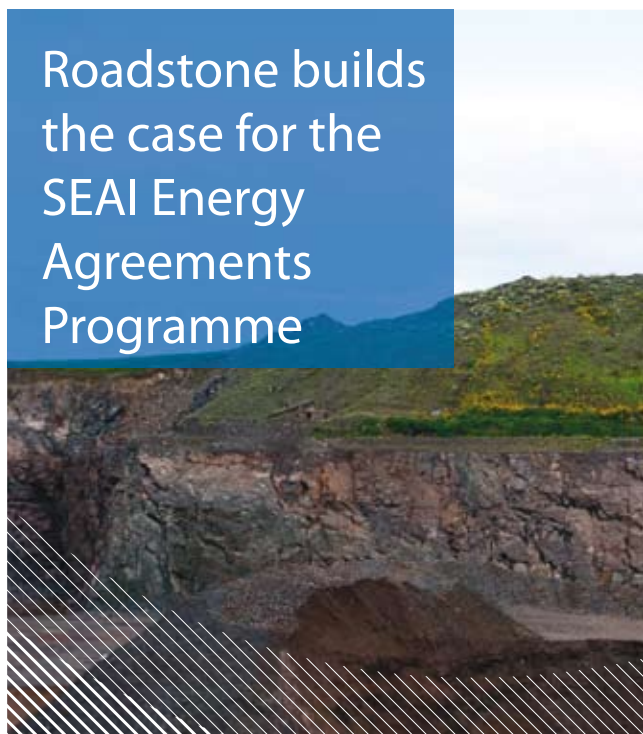


## PROGRAMME SUCCESS STORIES

### ENERGY MANAGEMENT SYSTEM IMPACTS

THE ENERGY MANAGEMENT PROCESS HAS DEVELOPED SINCE THE INTRODUCTION OF THE ENERGY MANAGEMENT STANDARD. IT IS BEING INTEGRATED INTO BUSINESS DECISIONS, BUSINESS PROCESSES AND STANDARDISED THROUGHOUT ORGANISATIONS. THIS WILL BE DEVELOPED FURTHER WITH THE NEW ISO50001 STANDARD WHICH OFFERS SOME ADDITIONAL REQUIREMENTS THAT BROADENS ITS SCOPE.

#### Roadstone builds the case for the SEAI Energy Agreements Programme



'Roadstone Wood Ltd joined the SEAI Agreements Programme in 2007 and implemented IS393 at one pilot site in Slane. Since then we have achieved EN16001 certification at 20 locations spread across the Republic of Ireland, resulting in an increase in operating efficiencies and associated reductions in our energy costs.

'The support provided by the SEAI Energy Agreements Programme including mentoring, specialist consultants, training and grants has been essential in assisting Roadstone Wood Ltd achieve certification to EN16001 and derive the associated benefits.

'A particular benefit of the SEAI programme has been the knowledge transfer and 'on the job' training of our in-house energy management teams. This in-house expertise is being used to assist Roadstone Wood Ltd in working towards achieving certification to ISO50001 and spreading the associated benefits throughout all of its operational locations.'

**KEVIN DONOVAN, ENERGY MANAGER, ROADSTONE WOOD LTD.**

#### HJ Heinz Dundalk leads European group in Energy Management



"HJ Heinz were one of the original companies to join the SEAI Energy Agreements Programme in 2007 and to be certified to IS393. The energy efficiency improvements implemented at HJ Heinz, Dundalk have been recognised with awards from SEAI and internally by the HJ Heinz Group.

Our in-house expertise is being used to help the Heinz Group to implement ISO50001 throughout the UK and Europe. The Dundalk site recently hosted an energy management seminar for European plant managers, and key members of our Irish team have given energy presentations at Heinz international seminars and meetings.

The considerable help and support from SEAI has led to Heinz Dundalk being the global leader in energy management within the HJ Heinz Group."

**MOHAMMED HAMOUDA, ENERGY MANAGER, HJ HEINZ LTD**

## Sustained energy efficiency drive by Irish Cement



Irish Cement, a founder company of CRH plc, has been producing high-quality cement products in Ireland since 1938 for home and export markets. It is committed to sustainable development of its business activities and has invested strongly in enhancing the energy efficiency of its facilities.

In 2008, Irish Cement joined SEAI's Energy Agreements Programme, thus committing to implement an Energy Management System (EnMS). The Irish Cement Sustainable Development strategy, Investing in Our Future, has delivered sustainable energy efficiency improvements by implementing three core initiatives:

- The development of eco-efficient CEM II cements
- Investment in the best available energy-efficient technology
- Substitution of fossil-fuel usage with sustainable alternative fuels

### ECO-EFFICIENT CEM II CEMENTS

Eco-efficient CEM II products were introduced to the Irish marketplace following substantial R&D and field trials. The products were formulated and produced in accordance with the harmonised European Cement Standard to deliver the same performance as their CEM I predecessors while simultaneously addressing the need for a more sustainable product portfolio. Each tonne of eco-efficient CEM II produced uses less energy and generates lower CO<sub>2</sub> emissions.

Irish Cement's eco-efficient CEM II sales have grown steadily and now account for over 80% of sales in Ireland. In addition, Irish Cement has become the first company in Ireland to achieve successful certification to the BRE BES 6001 sustainability standard for its eco-efficient CEM II range of products.

# €200m

IRISH CEMENT HAS REALISED SIGNIFICANT ENERGY EFFICIENCY IMPROVEMENTS THROUGH ITS €200M INVESTMENT IN THE KILN 3 PRODUCTION LINE AT PLATIN WORKS.

# 50%

IN FUTURE, MORE THAN 50% OF THE THERMAL ENERGY REQUIREMENTS OF THE CEMENT MANUFACTURING PROCESS AT PLATIN WILL BE SUPPLIED USING ALTERNATIVE FUELS

### ENERGY EFFICIENCY INVESTMENTS AND IMPROVEMENTS

Irish Cement has realised significant energy efficiency improvements through its €200m investment in the Kiln 3 production line at Platin Works. The investment in ultra-modern Calciner kiln technology and the first Vertical Roller Cement Mill in Ireland has yielded savings of >20% in thermal and >30% in electrical energy consumption per tonne of product.

In addition, with the assistance of SEAI in the application of the EnMS, energy efficiency initiatives have been identified from cement facilities across CRH globally and implemented in the areas of metering, automated monitoring of utilities, replacement of fixed-speed motors with variable-speed control, lighting surveys, and automated equipment shutdowns.

Despite a considerable reduction in production output, these initiatives in combination led to an 11% decrease in energy consumed per tonne in 2010.

### SUSTAINABLE ALTERNATIVE FUELS

As thermal energy requirements account for over 70% of the energy consumed in the cement manufacturing process, the next step for Irish Cement in the area of sustainable energy usage is to displace a proportion of its fossil-fuel usage with specially prepared waste-derived alternative fuels. Success in this area will allow it to balance its ongoing energy efficiency focus with the long-term sustainability benefits of using renewable thermal energy sources.

In early 2011 the first delivery of Solid Recovered Fuel (SRF) arrived at Platin Works (pictured). SRF is the clean, dry blend of fragments of plastics, paper, cardboard and textiles which arise once recycling of waste materials has been completed through mechanical and biological treatment. This fuel is produced to defined chemical and physical standards suited to the cement industry. In future, more than 50% of the thermal energy requirements of the cement manufacturing process at Platin will be supplied using alternative fuels, thereby improving the sustainability aspects of efficient energy usage at Irish Cement.

For more information please visit the Sustainable Development section at [www.irishcement.ie](http://www.irishcement.ie)

## RESULTS AND TARGETS

### METHODOLOGY FOR LIEN ENERGY PERFORMANCE CALCULATION

Energy Performance Indicators (EPIs) are used to highlight the individual performance of all LIEN members. The EPI is a normalised number, set to 100 in the year of joining, for each member. It is then calculated according to baseline energy intensity (in year of joining) and the energy intensity of each subsequent reporting year. An EPI run chart is reported for each member; it includes influencing factors for the EPI result and the target set for the next year.

The year-to-year energy saving or loss for the LIEN as a whole is reported using principles of the Paasche Method. For yearly changes, the relative change of energy intensity from one year to the next is used for calculations. The energy saving or loss is calculated by subtracting the actual energy consumed in the reporting year from the energy that would have been consumed to produce the same output if the previous year's energy intensity had remained unchanged. For longer periods, energy intensity and output changes within this defined time period are used. The energy saving or loss is calculated for each member; all these are added together to give an overall energy saving or loss for the LIEN.

The method calculates an energy saving or loss that captures all influences of energy usage. This may include any operational influences, including output volume fluctuation, quality, productivity and all operational or engineering improvements. These are, however, factors that affect overall energy demand and energy efficiency and should be incorporated into business planning, to mitigate a negative impact. This principle is considered by energy management systems.

The opportunity to improve energy performance through operational excellence, in addition to all technical opportunities providing high efficiency, is promoted and integrated within the LIEN and Energy Agreements work programme.

As specific energy-saving projects would not be transparent, energy project data is also collected. This provides a 'bottom-up' measurement of energy avoided through reported energy projects.

### ENERGY PERFORMANCE IMPROVEMENT

Energy performance is calculated using energy intensity and is the relative improvement or loss in energy intensity from one year to the next.

### RESULTS SUMMARY

The performance of the LIEN members during 2010 is summarised in the table below.

TABLE 4.1: 2010 OVERALL ENERGY PERFORMANCE

LIEN Total Primary Energy Requirement 2010 (GWh)	25,500
Energy Savings (Loss) due to Energy Efficient Gains (Losses) 2010 (GWh)	1,300
Energy Performance Improvement	5.3%
National Total Primary Energy Requirement (TPER) 2010 (GWh)	175,490
LIEN as Percentage of National TPER (%)	14.5%
Total CO <sub>2</sub> Emissions 2010 (tonnes)	5,840,400
CO <sub>2</sub> Avoided due to Energy Performance Gains	298,900

In 2010 an energy performance improvement of 5.3% was achieved, over 2009. This represents an avoided energy requirement of 1300 GWh, valued at €45million based on 2010 energy prices.

The LIEN Total Primary Energy Requirement (TPER) in 2010 was 25,000 GWh. In primary energy terms, an improvement of 1% in energy performance translates to a reduction in energy consumption of 250 GWh, and saving of approximately €8.8 million.

5.3%

ENERGY PERFORMANCE IMPROVEMENT  
ACHIEVED IN 2010

€45M

AVOIDED ENERGY REQUIREMENT



Since the inception of the LIEN in 1995, founding member companies have achieved on average an energy performance improvement of approximately 33%, based on energy intensity. This is an average improvement of 2% per annum. In 2010, the energy performance improvement of 5.3% is a reversal of the efficiency loss of 1% reported in 2009 and is more in line with the average improvement gains of approximately 5% reported between 2006 and 2008.

The 2010 national TPER remained at 2009 levels. On average, LIEN members reported a small increase in TPER in comparison to 2009. Membership grew in 2010 from 135 to 150 members. Coupled with the small increase in average LIEN members' TPER, the energy requirement of the LIEN accounts for 14.5% of the national TPER.

LIEN members consist predominantly of large industrial energy users, but also include non-manufacturing businesses. The LIEN covers 58% of the national industrial energy requirement. This, however, omits the energy used by non-manufacturing members; if this is included to denote scale, the LIEN TPER represents an equivalent coverage of 70% of the national industrial energy requirement.

## ENERGY PERFORMANCE

The energy performance improvement reported in the LIEN reports includes all influencing factors that either improve or erode energy performance. This is a top-down calculation based on energy intensity. A significant factor in 2010 was a recovery in output activity in comparison with 2009. Average output volume increased by 7.8% in 2010 from 2009, in comparison with an average output reduction of 5.6% in 2009 from 2008.

A bottom-up calculation was also completed using the data compiled. For 2010, 53 companies provided details of specific energy saving projects, for which the savings were quantified. These only represent voluntary discrete projects reported, not a cumulative breakdown of all savings. In total, these projects saved a reported 265 GWh (61% thermal and 39% electrical). If the data provided by the 53 companies on specific energy saving measures is assumed to be representative of the energy saving projects undertaken by all 150 members, the sample represents savings of approximately 750 GWh across the LIEN. This is 58% of the top-down calculation, which is plausible. The remaining 42% energy savings estimated by the top-down calculation could be attributed to all no-cost energy management activity, improved performance with volume increases and other productivity or operational improvement factors.

## ENERGY AGREEMENTS VERSUS LIEN-ONLY

Energy Agreements Programme (EAP) members are committed to the implementation and operation of energy management systems. This is considered a more effective means of finding, implementing and maintaining energy savings. LIEN-only members are committed to an energy management programme but performance depends on the individual company.

There was a difference between the performance of the LIEN-only and the EAP members in 2010. This performance difference has been illustrated for 2007 to 2010.

In 2010, the LIEN as a whole had an energy performance gain of 5.3%. When this is broken down to the contribution of EAP members in comparison to LIEN-only members, the Energy Agreements group had an energy performance gain of 7% while the LIEN-only group had an energy performance gain of -0.3%.

**TABLE 4.2: ENERGY PERFORMANCE DIFFERENCE**

Year	LIEN-Only	Energy Agreements
2007	1%	7%
2008	4.7%	6%
2009	1%	5%*
2010	-0.3%	7%

\* Figure represents average annual improvement of EA companies omitting distortive data points. If the exceptional data is included the overall result is -3%. (refer to 2009 LIEN Report Section 4)

## HISTORICAL PERFORMANCE OF THE LIEN

The chart below illustrates the historical performance of the LIEN over the 16-year period from 1995 to 2010. It comprises four datasets:

1. The energy performance change from previous year annually, illustrated by bar series
2. The cumulative energy performance data from a 1995 baseline and member subset
3. The cumulative energy performance data from a 2000 baseline and member subset
4. The cumulative energy performance data from a 2005 baseline and member subset

The cumulative charts shows results for fixed groups of companies that reported in each of the reporting years. These fixed groups are overlapping (ie. 1995 graph is included in 2000 etc). This data is not affected by new companies joining the network every year and is less influenced by changes in output characteristics.

The following conclusions are made:

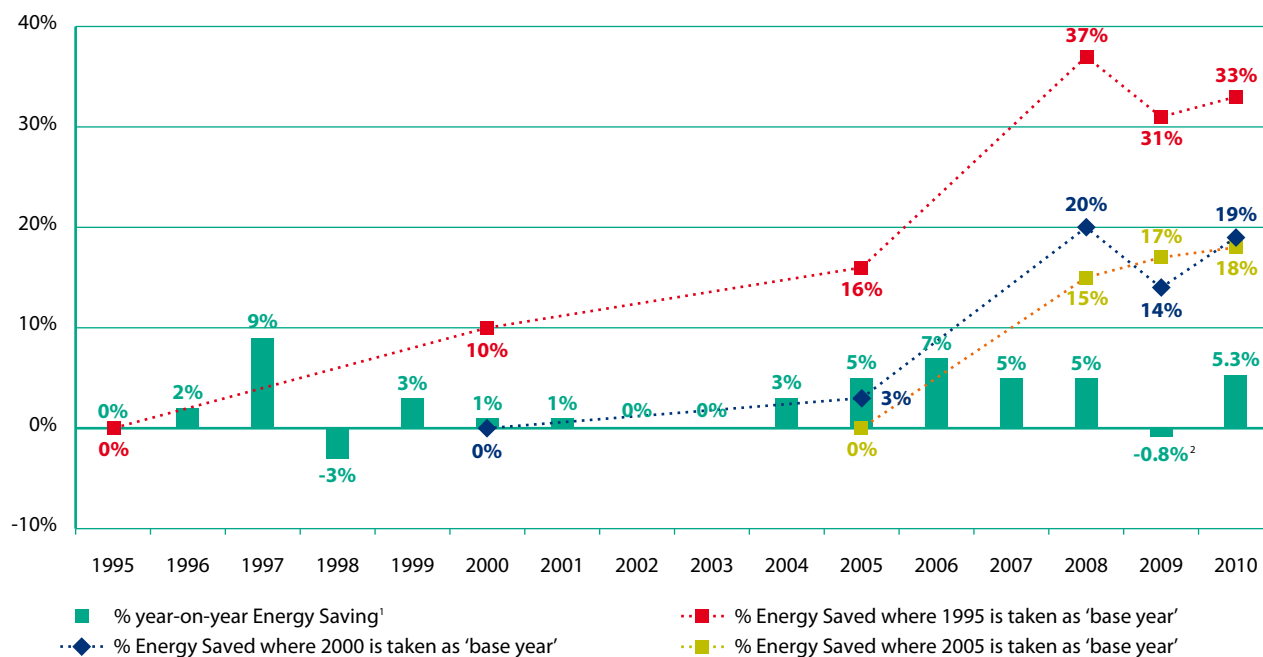
- The LIEN members that joined in 1995 achieved an energy performance improvement of 33% in comparison to 1995. There was a decrease in 2009, a factor arising from significant output drops, but a recovery in output and energy performance in 2010.
- The LIEN members that were active and reported in 2000 and in 2010 achieved savings of 19% over that period, in comparison to 2000 energy performance. This group of companies had a significant drop in the levels of output and energy performance in 2009 – but recovery in 2010.
- The LIEN members that were active and reported in 2005 and in 2010 achieved savings of 18% over that period in comparison to 2005 energy performance.

The group with a 2005 baseline is an important dataset.

The Energy Agreements Programme was launched in 2006 following the publication of the Irish Energy Management Standard in 2005. This group of companies best represents the energy performance contribution to LIEN overall performance of the EAP and the energy management systems approach. The following observations can be made:

- This is the only group that did not show a reduction in energy performance in 2009.
- There is an average of 3.6% energy performance improvement annually since 2005, in comparison with an average of 2% improvement over 16 years.
- During the period 2005–2010, companies in this group would have transitioned from LIEN-only to Energy Agreements.

FIGURE 4.1: HISTORIC ENERGY PERFORMANCE OF THE LIEN



1. This data is subject to change as additional data is collected from members
2. Refer to 2009 LIEN Report section 4 for result detail

CATEGORISING ENERGY SAVINGS

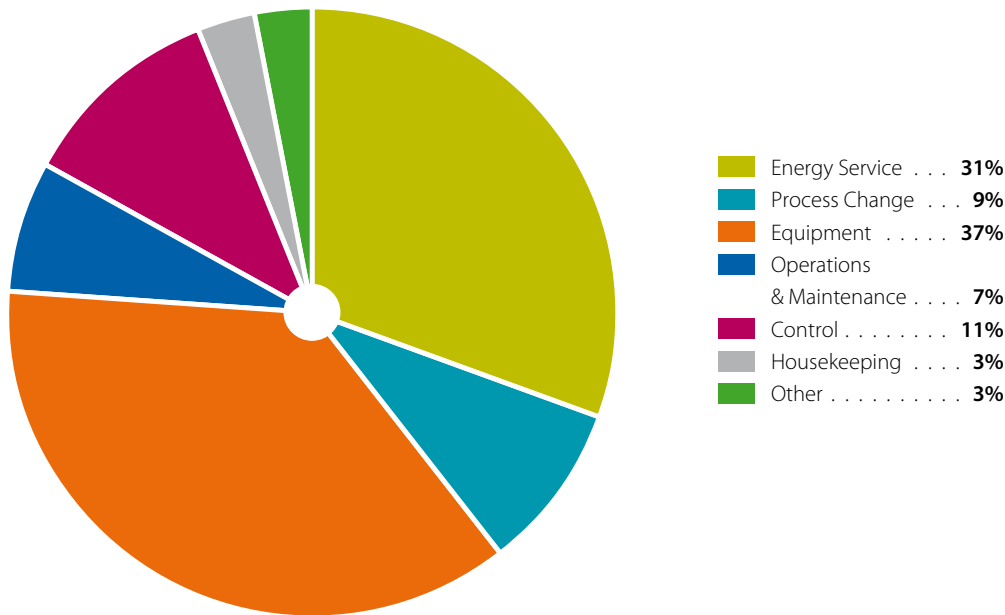
Specific project details produced by LIEN members are reported as part of the data-collection process. Projects are categorised according to the Energy Venn Diagram per previous years. The data demonstrates maturing energy programmes among the higher proportion of projects that either challenge the energy service requirement or process changes and equipment upgrades. The previous four years of data, presented below, show the trends in these categories in recent years. Investing in these project categories generally has a higher savings impact – this is reflected in the historical data chart since 2005.

It is worth noting that EAP special initiatives promote the use of Alternative Methodologies or the mainstream Business Improvement Methodologies to uncover project opportunities by analysing how manufacturing operations and product engineering functions can affect energy requirement.

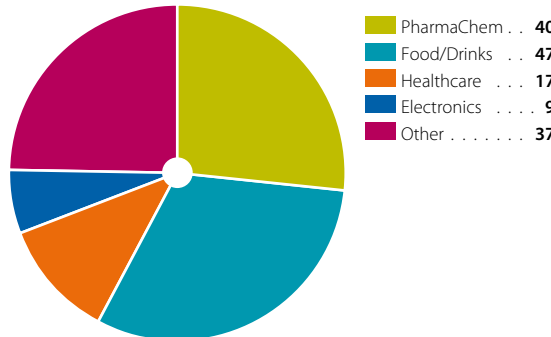
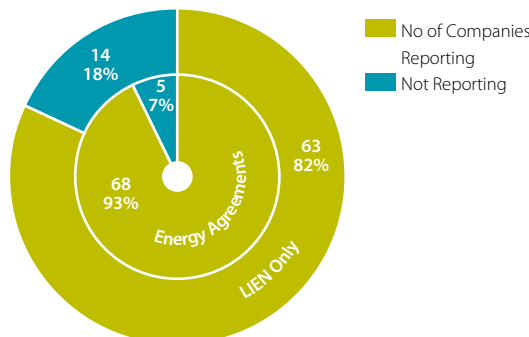
2010 LIEN RESULTS HIGHLIGHTS

- The energy performance improvement of the LIEN was 5.3% from 2009 to 2010, providing an energy avoidance equivalent of €45 million in 2010.
- A 7% performance variation between LIEN-only and Energy Agreements companies highlights the higher performance of companies committed to the energy management system approach.
- Energy Agreements companies are achieving a higher level of energy performance change since the introduction of the programme in 2006.
- Output activity has increased across all sectors in 2010, showing a recovery after the dramatic decline in output in 2009. This recovery contributed to energy performance improvement from 2009.
- Project activity trends highlight maturing energy programmes that are extracting deeper savings.
- The LIEN has grown to 150 companies in 2010, from 135 in 2009, and now represents 14.5% of national TPER.

FIGURE 4.2: ENERGY SAVINGS, BY CATEGORY





LIEN Data Analysis																			
Attribute	Programme Consideration	Performance	Future Implication																
<b>Membership split by sector</b>	<p>The LIEN grew by 15 members in 2010.</p> <p>Supports and initiatives need to be continuously reviewed to match membership profile.</p>	<p><b>Number of Members, by Sector</b></p>  <table><tr><td>PharmaChem . . .</td><td>40</td></tr><tr><td>Food/Drinks . . .</td><td>47</td></tr><tr><td>Healthcare . . . .</td><td>17</td></tr><tr><td>Electronics . . . .</td><td>9</td></tr><tr><td>Other . . . . .</td><td>37</td></tr></table>	PharmaChem . . .	40	Food/Drinks . . .	47	Healthcare . . . .	17	Electronics . . . .	9	Other . . . . .	37	<p>The Food &amp; Drink and PharmaChem sectors remain the two largest sectors within the LIEN.</p> <p>It is expected that the LIEN will continue to grow – to 200 members by 2013.</p> <p>It is planned to launch sub-networks within the LIEN, tailored for specific groups, in 2011.</p> <p>Impact of EU-ETS Phase III in 2013.</p>						
PharmaChem . . .	40																		
Food/Drinks . . .	47																		
Healthcare . . . .	17																		
Electronics . . . .	9																		
Other . . . . .	37																		
<b>LIEN data response rate</b>	<p>Good response rate of 87% (80% LIEN-only and 93% Energy Agreements).</p> <p>Considerable improvement in LIEN-only member responses.</p> <p>A large sample size of data leads to higher accuracy of energy performance reported for LIEN.</p>	<p><b>EA vs LIEN Only</b></p>  <table><tr><td>No of Companies Reporting</td><td>68</td><td>93%</td></tr><tr><td>Not Reporting</td><td>5</td><td>7%</td></tr><tr><td colspan="2">Energy Agreements</td></tr><tr><td>No of Companies Reporting</td><td>63</td><td>82%</td></tr><tr><td>Not Reporting</td><td>14</td><td>18%</td></tr><tr><td colspan="2">LIEN Only</td></tr></table>	No of Companies Reporting	68	93%	Not Reporting	5	7%	Energy Agreements		No of Companies Reporting	63	82%	Not Reporting	14	18%	LIEN Only		<p>LIEN-only members targeted to progress to Energy Agreements.</p> <p>Thoroughness and quality of data responses will continue to be improved.</p>
No of Companies Reporting	68	93%																	
Not Reporting	5	7%																	
Energy Agreements																			
No of Companies Reporting	63	82%																	
Not Reporting	14	18%																	
LIEN Only																			

LIEN Data Analysis																																	
Attribute	Programme Consideration	Performance	Future Implication																														
Rolling 4-year historical energy performance	Trend in energy performance within main sectors.	<h3>Percentage Change in Energy Efficiency, by Sector</h3> <table><thead><tr><th>Sector</th><th>2007</th><th>2008</th><th>2009</th><th>2010</th></tr></thead><tbody><tr><td>Other</td><td>3%</td><td>7%</td><td>0%</td><td>1%</td></tr><tr><td>Electronics</td><td>-13%</td><td>6%</td><td>22%</td><td>8%</td></tr><tr><td>Healthcare</td><td>-3%</td><td>2%</td><td>0%</td><td>15%</td></tr><tr><td>Food/Drinks</td><td>3%</td><td>2%</td><td>1%</td><td>4%</td></tr><tr><td>PharmaChem</td><td>0%</td><td>4%</td><td>7%</td><td>15%</td></tr></tbody></table>	Sector	2007	2008	2009	2010	Other	3%	7%	0%	1%	Electronics	-13%	6%	22%	8%	Healthcare	-3%	2%	0%	15%	Food/Drinks	3%	2%	1%	4%	PharmaChem	0%	4%	7%	15%	Overall trend in comparison with 2009 is positive across all sectors.
	Sector		2007	2008	2009	2010																											
Other	3%	7%	0%	1%																													
Electronics	-13%	6%	22%	8%																													
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Food/Drinks	3%	2%	1%	4%																													
PharmaChem	0%	4%	7%	15%																													
	Relative change in energy performance over previous four years across main sector groupings.		Although 2009 had an overall negative (-1%) energy performance compared with 2008, the graph highlights the positive results across all sectors in the LIEN over this 4 year period.																														
Rolling 4-year TPER change	Trend in energy requirement taking into account output activity change and energy efficiency actions.	<h3>Percentage Change TPER, by Sector</h3> <table><thead><tr><th>Sector</th><th>2007</th><th>2008</th><th>2009</th><th>2010</th></tr></thead><tbody><tr><td>Other</td><td>-4%</td><td>-4%</td><td>-19%</td><td>6%</td></tr><tr><td>Electronics</td><td>-4%</td><td>-3%</td><td>-9%</td><td>-9%</td></tr><tr><td>Healthcare</td><td>7%</td><td>8%</td><td>-3%</td><td>4%</td></tr><tr><td>Food/Drinks</td><td>-5%</td><td>-4%</td><td>-6%</td><td>3%</td></tr><tr><td>PharmaChem</td><td>-7%</td><td>-1%</td><td>-4%</td><td>-8%</td></tr></tbody></table>	Sector	2007	2008	2009	2010	Other	-4%	-4%	-19%	6%	Electronics	-4%	-3%	-9%	-9%	Healthcare	7%	8%	-3%	4%	Food/Drinks	-5%	-4%	-6%	3%	PharmaChem	-7%	-1%	-4%	-8%	Some sectors showing an increase in TPER and indication of output activity increase.
	Sector		2007	2008	2009	2010																											
Other	-4%	-4%	-19%	6%																													
Electronics	-4%	-3%	-9%	-9%																													
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Food/Drinks	-5%	-4%	-6%	3%																													
PharmaChem	-7%	-1%	-4%	-8%																													
	General comparison can be made with national total industrial energy requirement as published by SEAI-EPSSU.																																

LIEN Data Analysis																																	
Attribute	Programme Consideration	Performance	Future Implication																														
<b>Rolling 4-year historical output change</b>	<p>Purpose is to highlight the trend in output activity across sectors and the LIEN.</p> <p>Each year the average change is a comparison with the previous year, i.e. no baseline.</p> <p>Although average outputs are positive, there are some considerable fluctuations in output data at company level.</p> <p>Output change is averaged attribute data; it does not take into account the relative energy intensity between different organisations in the same sectors.</p>	<p><b>Percentage Change Output, by Sector</b></p> <table><thead><tr><th>Sector</th><th>2007</th><th>2008</th><th>2009</th><th>2010</th></tr></thead><tbody><tr><td>Other</td><td>1%</td><td>-2%</td><td>-13%</td><td>2%</td></tr><tr><td>Electronics</td><td>12%</td><td>5%</td><td>-12%</td><td>13%</td></tr><tr><td>Healthcare</td><td>3%</td><td>11%</td><td>0%</td><td>27%</td></tr><tr><td>Food/Drinks</td><td>-3%</td><td>-3%</td><td>-6%</td><td>3%</td></tr><tr><td>PharmaChem</td><td>-7%</td><td>1%</td><td>4%</td><td>9%</td></tr></tbody></table>	Sector	2007	2008	2009	2010	Other	1%	-2%	-13%	2%	Electronics	12%	5%	-12%	13%	Healthcare	3%	11%	0%	27%	Food/Drinks	-3%	-3%	-6%	3%	PharmaChem	-7%	1%	4%	9%	<p>Highlights an overall positive change in output activity within the LIEN in comparison with 2009.</p> <p>There was an 8% average increase in output levels during 2010, which is substantiated by other economic metrics which report a healthy manufacturing sector with strong exports.</p> <p>Some startup activity influencing high output number in healthcare.</p> <p>Correlations of energy performance to output activity cannot be taken from this data – only at company-specific data.</p>
Sector	2007	2008	2009	2010																													
Other	1%	-2%	-13%	2%																													
Electronics	12%	5%	-12%	13%																													
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PharmaChem	-7%	1%	4%	9%																													
<b>Driver of energy saving projects</b>	<p>70% of projects reported are associated with an EnMS driver.</p> <p>Maturity and efficacy of Energy Management Systems.</p>	<p><b>Drivers for Energy Saving Projects (kWh)</b></p> <table><thead><tr><th>Driver</th><th>Percentage</th></tr></thead><tbody><tr><td>Energy Management System</td><td>70%</td></tr><tr><td>Other Driver</td><td>30%</td></tr><tr><td>Regulatory Compliance</td><td>0%</td></tr></tbody></table>	Driver	Percentage	Energy Management System	70%	Other Driver	30%	Regulatory Compliance	0%	<p>Energy Management Maturity Model in development will aim to demonstrate the correlation of continued energy performance improvement and level of maturity in energy management.</p>																						
Driver	Percentage																																
Energy Management System	70%																																
Other Driver	30%																																
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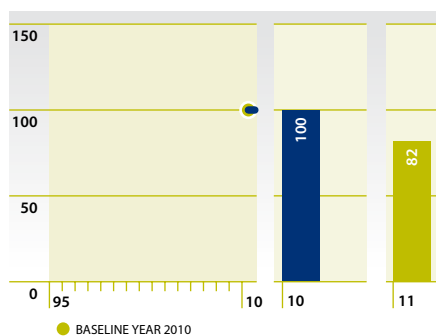
LIEN Data Analysis																																	
Attribute	Programme Consideration	Performance	Future Implication																														
Project categorisation	<p>Trends in activity can be a signal of maturity in project identification across LIEN.</p> <p>76% of projects reported in 2010 challenged either the Energy Service requirement, equipment or process.</p> <p>This activity has the greatest levels of opportunity for step-change reductions in energy requirements.</p>	<p>Categorisation of Energy Savings (kWh)</p> <table><tr><td>Energy Service</td><td>31%</td></tr><tr><td>Process Change</td><td>9%</td></tr><tr><td>Equipment</td><td>37%</td></tr><tr><td>Operations &amp; Maintenance</td><td>7%</td></tr><tr><td>Control</td><td>11%</td></tr><tr><td>Housekeeping</td><td>3%</td></tr><tr><td>Other</td><td>3%</td></tr></table>	Energy Service	31%	Process Change	9%	Equipment	37%	Operations & Maintenance	7%	Control	11%	Housekeeping	3%	Other	3%	<p>Projects being reported may be biased towards tangible projects rather than no-to-low-cost projects. This needs to be investigated further for 2011 data.</p> <p>Project activity will continue to be categorised using the EED Venn diagram.</p>																
	Energy Service	31%																															
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Operations & Maintenance	7%																																
Control	11%																																
Housekeeping	3%																																
Other	3%																																
Historical project categorisation	<p>The trends in project activity demonstrate a more mature and structured energy management approach.</p> <p>Significant trend in energy service requirement challenge over last 4 years.</p>	<p>Categorisation of Energy Savings Projects</p> <p>% of KWh Saving</p> <table><thead><tr><th></th><th>2007</th><th>2008</th><th>2009</th><th>2010</th></tr></thead><tbody><tr><td>Energy Service</td><td>0%</td><td>23%</td><td>29%</td><td>30%</td></tr><tr><td>Process Change</td><td>0%</td><td>1%</td><td>10%</td><td>10%</td></tr><tr><td>Equipment</td><td>13%</td><td>31%</td><td>19%</td><td>35%</td></tr><tr><td>Operations &amp; Maintenance</td><td>47%</td><td>11%</td><td>6%</td><td>6%</td></tr><tr><td>Control</td><td>8%</td><td>17%</td><td>6%</td><td>10%</td></tr></tbody></table>		2007	2008	2009	2010	Energy Service	0%	23%	29%	30%	Process Change	0%	1%	10%	10%	Equipment	13%	31%	19%	35%	Operations & Maintenance	47%	11%	6%	6%	Control	8%	17%	6%	10%	<p>Grant support for investment by the Energy Efficiency Fund incentivises investment for more attractive projects.</p> <p>Continued investment in Special Initiatives that stimulate the investigative process to find new investigation opportunities.</p>
		2007	2008	2009	2010																												
Energy Service	0%	23%	29%	30%																													
Process Change	0%	1%	10%	10%																													
Equipment	13%	31%	19%	35%																													
Operations & Maintenance	47%	11%	6%	6%																													
Control	8%	17%	6%	10%																													

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## Abbott Ireland Diagnostics Division



### Factors influencing 2010 result

Projects that contributed to the 2010 EPI are:

- Rainwater harvesting, saving 4m litres of purchased non-potable water/year.
- Energy-efficient lighting in warehouses, saving 420,000 kWh.
- Passive infrared sensors on lighting circuits in all high-occupancy areas, saving 229,000 kWh.
- Steam condensate recovery project, saving energy and 1.5m litres of water p.a.

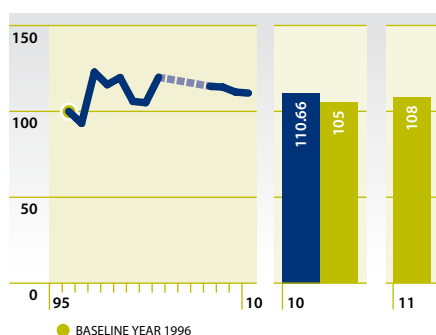
**RESULT 100**

### Factors influencing 2011 target

- The utility systems efficiency upgrade project is a suite of investments to reduce the energy consumption associated with providing utilities and conditioned facilities to support production in the diagnostic facility.
- The major savings will be achieved by joining two utility blocks serving different phases of the facility.

**TARGET 82**

## Abbott Ireland Ltd (Cavan)



### Factors influencing 2010 result

- Various projects have reduced electrical consumption, incl. installation of energy-efficient lighting and operational changes.
- Reduction in fuel oil has been achieved through various projects, incl. installation of boiler economisers and dryer heat-recovery technology.
- Energy Champion Team was developed along with plant focus on energy savings.

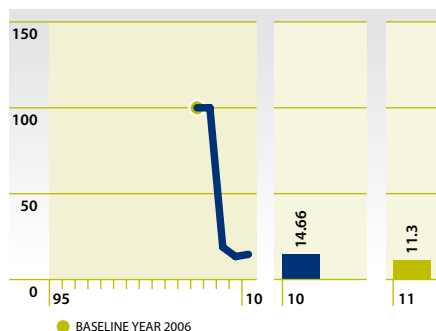
**RESULT 100.66**

### Factors influencing 2011 target

- Improvements to tracking system of EPIs.
- Installation of economiser in boiler 3.
- HVAC modifications and operational changes to monitoring of HVAC EPIs.

**TARGET 108**

## Abbott Ireland Ltd (Longford)



### Factors influencing 2010 result

- Plant optimisation capital investment project included HVAC, refrigeration, lighting and general services.
- Energy metering system installed to help manage/measure future energy-focused initiatives.
- Oversized steam boilers replaced with smaller hot-water and steam boilers.
- LPHW and chilled-water systems converted to variable-volume systems.

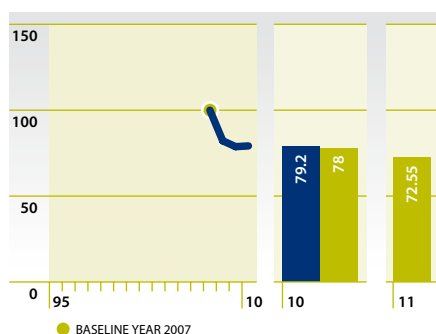
**RESULT 14.66**

### Factors influencing 2011 target

- The benefits of the utility upgrade project will be realised from 2011 on.

**TARGET 11.3**

## Abbott Ireland Pharmaceutical Operation



### Factors influencing 2010 result

- The Energy Team has helped to continuously reduce energy consumption, by completing planned projects and driving energy efficiencies.
- The projects targeted in 2010 included HVAC shutdown within a CNC2 environment, installing PIRs site-wide on switched lighting circuits, and some small energy-efficiency projects.

**RESULT 79.2**

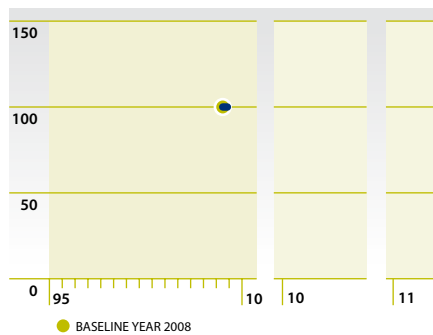
### Factors influencing 2011 target

- Operational control spreadsheet project to track, verify and control a 2% energy reduction target.
- Summer Boiler project to reduce steam outputs.
- Glycol project will provide a precise control on chillers, eliminating the requirement to run Process chillers and HVAC chillers simultaneously.

**TARGET 72.55**



## Abbott Vascular



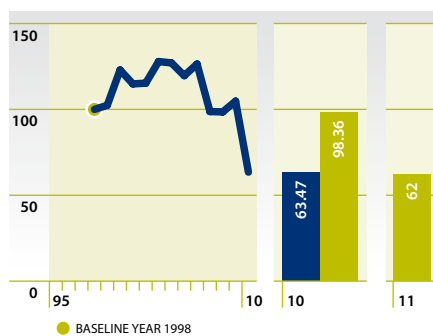
**Factors influencing 2010 result**  
No influencing factors provided.

**Factors influencing 2011 target**  
No influencing factors provided.

**RESULT NOT SPECIFIED**

**TARGET NOT SPECIFIED**

## Allergan Pharmaceuticals Ltd



**Factors influencing 2010 result**

- Output was up nearly 20%.
- Even with increase in output, electric, gas and water usage was reduced with the help of the EN16001 EnMS.

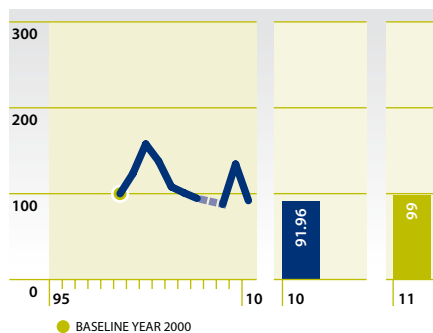
**Factors influencing 2011 target**

- Allergan has a full list of projects for 2011. Using EN16001 and Lean Six Sigma will achieve a net reduction (with increases in production accounted for) of 3%.
- Targets have been set by the Energy Team for electrical, gas and water usage.

**RESULT 63.47**

**TARGET 62**

## Analog Devices BV



**Factors influencing 2010 result**

- Boiler Optimisation programme.
- Installation of new high efficiency cooling tower.

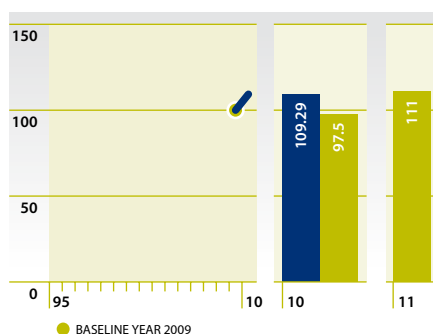
**Factors influencing 2011 target**

- Development of automatic fault diagnosis tool for HVAC.
- Investigation into reducing compressed air consumption on site.

**RESULT 91.96**

**TARGET 99**

## Arigna Fuels



**Factors influencing 2010 result**

- A difficult trading year resulted in lower plant throughput. The high baseload energy requirements thus resulted in a higher EPI than expected.
- The achieving of certification to EN 16001 allowed a plant-wide rollout of energy awareness. All employees were given domestic electricity monitors for home use.

**Factors influencing 2011 target**

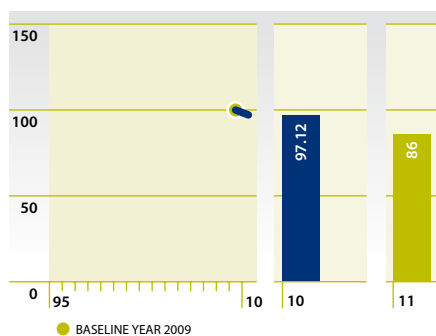
- After studies by internal energy group and a special investigation (with aid of SEAI), a number of energy efficiency capital projects are being undertaken in 2011.

**RESULT 109.29**

**TARGET 111**



## Arkil Ltd



### Factors influencing 2010 result

- A large project to remove the use of fossil-powered generation to the main production area was begun and is continuing.
- A VSD was installed on the asphalt plant, thus reducing energy use.

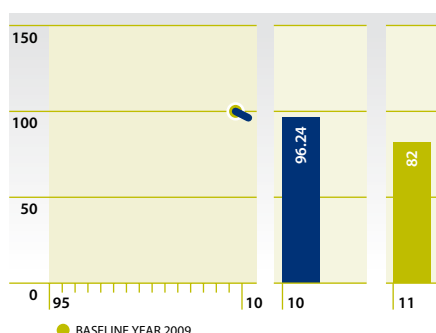
### Factors influencing 2011 target

- Plans to reduce energy use further by targeting all other processes once main project has been completed.
- Further investigations into reducing energy use will take place in 2011.

RESULT 97.12

TARGET 86

## Arvato Digital Services Ireland



### Factors influencing 2010 result

- Energy improvement projects were implemented.
- The value of these improvements is masked on the EPI due to reduced plant volumes and a high plant baseload.

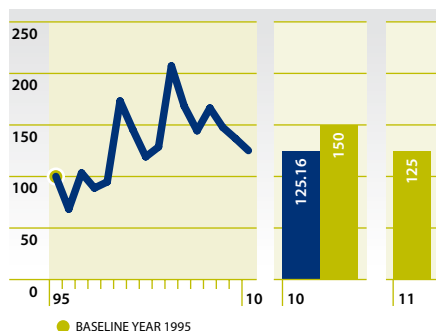
### Factors influencing 2011 target

- Improved EPI projected in 2011.
- Stable volumes and site energy efficiency is improving.

RESULT 96.24

TARGET 82

## Astellas Ireland Co Ltd (Dublin)



### Factors influencing 2010 result

- Chiller and cooling towers were replaced (obsolescence), with added benefit of saving electricity.
- Lights replaced with occupancy sensors so used only when needed.
- Gas use increased during cold weather in January, November and December.

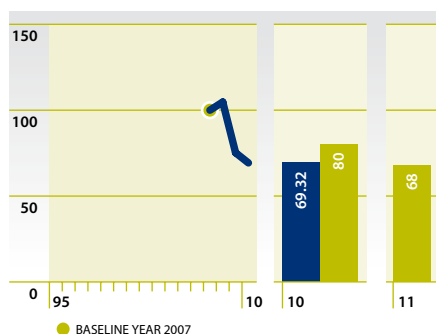
### Factors influencing 2011 target

- EPI expected to remain relatively consistent for 2011, as one production plant will undergo refurbishment to facilitate manufacture of a new product in late 2012.
- Fuel Conditioning should yield gas savings of approx. 6% – but another cold winter might skew EPI.

RESULT 125.16

TARGET 125

## Astellas Ireland Co Ltd (Kerry)



### Factors influencing 2010 result

- 3-cycle shift was introduced as a result of increased sales volumes.
- Continued use of EnMS and overall site energy awareness.
- LTHW distribution control upgrade.
- Review and upgrade BMS operating strategy for AHUs.

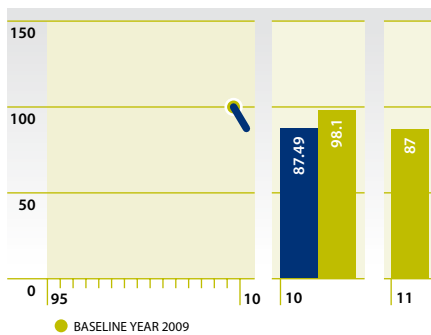
### Factors influencing 2011 target

- Installation of 800 kW turbine on site for auto-production.
- Installation of 1.8 MW wood-chip boiler.
- Site-wide energy awareness programme.

RESULT 69.32

TARGET 68

## Bank of Ireland



### Factors influencing 2010 result

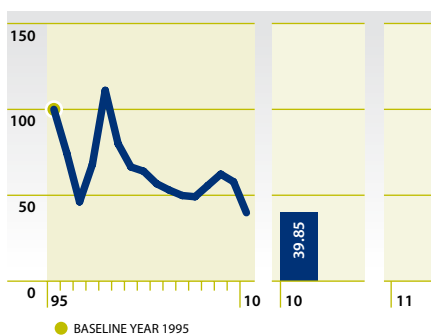
- Business operating hours.
- Climate conditions.

### Factors influencing 2011 target

- EN16001 review of energy aspects.
- Results of boiler optimising trial.
- Energy awareness campaign.

**RESULT 87.49**
**TARGET 87**

## Bausch & Lomb Ireland Ltd



### Factors influencing 2010 result

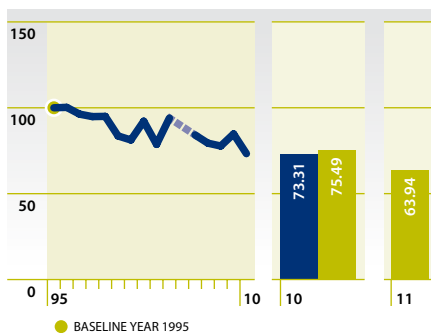
- Reducing site energy usage through implementing the company's energy-management programme.
- Identified thermal energy savings in relation to steam generating and distribution.

### Factors influencing 2011 target

*No influencing factors provided.*

**RESULT 39.85**
**TARGET NOT SPECIFIED**

## Baxter Healthcare SA



### Factors influencing 2010 result

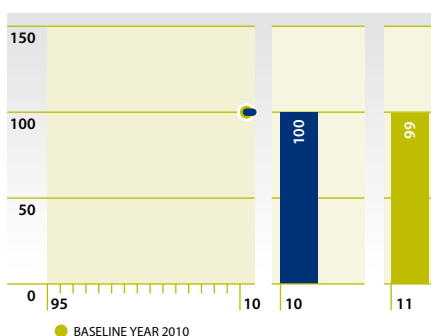
- Recovery of CHP plant heat: for heating RO water, after RO unit and before distillation units; to facilitate heating of steriliser water, to offset steam consumption; and to facilitate space heating, to offset steam consumption. Insulation blankets on steam and hot-water systems. Installation of approx. 85 600 x 600 mm LED lighting panels in packing area.

### Factors influencing 2011 target

- Elimination of DI rinse water in filling lines.
- Relocation of 2 electrical transformers.

**RESULT 73.31**
**TARGET 63.94**

## BD Medical



### Factors influencing 2010 result

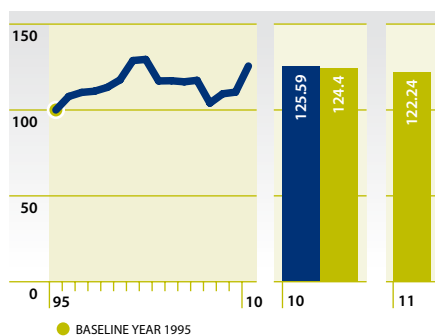
- Facility use has altered in recent years, leaving high lighting levels in low-occupancy areas; opportunities remain for new zoning, scheduling and raising of lighting efficiency.
- Opportunities identified to better match performance to available capacities. Continuous improvement programmes enable greater use of fixed facility capacities.

### Factors influencing 2011 target

- Aggressive performance targets and management system for energy conservation. Improve output while reducing energy input.
- Increase Space heating efficiency by installing fully modulating boilers.
- Local lighting zone control, replace of HID lamps, BMS scheduled lighting. Corporate energy survey.

**RESULT 100**
**TARGET 99**


## Boliden Tara Mines Ltd



### Factors influencing 2010 result

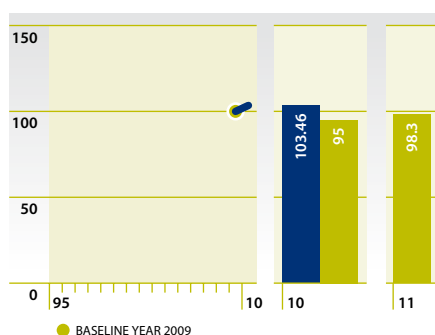
- Predicted EPI for 2010 was affected by unexpected commissioning issues with the AG mill installed late in 2009.
- Various process optimisation projects in relation to the significant energy users are being developed.
- Energy efficient retrofit projects in relation to site lighting and heating are being developed.

### Factors influencing 2011 target

- Focus on optimising ore size production to improve milling efficiency.
- Focus on optimising the operation and control of ventilation fans.
- Focus on optimising ore handling and reducing conveyor idling times.
- Focus on energy-efficient site lighting & heating.
- Certified to EN16001 in October 2010.

**RESULT 125.59**
**TARGET 122.24**

## Bord na Móna Energy Ltd



### Factors influencing 2010 result

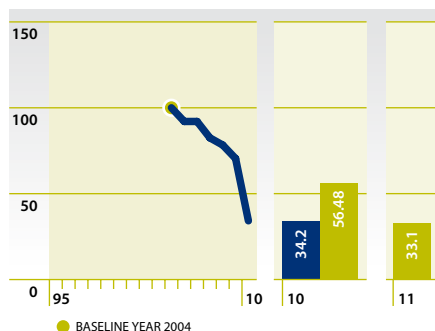
- Rainfall and drying conditions (incl. temperature and sunshine) are the main influencing factor in the number of crops produced and energy required to produce each crop.
- Rainfall also dictates pumping requirements in summer, so the bog can be travelled, and in winter so that peat stockpiles can be protected.

### Factors influencing 2011 target

- 2011 rainfall (to date) was 21% greater than for same period in 2010, so pumping requirements increased over 2010.
- Production to date for 2011 is 40% of target, compared to 104% for the same period in 2010.

**RESULT 103.46**
**TARGET 98.3**

## Boston Scientific Ireland Ltd (Cork)



### Factors influencing 2010 result

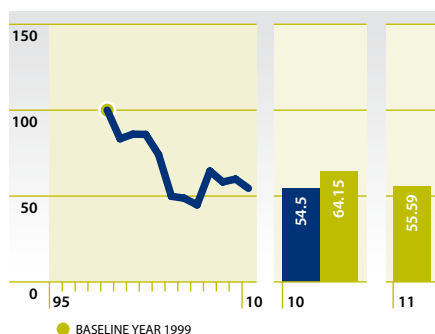
- Humidification technology was upgraded to resistive humidification and modulating controls were introduced to match exact demand.
- Installed new differential pressure valve to increase temperature differential in chilled water system, and also to the LPHW system.

### Factors influencing 2011 target

- Installed VSD air compressor.
- Sustained energy efficiency activities in line with corporate requirements.
- Installed water meters on all hot-water calorifiers.
- Maintaining efforts on optimising control, setpoints & performance of HVAC equipment.

**RESULT 34.2**
**TARGET 33.1**

## Boston Scientific Ireland Ltd (Galway)

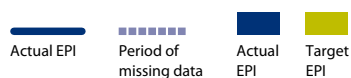


### Factors influencing 2010 result

- Electricity consumption down by 0.8% on 2009. Coupled with output increase, this improved EPI.
- Key energy-efficiency projects in 2010 included: air-change reduction, chiller upgrades, lighting controls, widening of control bands on HVAC systems.

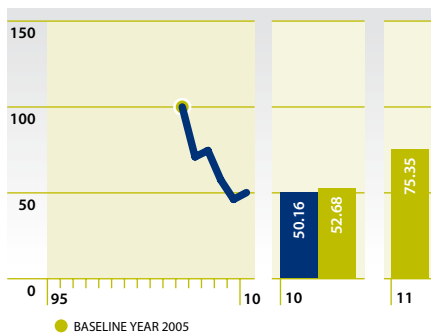
### Factors influencing 2011 target

- Continued rollout of Energy Monitoring & Reporting system to value-stream level following successful pilot.
- Maintain goal of energy reduction through continuous investigations and energy efficiency projects.

**RESULT 54.5**
**TARGET 55.59**




## Bristol-Myers Squibb (Cruiserath)



### Factors influencing 2010 result

- Natural gas and electrical energy reduction projects implemented, incl. standby boiler set-up, HVAC humidity and air-change rate changes.
- Production loading reduced, with negative impact on energy EPI.
- Services load management implemented to ensure services set back or switched off when not required.
- Also: motor VSD, control changes

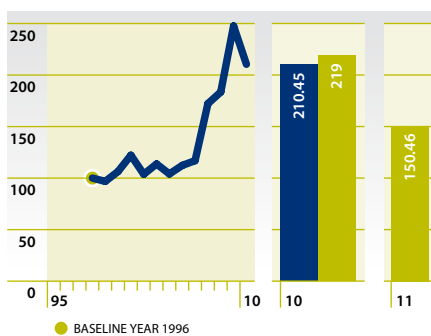
### Factors influencing 2011 target

- Production loading changes will have a large negative impact on the energy EPI for 2011.
- Further trials are under way to identify future energy reductions which will help to offset the EPI increase, if successful.

**RESULT 50.16**

**TARGET 75.35**

## Bristol-Myers Squibb (Swords)



### Factors influencing 2010 result

- Manufacturing output factor remained relatively flat in 2010. EPI was reduced due to projects implemented in 2009 and 2010. Services load management implemented to ensure services were set back or switched off when not required.
- Other projects: HVAC air-change and humidity control changes, motor VSD and control changes.
- Site certified to EN16001.

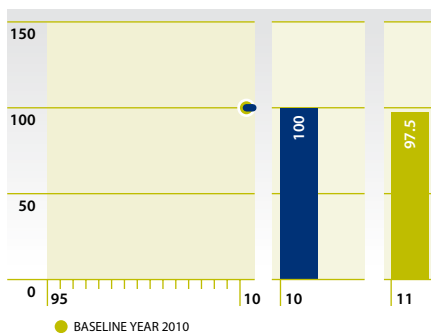
### Factors influencing 2011 target

- Increased manufacturing output factor will reduce the energy EPI.
- More projects such as chiller sequencing, further VSD installations and HVAC setback/air-change rate reductions in more areas of site.
- Upgrade to admin. building HVAC system in late 2010.
- New equipment installed reviewed for EED, which minimised energy impact.

**RESULT 210.45**

**TARGET 150.46**

## Britvic Ireland



### Factors influencing 2010 result

- Increased production volumes.
- Ongoing air leak surveys and repair programme in place.
- Increased monitoring and management of baseload energy.

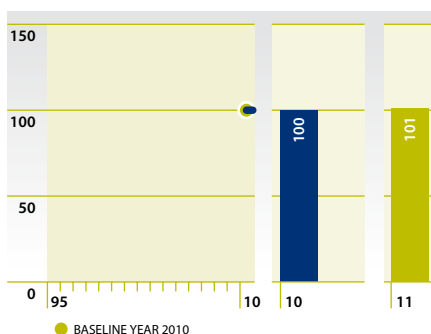
### Factors influencing 2011 target

- Development of performance metrics for main energy users.
- Compressor replacement project.

**RESULT 100**

**TARGET 97.5**

## BT



### Factors influencing 2010 result

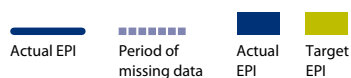
- Number of customers hosted in facility grew, while existing customers demanded more electrical power due to denser technologies, such as SAN and Blade Computing appliances. This was counterbalanced by programme of consolidation and virtualisation of internal systems as well as best practice on driving down cooling overheads.

### Factors influencing 2011 target

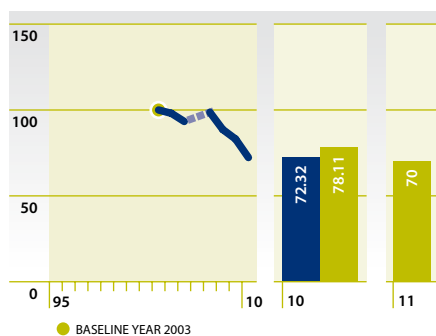
- Investigation of best practice with regard to driving down cooling overheads.

**RESULT 100**

**TARGET 101**



## Bulmers Ltd



### Factors influencing 2010 result

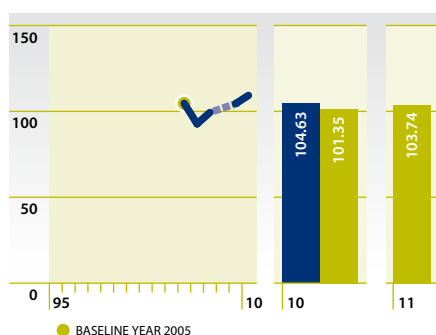
- Restructuring due to product volumes.
- The operational control on all significant users assigned to specific trained user.

### Factors influencing 2011 target

- In 2011, significant focus on low cost savings opportunities.
- Significant focus on operational control on all significant users.
- All service contracts tendered in 2011 made specific reference to what contractor can do for Bulmers in terms of sustainability (water and energy savings), sustainability being a key part of the service.

**RESULT 72.32**
**TARGET 70**

## Cara Partners



### Factors influencing 2010 result

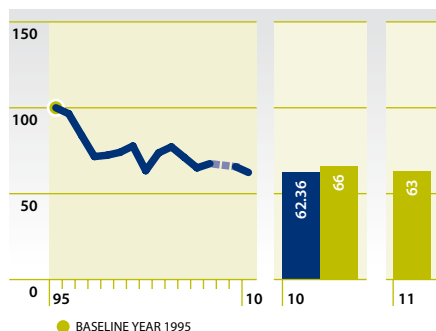
- Reduced production volumes over 2009 negatively affected indicators.
- Upgrade of chilled-water generation and distribution system delivered good savings.

### Factors influencing 2011 target

- Reduced production volumes negatively affected the site EPI.
- Initiatives undertaken as part of site-wide Lean/Six Sigma implementation generated savings and new targets for usage reduction.

**RESULT 104.63**
**TARGET 103.74**

## Carbery Milk Products Ltd



### Factors influencing 2010 result

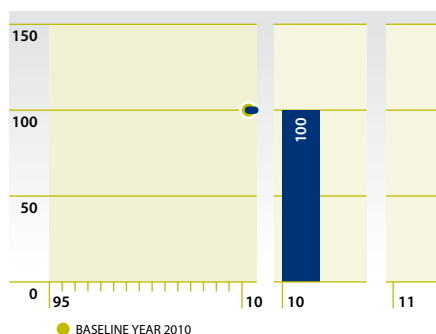
- Milk intake up by 7% and whey intake up 14% on 2009 volumes.
- Increased production of value-added products, which are more energy-intensive.
- Energy saving projects in previous years resulted in no net increase in energy.

### Factors influencing 2011 target

- MES/MIS is being investigated to drive down info to operators and achieve savings on energy use, product loss and operation efficiency.
- Increase production of value-added v commodity products.

**RESULT 62.36**
**TARGET 63**

## Celtic Anglian Water Ltd



### Factors influencing 2010 result

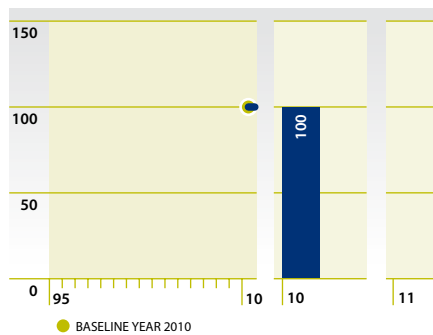
No influencing factors provided.

### Factors influencing 2011 target

No influencing factors provided.

**RESULT 100**
**TARGET NOT SPECIFIED**


## Celtic Linen



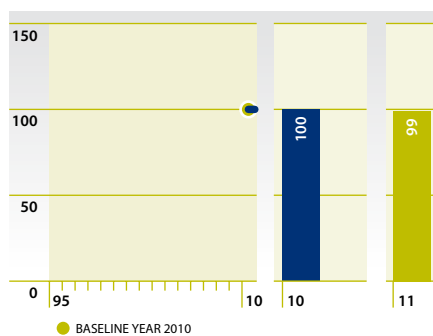
**Factors influencing 2010 result**  
No influencing factors provided.

**Factors influencing 2011 target**  
No influencing factors provided.

**RESULT 100**

**TARGET NOT SPECIFIED**

## Charleville Foods



**Factors influencing 2010 result**

- First year in the programme.
- Weekly focus on energy usage - part of KPI.
- Energy management team established, with regular meetings.

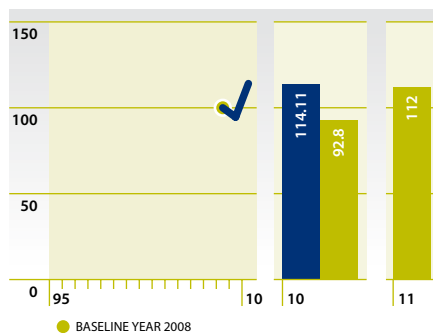
**Factors influencing 2011 target**

- Energy efficiency continues to be a high priority; new projects identified through energy audits implemented throughout 2011.

**RESULT 100**

**TARGET 99**

## CITADEL100 Datacentres Ltd



**Factors influencing 2010 result**

- Focus on the free cooling option.
- Investigation of a CHP engine, in particular tri-generation.

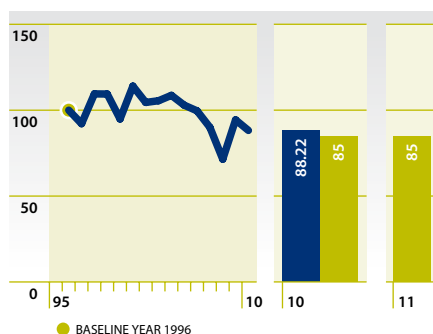
**Factors influencing 2011 target**

- CHP engine is also being investigated – in particular tri-generation.
- We have been looking at the free cooling option.

**RESULT 114.11**

**TARGET 112**

## Cognis Ireland Ltd



**Factors influencing 2010 result**

- Reduced plant output significantly.
- Boilers converted to gas oil.

**Factors influencing 2011 target**

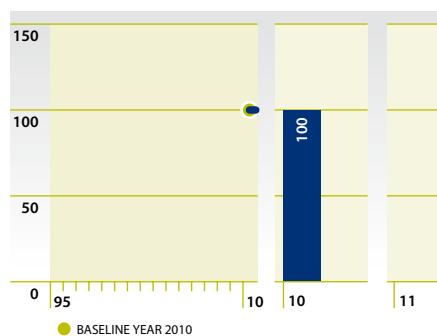
- Plant use.
- Change of company ownership.

**RESULT 88.22**

**TARGET 85**

Actual EPI  
 Period of missing data  
 Actual EPI  
 Target EPI

## College Proteins Group



### Factors influencing 2010 result

No influencing factors provided.

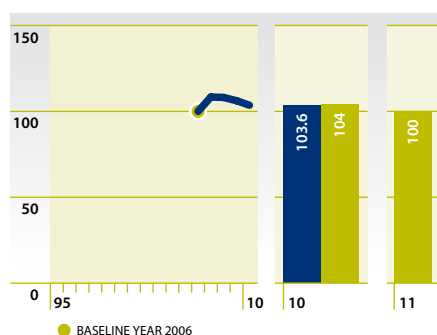
### Factors influencing 2011 target

No influencing factors provided.

**RESULT 100**

**TARGET NOT SPECIFIED**

## Connacht Gold Ltd (Shannonside)



### Factors influencing 2010 result

- A Compressed Air Leak Reduction Programme was carried out.
- Implementation of online OEE on the bagging line.

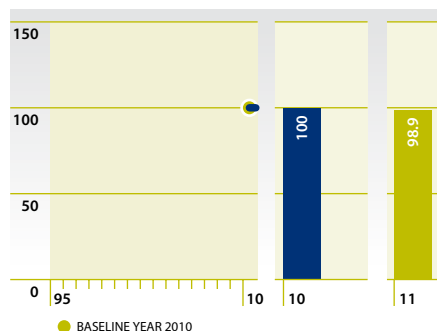
### Factors influencing 2011 target

- Operational control improvements at operator level for significant equipment.
- Installation of a new compressed-air system.
- Installation of a new bagging line.
- Additional meters installed to improve process area metrics.

**RESULT 103.6**

**TARGET 100**

## Connolly's Red Mills



### Factors influencing 2010 result

- Improved operational control of steam.
- Compressed air-leak detection.
- Max Demand Management.
- Improved operational control of process.
- Increased energy awareness.

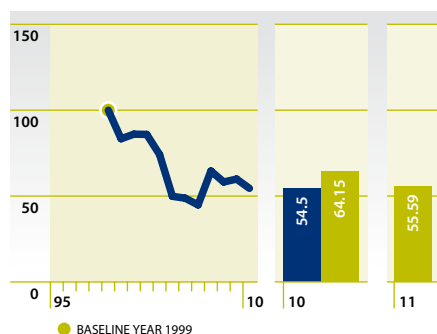
### Factors influencing 2011 target

- Additional energy efficiencies expected in 2011.
- Improvement in site metering, monitoring & measurement.
- Full impact of grinder project.

**RESULT 100**

**TARGET 98.9**

## ConocoPhillips Whitegate Refinery Ltd



### Factors influencing 2010 result

- Introduction of natural gas into the site as a fuel reduced the heating demands compared with use of HFO as a fuel.
- Replacement of condensed steam as cooling medium with demineralised water reduced steam usage.
- CHP plant efficiency improved.

### Factors influencing 2011 target

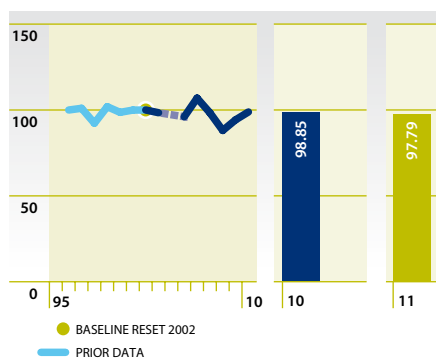
- Replacement of SG4 steam turbine with electrical motor.
- Recovery of hydrocarbon condensate.

**RESULT 111.63**

**TARGET 103.58**



## Covidien (Athlone)



### Factors influencing 2010 result

- Installed and commissioned new 400 kW CHP plant.
- Installed energy-efficient lighting in warehouse and offices.
- Baseline reset to reflect changes in product mix output.

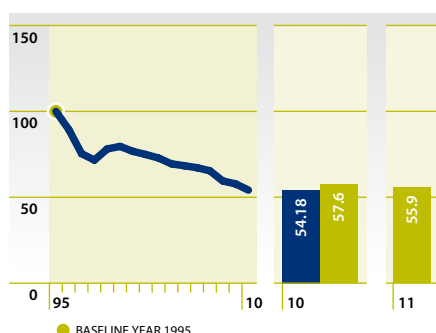
### Factors influencing 2011 target

- Energy-efficiency gains from the new 400 kW CHP plant.
- Energy efficiency gains from new 400 kW CHP plant.
- Install new 1,000 kW gas condensing boiler.
- Install an energy monitoring system.
- Replace two chillers with more energy-efficient units.

RESULT 98.85

TARGET 97.79

## Covidien (Mulhuddart)



### Factors influencing 2010 result

- Installation of conditioning on the boiler gas line appeared to improve fuel consumption (not statistically proven).
- Improved cooling-tower control has allowed 1 of 3 towers to be turned off during cold months.

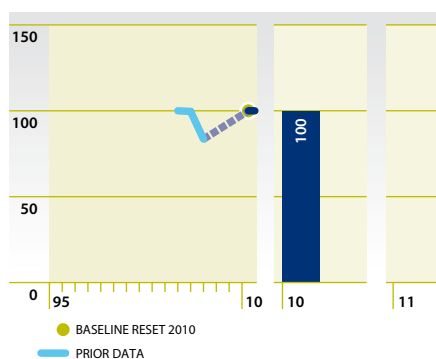
### Factors influencing 2011 target

- Continued drive to ensure energy-efficient and environmentally sustainable production methods.
- Work is continuing to reduce specific energy usage of both natural gas and electricity.

RESULT 54.18

TARGET 55.9

## Cuisine de France Ltd



### Factors influencing 2010 result

- Energy-efficient lighting retrofit programme.
- Reduced effluent emissions, lower pumping & treatment energy requirements.
- Increased cooling-tower efficiency.
- Investigated heat-pump improvements.
- Baseline reset.

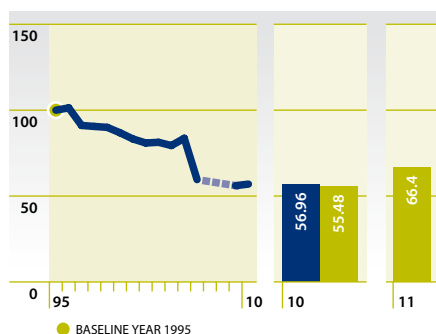
### Factors influencing 2011 target

- Installation of inline gas meters to monitor process improvements.
- Focus on areas of high electricity consumption.
- Focus on energy consumption in wastewater treatment plant.
- Introduction of new production capacity at Grangecastle.
- Optimisation of heat-pump and cooling system in refrigeration plant.

RESULT 100

TARGET NOT SPECIFIED

## Dairygold Co-op Society



### Factors influencing 2010 result

- Implementing and certifying EN16001 was key to 2010 energy savings. It raises awareness of energy demands and usage, and reveals areas for improvement and optimisation.
- Initial implementation involved focus on electrical usage and reduction, but more significant focus now and in future is thermal usage and reduction of carbon footprint for each process.

### Factors influencing 2011 target

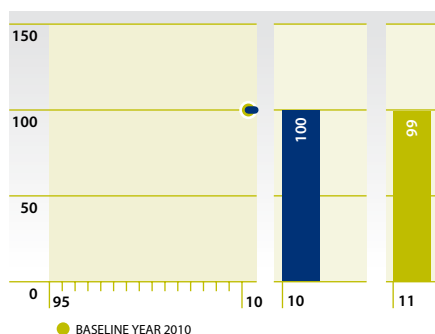
- Increased production forecast - in accordance with milk plan.
- Different products have different energy intensity, which can affect overall energy prediction and budget.

RESULT 56.96

TARGET 66.4



## Dawn Meats (Grannagh)



### Factors influencing 2010 result

- First year in the programme.
- Weekly focus on energy usage – part of KPI.
- Energy management team established, with regular meetings.

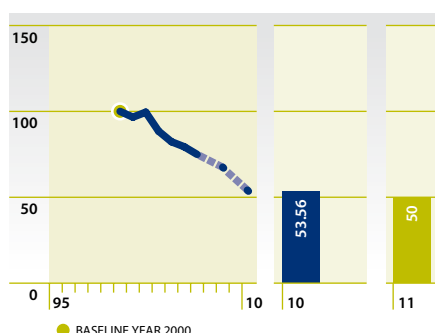
### Factors influencing 2011 target

- Energy efficiency continues to be a high priority.
- New projects identified through energy audits will be implemented throughout 2011.

RESULT 100

TARGET 99

## Dawn Meats Ltd (Ballyhaunis)



### Factors influencing 2010 result

- Refrigerant thermal energy recovery: plate heat-exchanger was installed on refrigerant gas prior to entry into condenser; pre-heating of boiler water reduced amount of oil needed to heat wash-down water and steam
- Compressed-air demand optimisation with heat recovery: installation of VSD air compressor with heat recovery. Oil requirement reduced.

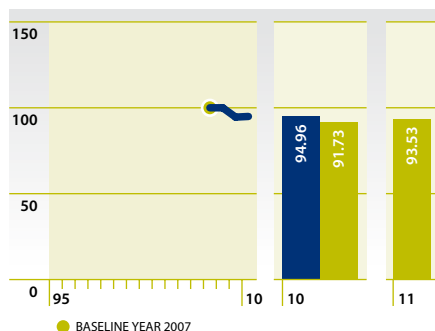
### Factors influencing 2011 target

- Steriliser optimisation – use of efficient sterilisers, reducing hot-water requirement and oil demand.
- Installation of water submeter to aid monitoring and targeting.

RESULT 53.56

TARGET 50

## Depuy (Ireland) Ltd



### Factors influencing 2010 result

- Strategy based on three pillars: cost, usage and sustainability.
- kWh/unit shipped was slightly up last year due to installation of new production equipment which had yet to come online.
- Installation of a biomass boiler system this year will aid future sustainability.

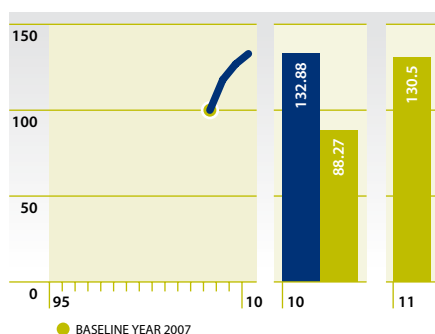
### Factors influencing 2011 target

- Energy efficiency continues to be a high priority.
- 2011 target is to reduce kwh per unit shipped by 5% on 2010 consumption.

RESULT 94.96

TARGET 93.53

## Diageo Bailey's Global Supply



### Factors influencing 2010 result

- 2010 Energy performance was influenced by optimisation of the HVAC system and compressed-air system improvements, as well as annual variation in output/activity.
- Severe winter weather increased gas usage.

### Factors influencing 2011 target

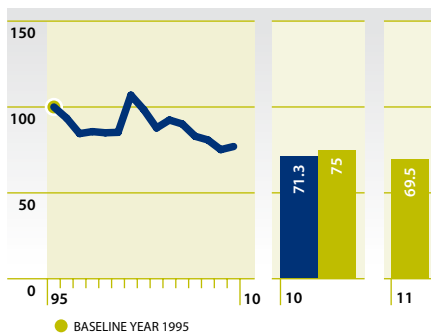
- The 2011 projected EPI has been influenced by planned programmes for steam pipework insulation and condensate return system upgrades.
- Local hot-water generation in place of boiler operation during low-demand periods.

RESULT 132.88

TARGET 130.5



## Diageo Ireland (Dundalk)



### Factors influencing 2010 result

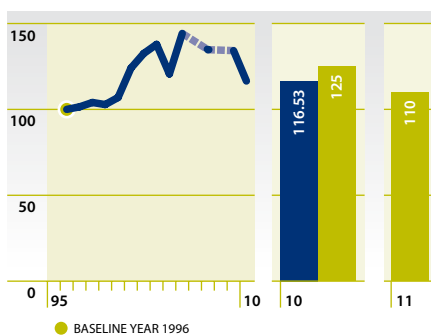
- Continuous improvement in energy consumption delivered by using site-wide automation system to target high level of process repeatability and consistency.
- All energy recovery systems fitted with monitoring equipment to monitor recovery efficiency and ensure any deviations from desired performance are easily identified and can be immediately tackled.

### Factors influencing 2011 target

- During 2010 the capacity of each core utility required to meet the revised requirement of the site has been evaluated.
- After this evaluation, the control system has been revised to optimise use of the installed capacity of each utility.
- This optimisation will deliver a significant step change in energy usage on site during 2011.

**RESULT 71.3**
**TARGET 69.5**

## Diageo Ireland (Kilkenny)



### Factors influencing 2010 result

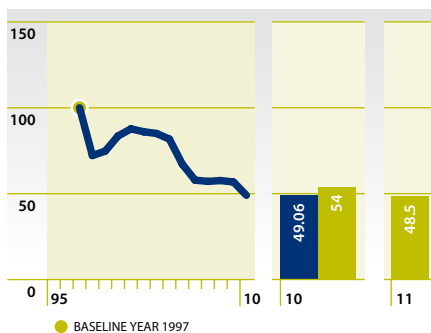
- Installation of energy-efficient lighting.
- EnMS implementation.
- Enhanced boiler controls.
- Closure of keg plant in September 2010.

### Factors influencing 2011 target

- Full year without keg plant operation.
- Challenging site targets.
- Refrigeration upgrade completed.
- Shutdown of boiler operation for periods during low activity (e.g. weekends).
- Projects – Clean Steam Generator.

**RESULT 116.53**
**TARGET 110**

## Diageo Ireland (St James's Gate)



### Factors influencing 2010 result

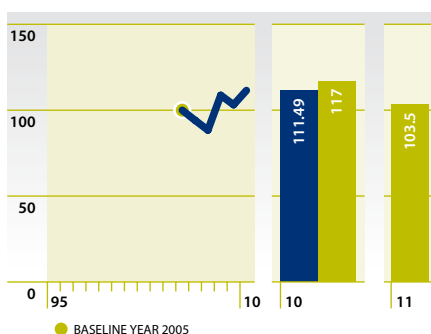
- Investment at St James's Gate has improved economies of scale and efficiencies in packaging plant.
- Investment in VSDs and intelligent lighting systems yielded good electrical savings.

### Factors influencing 2011 target

*No influencing factors provided.*

**RESULT 49.06**
**TARGET 48.5**

## Donegal Meat Processors



### Factors influencing 2010 result

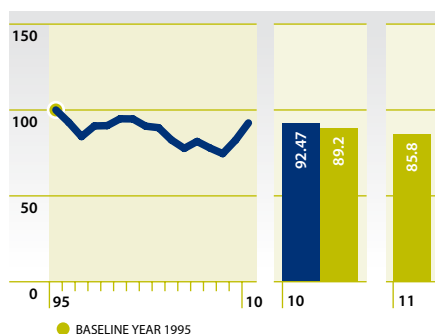
- Severe weather contributed to some increase in thermal use, as did internal process changes.

### Factors influencing 2011 target

- New gas-fired boilers to be installed Oct 2011.
- Monitoring system for electricity, flows and compressed air being installed July/August 2011.

**RESULT 111.49**
**TARGET 103.5**


## Dublin Airport Authority



### Factors influencing 2010 result

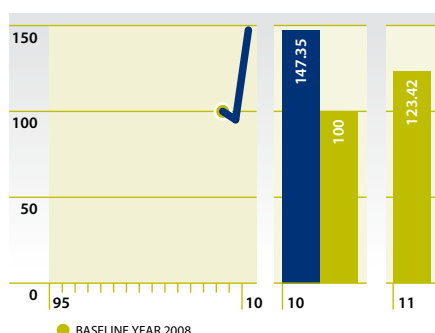
- Larger than expected drop in passenger numbers (due to volcanic ash cloud and extreme winter weather).
- Increase in consumption was associated with new campus road lighting and new T2 multi-storey carpark.

### Factors influencing 2011 target

- Target for 2011 based on like-for-like consumption against 2010. Base year likely to be reset in 2011 to reflect a more accurate metric. Reduced consumption due to lighting projects.
- Planned in-house energy audits and correction for areas in terminal. Heating system temps. reduced and better use of free cooling in summer.

**RESULT 92.47**
**TARGET 85.8**

## Edenderry Power Ltd



### Factors influencing 2010 result

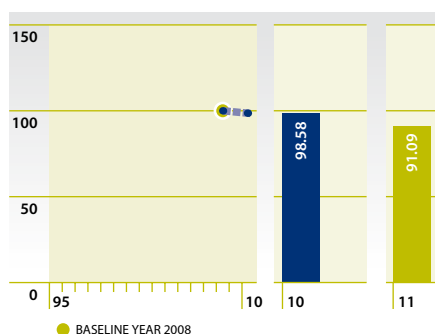
- Overall performance affected by a planned major turbine overhaul and poor-quality primary fuel (peat moisture).
- Plant output frequently restricted by Grid due to increased availability of wind energy during the year.
- Poor fuel situation partially offset by use of more carbon-neutral biomass fuel. On energy basis, 12% co-firing rate achieved in 2010.

### Factors influencing 2011 target

- Anticipated increased supply of biomass during 2011 should provide efficiency benefits.
- Continuing technical investigations of Stack Exit Temperature should increase overall efficiency.

**RESULT 147.35**
**TARGET 123.42**

## Eircom



### Factors influencing 2010 result

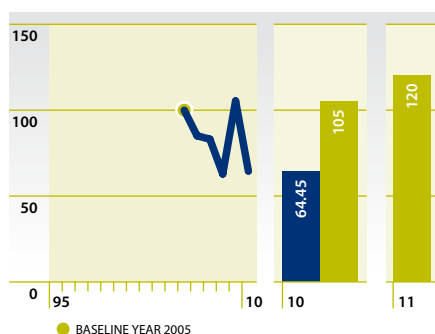
- SURE campaign 'Switch Off, Unplug and Recycle' launched in eircom group.
- Energy Roadshow taken to 12 of our largest sites in Oct/Nov 2010 increased staff awareness of energy consumption/ costs both at home and at work.
- New Energy Management website provides information on saving energy, where to log saving ideas, projects being implemented to reduce consumption.

### Factors influencing 2011 target

- Full-time Energy Manager appointed in early 2011.
- We have been working on identifying and implementing energy savings projects in the areas of lighting, air conditioning, heating and IT.
- A new facilities energy routine has been rolled out to identify cost-saving opportunities and implement no/low-cost savings measures.

**RESULT 98.58**
**TARGET 91.09**

## Element Six Ltd



### Factors influencing 2010 result

- Site rationalisation from 22 to 7 acres.
- Reduction in facilities demand.

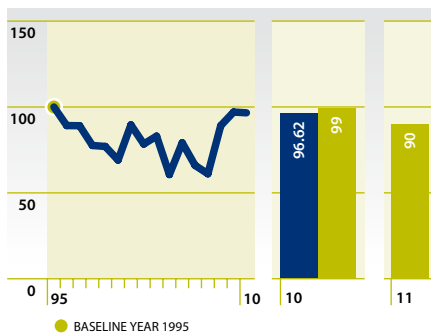
### Factors influencing 2011 target

- Stabilisation of site services following infrastructure changes.
- Reduction of steam requirement on site.

**RESULT 64.45**
**TARGET 120**



## Eli Lilly SA



### Factors influencing 2010 result

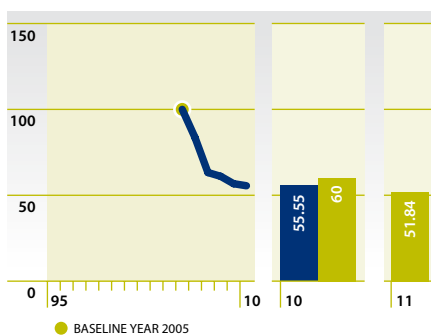
- Installation of natural gas allowed retrofitting of exhaust gas economisers to boilers.
- Installation of natural gas on the site has displaced liquid fuel (for combustion support) to incineration plant.
- Smaller initiatives on lighting, VSDs and extra insulation have been executed across the site.

### Factors influencing 2011 target

- Site is undergoing business change with turn from chemical-based pharmaceuticals to biotech production. Large biotech facility is being qualified/commissioned in 2011.
- Engineering study underway to optimise energy usage on biotech campus cooling towers. Good results achieved on existing site; comparable savings being aimed for in recently added (6) towers.

**RESULT 96.62**
**TARGET 90**

## EMC Information Systems International



### Factors influencing 2010 result

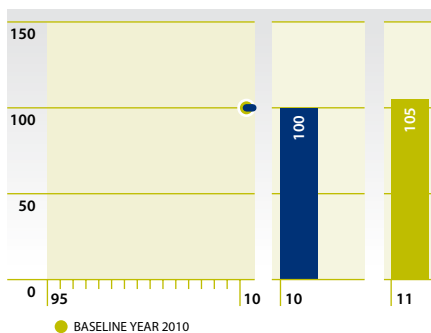
- EN16001 recertification helped EMC to identify/control energy-saving initiatives in controlled way.
- Special investigation on EPIs improved understanding of operations onsite, to develop successful metrics.
- Maximised HVAC efficiencies by taking part in HVAC & Data Centre SWGs.
- Energy & Environment Week held to coincide with World Earth Day.

### Factors influencing 2011 target

- Commissioning of Free Fresh Air cooling projects in 2010 and installation of aisle containment are giving accumulated saving of >20% on site.
- Implementation of operational control system for AHUs to identify any issues with equipment and controls.
- In-house development of area-specific energy monitoring tool (eMap) displaying real-time and historic information.

**RESULT 55.55**
**TARGET 51.84**

## Fournier Laboratories Ireland Ltd



### Factors influencing 2010 result

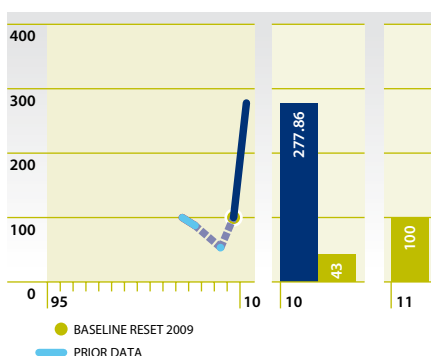
- Achieved certification to IS EN16001 standard in 2010. This contributed to Electrical, Gas, Water and CO<sub>2</sub> reductions.
- The EN16001 structured approach enabled the site to focus resources on evaluating/optimising business-specific energy users.

### Factors influencing 2011 target

- Evaluation and development of a strategic renewable energy programme in line with corporate reduction targets.
- Rollout of targeted optimisation projects identified in 2010.

**RESULT 100**
**TARGET 105**

## Genzyme Ireland Ltd



### Factors influencing 2010 result

- Initiatives in 2010 included refrigeration/chilled-water pumping upgrades, and improvements in BMS & humidity control and cooling-tower operation. A new 4-storey administration building/cafeteria achieved Gold standard in the LEED (US Green Building Council) classification.

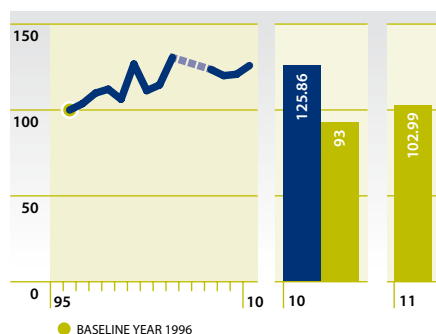
### Factors influencing 2011 target

- Continued implementation in 2011 of programmes to improve energy efficiency, incl. reducing air-change rates in manufacturing areas, further metering on utilities, further improvements to BMS controls and operation, and recommissioning chilled water users to design and redesigned settings.

**RESULT 277.86**
**TARGET 100**

Actual EPI  
 Period of missing data  
 Actual EPI  
 Target EPI

## Glanbia Consumer Foods Ltd (Inch)



### Factors influencing 2010 result

- 2010 weather resulted in higher than forecasted thermal energy usage. Improved process control of refrigeration & waste-water treatment plant helped reduce electrical energy usage.
- Implementation/accreditation to EN16001 has led to more forensic approach to finding sustainable solutions.
- Decrease in production output affected EPI, but overall energy spend cut by 16%.

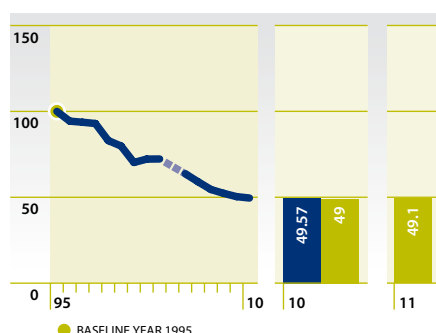
### Factors influencing 2011 target

- Strategy for 2011 much the same as 2010, with most focus on SEUs as part of the development of EN16001.
- Special projects identified through EN16001 system (register of opportunities) will deliver 12% in thermal energy & 7% reduction in electrical consumption.

**RESULT 125.86**

**TARGET 102.99**

## Glanbia Ingredients Ltd (Ballyragget)



### Factors influencing 2010 result

- Specific energy consumption improved by 2% in 2010.
- Installation of the process monitoring & data capture system (MES) has helped to identify opportunities for energy improvement.
- Ongoing insulation improvement programme.

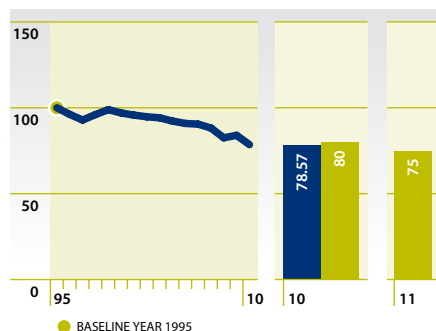
### Factors influencing 2011 target

- Continued implementation of Lean and OEE principles to improve plant control and performance.
- Further insulation, heat-recovery, waste minimisation and recovery/recycling of water.
- Controlled use of chilled water.
- Ongoing insulation programme.

**RESULT 49.57**

**TARGET 49.1**

## Glanbia Ingredients Ltd (Virginia)



### Factors influencing 2010 result

- Continuous monitoring and reporting of usage and managerial awareness resulted in improvements in overall plant efficiencies.
- Gradual improvement in energy-reduction measures has resulted in an improved energy consumption per unit ratio.

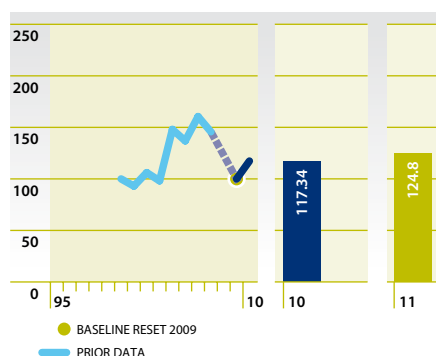
### Factors influencing 2011 target

- Continuous monitoring and reporting of usage plus awareness among managers have improved overall plant efficiencies.

**RESULT 78.57**

**TARGET 75**

## GlaxoSmithKline Ltd (Cork)



### Factors influencing 2010 result

- Good progress made on energy reduction in 2010, with a further 6% reduction on top of the 23% reduction in 2009.
- Main focus areas were: Cooling Water and Nitrogen Generation Optimisation projects and roll-out of Tiered Metrics Performance Management to building owners across the site.
- Work also began on preparation for EN16001 certification.

### Factors influencing 2011 target

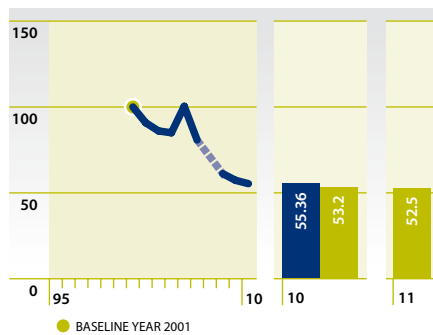
- By continuing rollout of tiered metrics and using key EN16001 features, more saving projects will be identified.
- Tools such as dashboard reporting and energy mapping will improve energy-use understanding and deliver more savings.
- Kaizen event will investigate ways of reducing site's carbon footprint.
- Planning application for 3 MW wind turbine will be lodged during year.

**RESULT 117.34**

**TARGET 124.8**



## GlaxoSmithKline Ltd (Dungarvan)



### Factors influencing 2010 result

- Selected AHUs shut down during non-production times at weekends.
- Selected AHUs rebalanced to reduce excess air-change rates, fresh-air intake.
- Additional energy-efficient lighting upgrades installed across both plants.
- Additional insulation upgrades of difficult-to-clad areas.
- Survey of steam and condensate systems and replacement of defective traps, etc.

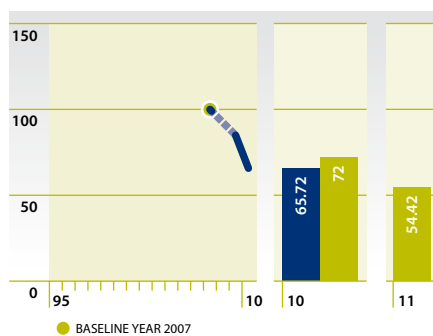
**RESULT 55.36**

### Factors influencing 2011 target

- Upgrade project will (a) replace older chiller units with high-efficiency units; (b) convert CHW distribution system from 3-port fixed-flow to 2-port variable-flow.
- M&T project on both sites will lead to real-time consumption information and provide energy efficiency monitoring of key utilities systems.
- Conversion to diesel of steam boilers will improve performance.

**TARGET 52.5**

## Google Ireland



### Factors influencing 2010 result

- The operating hours have increased in line with a higher head count in 2010.
- Achieved EN16001 certification.
- Energy reduction target of 4% for 2010 was achieved.

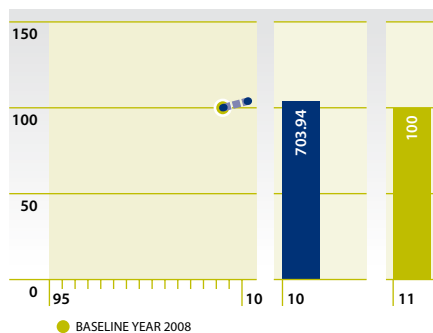
**RESULT 65.72**

### Factors influencing 2011 target

- Upgrading the EnMS to ISO50001.
- Additional energy reduction of 3% on baseload during redesign of office space.
- Increased output due to head-count rise from 1,800 to 2,000.
- Overall site energy reduction set at 5% with increased output.
- Additional energy reduction of 3% on baseload during redesign of office space.

**TARGET 54.42**

## Green Isle Foods (Gurteen)



### Factors influencing 2010 result

- Savings in hot-water heating system achieved through recovery of heat from the refrigeration plant and installation of a condensing boiler.

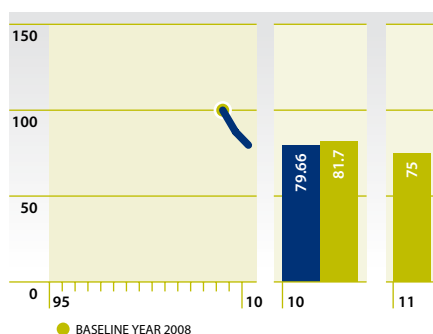
**RESULT 103.94**

### Factors influencing 2011 target

- Planned replacement of T8 fluorescent fittings with T5s and installation of occupancy sensors.
- Condensing optimiser unit installed to control refrigeration condensing pressure.

**TARGET 100**

## Green Isle Foods (Longford)



### Factors influencing 2010 result

- Iceless System improved freezer performance which allowed speed-up of production lines - 15% on takeaway-size pizzas.
- Continuous improvement led to better plant efficiencies, reducing waste/downtime and increasing tonnage produced without affecting energy usage.

**RESULT 79.66**

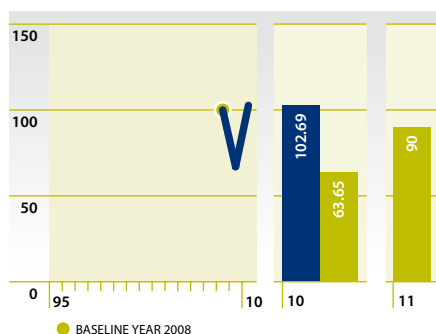
### Factors influencing 2011 target

- Project implemented for heat recovery from the refrigeration plant to heat hot water.
- Also installed floating head pressure to reduce consumption in refrigeration plant.

**TARGET 75**



## Green Isle Foods (Naas)



### Factors influencing 2010 result

- Savings of €97,000 achieved by combining two refrigeration condensers and installing floating-head pressure controls.
- Old twin-tube T8 fluorescent lights replaced with single-tube T5 fittings.

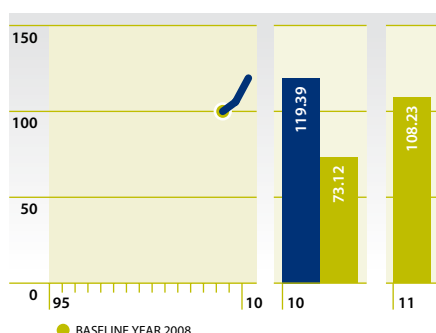
### Factors influencing 2011 target

- Ensuring that savings achieved in refrigeration are continued.

**RESULT 102.69**

**TARGET 90**

## Green Isle Foods (Portumna)



### Factors influencing 2010 result

- Lower production throughput than in previous years resulted in a higher fixed energy requirement, which affected energy performance.
- Restriction on funds availability meant projects could not be completed as required.

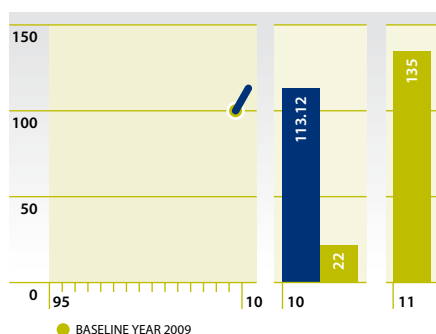
### Factors influencing 2011 target

- An upturn in volume will result in an improved EPI.
- Capital projects anticipated to be completed as costed with sufficient payback to warrant investment.

**RESULT 119.39**

**TARGET 108.23**

## Helsinn Birex Pharmaceuticals Ltd



### Factors influencing 2010 result

- Energy monitoring installed in late 2010.
- Increased use of product development area, which does not produce finished units.
- Register of Opportunities expanded to include projects identified through initial monitoring.

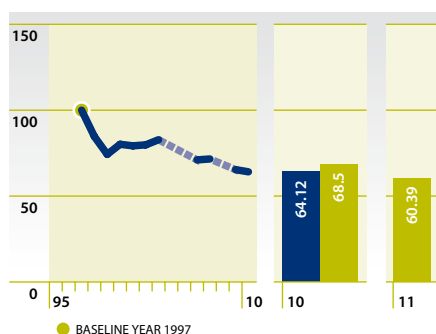
### Factors influencing 2011 target

- Register of opportunities expanded to include projects identified through initial monitoring.
- Production figures down approximately 15% but heavy energy users such as HVAC must remain on to ensure GMP compliance.

**RESULT 113.12**

**TARGET 135**

## HJ Heinz Frozen & Chilled Foods Ltd



### Factors influencing 2010 result

- Energy Internal Audit training provided to all internal auditors.
- Increased energy awareness and training across the site.
- Implementing and maintaining EN16001:2009.
- Implementing energy opportunities projects.
- Strong commitment from the plant manager and management team.

### Factors influencing 2011 target

- New steam boiler performance.
- Implementation of energy management programme for the site.
- Results of internal audits and close-out actions.
- Heinz commitments for continual improvement.

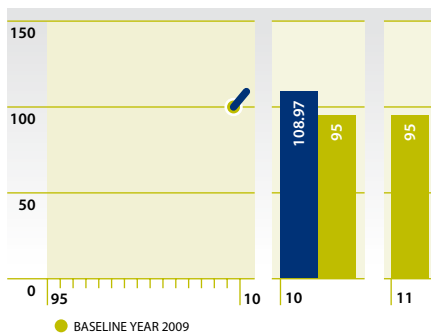
**RESULT 64.12**

**TARGET 60.39**





## Iarnród Éireann



### Factors influencing 2010 result

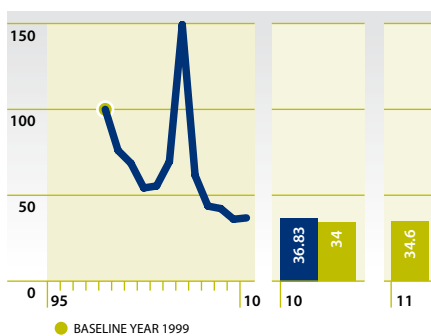
- The Chief Mechanical Engineer, who manages all rail depots nationwide, initiated an energy reduction works programme in 2009.
- Energy audits of Drogheda rail depot & Inchicore Bogie Shop carried out under SEAI's Services for Business Programme in 2008 & 2009 provided an impetus to implement energy-saving recommendations.

### Factors influencing 2011 target

- The Chief Mechanical Engineer initiated an energy reduction works programme in 2009.

**RESULT 108.97**
**TARGET 95**

## IBM International Holdings



### Factors influencing 2010 result

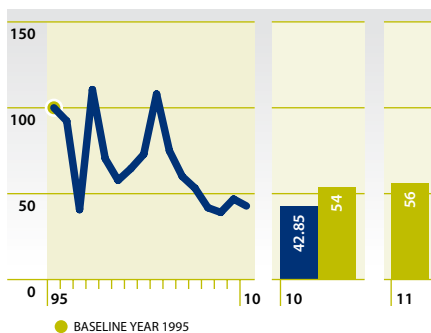
- Energy savings delivered through IT virtualisation and facilities optimisation.
- Direct (fresh air) cooling installed as part of new computer lab construction to minimise mechanical cooling energy requirements.

### Factors influencing 2011 target

- Continued focus in 2011 on energy conservation through IT virtualisation.
- The IBM Intelligent Building Manager Software Suite (derived from Green Sigma initiative) will be deployed to improve energy monitoring and analytics.
- Continued focus on continuous commissioning as a path to optimal energy-efficient operation.

**RESULT 36.83**
**TARGET 34.6**

## Intel Ireland Ltd



### Factors influencing 2010 result

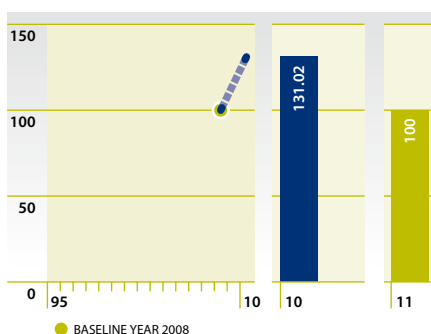
- Further increased energy reduction due to efficient modes of operation in IFO facilities.
- Full-year impact of 2009 energy-reduction projects and pro-rated impact of 2010 projects.
- Harsh winter weather meant increased use of natural gas.
- EN16001 certification increased engagement in I2E2 ERC.

### Factors influencing 2011 target

- EED approach to Fab 14 factory facilities upgrade.
- Reduction of operations in IFO facilities.
- Review of ISO50001 Energy Management Standard.

**RESULT 42.85**
**TARGET 56**

## Interxion Ireland Ltd

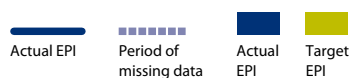


### Factors influencing 2010 result

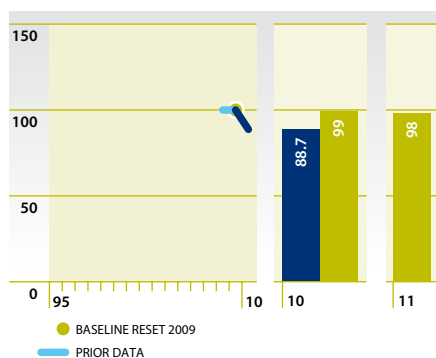
- Data Centre 1 (Dub 1) nearing full capacity.
- Data Centre 2 (Dub 2) over 50% capacity.

### Factors influencing 2011 target

- New Dub 2 site uses infrastructure with focus on efficiency. Free cooling chillers, air conditioners with VFDs that work on pressure sensitivity, cold aisle containment as standard, 1 metre floor void, etc. This will allow for higher power density with improved efficiency as load grows.

**RESULT 131.02**
**TARGET 100**


## Irish Cement Ltd



### Factors influencing 2010 result

- Optimisation of new Kiln 3 production facility and new Cement Mill 4 at Platin Works.
- Reduction in clinker content in CEM II cement products at both works.
- Replacement of fixed-speed motors with variable speed where viable; increased metering/monitoring of fixed electricity load at both works.

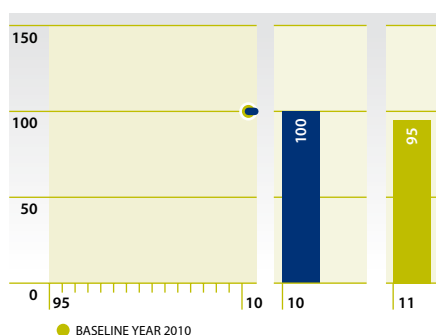
### Factors influencing 2011 target

- Commissioning of alternative renewable fuels in partial substitution of fossil-fuels will improve process sustainability and reduce carbon emissions per tonne
- With lower market demand, focus for 2011 continues to be on identifying and reducing energy baseload.
- Energy metering & monitoring will be expanded to highlight focus areas.

RESULT 88.7

TARGET 98

## Irish Pride



### Factors influencing 2010 result

- Real Time Kilowatt metering installed on large energy consumers.
- Signed up to Energy Agreements Programme.

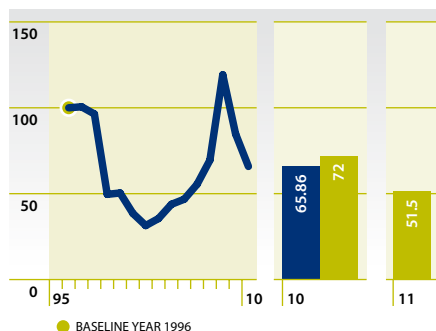
### Factors influencing 2011 target

- Continued metering programme and cooling, lighting and heat recovery.
- Output will be reduced due to economic downturn.

RESULT 100

TARGET 95

## Janssen Pharmaceutical Ltd



### Factors influencing 2010 result

- Plant output has increased by 43%, improving efficiencies.
- A number of systems operating to ensure business continuance were shut off following detailed FMECA's.
- Pilot for planned site-wide reduction of air-change rates in classified areas was successfully completed. Energy savings expected for 2011.
- Onsite nitrogen generation started.

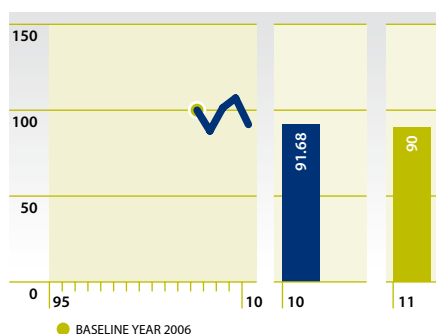
### Factors influencing 2011 target

- Increased production has improved the site EPI.
- A change in operating practices (from 24/5 to 24/7) has eliminated all weekend switch-offs.
- CHP start-up scheduled for Q4 will increase natural-gas use while reducing amount of electricity bought on site.

RESULT 65.86

TARGET 51.5

## Kerry Foods Ltd (Shillelagh)



### Factors influencing 2010 result

- Additional processing increased energy but reduced conversion cost.
- Product mix.

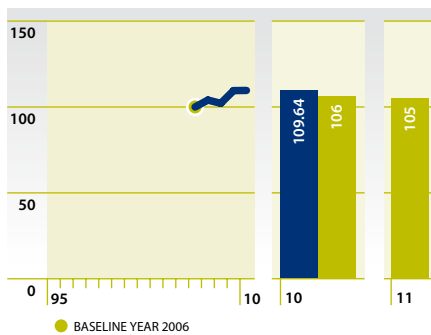
### Factors influencing 2011 target

- Installation of LED lighting across the site.
- Increased monitoring and measurement of energy use.
- BMS programming and training to enable more efficient scheduling of utilities.

RESULT 91.68

TARGET 90

## Kerry Ingredients (Charleville)



### Factors influencing 2010 result

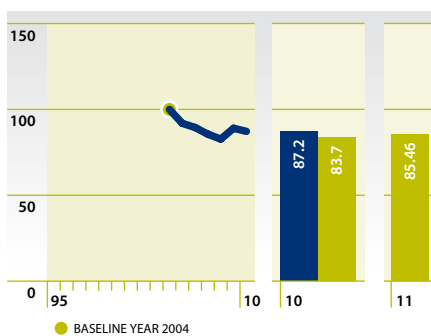
- EN16001 implementation in 2010 standardised the approach to energy management and enabled systematic identifying of energy-reduction opportunities.
- Reconfiguration of process pipework led to energy savings.
- Review of process temperature settings led to low-cost energy savings.

### Factors influencing 2011 target

- EN16001 will help ensure continual improvement in reducing energy on site.
- An increase in production volumes along with our continual objective of improving energy efficiency will ensure a lower EPI is achieved for 2011.

**RESULT 109.64**
**TARGET 105**

## Kerry Ingredients (Listowel)



### Factors influencing 2010 result

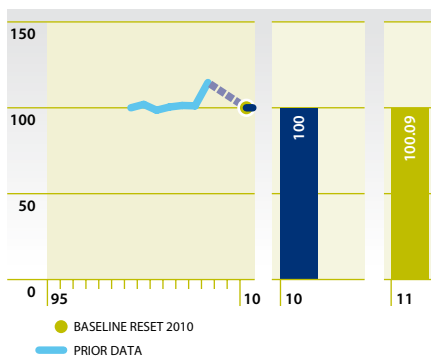
- Implementation of EN16001 helped in 2010 to improve energy efficiency.
- Energy-efficiency projects included VSD control of primary air fan on coal boiler and installation of EFF1 motors in cold stores.

### Factors influencing 2011 target

- Energy projects will yield savings in 2011 and improve overall efficiency. Projects in biogas CHP installation, lighting projects, energy-efficiency motors, coal-boiler optimisation.
- EN16001 is helping to drive energy projects in 2011.

**RESULT 87.2**
**TARGET 85.46**

## Kostal Ireland Gmbh



### Factors influencing 2010 result

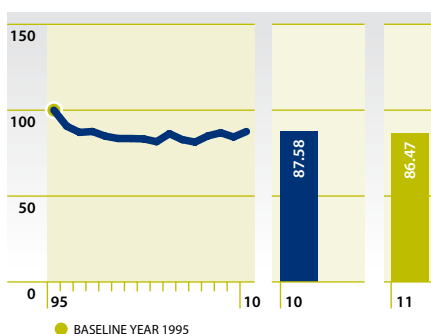
- Energy consumption reduced substantially compared to units produced: overall energy reduction of 19% for 2010/2011.
- Method of calculating production output updated to take account of the change in product mix/new product ranges, which has reset EPI base year from 2010 forward.

### Factors influencing 2011 target

- Manufacturing departments will analyse electrical consumption to identify base lines and peak trends, and use this data to create a Pareto analysis chart, to identify and implement tasks to reduce energy consumption.
- Plant lighting will be reviewed and payback on investment established for more efficient lighting where existing lighting is past serviceable life.

**RESULT 100**
**TARGET 100.09**

## Kraft Foods Ireland Ltd (Kerry) (formerly Cadbury)



### Factors influencing 2010 result

- Reduced production volumes had a negative influence on our energy targets during 2010.
- Ongoing savings realised from recent upgrade projects.
- Prolonged cold weather at start of 2010 had a negative impact on energy usage.

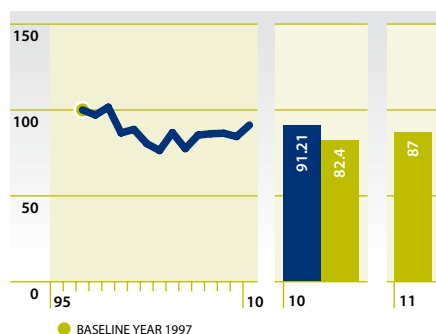
### Factors influencing 2011 target

- Implementation of energy saving opportunities will help reduce energy consumption and cut CO<sub>2</sub> emissions.
- Ongoing high level management commitment to energy reduction.
- Reduction in production volumes in 2011 will make it difficult to achieve our energy targets.

**RESULT 87.58**
**TARGET 86.47**

Actual EPI
 Period of missing data
 Actual EPI
 Target EPI

## Kraft Foods Ireland Ltd (Dublin) (formerly Cadbury)



### Factors influencing 2010 result

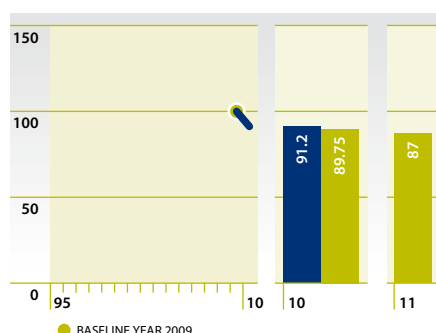
- Ongoing drive for energy savings, reducing CO<sub>2</sub> emissions and compliance were the main drivers in 2010, in order to be competitive and offer our customers quality at a price they can afford.

### Factors influencing 2011 target

- Ongoing improvements to make the plant efficient and effective for the future.
- Thermodynamic panels to be installed in workshops to replace expensive electrical heating.

**RESULT 91.21**
**TARGET 87**

## Kraft Foods Ireland Production Ltd (Tallaght) (formerly Cadbury)



### Factors influencing 2010 result

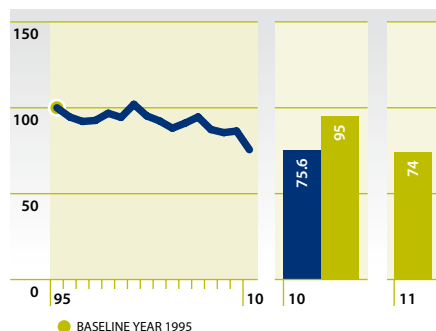
- Increase in our production output has helped to reduce our cost/ton.
- Focus on compressed air usage/Air leaks.
- Attention to schedules and running conditions of AHUs.

### Factors influencing 2011 target

- Focus on Refrigeration, to increase COP.
- Focus on Compressed air usage/leaks.
- Focus on process parameters to avoid over processing/over-cooling/over-heating.

**RESULT 91.2**
**TARGET 87**

## Lakeland Dairies (Bailieboro)



### Factors influencing 2010 result

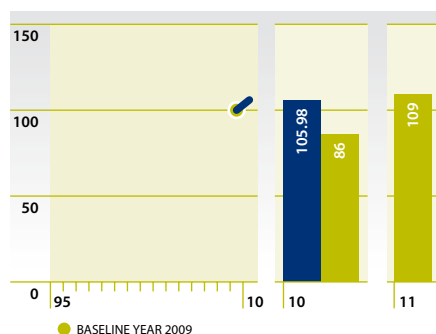
- Lakeland Dairies commissioned and began operating a new milk powder spray dryer in April 2010 to handle a 70% increase in milk volumes.
- Through an agreement with EScO, electricity and steam was taken from the new CHP plant. This plant was a net exporter of electricity, with operating efficiencies exceeding 80%.

### Factors influencing 2011 target

- New dryer will be operated for the full 12 months of 2011 with further improvement in efficiencies.

**RESULT 75.6**
**TARGET 74**

## Largo Foods Ltd



### Factors influencing 2010 result

- Installation of additional electrical loading with no output increase affected EPI in 2010.
- Packing hall building extension.
- Waste segregation room constructed.

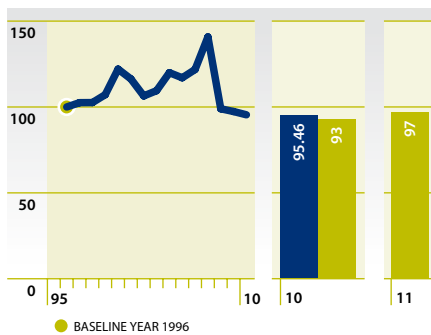
### Factors influencing 2011 target

- The introduction of new processes will affect energy consumption and EPI in 2011.
- EN16001 certification planned for Q4 2011.

**RESULT 105.98**
**TARGET 109**



## LEO Pharma



### Factors influencing 2010 result

- Remarkable improvement in EPI in 2010.
- Better EPI achieved through implementation of energy-saving projects, which continue to be highlighted through implementation of EN 16001. One of the biggest successes in 2010 was the installation of a new air compressor, with its waste heat diverted into the boiler house, thus improving the efficiency of the steam boilers.

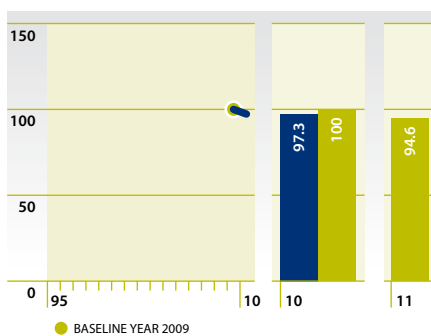
**RESULT 95.46**

### Factors influencing 2011 target

- EPI expected to deteriorate slightly in 2011, but we are bringing major infrastructural improvements to the site in terms of CHP, absorption chilling, ammonia chilling and new distribution systems.
- These plant items will not be fully operational until end 2011.
- These savings will improve our EPI, but will not be shown until 2012 figures are published.

**TARGET 97**

## Liffey Meats Ltd



### Factors influencing 2010 result

- Upgrades including new boiler and compressed air dryers have helped performance.

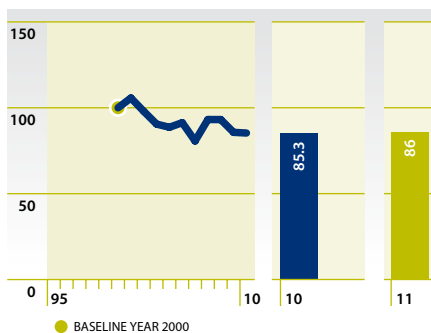
**RESULT 97.3**

### Factors influencing 2011 target

- Despite the expected reduction in cattle killed, output from the other production areas of boning and value-added plants is expected to increase.
- Short-term increase in refrigeration costs when running two systems side by side will be recovered now the older system has been decommissioned.

**TARGET 94.6**

## Lisheen Mine



### Factors influencing 2010 result

- Strong drive to maintain the energy savings achieved the previous year through better water management and control of underground auxiliary pumps.
- Reaping the rewards of a new VSD for the compressed-air system. Also using a more detailed air-leak detection and repair system.

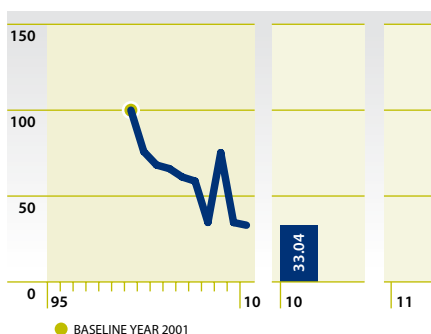
**RESULT 85.3**

### Factors influencing 2011 target

- After major energy savings in 2009, the challenge was to maintain that level of savings. Infrastructure hardware has been installed as well as better controls and monitoring to help maintain the savings achieved.
- The mine is extending into new areas. More water may be encountered; this has to be controlled and pumped to the surface for discharge.

**TARGET 86**

## Masonite Ireland



### Factors influencing 2010 result

- Another tough year in the building sector affected efficiency because of baseload requirements.
- Reduced sales and a high plant baseload does not lead to a low EPI figure.
- Many improvement projects were implemented that offset efficiency losses to a certain extent.
- No expectation of building sector improvement in 2011 – rather the opposite.

**RESULT 33.04**

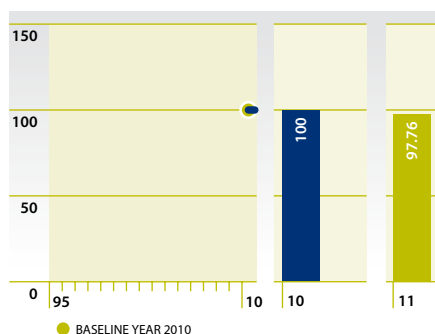
### Factors influencing 2011 target

- As for other building product suppliers, lower sales expected in 2011 than in 2010.
- 2011 projects are not big enough to offset the EPI gain due to lower product sales.

**TARGET NOT SPECIFIED**



## Meadow Meats



### Factors influencing 2010 result

- First year in the programme.
- Weekly focus on energy usage – part of KPI.
- Energy management team established, with regular meetings.

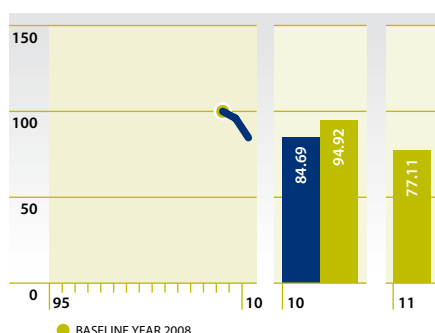
### Factors influencing 2011 target

- Energy efficiency continues to be a high priority.
- New projects identified through energy audits will be implemented throughout 2011.

**RESULT 100**

**TARGET 97.76**

## Microsoft



### Factors influencing 2010 result

- Maintaining high awareness (regular communications, internal publications, training, Green Week, regular audits, reporting) further reduced consumption in offices.
- EnMS implemented to EN16001 standard.
- Local meters fitted on utilities to improve monitoring and control.
- Technical projects included work on BMS systems and energy usage in labs.

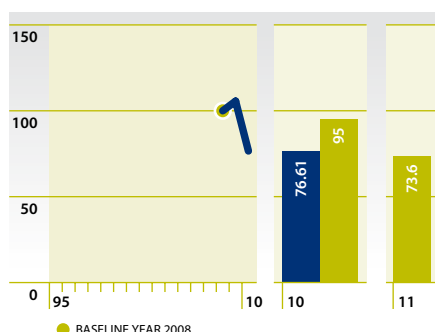
### Factors influencing 2011 target

- Plan to reduce electricity consumption by 10% and gas consumption by 5%.
- We intend to achieve this by adhering to our Energy Management Programme and carrying out the projects and actions therein.

**RESULT 84.69**

**TARGET 77.11**

## Molex Ireland



### Factors influencing 2010 result

- Weekly energy audits in moulding had good results.
- 5 new assembly machines & 1 new moulding machine & 1 new stamping press impacted overall consumption.

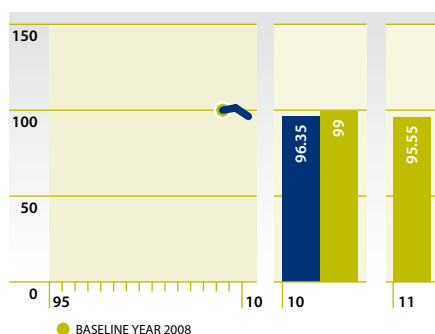
### Factors influencing 2011 target

- Increased energy awareness.
- KPIs by area.
- More areas being metered.

**RESULT 76.61**

**TARGET 73.6**

## Monaghan Mushrooms Ltd



### Factors influencing 2010 result

- Two small farms closed and Tyholland Mushrooms opened. New farm has most modern energy-efficiency equipment installed.
- Opening of new indoor phase 1 building, all processes automated, less heat required in the process.
- Cold weather in January and December caused oil consumption on farms to increase.

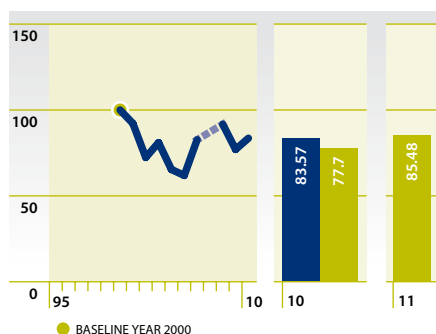
### Factors influencing 2011 target

- New bunkers at Carbury Compost should reduce thermal energy but increase electrical demand.
- Thermal energy will fall due to improved performance of Tyholland Mushrooms and new boilers at Claremorris site.
- There will be an increase in output from Tyholland Mushrooms and Carbury Compost.

**RESULT 96.35**

**TARGET 95.55**

## MSD Ireland (Ballydine)



### Factors influencing 2010 result

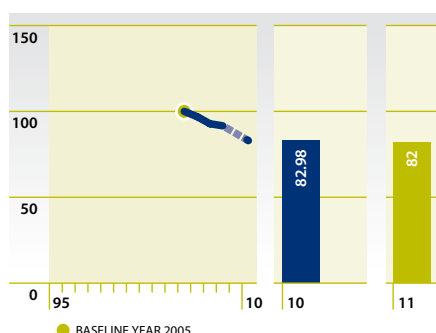
- New bulk tablet plant disimproved EPI.
- LSS approach identified focus areas, based on energy usage/consumption profiles. LSS Green and Black Belt projects contributed to energy savings.
- Operational changes and system rationalisation helped reduce energy consumption.
- Upgrade of production building jacket service to single fluid system.

### Factors influencing 2011 target

- Capital projects identified in Kaizens now being executed.
- Better cross-site communication has increased effectiveness of monitoring energy-intensive systems.
- Standardised visual tools provided to SEUs have enabled daily equipment monitoring.
- Savings measures and energy management are offsetting extra energy usage by new production facility.

**RESULT 83.57**
**TARGET 85.48**

## MSD Ireland (Swords)



### Factors influencing 2010 result

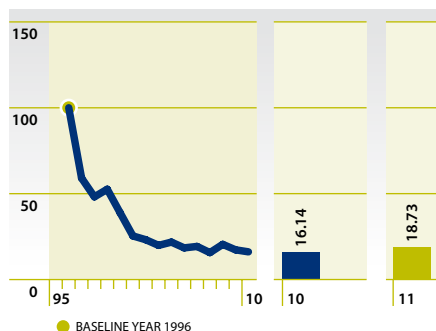
- Projects are ongoing to improve the efficiency of the steam boilers and increase the flexibility of controlling AHUs.
- Cold weather during the winter increased the site heating demand.

### Factors influencing 2011 target

- Extra production shifts will increase energy consumption.
- A review of all air-change requirements will be completed and reductions in HVAC load will be implemented where possible.
- The operation of the compressed-air system will be reviewed to identify opportunities for savings during non-production hours.

**RESULT 82.98**
**TARGET 82**

## Novartis Ringaskiddy Ltd



### Factors influencing 2010 result

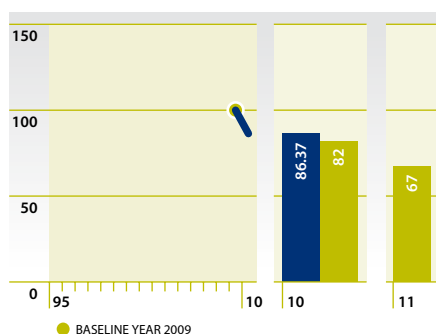
- Full year of running efficient air generation brought electricity savings of 0.987 GWh (2% of 2009 consumption) and thermal savings of 1.18 GWh (also 2%).
- 16% increase in volume of solvent recovered; waste solvent combustion reduced by 21%.
- Overall gas consumption rise: 3.967 GWh (5% v 2009); electricity consumption down 2%. Site output up 8%.

### Factors influencing 2011 target

- Commissioning of District Heating Loop and WESP (mid 2011) anticipated to deliver gas savings of 46%.
- Full-year running of new HVAC chiller is anticipated to cut electricity consumption by 1.505 MWh (3% down on 2010).
- 2011 production output down 30% on 2010.

**RESULT 16.14**
**TARGET 18.73**

## Nutricia Infant Nutrition Ltd



### Factors influencing 2010 result

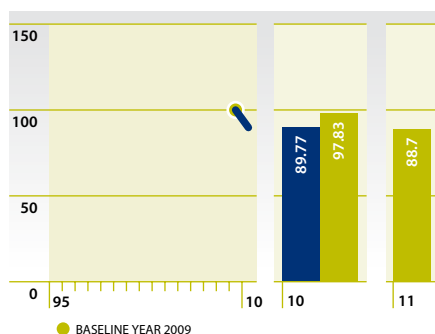
- Member of LIEN and of special working group for food and dairy in relation to energy reduction.
- EnMS installed that meets the requirements of EN16001.
- Nutricia Macrooom set up an energy monitoring system that generates daily and weekly energy usage reports for each production area. Energy KPIs have been set for each process.

### Factors influencing 2011 target

- As part of drive for EN16001 certification, all process parameters are more tightly controlled to reduce overshoots in those parameters, mostly associated with excessive energy usage.

**RESULT 86.37**
**TARGET 67**


## Nutricia Ireland Ltd



### Factors influencing 2010 result

- Economisers on two oil-fired boilers installed.
- Biofuel and renewable-energy study conducted.
- Continued improvements to EnMS.

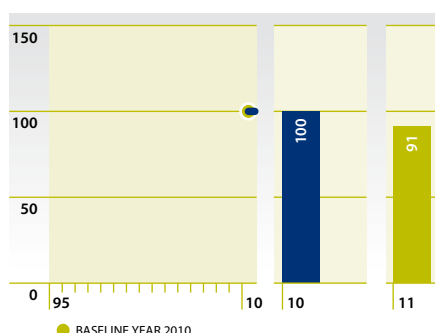
### Factors influencing 2011 target

- Continued improvement in the EnMS.

**RESULT 89.77**

**TARGET 88.7**

## Nypro Ltd



### Factors influencing 2010 result

- Compressed-air reduction programme.
- Efficient chiller pumps.
- Sensor lighting.
- Fixed-speed to variable-speed drives on compressors.
- AHU upgrades.

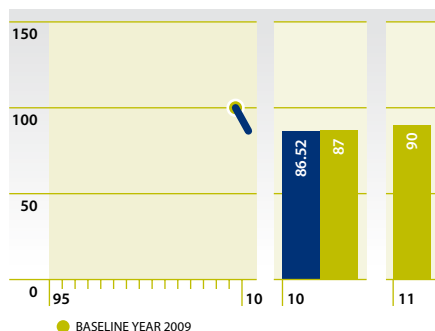
### Factors influencing 2011 target

- Compressed-air survey and leak detection.
- Controls on moulding machines.
- Procedures on moulding machines.
- Energy-efficient lighting.
- Energy Efficient Design of new cleanroom.

**RESULT 100**

**TARGET 91**

## P & G Manufacturing Ireland Ltd (Newbridge) (formerly Braun Oral-B Ireland Ltd)



### Factors influencing 2010 result

- Production output increased due to transfer of Braun Oral B Ireland Carlow facilities to P&G Manufacturing Irl Ltd (Newbridge).
- New value stream added to the site - new personnel and new processes.
- One new line requires gas, which will affect gas consumption in 2010.
- 3 new production lines added in 2010 in pre-existing value stream(s).

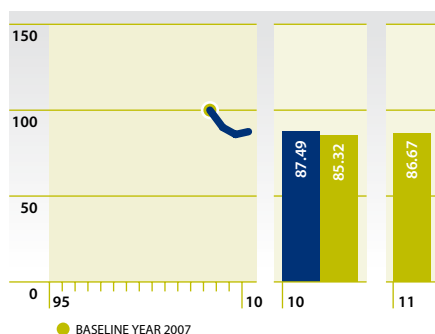
### Factors influencing 2011 target

- Decrease in production volume due to inventory improvements throughout the company.

**RESULT 86.52**

**TARGET 90**

## Organic Lens Manufacturing



### Factors influencing 2010 result

- Installed a new energy-efficient electric moulding machine to replace inefficient hydraulic one.
- Change in production process to reduce reliance on large-energy-using equipment.
- Better communication & energy awareness among employees.

### Factors influencing 2011 target

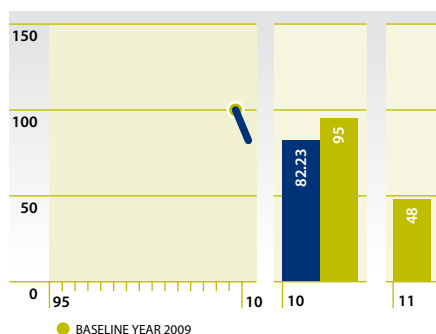
- Continued replacement of inefficient equipment throughout the plant.
- Focus on plant chilling.
- Recycling of process heat.

**RESULT 87.49**

**TARGET 86.67**



## Pfizer (Newbridge)



## Factors influencing 2010 result

- Reduction of plant footprint.
- Enhanced energy metering.
- Improved energy awareness.
- Improved control systems.

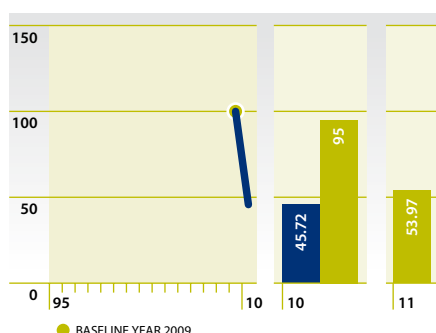
## Factors influencing 2011 target

- CHP shut down for Q3 & Q4 due to energy prices at that time.
- First phase of facility footprint consolidation completed in Q4.

RESULT 82.23

TARGET 48

## Pfizer Biotechnology (Grange Castle)



## Factors influencing 2010 result

- Increased output has seen energy intensity drop at faster rate than decline in energy usage, due to energy-reduction programme. This indicates a weak output/energy usage correlation. Main drivers for energy usage will be re-evaluated, with assessment if more appropriate EPI could be used.
- Programme to reduce no. of air changes continued in 2011.

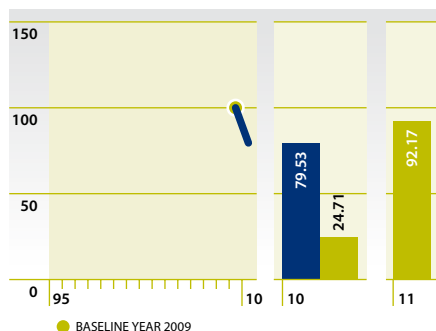
## Factors influencing 2011 target

- HVAC is the main energy user. There is a programme to reduce the no. of air changes in certain areas, to reduce energy consumption.
- A diagnostic tool has been developed to ensure components in each HVAC system operate at optimum setting. This will be implemented in 2011.

RESULT 45.72

TARGET 53.97

## Pfizer Biotechnology Ireland – Shanbally



## Factors influencing 2010 result

- HVAC was a major target in 2010, yielding good savings.
- Energy consumption reduced through improvements in the EnMS.

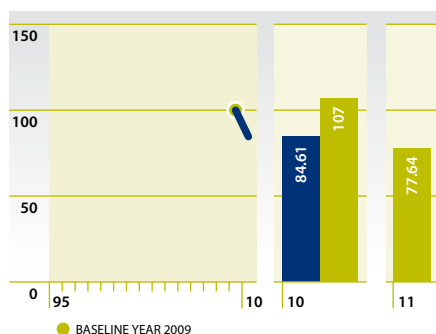
## Factors influencing 2011 target

- Production figures in 2011 are reduced, which causes a negative effect on site EPI.
- Continued implementation of energy efficiency projects to further reduce energy consumption.

RESULT 79.53

TARGET 92.17

## Pfizer Loughbeg Drug Product Plant



## Factors influencing 2010 result

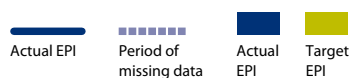
- HVAC air-change reductions were a major driver in the site's energy reduction.
- Pfizer target of 5% year on year was another major factor in the energy reduction.
- Compressed-air surveys drove savings in energy consumption.
- Achieving EN16001 has focused the site strongly on energy management.

## Factors influencing 2011 target

- HVAC air-change reductions are a major target area this year.
- Lighting, a significant energy user, will be improved.

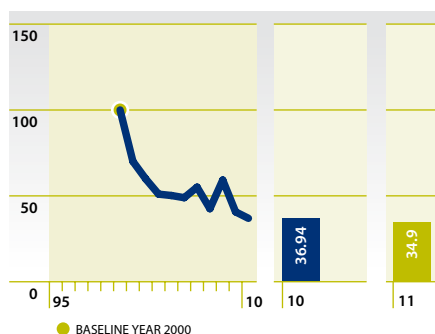
RESULT 84.61

TARGET 77.64





## Pfizer Ireland Pharmaceuticals (Little Island)



### Factors influencing 2010 result

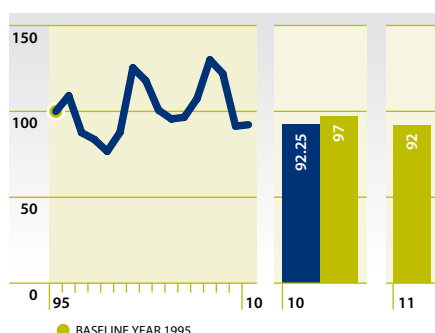
- In 2010 the site transitioned its EnMS to EN16001. A comprehensive Energy Management programme was developed. Many energy-saving projects reduced usage associated with SEUs.
- Savings due to WWTP optimisation project and thermal oxidiser ceramic packing change-out resulted in CO<sub>2</sub> reduction of 742 tonnes p.a. Water consumption cut by 48% in 2010.

### Factors influencing 2011 target

- The site continues to push the boundaries and look for innovative ways to reduce the site's energy cost and carbon footprint.
- Energy management is key to Pfizer Little Island's future competitiveness.

**RESULT 36.94**
**TARGET 34.9**

## Pfizer Ireland Pharmaceuticals (Ringaskiddy)



### Factors influencing 2010 result

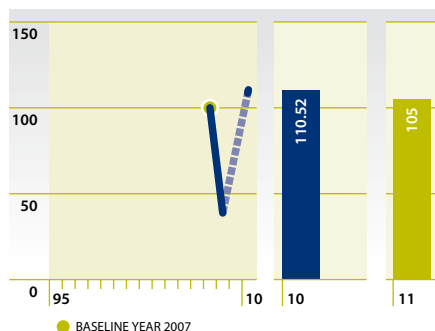
- In 2010, production activity fell slightly, resulting in marginal EPI disimprovement. Energy Management programme is driven by an energy master plan. Main focus areas were: increased ownership & awareness and continuous challenging of way key utility equipment is operated.
- Some projects requiring capital were implemented in 2010. Main focus areas were HVAC, compressed air and chillers.

### Factors influencing 2011 target

- In 2011, EPI is expected to improve due to increase in site activity. Saving projects will be implemented, as directed by energy master plan. Key elements for 2011 are: Further HVAC optimisation, refinement of process chiller sequencing, VSD retrofitting to WWTP blowers, continued use of 'right first time' tools and technology and innovation techniques.

**RESULT 92.25**
**TARGET 92**

## Pfizer Nutritionals Ireland



### Factors influencing 2010 result

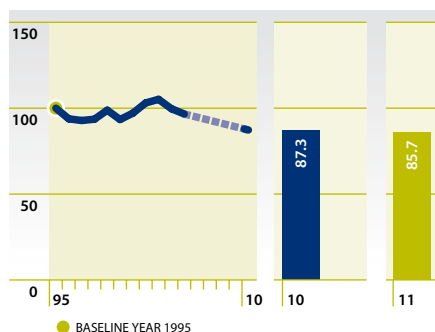
- Lighting upgrades in the high-level warehouse reduced electrical consumption.
- Upgraded condenser packing and reduced head pressure control to improve efficiency.
- Operation rationalisation resulted in the shutdown of an inefficient dryer and associated process equipment.

### Factors influencing 2011 target

- Phase 2 of insulation upgrade programme will be implemented in 2011.
- Upgrading of 3 main potable water pumps with high-efficiency pumps complete with VSDs to improve operational efficiency and control.
- A project to improve the efficiency of the condensate recovery will improve the site's thermal energy efficiency.

**RESULT 110.52**
**TARGET 105**

## Premier Periclase Ltd

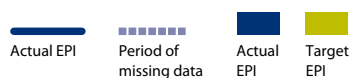


### Factors influencing 2010 result

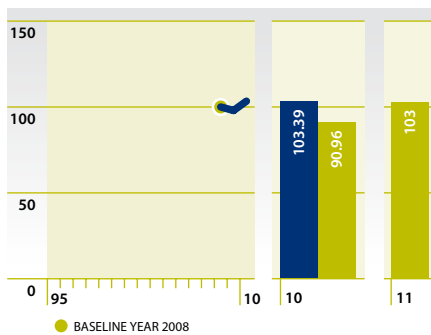
- Raw material issues led to increased power consumption on Lime Kiln ID fan (850 kW).
- Installation of new secondary seawater pump led to improved pumping efficiencies.
- Raw-material issues led to increased specific fuel consumption on lime kiln.

### Factors influencing 2011 target

- Improvements to raw-material quality will improve both electrical and thermal efficiencies throughout plant.
- Increased market demand will lead to improved planning of production and maintenance steps, thus reducing downtimes and improving operating efficiencies.

**RESULT 87.3**
**TARGET 85.7**


## Quinn Cement Ltd



### Factors influencing 2010 result

- Economic conditions affected plant efficiency, with production shutdowns. Plant restart is an energy-intensive process, which is reflected in the increased EPI.
- Current objectives and targets have a timescale of over one year, which resulted in little improvement in 2010 EPI.

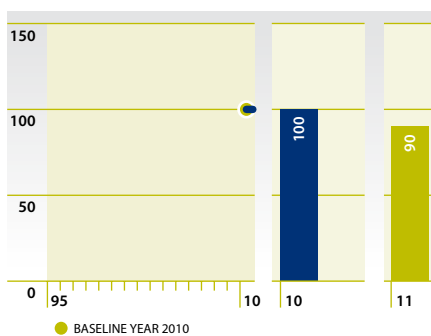
### Factors influencing 2011 target

- Development of the alternative fuels programme to substitute 55% of fossil-fuel use.
- Progression on EnMS to ultimately achieve ISO50001 certification.
- Continued energy awareness programme.

RESULT 103.39

TARGET 103

## Recordati Ireland Limited



### Factors influencing 2010 result

- Improvement of equipment controls.
- Cooperation with Production and Quality to target equipment oversized during plant designing stage.

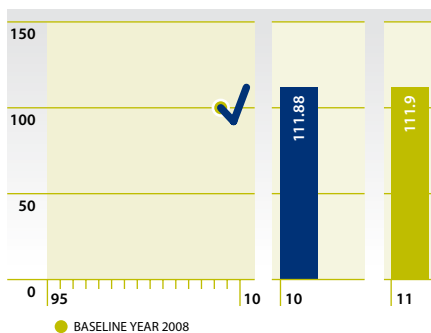
### Factors influencing 2011 target

- Improvement in Energy Map accuracy and data analysis.
- Cooperation with Production & Quality to target equipment oversized during plant designing stage.

RESULT 100

TARGET 90

## Roadstone Wood Group



### Factors influencing 2010 result

- Volumes fell again in 2010, which emphasised the need to reduce the baseload.
- Over 50 energy-reduction projects were implemented during 2010, resulting in a reduction of over 9 million kWh.
- All factors affecting energy requirements during times of non-operation were reviewed, to implement energy reductions where possible.

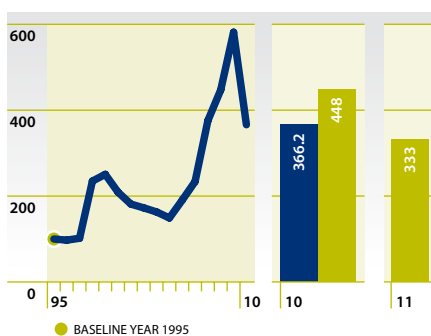
### Factors influencing 2011 target

- Similar factors with similar projects.
- There will also be increased emphasis on fuel monitoring in mobile plant and equipment. Data obtained will be used for specific training.

RESULT 111.88

TARGET 111.9

## Roche Ireland Ltd



### Factors influencing 2010 result

- New product introduced but other volumes reducing.
- Gas consumption reduced in thermal oxidiser through improvements to burner management system and controls.
- Refrigeration plant was upgraded to natural refrigerants and resulted in energy use reduction.

### Factors influencing 2011 target

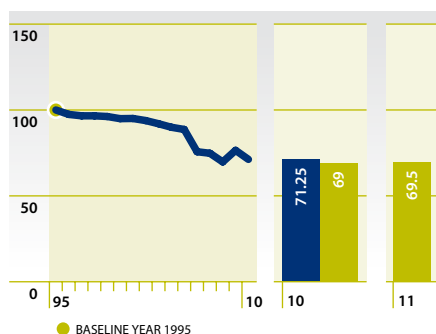
- EN16001 system continues to drive improvement, with regular monitoring and targeting meetings. EnMS also ensures energy-reduction projects are pursued and expectations delivered.
- Challenge in 2011 is to reduce baseload not directly linked to production activities, through projects on nitrogen compressors, heat recovery from condensate and lighting upgrades.

RESULT 366.2

TARGET 333

Actual EPI    Period of missing data    Actual EPI    Target EPI

## RUSAL Aughinish



### Factors influencing 2010 result

- The heat-recovery improvement programme in the digestion area brought energy efficiency back to the level of 2008 after low production throughout 2009.
- The programme to replace obsolete 3.3 kV motors and drives with modern systems continued. Three 900 kW motors installed in 2010; 1 fixed-speed, the other 2 with VSDs. Heat recovery improved in other process areas.

### Factors influencing 2011 target

- The ongoing heat-recovery programme will improve energy efficiency.
- The ongoing programme to replace obsolete 3.3 kV motors with high-efficiency motors and VSDs will optimise power use and increase reliability.
- The conversion of the calciners to gas will reduce CO<sub>2</sub> emissions.

**RESULT 71.25**
**TARGET 69.5**

## Schering Plough (Avondale) Co.



### Factors influencing 2010 result

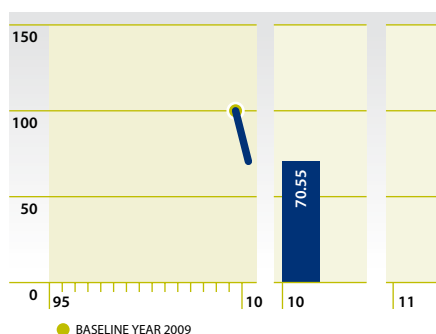
- New energy-efficient boilers commissioned.
- New process chillers with best available energy performance features/controls
- Energy Kaizen delivered energy savings quickly in targeted areas.
- Lower production volumes had a major influence on EPI.
- Project work in P5, production shut down for last quarter.

### Factors influencing 2011 target

- VSD installed on large cooling water pump; low-temp. chillers being installed for reactor cooling, to reduce liquid nitrogen usage.
- Energy Kaizen events being held to deliver on energy-reduction objectives.
- Energy studies in progress to evaluate further opportunities.
- EPI sensitive to production volumes.

**RESULT 209.9**
**TARGET 172**

## Schwarz Pharma Ltd



### Factors influencing 2010 result

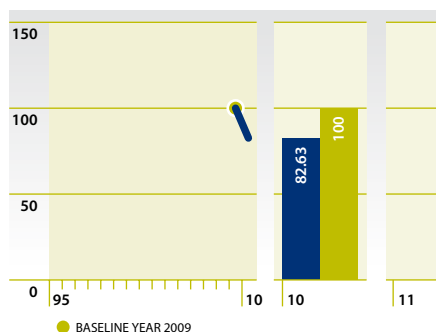
- Continuing to install additional meters and target high-energy users across site.

### Factors influencing 2011 target

- Continuing to install additional meters and target high-energy users across site.
- Continuing to implement energy-saving initiatives as identified in our Resource Plan.

**RESULT 70.55**
**TARGET NOT SPECIFIED**

## Servier (Ireland) Industries Ltd



### Factors influencing 2010 result

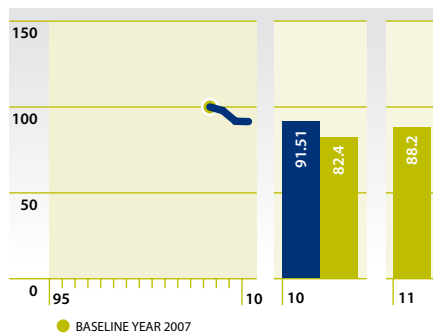
- Currently researching EN16001 requirements and setting up EPIs.

### Factors influencing 2011 target

No influencing factors provided.

**RESULT 82.63**
**TARGET NOT SPECIFIED**

## Silver Hill Foods



### Factors influencing 2010 result

- Ongoing energy monitoring and reporting to senior management maintains a focus on energy reduction and awareness throughout the company.
- Comprehensive Energy Awareness Campaign took place, involving all employees.
- Continuous Improvement Programme (CIP) identified key areas for energy efficiency projects.

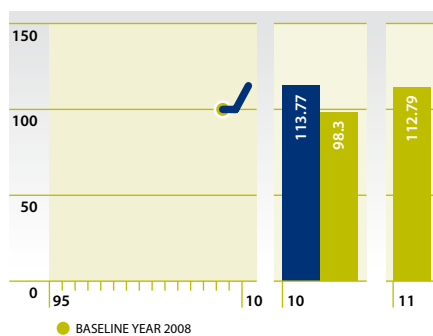
### Factors influencing 2011 target

- Continuous Improvement Programme in place.
- Improvements in site metering, monitoring and measurement.
- Training and awareness for all employees.

**RESULT 91.51**

**TARGET 88.2**

## Sonoco Plastics (APT Ireland)



### Factors influencing 2010 result

- Overall output did not match target expectations due to challenging economic conditions.

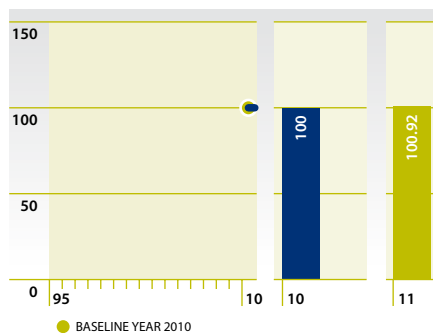
### Factors influencing 2011 target

- A challenging year in which global oil prices affected overall performance.
- However, a free-cooling investment option is being considered to reduce energy usage.

**RESULT 113.77**

**TARGET 112.79**

## Taconic International Ltd



### Factors influencing 2010 result

- Use of gas in the PTFE coating and silicones area.
- Use of electricity in the PTFE coating and silicones area.
- Use of gas for heating.
- Use of electricity for utilities such as lighting and computers.

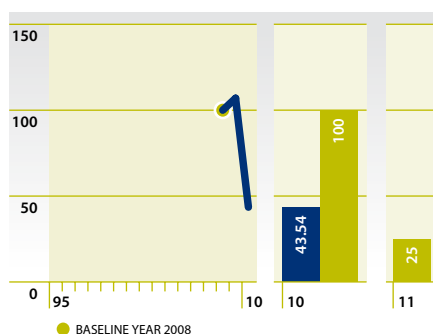
### Factors influencing 2011 target

- PTFE coating.
- Adhesive coating and thermal oxidiser.
- Heating.
- Utilities – lighting and computer.
- Lighter equipment.

**RESULT 100**

**TARGET 100.92**

## Takeda Ireland Ltd (Grange Castle)



### Factors influencing 2010 result

- Key project in 2010 was to reduce the run-times of the main production building HVAC systems. HVAC was highlighted as the main gas and electricity user.
- Improved maintenance and control on main production building HVAC.
- Removal of humidity control from all HVAC systems other than to controlled rooms.

### Factors influencing 2011 target

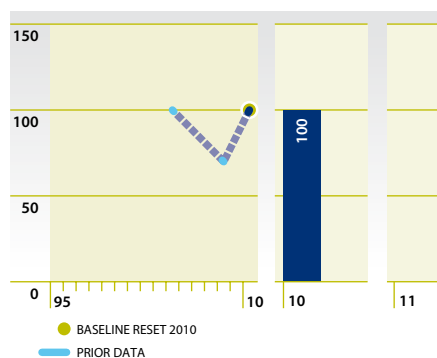
- An increase in production output helped significantly to reduce the site EPI.
- A number of HVAC operation and control-type HVAC projects were implemented in late 2010.

**RESULT 43.54**

**TARGET 25**



## Tech Group Europe Ltd (Dublin)



### Factors influencing 2010 result

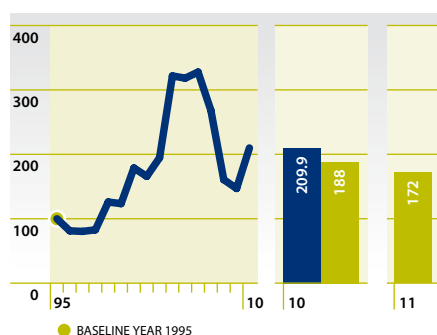
- Moving towards all-electric moulding machines.
- Improvements in compressed-air management.
- Introduced energy-efficient lighting in warehouse.

### Factors influencing 2011 target

- Changed baseline from machine run-hours to tonnes processed.
- Working to introduce heat recovery to displace boiler load.

**RESULT 100**
**TARGET NOT SPECIFIED**

## Tegral Building Products



### Factors influencing 2010 result

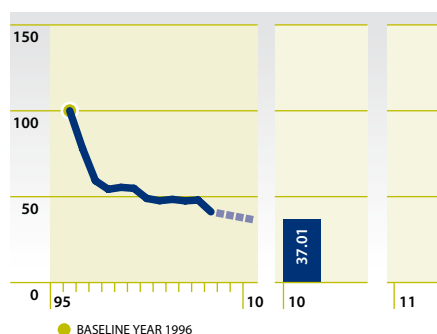
- Reduced demand hit productivity and energy efficiencies.
- Project ongoing to replace all light fittings with energy-saving T5 fittings and install occupancy sensors in offices and toilets.
- Optimising of SPC and MIC settings, along with lower energy demand, will yield €31,000 in energy savings for 2011.
- A number of energy saving projects will be considered for 2011.

### Factors influencing 2011 target

- Until market conditions improve, production remains depressed, which lessens all manufacturing efficiencies.
- More energy-saving projects will be considered for implementation.

**RESULT 157.78**
**TARGET 159**

## Temmler Ireland Ltd



### Factors influencing 2010 result

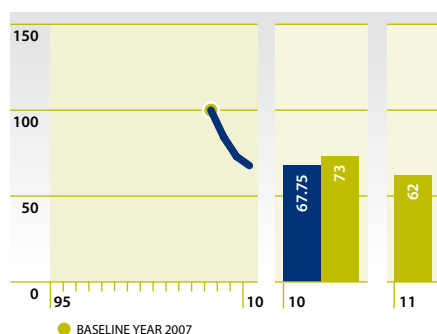
No influencing factors provided.

### Factors influencing 2011 target

No influencing factors provided.

**RESULT 37.01**
**TARGET NOT SPECIFIED**

## Tesco Ireland Ltd



### Factors influencing 2010 result

- Tesco Ireland is committed to reducing the carbon footprint of its stores by 50% by 2020.
- To achieve its ambitious carbon-footprint goal, Tesco commissioned a number of energy retrofit projects and new CHPs, and improved design specifications for new stores to reduce the energy required to operate them.

### Factors influencing 2011 target

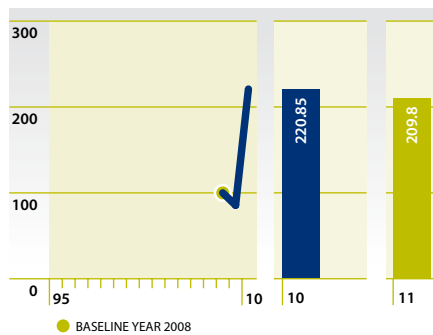
- Continued commitment to reducing the carbon footprint of stores by 50% by 2020.
- To further reduce EPI in 2011, Tesco is implementing an ambitious energy-reduction plan, using new low-carbon technologies including improved lighting and fridge control.

**RESULT 67.75**
**TARGET 62**

— Actual EPI  
 - - - - - Period of missing data  
 ■ Actual EPI  
 ■ Target EPI



## Teva Pharmaceuticals Ireland



### Factors influencing 2010 result

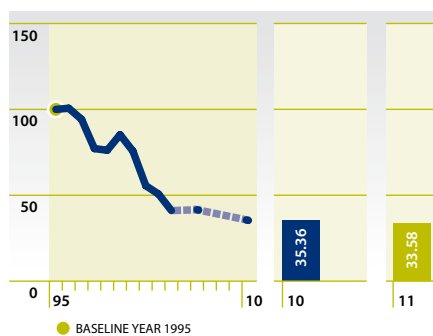
- Savings achieved via air-change rate reduction in manufacturing areas.
- Continued focus on compressed-air systems.

### Factors influencing 2011 target

- Lean efficiencies will be implemented for manufacturing to reduce energy costs.
- Procurement of process upgrade to get best price from market.

**RESULT 220.85**
**TARGET 209.8**

## Thermo King Europe



### Factors influencing 2010 result

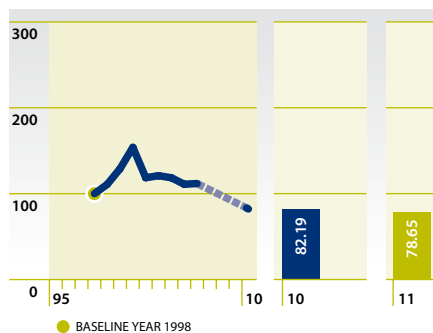
- An Energy Team was set up to reduce consumption and cost.
- Technology installed to monitor and improve electrical energy consumption.

### Factors influencing 2011 target

- The energy team on site will lead energy-reduction projects.
- 25% reduction in energy used, since 2009.
- Technology installed to monitor energy use by department on an ongoing basis.

**RESULT 35.36**
**TARGET 33.58**

## Transitions Optical Ltd



### Factors influencing 2010 result

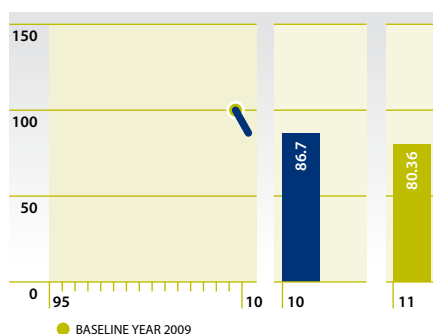
- More focus on energy usage in production, primarily around large process ovens.
- Introduced weather compensation around boilers and chillers.
- New VSD installed in chiller pumps.
- Increase chilled-water temperatures at weekends.

### Factors influencing 2011 target

- More focus on production energy usage (as opposed to building services).
- Reduced extraction to production ovens.
- Installation of additional controls to reduce oil consumption.

**RESULT 82.19**
**TARGET 78.65**

## Tyndall National Institute

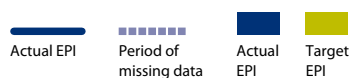


### Factors influencing 2010 result

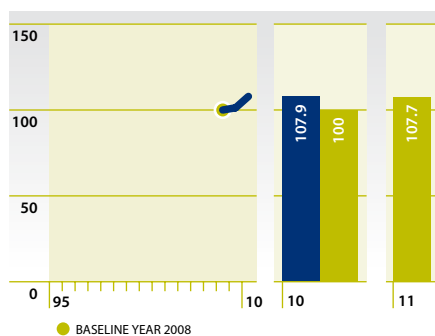
- Began full production of 5,000m<sup>2</sup> facility.
- Energy upgrades on air handling systems, boiler controls and valve prioritisation yielded savings.
- Energy team and awareness drive launched in Q4, 2010.

### Factors influencing 2011 target

- Refurbishment of spaces will lead to an increase in site occupancy levels.
- Continued promotion of energy savings through energy team group.
- Continued striving for EN16001 certification and best practice.

**RESULT 86.7**
**TARGET 80.36**


## United Fish Industries Ltd



### Factors influencing 2010 result

- Completed a lighting conversion to LED project in 2010. Savings of around €10,000 per year expected.
- Two projects for steam reuse in 2010; one to change the main cooker for a unit which could partly be run on flash steam; the second to fit two indirect steam exchangers where the condensate could be fully collected and returned to the boilerhouse.

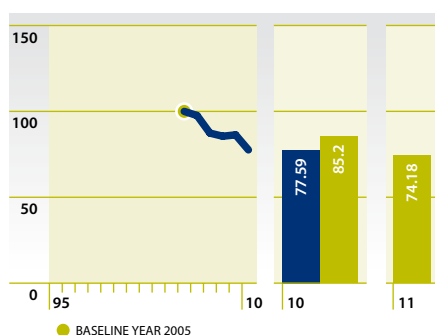
### Factors influencing 2011 target

- No major projects planned but there will be ongoing motor upgrades and VSD installations. Surveys for air and steam leaks to be carried out.
- The target for 2011 is to be the same as 2010 but because less raw material will be processed, this may prove difficult.

**RESULT 107.9**

**TARGET 107.7**

## Vistakon Ireland



### Factors influencing 2010 result

- In 2010 improvements to the chillers reduced their electrical energy consumption.
- Compressed-air consumption was optimised across the site.

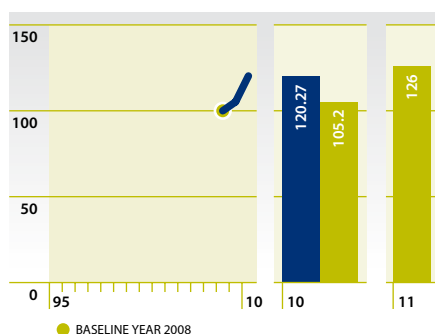
### Factors influencing 2011 target

- Boiler heat-recovery project will reduce thermal energy consumption.
- Vistakon will continue with its goal of continual improvement in energy efficiency.

**RESULT 77.59**

**TARGET 74.18**

## Vodafone



### Factors influencing 2010 result

- Cold December in 2010, with extended Christmas opening hours, increased consumption requirement for heating.
- Compared with 2008, more stores are trading on Sundays.

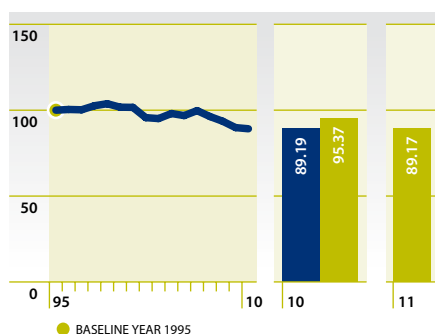
### Factors influencing 2011 target

- Energy-efficient lighting to be installed in 3 stores in 2011.
- 3 stores to be closed but as these are smaller stores the reduction in consumption will be minimal.

**RESULT 120.27**

**TARGET 126**

## Wellman International Ltd



### Factors influencing 2010 result

- Replacement of high-pressure process air fans with blowers.
- Upgrading of lighting and installation of controls in warehouses to switch off lights when not occupied.

### Factors influencing 2011 target

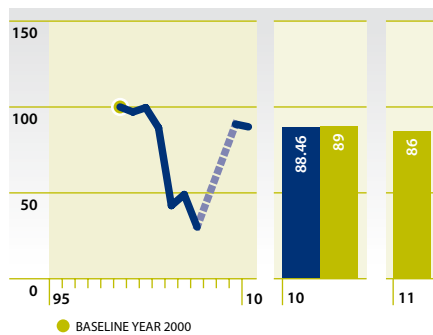
- Replacement of reciprocating compressors with variable-speed screw design and upgrading of controls to enhance performance.
- Upgrading of lighting in selected areas.

**RESULT 89.19**

**TARGET 89.17**



## Western Proteins



### Factors influencing 2010 result

- Weekly focus on energy usage – part of the KPI.
- Corrective actions following Energy Audit Survey.

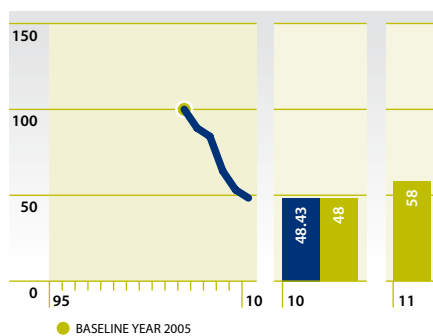
### Factors influencing 2011 target

- Continuous monitoring of KPIs.
- Other projects implemented during 2011 will begin to show results by year end.

**RESULT 88.46**

**TARGET 86**

## Xerox (Europe) Ltd



### Factors influencing 2010 result

- Changes to base product portfolio.
- Warehouse AHU design.
- Improved energy metering. Harmonisation of BMS and Scada process data onto one process historian database.

### Factors influencing 2011 target

- Significant change in product portfolio.
- Review of building lighting.
- Review of compressed-air generation efficiency, having achieved significant demand reduction.
- New product size will impact energy efficiency.

**RESULT 48.43**

**TARGET 58**

## NON RESPONDING MEMBERS 2010

Boston Scientific Ireland Ltd (Clonmel)

Citi

Dawn Fresh Foods

Diageo Ireland (Waterford)

Elan Pharma

Gypsum Industries Ltd

Hewlett-Packard (Manufacturing) Ltd

Honeywell Turbo Technologies

Johnson & Johnson (Cashel Campus)

Micro-Bio Ireland Ltd

Rosderra Irish Meats Group Ltd

Schering Plough (Brinny) Co.

Takeda Ireland Ltd (Bray)

## ABOUT THE SUSTAINABLE ENERGY AUTHORITY OF IRELAND

THE SUSTAINABLE ENERGY AUTHORITY OF IRELAND (SEAI), FORMERLY THE IRISH ENERGY CENTRE, WAS SET UP BY THE GOVERNMENT IN 2002 AS IRELAND'S NATIONAL ENERGY AGENCY.

### OUR MISSION

To play a leading role in transforming Ireland into a society based on sustainable energy structures, technologies and practices.

### OUR KEY STRATEGIC OBJECTIVES

#### Energy efficiency first

Implementing strong energy efficiency actions that radically reduce energy intensity and usage.

#### Low carbon energy sources

Accelerating the development and adoption of technologies to exploit renewable energy sources.

#### Innovation and integration

Supporting evidence-based responses that engage all actors, supporting innovation and enterprise for our low-carbon future.

### OUR ROLES

- Supporting Government decision-making through advocacy, analysis and evidence
- Driving demand reduction and providing advice to all users of energy
- Driving the decarbonisation of energy supply
- Raising the standards in sustainable energy products and services
- Building markets based on quality, confidence and proven performance
- Fostering innovation and entrepreneurship
- Improving the coherence of Irish energy research and development.

### SEAI FUNDING

SEAI is financed by Ireland's EU Structural Funds Programme co-funded by the Irish Government and the European Union.

## MEMBERS LIST

Abbott Ireland Diagnostics Division	Covidien (Athlone)
Abbott Ireland Ltd (Cavan)	Covidien (Mulhuddart)
Abbott Ireland Ltd (Longford)	Cuisine de France Ltd
Abbott Ireland Pharmaceutical Operation	Dairygold Co-op Society
Abbott Vascular Devices Ireland Ltd	Dawn Fresh Foods
Allergan Pharmaceuticals Ltd	Dawn Meats (Grannagh)
Analog Devices BV	Dawn Meats Ltd (Ballyhaunis)
Arigna Fuels	Depuy (Ireland) Ltd
Arkil Ltd	Diageo Bailey's Global Supply
Arvato Digital Services Ireland	Diageo Ireland (Dundalk)
Astellas Ireland Co Ltd (Dublin)	Diageo Ireland (Kilkenny)
Astellas Ireland Co Ltd (Kerry)	Diageo Ireland (St James's Gate)
Bank of Ireland	Diageo Ireland (Waterford)
Bausch & Lomb Ireland Ltd	Donegal Meat Processors
Baxter Healthcare SA	Dublin Airport Authority
BD Medical	Edenderry Power Ltd
Boliden Tara Mines Limited	Eircom
Bord na Mona Energy Ltd	Elan Pharma
Boston Scientific Ireland Ltd (Clonmel)	Element Six Ltd
Boston Scientific Ireland Ltd (Cork)	Eli Lilly SA
Boston Scientific Ireland Ltd (Galway)	EMC Information Systems International
Bristol-Myers Squibb (Cruiserath)	Fournier Laboratories Ireland Ltd
Bristol-Myers Squibb (Swords)	Genzyme Ireland Ltd
Britvic Ireland	Glanbia Consumer Foods Ltd (Inch)
BT	Glanbia Ingredients Ltd (Ballyragget)
Bulmers Ltd	Glanbia Ingredients Ltd (Virginia)
Cara Partners	GlaxoSmithKline Ltd (Cork)
Carbery Milk Products Ltd	GlaxoSmithKline Ltd (Dungarvan)
Celtic Anglian Water	Google Ireland
Celtic Linen	Green Isle Foods (Gurteen)
Charleville Foods	Green Isle Foods (Longford)
CITADEL100 Datacentres Limited	Green Isle Foods (Naas)
Citi	Green Isle Foods (Portumna)
Cognis Ireland Ltd	Gypsum Industries Ltd
College Proteins Group	Helsinn Birex Pharmaceuticals Ltd
Connacht Gold Ltd (Shannonside)	Hewlett-Packard (Manufacturing) Ltd
Connolly's Red Mills	HJ Heinz Frozen & Chilled Foods Ltd
ConocoPhillips Whitegate Refinery Ltd	Honeywell Turbo Technologies



Iarnród Éireann	Pfizer Biotechnology (Grange Castle)
IBM International Holdings	Pfizer Biotechnology Ireland - Shanbally
Intel Ireland Ltd	Pfizer Drug Product Plant (Loughbeg)
Interxion Ireland Ltd	Pfizer Ireland Pharmaceuticals (Little Island)
Irish Cement Ltd	Pfizer Ireland Pharmaceuticals (Ringaskiddy)
Irish Pride	Pfizer Nutritionals Ireland
Janssen Pharmaceutical Ltd	Premier Periclas Ltd
Johnson & Johnson (Cashel Campus)	Quinn Cement Ltd
Kerry Foods Ltd (Shillelagh)	Recordati
Kerry Ingredients (Charleville)	Roadstone Wood Group
Kerry Ingredients (Listowel)	Roche Ireland Ltd
Kostal Ireland GmbH	Rosderra Irish Meats Group Ltd
Kraft Foods Ireland Ltd (Dublin) (formerly Cadbury)	RUSAL Aughinish
Kraft Foods Ireland Ltd (Kerry) (formerly Cadbury)	Schering Plough (Avondale) Co.
Kraft Foods Ireland Production Limited (Tallaght) (formerly Cadbury)	Schering Plough (Brinny) Co.
Lakeland Dairies (Bailieboro)	Schwarz Pharma Ltd
Largo Foods Ltd	Servier (Ireland) Industries Limited
LEO Pharma	Silver Hill Foods
Liffey Meats Limited	Sonoco Plastics (APT Ireland)
Lisheen Mine	Taconic
Masonite Ireland	Takeda Ireland Ltd (Bray)
Meadow Meats	Takeda Ireland Ltd (Grange Castle)
Micro-Bio Ireland Ltd	Tech Group Europe Ltd (Dublin)
Microsoft	Tegral Building Products
Molex Ireland	Temmler Ireland Ltd
Monaghan Mushrooms Ltd	Tesco Ireland Ltd
MSD Ireland (Ballydine)	Teva Pharmaceuticals Ireland
MSD Ireland (Swords)	Thermo King Europe
Novartis Ringaskiddy Ltd	Transitions Optical Ltd
Nutricia Infant Nutrition Ltd	Tyndall National Institute
Nutricia Ireland Ltd	United Fish Industries Ltd
Nypro	Vistakon Ireland
Organic Lens Manufacturing	Vodafone
P & G Manufacturing Ireland Ltd (Newbridge) (formerly Braun Oral-B Ireland Ltd)	Wellman International Ltd
Pfizer (Newbridge)	Western Proteins
	Xerox (Europe) Ltd



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EUROPEAN REGIONAL  
DEVELOPMENT FUND

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by the Irish Government and the European Union*