



Make the Switch

The ELC Road-Map
for Deploying Energy Efficient
Lighting Technology across Europe

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Introduction: Eco-Technology for Energy Efficiency

Whether you are primarily concerned with the issue of how to address the challenge of global climate change or if your focus is more on how Europe seeks to become the most competitive and dynamic economy in the world, improvements in energy efficiency are now widely seen as a key success factor to ensure both outcomes are positive.

From an environmental perspective, improved energy efficiency can reduce both Europe's use of natural resources (for electricity generation) and the amount of greenhouse gases released into the atmosphere, helping to mitigate the impact of human activity on our environment and especially the climate. At the same time, by improving energy efficiency Europe can strengthen its industrial base by reducing costs, increasing security of energy supply and creating markets for new products, promoting innovation, improved competitiveness and employment and other social and welfare benefits that derive from this.

'Clean, clever and competitive'

Energy efficiency can rightly therefore be seen as a key element of EU efforts to become 'clean, clever and competitive', and seek to meet both its international obligations under the UN's Kyoto Protocol as well as its own 'Lisbon' objective of becoming the most dynamic, knowledge based economy in the world.

A vast range of energy-efficient lamps for the European market


These are the reasons why the EU is now considering legislation¹ which would set European targets for increases in energy efficiency and promote energy services which integrate energy-efficient technology, such as lamps. And they are the same reasons why ELC², the representative of companies manufacturing 95% of all European lamps, has striven over the past two decades to innovate and market



more energy-efficient lamp technologies, long before the EU's more recent focus on the eco-design of energy using products³. As a result, ELC's members have developed a vast range of energy-efficient lamps for the European market. Now we want to ensure that these technologies are properly unleashed in order to realise the potential annual savings of 24 million tonnes of CO₂ emissions estimated by the EU's own climate change programme to be possible by 2010.

This paper outlines our vision for how Europe can 'Make the Switch' to energy efficient lighting technologies. We look at the energy efficiency benefits the technologies now available offer and examine the key to ensuring better take up: overcoming customer reluctance to invest in products whose initial price is higher than less energy efficient alternatives, even though the total cost of ownership is significantly lower. We identify several areas in which action can result in positive results, quickly and effectively and we conclude with what we and our partners in the industry and other stakeholders such as European policy-makers and public authorities, need to do between us to reach our goal.

We hope that you will find this paper a useful introduction to our own activities in this area. And we hope that it will encourage you to travel with us on our road to promote the deployment of energy efficient lighting across Europe as quickly and effectively as possible.



Help us to help
Europe make
the switch.

¹ COM(2003) 739 final, Commission Proposal for a Directive on the Promotion of End-Use Efficiency and Energy Services

² The members of ELC are Aura, GE, LEUCI, NARVA, OSRAM, Philips and Sylvania. These companies employ 50,000 people in Europe and account for 5 billion Euro European turnover.

³ COM(2003) 453 final, Commission Proposal for a Framework Directive on the Eco-Design of Energy-Using Products

New Energy-Efficient Lamps – How Good Are They?

Lamps have the most energy-related environmental impact during their use phase, an impact that can reach amounts up to 90% depending on the lamp type⁴. Therefore, by improving the design of lamps to ensure that they are as energy-efficient as possible, ELC member companies have sought to address overwhelmingly the largest single energy-related environmental impact – and what is more, ELC members have achieved this at the same time as making important additional environmental improvements⁵ and maintaining or improving important qualities such as lifetime and luminosity.

Reduced energy consumption

New energy efficient lamps can reduce energy consumption by as much as 80% and can last up to 15 times longer than conventional equivalents. Moreover, energy-efficient alternatives are available for all the main application areas, both the 70% of the market devoted to ‘professional’ applications and the 30% of the market devoted to domestic applications. As a result, by using the latest current product ranges that have been developed by ELC member companies, depending on the type of fixture and subject to some specific performance needs, domestic, professional/public lamp consumers alike could all save energy by re-lamping, upgrading or accelerated renovation as indicated overleaf.

The key measure of energy efficiency for lamps is luminous efficacy (measured in lumens per watt or lm/W), namely its light output in relation to power input. It is an indicator in much the same way as a car's fuel consumption, measured in litres per 100 kilometers, except the reverse is true: the less a car consumes in l/100km, the better its environmental performance; while the higher the lm/W figure, the better the energy efficiency of the lamp. And of course, the more energy efficient the product, the lower the cost of powering it. This saves its user money and lowers the emissions of CO₂ and reduces the negative environmental impact.

^{4, 5} For more information see ELC's 'Did you know...about the potential energy savings of an energy efficient lamp?'

Making the Switch: Energy-Efficient Alternatives by Lighting and Application Area

DOMESTIC APPLICATIONS

Application area: Homes

from Conventional Product (lm/W)

to Energy-Efficient Product (lm/W)

Incandescent
6 ... 15 lm/W



Switch



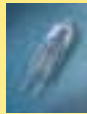
Energy Saver –
integrated
35 ... 65 lm/W

Switch



Energy Saver –
non-integrated
50 ... 85 lm/W

Switch



Halogen
10...15 lm/W

Switch



Halogen
Energy Saver
25 ... 30 lm/W

PROFESSIONAL APPLICATIONS

Application area: Offices and Industry

from Conventional Product (lm/W)

to Energy-Efficient Product (lm/W)

Standard
Fluorescent
55 ... 70 lm/W



Switch



3 Band Fluorescent
75 ... 95 lm/W

Standard
Fluorescent T12
55 ... 70 lm/W



PROFESSIONAL APPLICATIONS

Application area: Shops and Restaurants

from Conventional Product (lm/W)

to Energy-Efficient Product (lm/W)

Incandescent
6 ... 15 lm/W



Switch



Energy Saver –
non-integrated
50 ... 85 lm/W

Switch



Halogen
10...25 lm/W

Switch



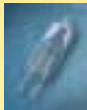
Halogen Energy
Saver
25 ... 30 lm/W

Switch



Halogen
10...25 lm/W

Halogen
10...15 lm/W



Switch



Halogen Energy
Saver
25 ... 30 lm/W

Switch



Compact Metal Halide
75 ... 100 lm/W

Application area: Street Lighting

High Pressure
Mercury
30 ... 60 lm/W



Switch



High Pressure
Sodium
70 ... 150 lm/W

Switch



Metal Halide
75...105 lm/W

Switch



Metal Halide
75...105 lm/W

What Is Preventing the Greater Use of Energy-Efficient Lamps?

If the environmental benefits of energy efficient lamps speak for themselves, the market doesn't always listen. In a society where purchase price and functional performance often take precedence over environmental concerns, the mere availability of an energy efficient lamp will not result in its widespread use.

Much has been done by manufacturers to address these issues, to the extent that functional difficulties, whilst still present, are no longer the principle factors preventing consumers from making the switch.

According to recent research by the UK Energy Saving Trust, a leader in its field, by far the most significant inhibiting factor in the take up of more energy-efficient products is the high purchase price coupled with lack of consumer understanding of the overall benefits. In effect, there is still insufficient appreciation of the total cost of ownership, which is now highly competitive with traditional lamp technologies.

The diagrams overleaf illustrate the type of total cost of ownership savings that can be made from making the switch to energy efficient lamps.

A 125W Mercury lamp has an annual total cost of ownership of €53.33 per year compared with €33 for a 70W high-pressure sodium lamp – an average saving of over €20 per lamp! Despite having a lower initial purchase price than its more energy efficient high-pressure sodium equivalent, a mercury lamp is more expensive to maintain, needs replacing more frequently and consumes more electricity.

Although a conventional incandescent lamp initially costs less than an energy saver the total cost of ownership is significantly higher. On average the annual total cost of ownership for an 100W incandescent lamp is €10.50 compared to €3.17 for a 20W energy saver – the savings speak for themselves....

Although energy saving lamps have decreased in price by over 60% since their introduction onto the market in 1985, price differences between conventional

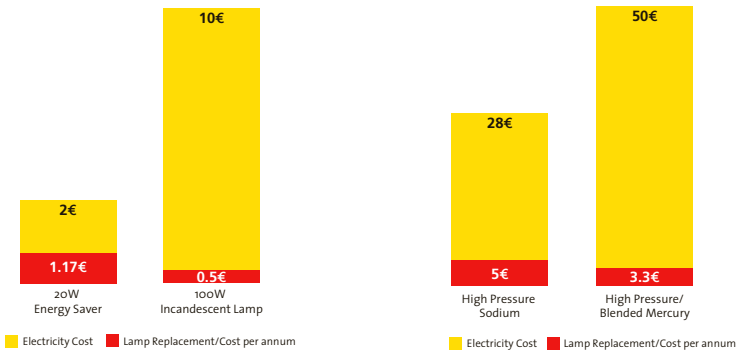
Total cost of ownership

The total cost of ownership of a product represents the cost incurred throughout its life cycle. For energy efficient lamps, although the consumer purchase price is higher than conventional less energy efficient lamps, the total cost of ownership is significantly lower as the lamp is replaced less frequently and uses less energy, with a consequently lower cost for electricity consumption for the consumer.

Upgrade from a 100W conventional incandescent lamp to a 20W energy saver

Upgrade from a 125W mercury lamp to a 70W high-pressure sodium lamp

Cost of Ownership p/a (€)



lamps and their energy efficient alternatives still can make the energy efficient alternative appear between 5 and 10 times more expensive to a consumer.

This problem is magnified by the huge numbers of products imported into the EU which do not conform with the CE Marking⁶. Although there is currently no criterion related to energy efficiency for a CE Marking, its abuse by unscrupulous manufacturers who exploit poor market surveillance means large numbers of cheap, low quality products undercut the legitimate high quality ones, many of which are preferable from an energy efficiency perspective. Indeed, low quality energy efficient products with very low lifetimes are now threatening to undermine consumer confidence in energy efficient products⁷ as a result.

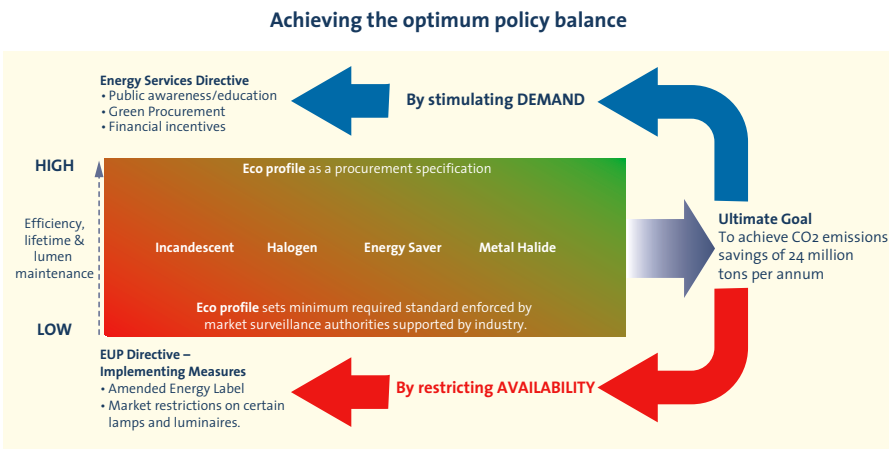
In terms of total cost of ownership, (which takes into account the savings from lower electricity consumption during the use phase), high quality, energy efficient products are clearly less expensive. These longer term benefits, especially if combined with a longer lamp life that the high quality products made by ELC members entail, are significant but less visible or important to many ‘short-termist’ consumers, despite the efforts that have gone into providing consumer information on the topic.

The question is how to make more apparent and compelling this point, as it is the route to successfully increasing the take-up of energy efficient products. And our thoughts on this turn on classical economic thinking related to supply and demand, as we outline in the next section.

^{6,7} For more information see the ELC’s ‘Did You Know about the Problems of Poor Market Surveillance of the European Lamp Market?’

Making the Switch to Energy Efficient Lighting – What Needs to be Done?

In looking at how to increase the penetration of the high quality, energy efficient lighting necessary to achieve the targeted emission reductions and energy savings across the EU, and to overcome the ‘total cost of ownership’ problem in particular, we have sought to consider the issue in the following way:



The key conclusions of this analysis are that there are two pieces of legislation currently being considered by the EU which between them cover the main possibilities for action to promote new progress on energy efficient lighting.

Using the Energy Services Directive to promote ‘green’ public procurement, financial incentives and public information

Short-term measures by Government to incentivise consumers, both public and private, to choose high quality, energy efficient technologies are necessary in order to stimulate the market.

Within the framework of the future legislation on end-use energy services⁸, Member States are asked to set targets to increase energy efficiency and promote services which integrate energy-efficient technology, such as lamps. If agreed and followed through properly, ELC believes that this will help to do the following:

- Boost public procurement of energy-efficient lamps, notably in the area of

street lighting⁹. ELC is undertaking studies to further identify the potential for this and best ways to achieve this.

- Encourage more Member States to set mandatory energy efficiency targets for energy suppliers, and associated organisational frameworks for channelling finance into schemes which seek to increase the use of energy-efficient products.

The example set by the UK, which has also involved the establishment of the Energy Saving Trust (EST), is of particular relevance given the energy efficiency improvements already delivered, in particular through a focus on setting lamp performance criteria for qualification to its scheme for domestic applications. This has increased the penetration of ‘energy savers’ (CFLs) by a factor of ten during its first 3 year commitment period.

The EST approach, like that of its counterpart in industrial/professional applications, the Carbon Trust (CT), is also useful in the way that it helps to overcome the problems of market surveillance as well as maintaining public information campaigns on energy efficiency to best effect.

Using the Framework Directive for Eco-Design of Energy Using Products to establish minimum standards for energy efficiency

To reduce the problems associated with low quality, energy inefficient products on the European market, a combination of specific measures to dissuade consumers from purchasing them may be necessary. The ELC federation wants to propose new implementing legislation for the future EC Framework Directive for Eco-Design of Energy Using Products, which would lead to market restrictions in Europe of a certain number of the least energy-efficient lamps. The ELC Federation suggests that this could be provided for two categories of lamps, for which more efficient alternatives exist which fully satisfy customer performance demands:

- For High Pressure and Blended Mercury lamps, used in street lighting, High Pressure Sodium or Metal Halide lamps should be used to replace them
- For Standard Phosphor lamps, used in offices and industry, 3-band fluorescent lamps should be used to replace them.

Given the size of the market concerned, achieving a shift to energy efficient alternatives in these areas would go a long way to achieving the potential identified by the Commission – and in a targeted, cost-efficient and highly effective way.

A further way to ensure a high impact and cost-effective market shift would be for a similar process to take place with regard to luminaires that do not contain ballasts (the electrical device starts and regulates lamps) – where our industry counterpart CELMA is involved.

Within the framework of the future legislation on the eco-design of energy-using products, ELC believes that ‘Implementing Measures’ (IMs) could be developed in these two areas to tackle the most significant areas of energy-use to best effect in a way which is complementary to the other initiatives mentioned – and with the support of key groups of affected stakeholders so that it can be achieved as quickly as possible.

⁸ For more information see the ELC’s official position paper on the Energy Services Directive

⁹ For more information see the ELC’s ‘Did you know about the energy saving potential from Street Lighting?’

Conclusion: A Collective Effort for All Stakeholders

ELC member companies have developed a comprehensive range of energy efficient alternatives to conventional lamps and are keen to see that their benefits are experienced by Europe and Europeans. We believe that measures such as the ones indicated in this road map could be undertaken quickly and effectively to make a difference to the take-up of energy efficient products and are the best way to get results.

We are working with other industry associations to ensure that energy efficient design, production and end compliance is also at the top of their agenda. Without commitment from all related sectors, real progress towards improving the environmental performance of lamps (from design stage, to the manufacturing process through to the promotion and adoption of energy efficient lighting) is difficult to achieve.

In particular, we are working to develop the eco-profile criteria that will help policy-makers and ultimately consumers determine which are the most and which are the least energy efficient forms of lamp – and we shall share this as soon as we can.

Summary

Actions Necessary by Our Industry Sector

- Undertake to continue to innovate, design and supply high quality, energy efficient products
- Collaboration with decision-makers on implementing measures under the EUP and Energy Services Directives, notably:
 - Provide suggested specifications for ‘green’ lighting public procurement and other priority application areas where more energy efficient alternatives should be promoted
 - Assist with targeted Implementing Measures under the EUP framework Directive
 - Training/advising Member State customs authorities to carry out more effective market surveillance to reduce false or unfair cost differences between competing products.

Policy makers also have a role to play. Lamp industry initiatives have thus far proved to be insufficient to convince households, companies, offices and public buildings to make the switch. The only way to convince and encourage end users to seriously examine how they can minimise their energy use by adopting energy efficient lighting alternatives is through a combination of additional measures including incentives, guidelines and legislative initiatives.

Actions by EU or Member State Governments

- Promoting awareness through educational campaigns which highlight total cost of ownership issues to promote the benefits of energy-efficient lamps to a broader range of consumers than at present
- Actively promote Green procurement – notably for street lighting
- Setting up national structures and bodies across Europe which can best achieve savings – such as the UK’s system, including its EST
- Allocate financial incentives at EU level for street lighting (e.g. via structural funds)
- Develop implementing measures under the EUP framework where feasible and where it is not possible to achieve targets through other measures.
- Actively promote the shift to energy efficient lamps in offices and industry.

**Help us to create the momentum to achieve
change in the ways we have indicated.**

We can't do this alone.

Help Europe make the switch

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