

# A Guide to Energy Reduction for Building Owners

Consumer Guide



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# Introduction

The typical forms of Energy used in buildings are Electricity, Gas, Oil and Solid Fuel. The procurement strategy and consumption of these forms of energy influence the cost and overall carbon footprint of your business.

Sustainability is about reducing consumption of limited resources and sustainability also makes good business sense as it also reduces costs to your business. If the primary objective of a drive to reduce energy usage is to achieve cost savings then allowance needs to be made in relation to the relative costs of the energy sources.

Buildings are reported to be responsible for c.40% of the total energy consumption. In multi tenanted buildings the landlord may be in receipt of some of the energy bills and the apportionment of energy usage to you may be based on a pro rata allocation.



Irrespective of your situation it is in your best interest to understand and control your energy usage. The significant energy consuming items in typical office buildings are:

- **Lighting**
- **Heating**
- **Cooling and Fresh Air systems (if Air Conditioned)**
- **Computers and Office power**
- **IT Server rooms (especially if cooling equipment is installed)**

## Action Plan to reduce energy consumption:

### 1. Audit

- Identify your sources of energy usage and use patterns to identify major consumption areas to target savings effectively

### 2. Controls

- Adjusting manual or automatic controls and on \ off schedules to eliminate energy wastage
- Ensure ventilation and heating to intermittently occupied areas are switched off when not required
- Avoiding conflicts and introducing dead bands where heating and cooling systems are working against each other (heating should stop at 19 degree C and cooling should start at 24 degree C)
- Ensure light switches are labelled to show the lights they control and lights are switched off when not needed
- Ensure office equipment is switched off overnight and this is done automatically for larger pieces of equipment with time switches

- Ensure maintenance staff is familiar with the correct operation of controls and equipment and turn off PCs and monitors at the end of the day and over holiday periods
- Implement good housekeeping to improve power management on PCs. These can be centralised or local controls.
- Group Air Conditioning units to make control easier
- Review set points for all plant
- Degree Day mode control
- Ensure Variable Speed drives (VSDs) are used so that speed of motors is appropriate for the task
- Check that temperature settings in IT rooms are appropriate and not excessively low
- Maintain appropriate temperatures, ventilation rates, lighting levels and water temperatures consistent with industry standards e.g. Chartered Institution of Building Services Engineers (CIBSE)

*Note: As an example when adjusting controls for energy efficiency it's important to ensure water heating system maintain water at safe temperatures e.g. the risk of legionella.*

### 3. Maintenance

- Ensure equipment is maintained
- Make sure any radiators and vents are not obstructed by furniture or equipment and keep any filters clean
- Ensure heating boilers are routinely serviced e.g. gas boilers once a year and oil boilers twice a year
- Establish a maintenance schedule for the cleaning of lamps and fittings

### 4. Investment / Redesign

- Automatic lighting controls and presence sensors
- Replace traditional lights with LEDs
- Install sub meters for the significant users
- Purchase IT equipment with good energy ratings
- Install centralised PC power management software
- Install Server Virtualisation

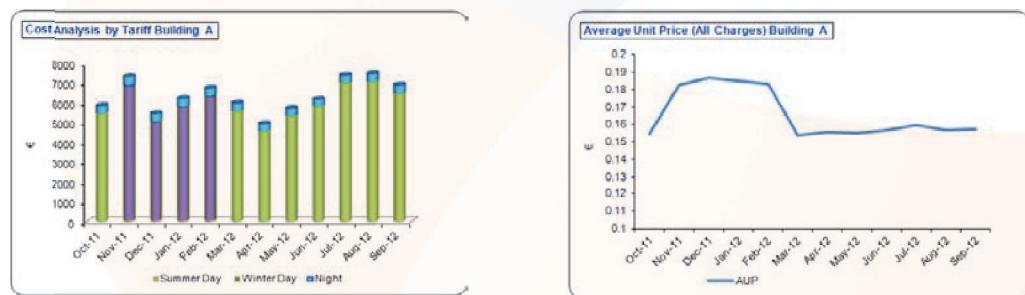
### 5. Life Cycle Costing

Looks at the total cost associated with the purchase and operation of a product, service or item in advance of procuring. The payback criteria for investment/redesign programmes depends on each specific business, but it is not uncommon in the current environment for these projects to be evaluated and prioritised on a quick win basis where the savings are achieved in a 1-2 year timeframe. In some cases this can be demonstrated, but each scenario needs to be carefully evaluated. There may be capital allowance schemes available to enhance the attractiveness of some of these investment projects. You should reference guidance from SEAI and your own advisors as required.

## Monitoring and understanding use

Power consumption at the highest level can be measured and monitored through the main energy bill(s) and for some sites, energy usage measures every quarter hour are available through the energy provider or the Meter Registration System Operator (MRSO). Through your energy provider you should have access to this detailed data. The first step to understanding energy usage is to capture and plot energy consumption to better understand the most significant energies consumed and which elements of the business consume the most energy. This process is referred to as Energy Mapping. High level mapping of energy usage by energy type, building element and time can be very informative in relation to highlighting the significant areas to focus on.

For some buildings a Building Management System (BMS) or Building Energy Management System (BEMS) will capture and report this information. A copy of the bills and a simple spread-sheet combined with basic graphics can also be a very effective starting point.



## Basic Monthly Cost and Average Unit Price Seasonal Trend

This high level analysis should force an organisation to focus on:

- **Your biggest energy consumption**
- **Your energy consumption outside of business hours (night time consumption)**
- **The difference or not between your heating or cooling energy consumption in different seasons**

Energy usage data may change due to factors associated with growth in the business (more buildings, employees, production...). Adjustments should be made to take account of these influences so that measures to reduce energy consumption are visible when normalised. Energy Performance Indicators (EPI) may be kWh / per sq. m or per employee etc. and this allows for benchmarking across sites.

Sub metering allows you to understand lower level energy usage by business area, floor, production line, tenant etc. Ideally sub metering is installed permanently so that you have a continuous measure in time. If this is not the case spot check measurements of consumption can be made with basic grip or clamp Ammeters. Your energy provider may also be able to assist.

## Types of Metering:

Significant energy usage is already metered through the energy provider or through fuel deliveries. Additional metering (sub metering) can be permanently installed if it is cost effective to do. Metering should be aligned with the energy efficiency focus areas so that improvements can be verified. Heat Energy usage can also be calculated from meters that are designed to measure water flow volumes and temperature difference between flow and return.

There have been significant developments in the technology used for collecting energy consumption data and it is worthwhile exploring the options with your electrical contractor to select the optimum system for your own specific requirements. In most cases the metering systems will include a reporting system along with the facility for notification remotely of energy consumption patterns outside normal profile. For electricity consumption, this can be measured at distribution board level while providing data discretely for an individual piece of plant or equipment using the technology available locally.

## Energy Tariff Analysis:

When reviewing energy consumption it also makes financial sense to complete an analysis of the bill from a tariff viewpoint. The structure of energy charges and bills is becoming more complex. This review will identify if the tariff structure is the most appropriate and if any penalties are being incurred. Procurement processes may need to be followed to ensure appropriate and cost effective solutions and the Commission for Energy Regulation (CER) is a useful reference point for industry guidance. You should not assume that your tariff structure and supply arrangements are optimum as there may have been changes in consumption, capacity requirements or in the regulatory charges that may influence the overall average price per unit of energy delivered. In the case of electricity, it may be useful to benchmark the tariffs offered for the supply of Green Vs Brown generated electricity as this may be an important factor in the overall sustainability strategy of your business.



## Continuous Improvement:

In order to effectively achieve and sustain energy savings, a management program is required. Management programs require:

- **Energy Champion at a senior level**
- **Clear policy with both short and long term objectives**
- **Specific objectives**
- **Measurement and reporting**
- **Regular Policy review**

The Sustainable Energy Authority of Ireland (SEAI) has developed the standard IS EN 16001 which is similar in structure to other management systems but focused on Energy Management. This standard will provide a structured approach to understanding energy usage, implement improvements and then investigate impacts. External certification to this standard is also an option.

## Energy Audits:

An energy audit is a systematic, independent process which identifies and documents energy consumption, conservation and efficiency. SEAI is a useful starting point if you are interested in this approach and investigating the potential for Grant aid.

## Useful Links

*Sustainable Energy Authority of Ireland (SEAI)* [www.seai.ie](http://www.seai.ie)

*Commission for Energy Regulation (CER)* [www.cer.ie](http://www.cer.ie)

*Meter Registration System Operator (MRSO)* [www.mrso.ie](http://www.mrso.ie)

*Irish Green Building Council (IGBC)* [www.igbc.ie](http://www.igbc.ie)

Greening the IFSC - 'Greening the IFSC' Project Launched to make Ireland's Financial Services Centre one of the most Resource Efficient in the World.

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