

REDUCING ENERGY COSTS

Increasing energy costs are going to be a feature of plastics processing for the foreseeable future. The "Climate Change Levy" and rising generation costs will ensure that energy becomes an ever more important cost to the plastics processing industry.

Energy is a controllable and a variable cost

Despite this the industry generally regards the energy as an overhead and as a fixed cost. Nothing could be further from the truth. Energy is both controllable and a variable cost. Most processors could easily reduce their energy costs (without substantial investment) and increase their profits. Energy management can save you real money. Energy management is simple. Energy management is good management.

If your costs are higher than they need to be, then your more efficient competitors will gain business and the end result is inevitable.

So why aren't you managing your energy costs instead of simply ignoring them and treating them as somebody else's problem?

FUNDAMENTALS

Before you can reduce your energy costs you need to understand the basics of your energy use. You need to understand:

•Where you are using energy

The main users of electricity in polymer processing (in rough order of importance) are motors and drives, heaters, cooling systems and lighting systems. A simple diagram of site energy distribution map will show you where energy is being used. If you are using a single meter it may be cost effective to install sub meters to get further information on the areas of high energy use. Sub metering will allow you to start to calculate the cost of energy for each operation and to identify areas of high energy usage - a key factor in reducing energy costs.

•When you are using energy

The time that you are using energy is important in the cost of energy and a

simple chart of the demand (at 1/2 hour intervals) plotted versus time will give invaluable information on how to reduce the energy costs.

Peaks of energy usage at the start of the day will increase the energy cost for the complete day. Stagger machine start-ups to reduce the maximum demand and energy costs. A demand graph also allows you assess the 'base load'.

The easiest way to find the base load is to note meter readings and production volumes (in kg) at the end of each shift. Plot the amount of polymer processed against the energy consumption and the energy used when no polymer is processed is the 'base load'. The base load is used for heating, lighting, compressors and pumps. *Machines that are idling with no production will also contribute to the base load!* Reducing the base load is a sure way to make savings.

•Why you are using energy

Knowing when and where you are using energy will start to reveal why you are using energy. Is it being used to keep machines idling when they should be turned off? Are heaters running that are not being used? Are compressors running just to pump air out of leaks?

A key value to calculate is the energy used to process each kg of good product (in kWh/kg). This can be compared to published industry averages to see if you are close to industry best practice and to provide useful targets for energy use and reduction.

•How much energy you are using

Knowing how much energy you are using will allow you to start to reduce your energy costs. Electricity charges are made up of several factors (see next page) and supply companies vary charges based on these factors. An initial survey of the company will reveal areas for potential savings - sometimes you are simply on the wrong tariff and a change in the MPR or MD can save large amounts of wasted money at no cost! For some plastics companies the use of 'peak demand lopping' can be a very effective investment. This can be carried out by diesel operated generators that cut in as the load approaches the peak demand.

Only by understanding where, when, why and how much can you start to control and decrease the cost of energy.



MANAGEMENT - TIPS

- Energy efficiency is not simply turning off lights and investing in new machinery. It is about managing the use of a vital and costly resource. This demands motivation and training to make energy reduction a part of the company culture rather than a 'one time fad'.
- The initial purchase cost of a machine will be exceeded by the cost of energy used during the lifetime of the machine. Energy efficient machines and controls may appear to cost more but you will pay less in the long term.
- Get your machines set right, record the settings and do not change them unless absolutely necessary. Use SPC to control machine performance. Tweaking of machines by operators causes more lost time and energy than almost any other cause.
- Monitor and keep good records of all aspects of performance of each machine for particular product and polymer runs. Process performance records are only one aspect of performance. Monitor and record 'people performance records' as well. Remember, "People do not react as you expect. They react as you inspect"

UTILITIES - TIPS

Water

- Record and monitor water usage. Water may seem cheap but you pay for it twice - once to buy it and once to dispose of it. The total cost can generally be reduced by 10%, this is up to £5000 per year and is better on the bottom line than down the drain.

Compressed air

- Compressed air is an expensive resource. Minimise the demand, then optimise the supply.
- A 3 mm hole in a 7 Bar main will leak about 11 litre/sec, at a cost of about £1,000 per year for a 120 hour working week. What is your total leakage? Reduce your costs by sealing the leaks.

- The higher the pressure, the more expensive it is to provide air. Twice the pressure means four times the energy cost. What are your real needs? Remember that the longer the pipeline, the greater the pressure loss and the greater the cost.

Buildings

- Buildings are large energy users. A simple site survey can reduce your costs considerably.

MACHINES - TIPS

Motor and drives

- The energy costs of a motor can exceed the purchase cost in just 40 days and 'life costs' are over 100 times the purchase cost. Fit more efficient motors that are matched to the need and use low cost 'soft start' and variable speed drive technology to reduce costs.
 - Schedule jobs to the most appropriate machines.
 - Invest in devices that limit peak loads.
- ### Heat transfer
- Barrel insulation has a rapid payback and should be a top priority.

Energy Efficiency Best Practice Programme Hotline
0800 585 794

START TODAY!

Energy management can save you money and make you more competitive. Start your energy management programme today and improve profits by cost effective investment and management.

Get the information, save the money and become more competitive today!

Electricity purchasing - the key words

Maximum Power Requirement (kVA)

The maximum current a site can draw at the supply voltage.

- Stagger start-ups to reduce MPR.
- Match MPR to real requirements.
- Get the MPR right for new premises.
- Consider negotiating an annually based MD instead of an MPR charge.

Maximum Demand (kVA or kVAh)

A measure of current drawn at the supply voltage, usually averaged over half an hour.

- Stagger start-ups to reduce MD.
- Give machinery time to stabilise before starting up new processes.

Power Factor

A measure of the phase shift created by machinery. Lightly loaded machinery tends to have a high phase shift, and thus a low power factor.

- Run electric motors energy efficiently to get power factors close to 1.

Load Factor

A measure of the hours per day that the user draws from the supply.

- Run for greater than a single 8-hour shift to reduce load factors.
- Can some operations be run outside the main shift pattern e.g. regrinding.

FURTHER INFORMATION

Action Energy provides excellent resources to plastics processors for energy management. "Energy in Plastics Processing - a practical guide" (GPG292) gives essential information on how to start reducing your energy costs. Some of the other publications available from the Hotline are:

- GPG239 - Energy efficient thermoplastics extrusion
- GPG092 - Extrusion blow moulding
- GPG048 - Reducing electricity use in injection moulding
- ECG025 - Injection moulding
- ECG031 - Blow Moulding
- ECG055 - Extrusion of thermoplastic pipes and profiles

CONTACTS AND SIGNPOSTS

- Action Energy:
Phone 0800 585 794,
www.actionenergy.org.uk
- Tangram Technology Ltd.:
Phone 08700 278 379,
www.tangram.co.uk