Glass Newsletter

Campaigning against waste

April 1998

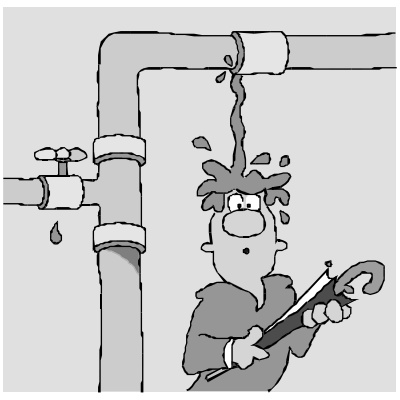
Running An Energy And Environmental Awareness Campaign

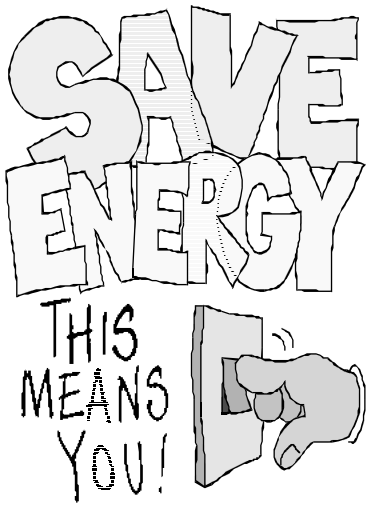
Is your company about to start an energy and environment campaign - or are you still mulling over the possibilities? In either case, two new publications should help you make a flying start. These contain all the tools that you need to design your own company's campaign and provide a valuable step-by-step guide to:

- preparing a presentation to gain senior management support;
- evaluating the campaign and, finally;
- developing a long-term plan of action.

The publications offer detailed guidance and contain templates for posters, staff briefings, images, newsletters and activities - in other words, a complete guide.

Many organisations have identified a lack of awareness, or staff apathy as the greatest barriers to energy efficiency and environmental improvement. Experience has shown that most employees are unaware of the energy they are using, and often wasting, and consequently do not have the knowledge or motivation to make reductions. As a result, improving awareness of energy use and waste minimisation is a major factor in changing attitudes and is likely to bring about significant savings for a relatively small investment.





To be effective, awareness campaigns should bring about permanent changes in attitudes and behaviour. Simply displaying posters or showing videos may result in short term reductions, but in the longer term these will have little effect unless backed up by a strategic approach and planned campaign.

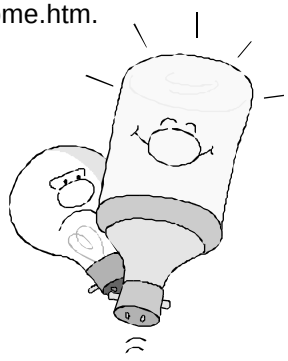
Good Practice Guide 172, *Marketing Energy Efficiency - Raising Staff Awareness,* will enable you to assess the position of your company in terms of marketing energy efficiency and show where and how you can make improvements. To support the Guide, a new pack *Running An Awareness Campaign* has been designed to take the hard work out of running an energy and environment campaign. It explains:

- the key elements in a successful campaign;
- how to organise your campaign;
- the materials you will need to run your campaign within your organisation; and
- how to use them.

The Energy and Environment Collection

The choice of images could make or break your campaign. *The Energy and Environment Collection* will liven up your communications and make them more interesting and effective. This specially designed clipart will give your posters impact, make your newsletters lively and attractive and help your presentations grab attention.

To obtain either of the publications or the Energy and Environment Collection, simply complete the publication request form at the rear of the Newsletter and return it to the Energy Efficiency Enquiries Bureau. Alternatively, you can download the clipart from our internet site - http://www.etsu.com/eebpp/home.htm.



Cutting Waste is Good Practice

A systematic approach to the minimisation of waste enables businesses to generate significant savings in operational costs, together with improvements in environmental performance. Waste minimisation is a permanent cross-sectoral theme in the Environmental Technology Best Practice Programme (ETBPP), which encourages initiatives covering a broad spectrum of waste reduction opportunities. In particular, the ETBPP aims to promote a 'cultural' change which will make waste minimisation an integral part of a company's management system.

Good Practice Guides and Case Studies

The ETBPP has published a wide variety of Good Practice Guides and details of industrial Case Studies during its life. Management, or people-based, issues include:

- training and awareness;
- motivation;
- accountability and commitment;
- monitoring and target setting;
- links to total quality management;
- financial accountability;
- market image.

The ETBPP has been looking for practical examples that embrace these themes across the full range of business sectors, through light and heavy manufacturing industry, commerce and service sectors.

A number of Guides have been produced. Those mentioned below capitalise on the wealth of practical experience that has been gained in regional waste minimisation club initiatives like Project Catalyst and the West Midlands Waste Minimisation Club. Themes include:

- GG25 Saving Money Through Waste Minimisation: Raw Material Use;
- GG26 Saving Money Through Waste Minimisation: Reducing Water Use;
- GG27 Saving Money Through Waste Minimisation: Teams and Champions.

The first two contain practical advice on how to go about realising initiatives on a site-wide basis. They also contain examples of how companies have benefited from the techniques described. The third Guide tackles the important issue of people and, in particular, the role of the manager who makes things happen.

Other Guides are also available. These include a practical guide to waste minimisation aimed at smaller companies (GG38) and a guide with handy tips for reducing waste (ET30).

To order any of these publications or for more information on the Environmental Technology Best Practice Programme, simply telephone the Environmental Helpline on 0800 585794.

Glass Opportunities - the challenge of waste management

The Spring Meeting of the Society of Glass Technology will be held on Wednesday 13 to Friday 15 May 1998 at The Dunkenhalgh Hotel, Clayton-le-Moors, Accrington, England. The theme of the two day conference will be the challenges and opportunities for management at a time of increasing landfill charges and the regulation of packaging waste streams from industry. As well as reviewing legislation and case studies of the responses by industry, the meeting will also look at the use of glass making techniques in the immobilisation of nuclear wastes, asbestos and other hazardous materials.

Factory Visit

Attendees who arrive on the Wednesday afternoon will have the opportunity to visit Philips Components at Simonestone. The site produces the front panels of a range of television and computer screens for the parent company as well as other manufacturers. The company is committed to the principles of environmental management, complying with BS7750/ISO14000, and operates a wide ranging waste minimisation programme which has achieved year on year savings and has been used as a benchmark for the whole of Philips.

Local Section Reception

The local section hosts, the Scottish Section, will hold a reception on Wednesday 13 May in the hotel.

Conference programme

The meeting will commence at 9.00 AM on Thursday 14 May. After the opening keynote lecture, the meeting continues with an description of the vitrification of nuclear waste by C Scales of *BNFL*. An overview of the Glass Batch Furnaces and Refractories Committee Clinic Meeting on refractory recycling and disposal by J Osborn of *Beatson Clark.* Wastewater recycling processes will be explained by a speaker from *CETCO.* The principles of lifecycle analysis are the subject of a paper by M Nicholas of Lurgi (UK).

Experiences of vitrification in Germany and the potential in the UK is discussed by K McNeill of *VERT.* Energy savings in glass manufacture are explored by P Stevenson of *ETSU.* The recycling of silica refractories and the "Drilok" concept are explained by S Brammer of *Hepworth Refactories.*

Presidential address

Dr P Sewell will present his address at 4.00 pm on Thursday 14 May.

Annual general meeting

The AGM of the Society of Glass Technologyill be held at 4.45 pm on Thursday 14 May, following the Presidential address.

Conference dinner

This will be held at 7.30 on the evening of Thursday 14 May.

Day two - Friday 15 MAY

The second day of the meeting begins with a discussion of the management of waste management by D Norman of *Pilkington*. This is followed by a paper on the vitrification of Asbestos-Containing Wastes by a speaker from *Vitreous State Lab/GTS Duratek.* Integrated pollution prevention and control (IPPC) is introduced by G Goode of *British Glass.*

The analysis of spent refractories using x-ray fluorescence spectrometry is explored by M West of *Sheffield Hallam University.* With recent increases in the cost of consigning spent refractories to landfill, the analyst may not only provide a service to identify controlled and special wastes but also assist in the search to find alternative ways to the disposal of spent furnace refractories. A full analysis of a material may enable the glassmaker to convert his waste into a cost effective co-product.

Vitrification - end product development is the subject of a presentation by D Roberts of *VERT.* This is followed by an exploration of cullet and the small user: maximising cullet recovery and its contribution to reducing batch costs by D Batt-Rawden of *ETSU.* The re-use of a byproduct of the glass polishing process, burgy, is discussed by S Slade of *Pilkington.* Fusion cast refractory disposal is explored by a speaker from *SEPR/VALOREF.*

Lunch and close of conference then follows.

Energy Efficiency Best Practice Programme

ENERGY CONSUMPTION GUIDES:

☐ **ECG 027 - 'The Glass Container Industry'**

During 1995/6, the glass container industry consumed 17.5 PJ of energy, valued at £53 M, to melt 2.4 Mt of glass and produce approximately 6,500 million containers per year. Since 1991, the specific energy consumption (SEC) of the process has decreased. This is most pronounced in the melting stage, which accounts for 71% of total energy, were the SEC has decreased by 20%. The Guide identifies trends in glass production, such as the increasing movement towards lightweighting, the growth in demand for brown glass and the increased use on non-internal cullet. In addition, the Guide offers information on further opportunities for energy cost savings.

☐ **ECG 063 - 'Energy Consumption in the Manufacture of Domestic, Borosilicate and Specialist Glass'**

A 1996 survey of all primary glass makers, excluding container and flat glass manufacturers, determined that these sectors consume approximately £25M worth of energy per year to melt 600,000 tonnes of glass. The information gathered for the survey has been compiled to form this Guide which reflects current practice within the sectors. The Guide aims to stimulate readers to seek out areas for improvement within their own process and focuses on the better current practices and opportunities for further energy savings.

GOOD PRACTICE GUIDES AND CASE STUDIES:

☐ **GPG 127 - 'Energy Efficient Environmental Control in the Glass Industry'**

This Guide outlines options open to the glass industry in addressing environmental issues in an energy efficient way. It considers present and likely future legislation, assesses the degree to which current technologies designed to improve energy efficiency can also help meet emission legislation, and examines the possible options for future pollution control - including an assessment of their economical viability. The emphasis of the Guide is on the container sector and, more specifically, the most energy intensive activity - the melting process.

☐ **GPG 172 - 'Marketing Energy Efficiency - Raising Staff Awareness'**

☐ **GPCS 133 - 'External Spray Insulation on Furnace Regenerators'**

A layer of sprayed fibre insulation was added to the 'K' furnace regenerator at Beatson-Clark's Rotherham factory. The insulation was simple to install and caused no disruption to the normal running of the plant. Investment costs were £10.5k (1991 prices), and the annual energy savings were valued at £24k, giving a payback on investment of less than six months. Savings arose from both improved thermal insulation and from sealing the structure against the entry of parasitic cold air.

☐ **GPCS 217 - 'Improved Process Control on a Glass Container Forming Machine'**

Lewis and Towers (Edenbridge) installed a continuous gob monitoring system (CGMS) on its two production lines to improve container weight control. The CGMS monitors the weight of the gob for every container manufactured and alerts the production operator when containers are either under or over weight, so that immediate corrective action can be taken. Investment costs were £17.6 k (1993 prices), and savings were£11.5k (£5.8k energy plus £5.7k raw materials), offering a payback of 18 months.

☐ **GPCS 251 - 'An Energy Management and Investment Campaign at a Glass Plant'**

Outlines an investment campaign at GB Glass Lighting Ltd's Harworth factory. The company operates an energy and investment campaign that aims to reduce the site's energy use via a monitoring and reporting system that enables management to make informed investment decisions. Five projects are described: boiler decentralisation, compressed air usage, lighting, and the replacement of lehrs and forehearths with energy efficient models. A total of £626k was spent on the projects, and total savings were £338k of energy plus £140k in maintenance and labour. Payback ranged from less than two months (for the marginal additional cost of specifying energy efficient lehrs) to two years (for boiler decentralisation).

☐ **GPCS 277 - 'Refurbishment of a Compressed Air System'**

Prior to the refurbishment programme, Beatson Clark operated with eight compressors of different sizes to control their air supply. Considerable difficulty was experienced in maintaining a stable system air pressure. After review the three larger, more efficient machines were refurbished and are now controlled by a Programmable Logic Controller (PLC), with air pressure regulated precisely. Total investment costs were £44 k (1992 prices), and savings were £21 k (for energy) and £12.4 k (maintenance), giving a payback of 15 months.

NEW PRACTICE PROFILES:

☐ **NPP 069 - 'Corrugated Cruciform Packing in a Glass Furnace Regenerator'**

The installation of a new type of regenerator packing improved both combustion air pre-heat temperatures and the efficiency of fuel use on a furnace at Rockware Glass, Wheatley. The new packing was one of a number of improvements incorporated during a furnace rebuild; its corrugated design increased the convective heat exchange coefficients within the regenerator, increasing combustion air temperature by nearly 120°C, and improving regenerator efficiency from less than 60% to nearly 67%. The associated reduction in fuel consumption was close to 8%, and payback on the investment (£95 k at 1990 prices) was 14 months.

FUTURE PRACTICE PROFILES:

☐ **FPIP 069 - 'Rapid Glass Melting by Transferred Plasma Arc'**

The study aims to demonstrate an a.c. transferred arc plasma furnace for the rapid and interruptable melting of glass. The project builds on the success of a pilot scale plasma melt unit, constructed with DTI support. The unit will be used in conjunction with the ultrasonic rapid refining system to realise the full benefits of a high speed melting unit.

☐ **FPIP 068 - 'Ultrasonic Rapid Refining of Glass'**

The study aims to demonstrate an ultrasonic refiner which will remove bubbles from glass melts in minutes, rather than the many hours required in conventionally fired furnaces and pots. The project builds on the success of a pilot scale refiner, constructed with DTI support. The unit will be used in conjunction with the transferred arc plasma furnace, but possibilities exist for its use solely to refine conventionally melted glass.

CADDET PUBLICATIONS:

☐ **Caddet R37 'Electric Forehearth with Indirect Cooling (EFIC) Saves Energy'**

Moss Glassverk (Norway) replaced gas fired/direct air cool forehearths with electric heated/indirect cooled units. Energy costs were reduced and control was improved, making it possible to achieve a accurate gob weights. Payback on the marginal extra cost of the electric unit was 1.5 years.

☐ **Caddet R207 'Improvements in the manufacture of glass frits'**

Johnson Matthey (Netherlands) improved their glass frit process by replacing air-gas burners with oxy-gas burners. The change reduced energy consumption, improved control and quality, and halved dust emissions. Payback was a little over two years. It is believed that this technology should offer similar benefits to small furnaces with limited waste heat recovery.

☐ **Good Practice Guide 172 - 'Marketing Energy Efficiency - Raising Staff Awareness'**

☐ **'Running an Awareness Campaign'**

☐ **'The Energy and Environment Collection'**

Publications from the Society of Glass Technology

☐ ***Raw Materials for Glass Melting***
By Bo Simmingsköld
1997. 80 pages. ISBN 0 900682 24 8
A practical guide on raw materials used in glass melting.
Members price (SGT and members of all participants in the ESG) £12.50. Non-members £22.50

☐ ***Borate Glasses, Crystals and Melts***
1997. 570 pages. ISBN 0 900682 23 X
Proceedings of the Second International Conference on Borate Glasses, Crystals and Melts, Abingdon, 22-25 July 1996. 64 papers. Edited by A. C. Wright, A. C. Hannon & S. A. Feller.
Members price (SGT and members of all participants in the ESG) £50.00. Non-members £60.00

☐ ***Refractories in the glass industry***
1993. 30 pages.
A collection of seven reports from the SGT's Refractories Committee, reprinted from *Glass Technology.*
Members price (SGT and members of all participants in the ESG) £5.00. Non-members £8.00.

☐ ***Glass Furnaces: design, construction and operation***
By W. Trier (Translated by K. L. Lowenstein).
1987. 296 pages. ISBN 0 900682 20 5.
Members price (SGT and members of all participants in the ESG) £65.00. Non-members £75.00.

☐ ***Stones and cord in glasses***
By C. Clark-Monks & J. M. Parker.
1980. 208 pages.
Members price (SGT and members of all participants in the ESG) £25.00. Non-members £30.00

☐ ***Coloured glasses***
By W. A. Weyl.
First published 1951, reprinted 1992.
560 pages.
Members price (SGT and members of all participants in the ESG) £30.00. Non-members £35.00

☐ ***Fundamentals of the glass manufacturing process***
1992. 58 papers. 264 pages. ISBN 0 900682 21 3.
Proceedings of the First European Society of Glass Science and Technology Conference, Sheffield, 9–12 Sept. 1991.
Members price (SGT and members of all participants in the ESG) £50.00. Non-members £60.00.

☐ ***Topical Issues in Glass. Volume 1. Advances in amorphous state chemistry***
1993. 25 papers. 92 pages.
ISBN 0 900682 22 1
Proceedings of a joint meeting of the SGT and the Applied Solid State Chemistry Group of the Royal Society of Chemistry, London, 1 December 1992.
Members price (SGT and members of all participants in the ESG, RSC) £20.00. Non-members £25.00.

All the above prices include postage and packing.

Standard samples

The Society of Glass Technology has a range of standard sand and glasses for analysis and calibration purposes.

Glasses

☐ *Standard Glass No. 4. Fluoride opal glass.* Supplied as white pieces in 25 g packs or as 6 mm thick sheets to special order.
☐ *Standard Glass No. 5. Soda–lime–magnesia–silica glass.* Supplied as broken colourless glass containers in 25 g packs.
☐ *Standard Glass No. 6. Soda–lime–silica glass.* Supplied as broken colourless glass pieces in 25 g packs.
☐ *Standard Glass No. 7. Soda–lime–silica glass.* Supplied as 25 g packs of broken glass or as 4 mm thick pieces cut from flat sided colourless containers and suitable for x-ray analysis to special order.
☐ *Standard Glass No. 8. Lead oxide–potassium oxide–silica glass.* Supplied as broken colourless pieces in 25 g packs.
☐ *Standard Glass No. 9. Lead crystal glass.* Supplied as broken colourless pieces in 25 g packs.
Two lead glasses were received by the Analysis and Properties Committee but because of time limitations Glass No. 9 was not analysed by all of the collaborating laboratories. This glass has a lower lead oxide content, about 28% PbO, than Glass No. 8 and although it cannot be offered as a certified material, it could be useful as a subsidiary calibration check.

All glass samples cost £65 (£45 members) plus postage.

Sands

All contents in wt%.
☐ Standard Sand No. 1. Al_2O_3 0·061, Fe_2O_3 0·014, TiO_2 0·026.
☐ Standard Sand No. 6. Al_2O_3 0·06, Fe_2O_3 0·032, TiO_2 0·024.
☐ Standard Sand No. 8. Al_2O_3 2·07, Fe_2O_3 0·26, TiO_2 0·073, K_2O 1·06.
☐ Standard Sand No. 9. Al_2O_3 1·35, Fe_2O_3 0·103, TiO_2 0·044, K_2O 0·82.
All sands are sold in 200 g packs at £90 (£70 members) plus postage.

To order any of the books or samples on this page, please indicate your choice and send it to the address below.

Name: _____

Company: _____

Address: _____

_____

Tel: _____ **Fax:** _____

Please make cheques payable to the Society of Glass Technology
Please return this form to: The Energy Efficiency Enquiries Bureau, ETSU, Harwell, Oxon OX11 0RA. Tel 01235 436747/432735. Fax 01235 433066.

Crystal-clear savings

Tradition means a lot to companies in the highly skilled, labour-intensive lead crystal subsector. But they can do without traditions like poor first-quality yield and excessive cullet generation.

Two long-established firms in the West Midlands have discovered how a modern approach to waste minimisation can transform their performance, and their profits, without compromising the quality of their products.

Royal Brierley Crystal saved £191000 a year after joining a regional waste minimisation club, while Royal Doulton Crystal saved £115000 by focusing on the specific issue of cullet recovery. Both their experiences are described in free literature published by the Environmental Technology Best Practice Programme.

A Case History (CH117) *Glass Manufacturer Improves Yield And Reduces Cullet* highlights the benefits achieved by Royal Brierley Crystal as a result of taking part in the West Midlands Waste Minimisation Club. Working with the Club's consultants, the Company identified its areas of greatest concern and explored various methods to address them.

Trials established that reducing the lead content of glass from 30% to 24% would significantly improve first-quality yield and generate less cullet. Other ways to reduce cullet included modifying the blowing irons to eliminate discoloured crystal, changing preheating practices to improve crystal pick-up and recycling surplus glass into the process.

The combined measures improved product yield by 10% and reduced cullet disposal to landfill from 130 to 80 tonnes a year. With further cost reductions coming from more efficient energy use and better effluent quality, total annual savings came to £191000, equivalent to 3% of turnover.

Royal Brierley isn't stopping there. The family-owned Company, which has been making fine lead crystal since 1776, has undergone a change of culture towards waste. Its employees at Brierley Hill, near Dudley, are keen to suggest and implement cost-saving ideas for themselves and a permanent programme is in place to improve and optimise the glass-making process.

The reduction of work-in-progress and stock levels are among measures that have been identified to achieve further annual savings of £223000 in the longer term.

Cullet recovery

Royal Doulton Crystal's route to environmental and economic savings is described in the Good Practice Case Study (GC97) *Maximising Cullet Recovery Reduces Batch Costs*. The Stourbridge-based company relies on traditional hand methods to make cut crystal stemware and giftware from around 1000 tonnes of raw materials and recycled cullet each year.

However, most of its internal process cullet was too big for remelting and only about 30% was finding its way back into the process. The solution was to install a crushing unit to reduce the cullet to an optimum uniform size so that it could be recycled without producing faults in the blown glass products.

Capital costs were kept low by buying a reconditioned rotary hammer mill, which was later upgraded by adding a fine mesh screen and water spray system to separate fines and other sand and powdery material. As well as doubling the proportion of cullet that can be returned to the batch, Royal Doulton has found alternative uses for the crusher fines and other waste glass, including a lead reclaimer, glass artists and gas fire manufacturers.

The Company has reduced the purchase of primary raw materials by 37%, improved the yield of first-quality glass and virtually eliminated waste disposal to landfill. Its total annual savings of £115000 were achieved with a payback of just three weeks, mostly because it was able to buy a reconditioned crusher unit. A typical small glassworks with similar throughput buying new equipment would get its investment back in about four months. Actual savings will be dependent on the total amount of process cullet that can be recovered for re-use.

To find out more details of how these two companies have increased profits and reduced their environmental impact, phone the Environmental Helpline on freephone 0800 585794 and ask for GC97 and CH117 (quoting ref 97/38).