

A photograph of several footprints in sand, with the largest footprint in the foreground on the left. The title 'Sands of time' is overlaid on the image.

Sands of time

Punitive new legislation could prove the high noon for industrial plants that have so far failed to calculate their carbon footprint and formulate a plan to effect improvements. But it isn't too late to get this right, as Brian Wall reports

If ever an event has served to concentrate the focus of managing directors and CEOs on their carbon footprints, the UK Carbon Reduction Commitment (CRC) Energy Efficiency Scheme must be it. While the pressures of corporate social responsibility and the desire to cut energy waste no doubt also play their parts, the government's new energy efficiency cap and trade scheme – mandatory and potentially punitive for those that fall within its radar – is certain to have a huge impact.

Why so? Well, first and foremost, it follows on the heels of the EC's own cap and Emissions Trading Scheme (ETS), now a major pillar of EU climate policy. The ETS is aimed at top tier energy-intensive users and covers more than 10,000 installations with a net heat excess of 20MW in the energy and industrial sectors, said to be collectively responsible for close to half of the EU's emissions of CO₂ and 40% of its total greenhouse gas emissions. By contrast, the government's CRC scheme applies to the UK only and is designed to sweep up thousands of the medium to large sized organisations outside the ETS's remit (see panel,

page 20). Its aim is to cut carbon emissions by 1.2 million tonnes per year by 2020.

Getting ready

Organisations that qualify will, if they haven't yet done so, need to prepare for the CRC by making an immediate assessment of their carbon emissions, via a full carbon footprint appraisal, and then start reducing them, in line with goals set for them. What's more, plant managers need to note that, with the cut-off date now passed (30 September) to register with the Environment Agency – and the onus on all potential qualifiers to find out for themselves whether they should be included in the scheme or not – time has already run out for 'free' registration. To avoid ramping up the now inevitable financial penalties, they need to act fast.

Meantime, the more energy-hungry businesses already covered by the ETS need to find new ways of cutting their levels of consumption, if they are to meet, and beat, their targets, too. But what are the appropriate steps that need to be taken, in order to achieve this?

"Calculating the carbon footprint of an organisation can be the first step in a programme to reduce the emissions it causes," states The Carbon Trust, which has developed an online calculator (www.carbontrust.co.uk/cut-carbon-reduce-costs/calculate) to help plant managers work out their footprint. It's not perfect – the basic footprint indicator provides a rough estimate of

What it is...

So what is a carbon footprint? Basically, it's a measure of the impact our activities have on the environment and, in particular, climate change. It relates to the amount of greenhouse gases produced through burning fossil fuels for electricity, heating and transportation, etc.

The carbon footprint is a measurement of all greenhouse gases we produce individually, calculated in units of tonnes (or kg) of carbon dioxide equivalent.

carbon emissions, based on energy bills and sectors – but it does provide a good indication.

Getting it right

All well and good, but the challenge runs much deeper than that. Equally important are the support systems. For example, does the plant have enough data available to assess how efficiently it is using energy to any level of detail? And what tools are available to detect chronic waste – from plant and pipes, for instance – of which the organisation may be totally oblivious?

As Andrew Kinder (pictured), director at business software provider Infor, points out, carbon footprint reduction is not simply about managing the commodity, but how the commodity is consumed.

“A programme to reduce carbon footprint usually starts with someone increasing it, by printing off a document: the company’s utilities bill. From this, the energy consumption of an entire business is derived and factored in, alongside other elements such as use and transport of materials, facilities, etc. This is then totalled up and presented as a single, large figure that the business must reduce.”



Critical omission

However, what this ‘big number’ does not include is the detailed energy consumption of individual plant assets. “This is a critical omission,” warns Kinder. “You need to know energy consumption, in order to set about reducing carbon footprint and achieving the cash savings that ‘green’ practices can deliver. No spreadsheet, no matter how sophisticated, is going to tell you this.”

Plants need to assess from the “asset level up”, not the “energy bill down”, he advises. “This part can actually be done quite simply. Asset management systems can include energy consumption metrics and not only track it, but also warn when it is getting too high,” he adds, noting that this is often an early indicator that plant or equipment is in need of maintenance.

Bearing down on waste

For an industrial plant with a significant number of energy-hungry machines, cooled by even hungrier air conditioning units, this approach quickly yields a goldmine of information. “Critically, it will show the actual energy being consumed in the course of production, and the units, or parts of a machine or process, that are consuming more energy than they should – thus enlarging your carbon footprint. These can then be tackled at source for maximum benefit, in terms of both carbon footprint reduction and cash savings.”

Another way to reduce your carbon footprint is

by identifying and reining in energy wastage from the ground up. For example, energy efficiency specialist Energys Services provides a carbon-cutting sound investigation service, aimed mainly at identifying compressed air or other pressurised gas leaks.

A trained technician uses a digital probe to listen to an organisation’s pipework and machinery, identifying hitherto unrecognised problems that may be costing the plant money and adding to its carbon footprint.

The probe uses ultrasound, which focuses on frequencies specific to detecting air leaks. By adjusting the frequency, the operator can ‘tune in’ better, while also recording bearing noise and comparing that against reference good bearing benchmark spectra.

Problems that can be detected in this way include: compressed air, nitrogen and hydrocarbon leaks; emissions of virtually any other type of gas under pressure; vacuum and ingress leaks and leaks in heat exchangers, tanks and pipes.

Energys’ services, and others like it, allow organisations to find even the smallest compressed air, pressurised gas or vacuum leaks, and can also identify faulty valves and steam traps that will be costing energy, money and carbon. Bear in mind that, according to The Carbon Trust’s own figures, even a tiny leak of 3mm diameter could cost a plant

The Payback

According to Deritend group general manager Stuart Hutchinson, several aspects are applicable when considering the carbon emissions from a factory.

First, he suggests ensuring that ancillary support services and equipment does not run outside of main plant operation times – and he cites, in particular, compressed air, heating, cooling and lighting systems. “This is easy to implement, costs are minimal and can result in significant reductions,” says Hutchinson.

He also advises plant managers to interrogate their half hour electricity data in a simple spreadsheet format, to identify abnormal plant operation. “Conduct an out-of-hours walkabout and note what is left operating when you are unoccupied. Look for opportunities to fit sub-metering. The costs are generally low, but this information can give great insight into how and where energy is being used, and aid in formulating further energy and cost reduction opportunities.”

Beyond these Hutchinson advises ensuring that procurement of new or replacement and repair equipment itself is carried out considering energy efficiency, while also reviewing expected operational costs as well as capital costs. “In many cases, the additional cost of a higher efficiency motor will pay for itself many times over throughout its operating life. At Anglian Water, for instance, Deritend delivered energy cost savings of £37,000 a year through the installation of vertical fixed aerators.”

Finally, like many others, Hutchinson urges plant engineers to consider variable speed drives or soft starts on pump and fans motors where variable flow or volume requirements are known to exist, and to ensure that fan and motor characteristics are matched properly to the required duty.

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Under the CRC scheme, large energy consumers will be encouraged to change their heavily polluting ways

more than £700 a year in wasted energy – and that estimate is generally even greater for gases.

“Organisations are increasingly becoming conscious of the financial and environmental benefits associated with cutting out wasteful energy drains,” states Aidan Salter, managing director of Energys.

Alarming wastage


“Digital investigation of pipework and machinery is rising in prominence as a non-disruptive way to boost energy efficiency across a site and to ensure that maintenance is carried out effectively, he adds.”

Meanwhile, for any industrial plant, measuring

carbon footprint should be an essential part of maintenance an energy management practice, governed by systematic processes of measuring, monitoring and identifying wastage, controlled either through third parties or an in-house manager.

In relation to that, Stuart Wright, a manager at sustainability consultancy dcarbon8 (recently acquired by Deloitte), offers this advice: “We would emphasise that these look at both the behavioural as well as technical measures, such as checking set points and timer controls for heating, and ensuring compressed air leakages are reported to a central point. Aligned to this should be appropriate governance systems, allowing the review of these measures against a weighted cost/carbon benefit, that are then fed as business cases to the finance team to encourage internal investment.”

Convinced? Well, the next step is to gain an independent and thorough understanding of your current greenhouse gas (GHG) emissions. There are many organisations out there, including those featured in this article, that will not only help you calculate your carbon footprint, but also pinpoint sources of energy wastage that can bring significant cost savings when remedied.

Spend time assessing the relative merits of what they offer and likely costs involved, etc, before making a decision. Once made, however, this is a move that is likely to transform how you view your plant's carbon usage. 

CRC scheme: applying the pressure now

Around 5,000 organisations with an energy spend greater than £500,000 and whose combined electricity use through half-hourly metering, exceeds 6,000 MWh per year will be obliged to take part in the government's Carbon Reduction Commitment (CRC) Energy Efficiency Scheme.

Its sweep is broad – and uncompromising. In fact, it is likely to cost those businesses a minimum of £40,000 to purchase their allowances in April 2011's first sale – and more, if their energy usage is greater than 6,000MWh per year.

Added to this, league tables will be in force, where a lowly position will lead to financial penalties, and the worst performers 'named and shamed'. For more information, go to:

www.ec.europa.eu/environment/climat/emission/

www.decc.gov.uk