

Environment Introduction

Electricity production, distribution and use result in a number of environmental impacts. These occur at local, regional and global levels. Greenhouse gas emissions and biodiversity losses, for instance, are best addressed globally. Emissions of sulphur dioxide and nitrogen oxides have more of a regional impact. Local issues might include airborne pollutant emissions, cooling water intake and discharges, landfills, injury to animal and plant populations, and land use changes.

Over the last several decades the electricity industry has gained much experience in understanding and addressing these impacts and has achieved remarkable reductions in these, without compromising growth in electricity supply.

At Powergen, we recognise the environmental impacts of our activities and that is why we are committed to high standards of environmental care and to continually improving our environmental performance.

Our Environmental Policy commits us to improve our environmental performance by:

- Complying with legislation and if possible exceeding minimum legal requirements;
- Maintaining effective and efficient Environmental Management Systems;
- Minimising environmental risks and preventing pollution;
- Reducing the visual impact of our operations;
- Promoting the efficient use of transport in all our activities;
- Managing our land sensitively and promoting nature conservation.

We also recognise that our stakeholders have a role to play and aim to:

- Educate and train our staff to conduct their activities in an environmentally responsible manner;
- Inform our suppliers and contractors of our high environmental standards;
- Encourage high standards throughout our supply chain;
- Encourage all our stakeholders to use energy and resources efficiently.

We have an 'Environment Forum', comprised of senior managers which meet regularly to review and address environmental issues across the UK business. The main aims of the Forum are to:

- Guide decisions on environmental consequences;
- Ensure consistent application of policy and approach to environmental issues across the UK business;
- Secure sign-on to environmental policy and its associated guidance.

Environment

The issues

There are a number of major environmental issues that are central to our business and continuing success.

Above all, Powergen UK is an energy company, deriving much of that energy from fossil fuels. Although the continuing availability of these resources has long been questioned, other related issues, e.g. greenhouse gas emissions and climate change, have recently become more pressing.

Burning fossil fuels releases various substances and some of these have a detrimental impact on the environment.

Carbon dioxide, for instance, contributes to global warming and climate change.

Other products, such as sulphur dioxide, can combine with water in clouds and can fall as acid rain many miles from where they were released. Others have an impact at a local level and are monitored through the National Air Quality Scheme to which reference is made later in this Report.

We have worked for many years to reduce all of these impacts, and that work continues today. Each year, we invest millions of pounds in technology to reduce the impact of our existing plant. We also build new, alternative forms of generation, such as wind power, and are planning to burn biomass in our fossil-fuelled power stations to reduce our total CO₂ emissions.

We are also investing in scientific research that will help refine these alternative forms of energy generation and make them commercially viable, as well as working on understanding and reducing the impact of traditional forms of energy use and generation.

The environmental issues for Powergen UK, upon which we report here are:

- Compliance and environmental management;
- Greenhouse gases and climate change;
- Emissions to air;
- Resource use;
- By-product and waste management;
- Electric and magnetic fields;
- Environmental research;
- Environmental data.

Shown below are these issues mapped against our stakeholder groups to show which issues, we believe, are of most relevance to each stakeholder group.

Stakeholder Groups	●	●	◆	◆	▲	▲	■	■
E.ON	●	●	◆	◆	▲	▲	■	■
E.ON investors	●	●	◆	◆	—	▲	■	■
Govt. & energy regulators	●	●	◆	◆	—	—	—	—
Environmental regulators	●	●	◆	◆	—	▲	■	■
Employees	●	●	◆	◆	▲	▲	■	■
Customers	●	●	◆	◆	▲	▲	■	■
Communities	●	●	◆	◆	▲	▲	—	—
External bodies	●	●	◆	◆	▲	▲	■	■
The media	●	●	◆	◆	▲	▲	■	■
Joint venture partners	●	—	—	—	—	—	■	■
Trade unions	●	—	—	—	—	—	—	—
Contractors	●	—	—	—	—	—	—	—
Suppliers	●	—	—	—	—	—	—	—

Key	
●	Compliance & environmental management
●	Greenhouse gases & climate change
◆	Emissions to air
◆	Resource use
▲	Electric and magnetic fields
▲	By-product and waste management
■	Environmental research
■	Environmental data

Environment

Compliance and environmental management

Environmental management systems

Compliance with the law is a minimum requirement for us. Where possible, we aim to outperform minimum legal requirements.

However, we appreciate that unforeseen problems and incidents may occur. A good environmental management system (EMS) serves to minimise the chances of incidents occurring, as well as lowering their impact if they do.

We aim continually to maintain a good, open relationship with our customers and with the local communities in which we operate. This requires effective complaint handling systems, so that if problems do arise, they can be dealt with quickly and efficiently in a manner satisfactory to all parties.



Within the UK our principal environmental regulator is the Environment Agency (EA). We work closely with the EA to ensure that we comply with the letter and spirit of the law.

Powergen UK developed an EMS and implemented this at its major power station sites as early as 1992. Since then, our EMS has been developed and from around 1997 made consistent with the international standard for environmental management systems, ISO 14001. In 1999, the company achieved corporate certification to the standard. The Powergen UK EMS is now in place across all our locations and most sites have been formally certified to ISO 14001.

Over 2002, all sites with ISO 14001 maintained their certification. We are presently reviewing the need for certification to ISO 14001 for our Energy Trading and Retail operations.

Environmental incidents

We maintain a close liaison with the Environment Agency (EA), aiming to be open, honest and transparent. By working together, we can have a more positive impact on the environment.

We define an environmental incident as any unforeseen environmental event, no matter how insignificant, which is reported through a site's environmental management system.

Our commitment to ISO 14001 and rigorous environmental procedures have helped to minimise the risk of environmental incidents. During 2002, we continued to have never been prosecuted for any breaches of our authorisations to operate.

INDICATOR: Power Station Environmental Incidents

Total incidents reported through power station sites' EMSs, 2002	9
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**Electricity distribution**

Whilst our electricity distribution network in the East Midlands is secure and reliable in operation, equipment can be adversely affected by the weather and faults can occur. In these instances there is the potential for oil to be released from our equipment, which could have an adverse effect on their surroundings if this were allowed to escape. For this reason all of our largest transformers have secondary containment devices, called bunds, to prevent oil from escaping. In addition, a comprehensive incident response process has been implemented to ensure that quick and effective responses are made to all reported incidents.

The process makes use of a dedicated incident management centre that co-ordinates the deployment of staff to incidents and maintains effective lines of communication with engineers, support staff and, where necessary, the emergency services and the Environment Agency. All field staff have received training in responding to environmental incidents and all have access to specialist spill response equipment to both contain and clear up any releases that do occur.

As a result of the training on the revised incident response and reporting process, 46 environmental incidents were reported within East Midlands Electricity during 2002. The majority of these resulted from equipment interference or faults and were minor in nature. However, some incidents involved the release of larger amounts of oil and required the removal of contaminated ground. In all cases, the reporting process to the Incident Management Centre was followed and the Environment Agency was informed in all appropriate circumstances.

Our distribution network includes approximately 400 km of cables that are insulated using a bio-degradable alkyl benzene product. Occasionally, this fluid may be released from these cables, which can have an impact on the environment. During 2002, six incidents occurred which involved releases from underground fluid-filled cables. We recognise the potential environmental impact of these cables and have contributed to the production of a revised operating code of practice with the Environment Agency.

A series of environmental emergency tests were carried out during the year, covering areas including operational equipment, generator refuelling and call handling scenarios. These have been used to review current procedures and help identify future briefing requirements.

To help identify potential environmental hazards and to capture any near hits that, in other circumstances, could have caused an environmental incident, a reporting process called "Environment Watch" was launched during 2002. Staff can use this process to report these hazards, which will not only put actions in place to address the hazard but can help to prevent future incidents from occurring.

Environmental complaints

All our sites have dedicated procedures for handling both inquiries and complaints. In the case of complaints, we are determined to make contacting us as simple as possible. We wish to resolve any problems as soon as they arise and are committed to learning from any mistakes that we have made. Our firm belief, however, is that prevention is better than cure and we therefore aim to minimise the cause of the complaints in the first place.

We are constantly seeking to improve our complaint handling systems, so although we aim to reduce the number of complaints received every year, we do not necessarily view a small increase as a bad thing. This can simply show that we have improved our systems, methods and procedures for reporting. What is more important is the number of substantiated complaints.

In 2002, 25 substantiated environmental complaints were received by our power station sites and 64 arising from the operation and maintenance of our electricity distribution network. All of these were resolved satisfactorily.

Within East Midlands Electricity, a new database is being developed to manage all communications with customers and to specifically monitor all environmental complaints.

Environment

Greenhouse gases and climate change

Climate change is a truly global issue and is closely connected to the wider issue of the future of energy production. We are making a concerted effort to tackle our contribution to climate change.

Since the industrial revolution, mankind has increasingly emitted CO₂ and certain other gases into the atmosphere, principally through the combustion of fossil fuels. These, according to a consensus of climate scientists, are enhancing the natural 'greenhouse effect' and raising the average global temperature. Future projections on current trends indicate that enhanced global warming will have important impacts including rising sea levels, the likelihood of more extreme and unpredictable weather patterns and changes in agriculture and species' territories.

Concern over potential impacts of enhanced global warming led to the 'World Summit' at Rio de Janeiro in 1992 at which the United Nations Framework Convention of Climate Change (UNFCCC) was agreed.

This was followed by a series of intensive global negotiations in which more than 160 nations took part, culminating in the Kyoto Protocol in 1997. Under this agreement, the developed nations committed themselves to an average reduction of 5.2% from 1990 levels in six greenhouse gases over the period 2008 to 2012.

The European Union has agreed to an overall reduction of 8% within its member states. In practice, this will be achieved through agreed targets per country, with the UK agreeing a reduction target of 12.5%. In addition, the UK Government has a manifesto commitment to reducing UK CO₂ emissions by 20% from 1990 levels by 2010.

The issue of climate change and emissions of greenhouse gases is closely connected to the wider issue of the future of energy production. Government policies on the two issues are becoming inextricably linked.

Greenhouse gases

Throughout our business we emit several greenhouse gases. These are discussed below:

Carbon dioxide (CO₂) is the most common greenhouse gas to be released into the atmosphere and is formed as a product of burning fossil fuels. Much of our generation business still uses traditional fossil-fuelled power stations, which means (CO₂) emissions are large.

Most transport is powered by fossil fuels, and thus our transport use also emits CO₂.

Our office sites use electricity, and this is ultimately from power stations and so accounts for a certain amount of CO₂ release. However, it is important not to double account in this case. If electricity generators like Powergen claim responsibility for the CO₂ emissions that their power stations generate, this will ultimately be the same CO₂ emissions that all other businesses claim to have responsibility for in their process and office electricity use.

However, it is our policy to manage office energy use and aim to minimise it. A major environmental objective of our office environmental management system (EMS) is to minimise our resource use such as energy.

Burning fossil fuels also emits oxides of nitrogen into the atmosphere. One of these, nitrous oxide (N₂O) is a greenhouse gas. It is emitted in insignificant amounts compared with CO₂, and is only measurable in our generation processes. It is, however, a more potent greenhouse gas than CO₂, with approximately 310 times more greenhouse gas potential than CO₂ over a time-frame of 100 years.

Natural gas is mostly made up of methane (CH₄) which is also a potent greenhouse gas, some 21 times more so than CO₂ over 100 years. Our gas-fired stations use large quantities of natural gas as fuel, delivered through high-pressure pipelines. Whilst the pipelines themselves do not leak, necessary maintenance on the lines means some gas has to be vented to atmosphere.

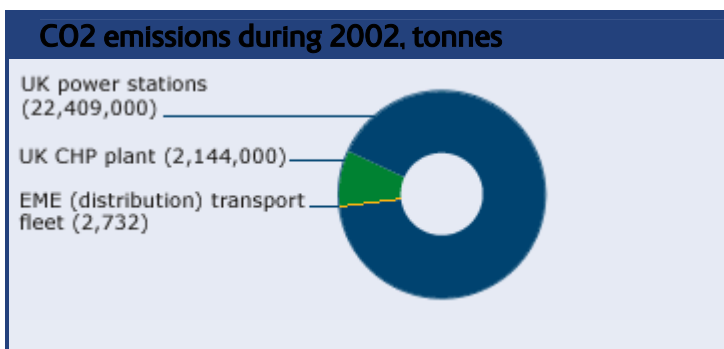
Some of the high voltage switchgear in our distribution networks is surrounded by a gas with certain electrical properties allowing the switchgear to work efficiently and safely. The gas used is sulphur hexafluoride (SF₆), a highly potent greenhouse gas, with some 23,900 times more greenhouse gas potential than CO₂ over 100 years.

It is used in small quantities, however, and controls on equipment and maintenance are such that emissions are so small as to be negligible.

We are tackling climate change in a number of ways, including:

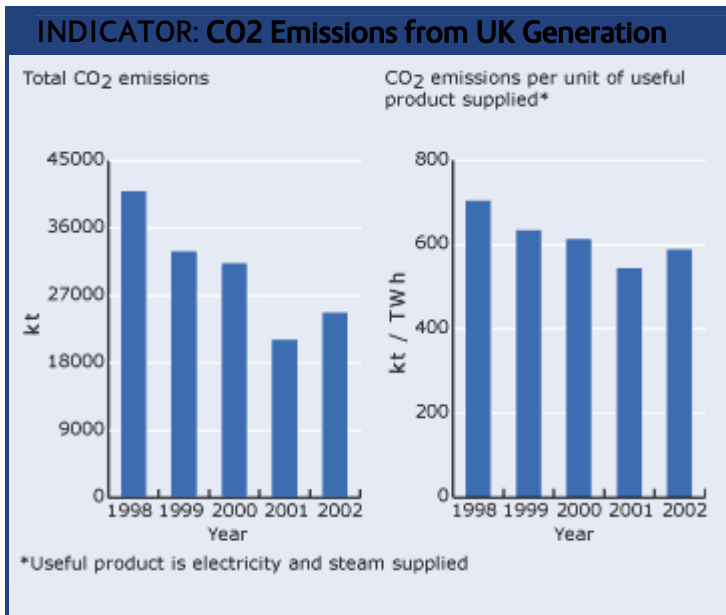
- Increasing the efficiency of our existing fossil-fuel power stations, or using less carbon-intensive fuels;
- Building new plant, which use renewable sources of energy, that emit little or no greenhouse gases during electricity generation;
- Changing office and transport use patterns that will reduce emissions of GHGs;
- Encouraging and investing in energy efficiency measures for our customers.

Over 99.5% of our greenhouse gas emissions are due to our emissions of CO₂. Some of our CO₂ emissions during 2002 were:





These figures have been calculated using the recommended guidelines from the UK Government Department for Environment, Food and Rural Affairs (DEFRA).

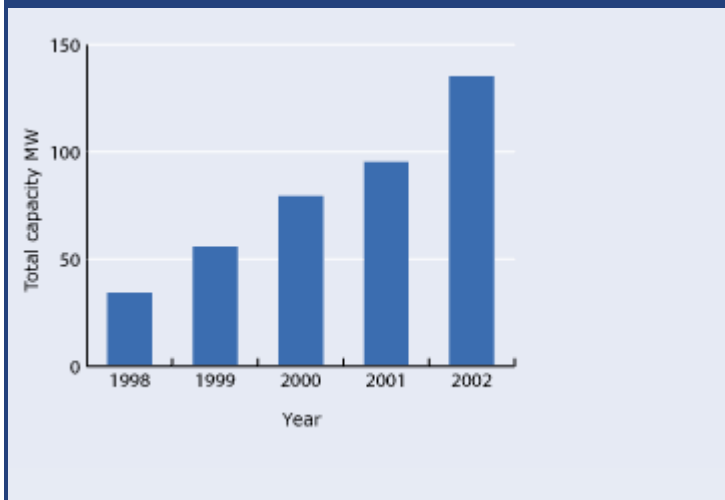


Reducing greenhouse gas emissions

We are continuing to reduce our emissions of greenhouse gases – principally CO₂ – through a range of business initiatives, as described below:

Renewable energy

Our use of renewable methods of generation has increased over the past nine years. Powergen Renewables is one of the UK’s leading wind generation businesses. We develop, own and operate wind farms across the UK. We were also the first wind farm business in the world to achieve the international environmental management standard, ISO 14001.

INDICATOR: Growth in UK Renewables Capacity


Since 1999, all our wind generation projects have been developed by Powergen Renewables Ltd., originally formed as a joint venture with Abbot Group plc. We bought out Abbot's share in Powergen Renewables in October 2002.

At the end of 2002 we had 17 operational wind farms, with a total capacity of almost 135 MW. The portfolio includes the UK's first off-shore wind farm, a 4 MW development at Blyth on the Northumberland coast, which was commissioned in December 2000.

We were recently granted consent to build a 76 MW offshore wind farm at Scroby Sands off the coast of Great Yarmouth in Norfolk. Once commissioned, the project will generate enough electricity to supply 52,000 homes.

The latest addition to the Renewables portfolio is Bowbeat, a 31.2 MW windfarm near Peebles in the Scottish Borders. This wind farm was commissioned in September 2002 and generates enough electricity annually to supply 22,500 homes.

We also sign medium- and long-term contracts with renewable generation projects to buy electricity and, therefore, underpin these projects which contribute to renewable energy supply for the UK.

Combined heat and power

We have been a leader in large-scale combined heat and power (CHP) plant for industrial customers requiring large amounts of power and heat, usually in the form of steam.

CHP, or cogeneration, is the simultaneous production of usable heat and electricity in the same plant. The generation site is specifically designed for the customer. This means that steam and electricity production can be tailored to meet the customer's needs, and thus each site is unique.

In existing coal-fired power stations, only around 38% of the energy produced can

be used to generate electricity, while the rest is lost as heat. Combined Cycle Gas Turbine (CCGT) plants improve on this and give an efficiency of 50–60%, but the location of CHP plants close to the customer means that waste heat can be utilised by the customer in the form of steam. This can give CHP plants an overall fuel utilisation efficiency of up to 80%, significantly reducing emissions of greenhouse gases.

Energy efficiency

Possibly the most significant contribution we can make to reduce our greenhouse gas emissions is to simply use less energy.

By increasing the efficiency of our existing fossil–fuel power stations, or using less carbon–intensive fuels, we can reduce the amount of emissions per unit of electricity produced. Examples of this are the trials we have undertaken to burn a mixture of coal and biomass.

Our office sites use electricity, and this originates from power stations and so accounts for a certain amount of CO₂ release. As a producer of electricity and promoter of energy efficiency we consider it good practice to manage office energy use, and aim to minimise it. A major environmental objective of our office environmental management system (EMS) is to minimise resource use – including energy.

Energy efficiency is also a very effective way of helping households who cannot afford to heat their homes adequately. Our work in this area is explained fully within the Marketplace Section of this Report.

Our Energy Efficiency Team creates, develops and project manages initiatives to allow all our residential customers to play their part in reducing the energy they use. These initiatives are marketed direct to customers or via partners such as local authorities, retailers and charities. The measures we promote are varied and cover many ways of saving energy in the home. We also work directly with registered social landlords to improve the efficiency of their housing stock helping them to meet the UK Government Department of Transport, Local Government and the Regions (DTLR)'s (now Office of the Deputy Prime Minister – ODPM's) Decent homes standard. We like to play an active, not passive, role in the partnerships we develop and we believe we have the skills within the team to achieve that. Some of our team are trained National Home Energy Rating (NHER) assessors and have the ability to quantify the benefits of the insulation measures carried out in the form of a stock profile. Working in the new build sector we help developers meet building regulations by providing energy efficiency Standard assessment procedure (SAP) ratings. We also offer NHER training for all levels of assessment and have the ability to pressure test housing to determine the energy loss through ventilation within a dwelling.



The installation of physical measures is not the only way of saving energy. Our energy efficiency advice line for both residential and business sectors offers a free service to educate and, in many cases, change behaviours in the way our customers use energy. In the residential market we have been active with low–income

customers, whom we consider would benefit greatly from such advice, as well as offering a reactive service for other customers and non-customers alike. We also offer home visits for customers who need extra support and have made over 4,000 such visits during 2002 as well as attending over 20 local events across the East Midlands talking to consumers about their energy use. We set up our business advice line in 2002 which offers customers the opportunity to talk to specialist engineers about reducing energy bills and understanding what grant support may be available from programmes such as Action Energy and initiatives from the Carbon Trust. Current awareness of this service is low, and we intend to increase our promotion of it to customers to increase its use.



Our energy efficiency programme is designed to deliver the Energy Efficiency Commitment (EEC) which commenced in April 2002 and runs to March 2005. This programme is approximately five times the size of the previous EESoP (Energy Efficiency Standards of Performance) III programme, and requires suppliers to make substantial investments in the delivery of a lifetime energy saving target of 62 TWh across the sector. Half of these savings are targeted at consumers who are in receipt of a means-tested benefit or tax credit.

Transport initiatives

Our staff need to travel between sites to carry out their work. Most transport is powered by fossil fuels, and so also emits CO₂.

We are working to change transport use patterns that will reduce emissions of GHGs.

Environment

Emissions to air

Local air quality

Poor local air quality is the outcome of pollutants such as dust and fine particulates, ozone and carbon monoxide building up in towns and cities. The consequences include smog and health problems for those with sensitive respiratory systems such as the young, older people and asthma sufferers. While power stations and other industrial sites can contribute to poor local air quality, the main source tends to be traffic.

Concerns about the health effects of air pollution have focused on the role of dust in the atmosphere, particularly the finer particles known as PM10. Although epidemiological evidence appears to show a link between PM10 and health effects, the mechanisms that might explain this are still unknown. Governments have, however, tended to set limits on PM10 air quality under a precautionary approach.

Because of its local nature, air quality tends to be tackled by governments at a national or local level. Most countries have developed air quality standards and programmes for bringing air pollution down to levels that will meet them.

The European Union (EU) has set air quality limit values for a range of air pollutants and work is continuing to extend the range and ensure that existing limits are reviewed and kept up to date. The EU has recently put in place an integrated approach to air quality known as CAFE (Clean Air for Europe) that links air quality and the control of pollution sources.

In the UK, national air quality standards have been set for sulphur dioxide (SO₂), oxides of nitrogen (NO_x), PM10 and other air pollutants. Objectives have been set for 2005, and local authorities are producing plans setting out how they intend to meet these objectives.

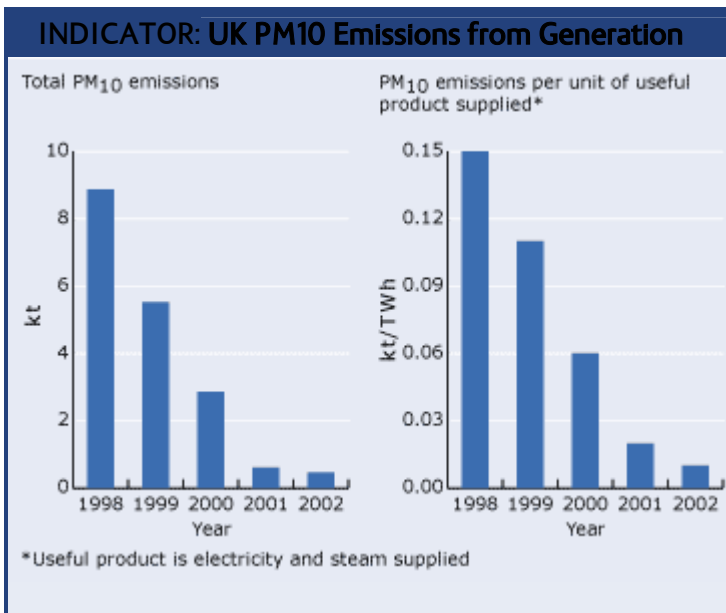
We have been working with the Environment Agency (EA) to establish modelling systems and management plans designed to ensure that none of our power stations will cause a breach of the air quality objectives. This theoretical approach is backed up by practical air quality monitoring around each of the sites. Each year we provide the EA with a report showing how far theory and practice match up, and if necessary, setting out any further action to be taken.

Coal- and oil-fired power stations produce dust and particulate matter as a result of the combustion process. Dust and particulates – pulverised fuel ash (PFA) – are removed from the emissions of fossil-fuelled power stations by electrostatic precipitators (ESPs). They use the static charge of the dust particles to attract and remove them from the flue gases before release to atmosphere. Our ESPs remove around 99% of these dust particles. However, small quantities of dust and particulates are unavoidably emitted to the atmosphere, some of which come from minor occurrences of dust blown from coal stocks. Integrated Pollution Control (IPC) authorisations, granted by the EA, for our coal- and oil-fired power stations include strict limits on emission of particulates in flue gas which are linked to air quality and achievement of the national objectives.

The European Union and the UK have set air quality objectives for PM10 that have been described above. Local authorities have included PM10 in their local air quality action plans.

The UK's objective has been incorporated into the work Powergen is doing with the Environment Agency on ensuring that air quality objectives for PM10 are not compromised by our power stations. The air quality monitoring systems also incorporate PM10 monitors.

In 2001, more stringent limits were introduced on dust emissions from our coal-fired power stations. Electrostatic precipitators were upgraded in anticipation of these, and other work such as improving combustion control has been carried out. A review of dust emission monitoring was carried out with the Environment Agency and national guidance on monitoring produced in co-operation with them and other generators. Early experience shows that the new stringent emissions are being met.



Dust emissions can also be a problem at our coal storage and importing facilities, particularly at Liverpool Bulk Terminal. Much effort has been put into addressing this. Over 2002, dust suppression trials for tarmac roads around the site have been undertaken, and will be continued in summer 2003. We also liaise closely with the local council over environmental issues and have twice-yearly visits from the council to discuss such issues.

Acid gases and acid rain

All rainwater is naturally slightly acidic. What we know as 'acid rain' is caused when gases such as sulphur dioxide (SO₂) and oxides of nitrogen (NO_x) rise into the atmosphere and combine with the moisture in the air. When this rain falls to ground, it increases the acidity of the ecosystem. In sensitive areas, this can lead to a

reduction in soil quality, a loss of species and the deterioration of buildings and stone work.

'Acid' gases can be released into the atmosphere through natural processes such as volcanic eruptions, but the problem we know as acid rain is mostly due to the burning of fossil fuels, particularly in power stations and transport.

The conversion of pollutants to acid can be a lengthy process and the problem of acid rain crosses national borders. Acid rain is therefore being tackled internationally. The United Nations Economic Commission for Europe (UNECE) has put in place a Convention on Long Range Transboundary Air Pollution, which has resulted in limits being placed on national emissions of SO₂ and NO_x. The European Union has recently passed a number of Directives setting national emission ceilings for these substances for Member States. These limits are applied in the UK via a national plan and for power stations are implemented through their IPC authorisations.

Each electricity generating company has a limit placed on its total emissions of SO₂ from its coal- and oil-fired power stations and IPC authorisations also set limits on SO₂ and NO_x emissions from each site. Powergen has consistently met the emission limits placed on it for SO₂ and NO_x.

Ratcliffe-on-Soar Power Station is fitted with a flue gas desulphurisation (FGD) system designed to prevent 90% of the SO₂ produced from being emitted and turning it into a useful by-product, gypsum, for the building industry.

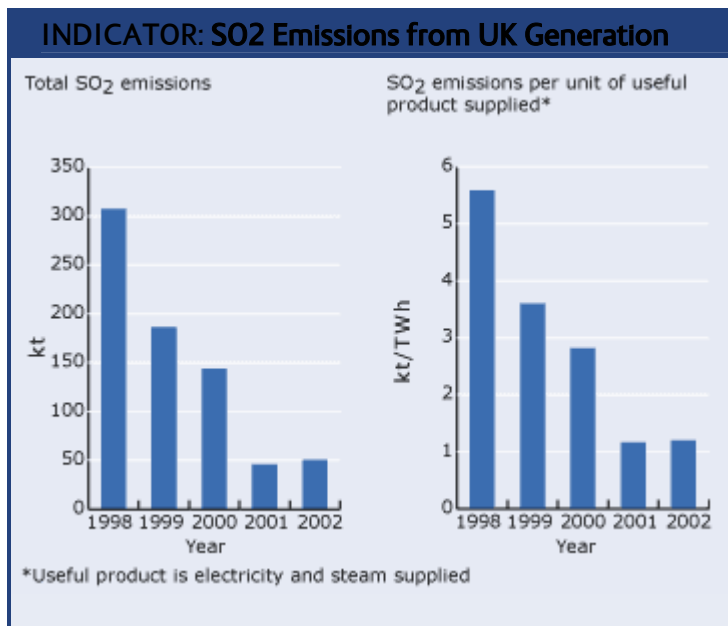
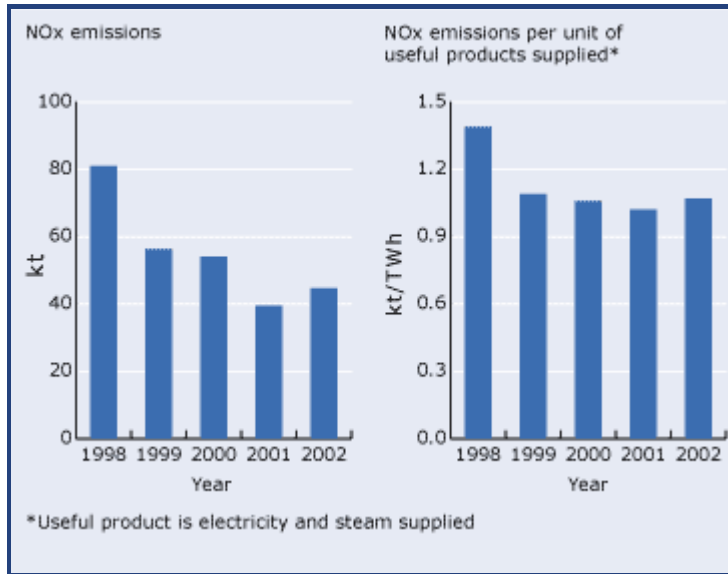
Kingsnorth Power Station, being located on an estuary, currently imports and burns low sulphur coal, which significantly reduces emissions of SO₂. However, we are now considering fitting Kingsnorth with FGD. It is estimated that this will cost £140 million and will prepare the plant for the implementation of the EU Large Combustion Plant Directive (LCPD) on emissions of SO₂ and NO_x.

Both Ratcliffe and Kingsnorth have been fitted with low NO_x burners designed to reduce emissions of NO_x. Our more efficient CCGT and CHP stations have inherently low emissions of both SO₂ and NO_x.

Renewable energy systems, such as wind power and hydroelectric schemes, have no gas emissions.

As a result of all these measures and initiatives, Powergen's emissions of acid gases have declined considerably over the last decade.

INDICATOR: NO_x Emissions from UK Generation



Environment Resource use

Managing resources poorly by using them wastefully and inefficiently is not only bad news for the environment, it is bad news for a company's economic bottom line.

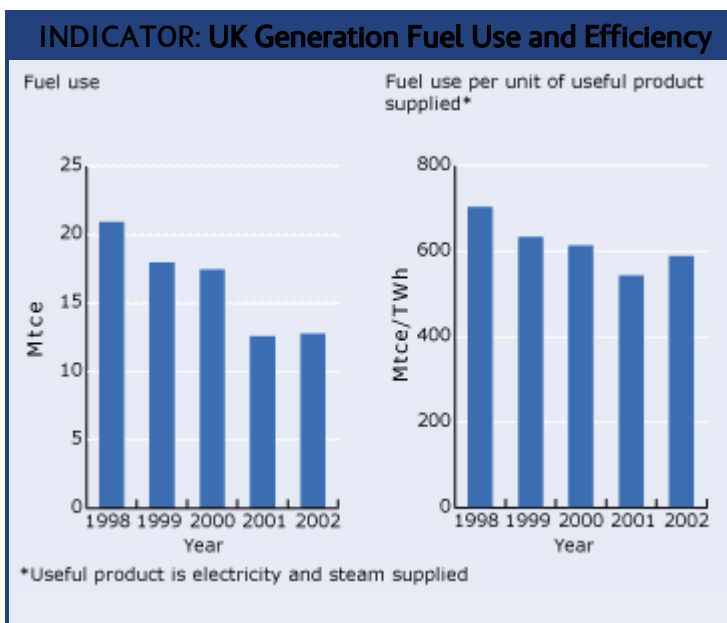
Fuel used in our fossil-fuelled power stations accounts for the majority of our resource use. However, we must also manage the use of transport, water and land and be aware of their impact on local biodiversity.

Power station fuel use and sources

Transport

Water use

Land and biodiversity



Power station fuel use and sources

Our fossil fuel-fired power stations all need a regular and reliable source of fuel.

Numerous and complex factors determine our sourcing of fuel and can include various legal restrictions, such as the amount of sulphur in coal, as well as the more obvious economic drivers.

Sourcing large quantities of fuel inevitably has a large social impact. Coal mines and oil and gas fields can be the life-blood of some communities and many people can be dependent on the use of certain fuels for their livelihoods.

As such, the source and use of certain fuels in power stations is never based simply on economic decisions. Government policies aimed at the welfare of communities, or at meeting environmental objectives, also play a part.

The environmental impact of transporting fuel to its final destination is different for each type. Coal must be shipped, or transported by road or rail, whereas gas and oil be can transported by pipeline.

During 2002, we used a total of 12.7 Mtce (million tonnes coal equivalent) (6.89 Mtce in our coal-fired stations and 5.81 Mtce in our gas-fired power stations and CHP plants).

Our coal-fired stations are Kingsnorth in Kent and Ratcliffe-on-Soar in Nottinghamshire. (As part of the TXU Europe acquisition, we now also own Ironbridge Power Station in Staffordshire.)

Kingsnorth is located on the Medway estuary, providing it with the flexibility to import coal by ship if necessary. A negative impact of importing coal comes from the greater distances it must travel to reach its destination and the inherent environmental impact this has.

This can be offset by the fact we can source coal with a lower sulphur content than would otherwise be available in the UK, thereby reducing acid gas emissions from the station.

Kingsnorth also takes delivery of Heavy Fuel Oil (HFO) by sea. Most of this oil is then transported via a 13-km pipeline for use at Grain power station. The sulphur content of the oil was reduced from 3.5% down to just 1%, ahead of new EU requirements.

Almost all the coal used at Ratcliffe-on-Soar power station comes from the UK and is transported to the site by rail. The Flue Gas Desulphurisation (FGD) plant we built at a cost of £250 million at Ratcliffe removes around 90% of the sulphur dioxide from the emissions. FGD at Ratcliffe uses limestone as a raw material, producing gypsum as an end-product. It is our policy not to source limestone from within national parks and the gypsum produced is sold for use in making plasterboard.

Powergen's gas-fired stations are supplied directly by pipelines. Connah's Quay power station is fed from Liverpool Bay and includes a gas treatment plant that removes any sulphur present in the Liverpool Bay gas. There is also a connection to the national transmission system (NTS) at Burton Point, through which we can import or export gas as required.

Killingholme power station is fed through our own 52 km long pipeline leading from Theddlethorpe on the North Sea and also had a connection to the NTS at Thorton Curtis, if needed. North Sea gas has a negligible sulphur content and so sulphur emissions from the plant are extremely low.

As well as trading and supplying coal for use in our own power stations, we also provide a service to many customers throughout the UK.

Our Energy Trading arm supplies over four million tonnes of coal every year to other electricity generators. We also import around 400 kt of high quality Colombian coal every year. This is delivered in 40 kt shipments through Powergen's own deep water port facility at Liverpool Bulk Terminal. The coal is washed and graded before being sold mainly into domestic and industrial markets in northwest England. In addition, we also supplied 150 kt of coal to cement producers and exported approximately 38

kt of UK coal to Ireland and Norway.

Transport

Our use of transport needs to be managed effectively. Almost all forms of transport use fossil fuels to power them and can affect local air quality, as well as contributing to climate change. Not only that, travelling unnecessarily adds to congestion, with all its associated problems.

Face-to-face business meetings can result in considerable additional mileage for large companies. We are committed to transforming the way we work by providing effective and innovative solutions.

Business travel

Business travel includes any journey undertaken whilst on Powergen business. It includes journeys between Powergen sites, as well as to other locations.

We have incorporated the latest technology into our working practices to minimise unnecessary travel. At our major office complexes we have installed video conferencing facilities which are open to all employees. Whether we need to talk in person across the country or anywhere in the world, these facilities save us time and money, and help reduce our impact on the environment.

We hope to further improve our tracking of business travel data in coming years. This will enable us to calculate savings on business miles from initiatives such as video-conferencing.

Commuting and green travel plans

Our large office centres accommodate many hundreds of employees, all of whom must commute to and from our office sites every day. If not properly managed, this commuting not only has an impact on the environment, but also on the health and wellbeing of our employees.

We are always exploring solutions that enable our employees to get to and from their place of work as conveniently and free from stress as possible, whilst also reducing our overall impact on the environment.

We have introduced integrated green travel plans at two of our office sites in the UK, Pegasus and Sherwood Park, and hope to implement others in the future. Flexible working is encouraged and prevents or reduces the need to work at peak times. At Pegasus there are 85 registered car sharers together with a park-and-ride scheme. The latter was developed with Nottingham City Council – a partnership that allowed us to benefit from an existing park-and-ride site for Nottingham city centre.

At Westwood and Power Technology car-sharing is now also actively encouraged and priority car parking spaces are now reserved for car-sharers. In addition, staff at Power Technology who commute by walking, cycling or car-sharing qualify for a monthly prize draw.



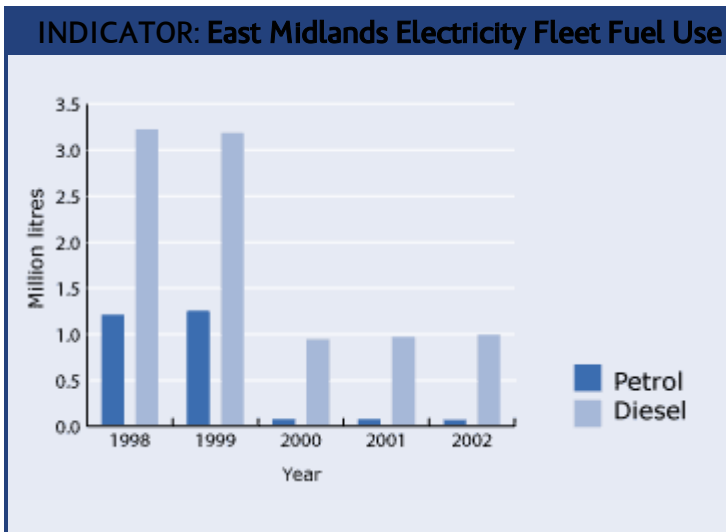
Our distribution fleet

East Midlands Electricity (EME) engineers and technicians have to respond quickly and efficiently across our distribution network in order to minimise potential disruption to customers. To do this they need a fleet of vehicles they can rely on to get them to where they need to go in the shortest time possible.

The environmental impact of EME’s fleet of vehicles is minimised in two ways:

- We ensure that each vehicle is suitable for the job for which it is to be used, and is maintained properly;
- Each vehicle is fitted with a Global Positioning System (GPS) sensor and is connected to our Automatic Vehicle Location (AVL) system. This enables the Incident Management Centre personnel to identify the nearest available craftsman to any fault, and to plan the shortest and most effective journey to the site. This is backed up by the on-board GPSs in each vehicle that identify the most effective route to drive.

In 2002, East Midlands Electricity operated a commercial fleet of 307 vehicles, including a range of vans, heavy goods vehicles and specialist response 4-wheel drive vehicles. During the year the fleet used 50,538 litres of petrol and 975,717 litres of diesel in carrying out our activities across the region. Through the specification of new vehicle types, we have been able to reduce the average age of vehicles in the fleet from 56 months to 46 months.



Water use

It is good practice to monitor water use and to try to minimise it in a similar way to energy use. Apart from reducing associated costs, it is a simple way to reduce our impact on the environment.

Our power stations generally use water as a coolant, which requires abstraction of large amounts of water. Power stations are therefore usually located by a river or on

the coast.

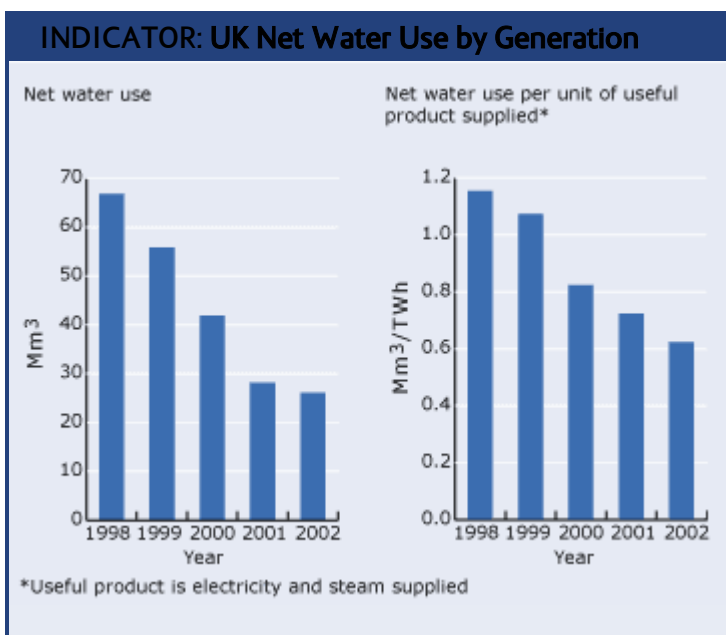
The water used in the cooling process is then returned to its original source. A small proportion may be lost as water vapour if the power station has cooling towers.

Each power station in the UK has environmental controls placed upon it in the form of its Integrated Pollution Control (IPC) authorisation, which allows it to operate. Each station's IPC authorisation covers limits on discharged water.

Abstraction of water is not a problem at Kingsnorth power station, located on an estuary, and Grain power station on the coast. They do not need cooling towers, having 'once-through' cooling systems and deliver all their cooling water back to the original source.

In addition to water for cooling purposes, Ratcliffe-on-Soar's Flue Gas Desulphurisation (FGD) plant uses water in the desulphurisation process. The station has cooling towers, which serve to minimise abstraction of water from the River Soar. Some water is returned to the river to maintain water quality for operational purposes. This is subject to strict discharge limits.

Our modern CCGT stations use a lot less cooling water than our coal-fired power stations because of their high efficiency, but are still subject to consent limits on discharges.



Land and biodiversity

Our Environmental Policy states that we will:

"manage our land sensitively and promote nature conservation wherever we operate."

Our large power station sites account for 664 ha of our land ownership, of which over three-quarters relates to our coal- and oil-fired power station sites. The new gas-fired stations built in the last decade are much smaller relative to the older, coal-fired, stations and consequently do not need nearly as much land.

At Rheidol hydroelectric power station in mid Wales we have 15,200 ha under our care, and managed sensitively for conservation purposes.

Our electricity distribution business, East Midlands Electricity (EME), spans an area of some 16,000 square kilometres and comprises 23,983 km of overhead lines, 44,706 km of underground cables and some 44,000 transformers. The operation, reinforcement and maintenance of this network obviously has an impact on its surroundings and the wider environment, which requires careful management.

Current land management practices

It is a requirement of each site's environmental management system that a formal land management plan is established, and four of our sites have formal nature reserves included in these plans.

Our former power station site at Ham's Hall, near Sutton Coldfield, has now been redeveloped into a National Freight Distribution Park. Despite this, it is still the site of one of our largest nature reserves.

The Hams Hall Ladywalk Nature Reserve and environmental studies centre has 125 acres of floodland and woodland, providing a habitat for over 200 species of birds. These include a resident bittern and all three species of British woodpeckers. The West Midland Bird Club maintains a web page on the birds of the area and general environmental quality.

The site of Connah's Quay power station on the Dee Estuary is designated as a Site of Special Scientific Interest (SSSI), a Wetland of International Importance under the Ramsar Convention and a Special Protection Area under the EC Conservation of Wild Birds Directive.

Working closely with the Deeside Naturalists' Society, the power station manages a 20 hectare conservation area that includes a lagoon, grass marshlands, bunded pools and salt marshes. Internationally significant numbers of pintail, shelduck, oystercatcher, redshank, teal, curlew and black-tailed godwit spend the winter at the site, while the numbers of wintering or migratory dunlin and lapwing are of national significance.

In 2001, the field study centre at Connah's Quay power station, jointly managed by Powergen and the Deeside Naturalists' Society was re-opened, following refurbishment. The centre occupies land adjacent to the River Dee.

Kingsnorth power station in Kent is surrounded by 10 acres of grounds in open countryside bordering the Medway Estuary SSSI and the Ramsar Special Protection Area. The saltmarsh island of Oakham is within the SSSI and is run by Powergen as a nature reserve. Thousands of waders and wildfowl use the island during migration periods and it also supports nesting avocets, a large number of scarce emerald damselflies and great crested newts. Work on the sea wall at Oakham won

recognition as runner-up in the 'Wildlife Conservation' category of the Kent Business Wildlife Conservation awards during 2001. Two new bird species were recorded in 2002 (wood warbler, *Phylloscopus sibilatrix*, and ruddy duck, *Oxyura jamaicensis*), bringing the total number of recorded species to 200. During 2002, work was completed on the sea wall to prevent spring tides inundating the island's interior. In addition, an area of woodland on the island has been selectively thinned to create a strand of silver birch woodland.

The neighbouring Grain power station site hosts around six pairs of nesting black redstarts (a tenth of the British population), as well as barn owls and peregrine falcons. All three of these are specially protected (Schedule 1) species.

At Power Technology, a nature area using wood from tree thinning has been created to encourage the colonisation of invertebrates and fungi. A variety of bird boxes have also been installed throughout the grounds. Nottinghamshire Wildlife Trust have recently visited the site to advise on the creation of a wildflower meadow on-site and planting will take place early 2003.

A wildflower meadow was created at Theddlethorpe, adjacent to one of our Gas Distribution Centres.

East Midlands Electricity

Our electricity distribution business operates over an area of 16,000 km² in the East Midlands of England, from north of Chesterfield in Derbyshire to south of Milton Keynes in Buckinghamshire, and from Tamworth, Staffordshire, in the west to the Lincolnshire coast in the east.

We therefore operate across a great number of different land types, including many specially protected areas – the Peak District National Park to name but one. We have added every SSSI, and other pertinent data, such as ancient monuments and environmental sensitivity, to a Geographical information system (GIS) used to manage work carried out on the network. This alerts our workers to special considerations, and allows us to ensure we fully consult with all interested parties before work is carried out.

As part of improving the environmental information available in the asset management data systems, an environmental risk rating study was carried out with Power Technology to quantify levels of potential contamination risk, in the event of oil release from our equipment. This information will be used in long term strategic maintenance and replacement plans and will be developed to help respond appropriately to environmental incidents involving our network equipment.

Other land management initiatives undertaken by EME over 2002 included:

- Working with the Anglian Water Bird Watching Centre to relocate an osprey at Rutland Water, Leicestershire. The osprey – part of a national migratory project for this species – had built its nest on the top of a 33kV circuit pole in the area, causing the circuit to trip and exposing the bird to the risk of electrocution. The nest was removed from the line, once the bird had migrated south, and placed on a replica pole structure supplied by EME at the side of the existing line. Raptor guards were then placed on the 33kV circuit

- equipment to prevent the bird from landing in the future and encourage it to the relocated nest;
- Finalising plans for work on a major transmission line modification between Castle Donington, Ratcliffe-on-Soar and Nottingham, which will involve placing much of the existing overhead circuit underground and will provide visual and wildlife benefits to a nature reserve in Attenborough. In planning the project, a full environmental impact assessment was carried out, with all identified actions being incorporated into the scheme. The work is expected to be complete during 2005.

Network equipment

We are well aware of the impact on the landscape of overhead lines, substations and the like. We are developing the use of new equipment that is less obtrusive and can be blended in with its surroundings.

For instance, in certain circumstances, we can use new low-level transformers in place of existing pole-mounted equipment.

When we need to replace lines or plan new routes, we consider the use of underground cables as well as overhead lines. There are advantages and disadvantages associated with either option:

Cabling advantages and disadvantages	
Overhead Lines	Underground Cables
Lower initial investment, but require periodic maintenance and inspection	Significantly higher initial investment, but require no maintenance
Faults can be easily located and quickly repaired	Difficult to locate faults resulting in longer repair times
Highly visible	Unseen when in place
Susceptible to the effects of weather	Susceptible to third party accidental damage
Prone to short-term interruptions	More reliable in operation
Flexible to adapt to changes in network demand	Installation causes land disturbance
	Further land disturbance in repairing faults

When installing underground cables, we strive to minimise disruption to the surrounding area, especially when working on or near roads. We are also developing ways of laying cables more quickly and efficiently, minimising the disturbance to the

ground.

A tunnelling device has been developed to lay cables that we aim to use wherever possible. Occasionally, we also use other techniques known as 'ploughing' or 'narrow trenching', which minimise disturbance.

Where overhead lines are used, our wayleaves officers work with landowners and local authorities to find the least obtrusive route to the local communities.

Biodiversity Action Plans (BAPs) – The UK Biodiversity Action Plan (UK BAP) is a national strategy aimed at maintaining biological diversity by targeting efforts towards rare or declining habitats and species. Industry is being encouraged to contribute to the UK BAP objectives.

During 2002 we developed a framework for managing sites while taking account of biodiversity issues. Work is underway at Kingsnorth power station to develop a company BAP, setting out how priorities identified in the UK BAP will be addressed. It is intended that this approach will be followed at other sites with large areas of land in 2003/4.

Visual amenity

The visual impact of our plants and equipment on the landscape is a difficult issue to deal with because of its subjectivity. What can look appealing to one person, can be an eyesore to another.

However, what is not debatable is that our activities visually impact on the landscape, whether they are new substations or overhead lines, or the construction of new wind farms.

There are certain guidelines and legislation to which we adhere. Some areas may be specifically recognised by law, and place certain restrictions on equipment that can be used.

For some sites or situations, planning legislation can impose strict requirements and provides for public consultation before any permission is given.

Under these circumstances we seek to fully consult with any local communities upon whom we may impact. We believe it is vital to work with all parties to improve understanding on all sides and reach a solution agreeable to all.

Wind farm turbines

Wind turbines are, by their very nature, visible in the landscape. In order to harness the wind's energy, these turbines are typically sited on high ground or in exposed locations where they can gain most benefit from the wind.

Powergen Renewables follows a number of mitigating measures to reduce the visual impact of its turbines. These include:

- Undertaking independent studies of the visual characteristics of all sites, as part of the environmental assessment;

- Following local planning authority choice of paint colour – usually off-white to blend turbines in with the general colour of the sky and to minimise any reflection of sun light;
- Optimising design layout – this includes studying any other wind farms in the area to ensure that a new farm does not combine to create an unacceptable cumulative effect;
- Including photomontages of the proposed wind farm in the environmental assessment.

Environment

By-product and waste management

By-product management

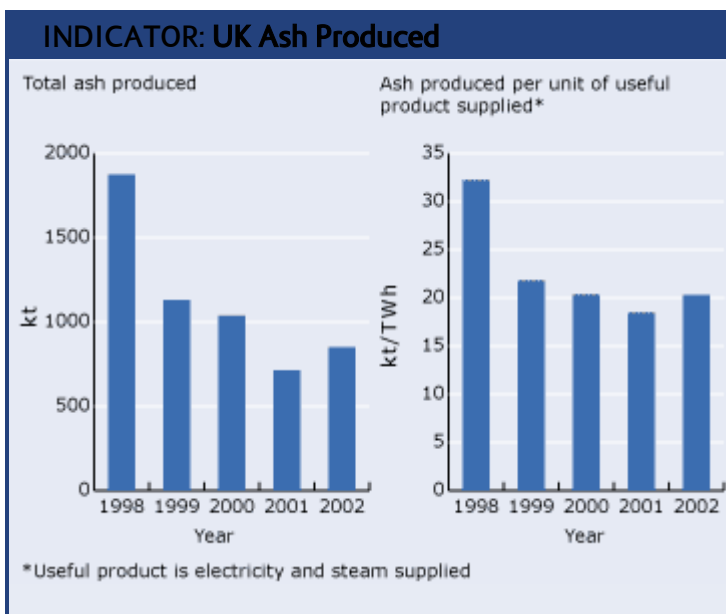
Ash

Our main by-product is ash from burning coal. It is inert and ideal for use in the construction industry either as a filler / landscaping agent, or as the main constituent of lightweight bricks.

Although the sale of ash is driven by the construction industry's need and is, to some extent, opportunistic from our point of view, we make every effort to produce ash of a quality that is attractive as a by-product and substitute raw material. We have invested heavily in technology that ensures ash quality is consistent and in processes that classify ash for different markets.

Ash that is not sold is landfilled with a view of reclaiming it if opportunities to sell it are identified.

Pulverised Fuel Ash (PFA) and Furnace Bottom Ash (FBA) are only produced at coal-fired power stations. In our case, this is now only Kingsnorth, Ratcliffe-on-Soar (and Ironbridge) power stations. Over recent years, production has decreased because of reduced generation and the sale of other coal-fired power stations, though PFA sales have increased significantly.





Gypsum

Gypsum is a by-product of the Flue Gas Desulphurisation (FGD) process at Ratcliffe-on-Soar power station. In 2002, 363 kt of gypsum was produced, all of which was sold on for manufacture of gypsum-based products. This gypsum acts as a substitute for virgin gypsum which would normally be mined, hence contributing to reducing natural resource use.

Waste management

All businesses generate waste, from their processes and the everyday activities of their employees. The responsible management of waste is a key element of sustainable development. An environmentally responsible company aims to minimise its waste production, and reuses or recycles as much as possible of that which is produced, thus improving efficiency, cutting resource use and pollution, as well as minimising costs.

Wastes produced by our activities are many and varied, ranging from wastes from power station processes, such as used lubricating oils, to general maintenance wastes from our network activities, to office wastes such as paper and redundant IT equipment.

In a similar way to the management of resources used by us, the management of waste is of paramount importance to our economic bottom line, as well as our impact on the environment.

It is a strict requirement in our environmental minimum standards that each business

unit must have in place an effective waste management plan. All plans follow the standard waste hierarchy:

1. **Reduce** use of materials where possible;
2. **Re-use** where possible;
3. **Recover** or recycle anything else;
4. **Dispose** of the remaining waste in a responsible way, complying with the relevant legislation.

Waste management is a highly complex and heavily legislated area. All producers and handlers of waste are under a 'Duty of Care' to take reasonable measures to prevent the unauthorised deposit, treatment or disposal of waste. Failure to do so is an offence.

The UK Government has also implemented an economic instrument in the form of a tax on the amount of waste sent to landfill, to help reduce the overall amount of waste disposed of nationally, and to increase waste minimisation, recycling and re-use. Those operating landfill sites may claim approximately 20% of their tax burden back and use that money for environmental projects. (The landfill sites operated by us are for surplus ash that cannot be sold for us in the construction industry, as described above.) These projects are discussed in the Community Section of this Report.

All of our office sites, including those offices on generation sites, are included in waste management plans, and as such have various waste minimisation and recycling schemes.

Every site aims to recycle paper and cardboard, but some also recycle plastic cups and bottles, drink cans and toner cartridges. Most also donate redundant IT equipment to charity. Wood recycling has been initiated at our Liverpool Bulk Terminal. See Our Locations for further details of our site-specific initiatives.



East Midlands Electricity

The nature and scale of our distribution business, East Midlands Electricity, means that it produces a significant amount of waste materials that have to be effectively managed and eventually disposed of. The movement of materials to and from activities within the region are managed by a specialist logistics provider, who works in partnership with the business and our waste management contractor, to reduce the amount of waste that has to be disposed of. Returned materials are inspected for re-use potential and facilities have been established to recycle a number of different types of materials, with disposal being a last option.

During 2002 the business disposed of 935.2 tonnes of waste from this operation, of which 787.7 tonnes were non-special waste and 147.5 tonnes were special waste. The business continues to work with its waste management contractor to develop further waste minimisation and recycling initiatives and as a result recycled 56 tonnes of material during the year, including paper, drinks cans and cups, cardboard

and wood.

Environment

Electric and magnetic fields

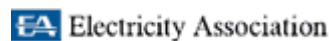
Electric and magnetic fields (EMFs) are present wherever electricity is used. This includes domestic electrical appliances as well as a regional electricity company's plant and equipment.



The National Radiological Protection Board (NRPB) advises the UK Government on EMF issues and establishes the required levels of investigation. The NRPB also provides guidance which the electricity industry complies in the course of its activities.



The electricity industry recognises that there may be public concern about electric and magnetic fields (EMFs) and for this reason, East Midlands Electricity provides technical advice and support, along with other sources of independent information via their EMF Liaison Officer.



Generally, the electricity industry looks to the Electricity Association (EA) and the National Radiological Protection Board (NRPB) for guidance. Both these organisations have web sites covering EMFs in detail.

Electricity Association (EA) – www.electricity.org.uk

National Radiological Protection Board (NRPB) – www.nrpb.org

Environment

Environmental research

Environmental research continues to provide a vital underpinning to our environmental performance. The research is carried out both in-house by Power Technology and in collaboration with other generators via the Joint Environmental Programme (JEP). Much of the work carried out centres around generation and distribution operational issues. The JEP group has made input to UK policy via discussions with the Environment Agency on a range of issues and particularly on implementation of the Large Combustion Plant Directive (LCPD).

In-house research during 2002 covered areas such as noise mapping around power stations, flue gas desulphurisation technology, greenhouse gas abatement, air quality issues and associated health effects, ash site management, development of site biodiversity action plans and oil risk assessment for fluid-filled cables owned by EME.

Environment

Environmental data

Environmental data from our UK operations over 2002 may be accessed using the links below:

Data are provided for:

- UK Power Stations (MS Excel 38k);
- UK CHP Plants (MS Excel 27k);
- UK Windfarms (MS Excel 18k);
- Environmental Trend Data, 1990 – 2002 (MS Excel 30k).

Environmental data for our Paiton II power station in Indonesia may be accessed using the link below:

- Paiton II Environmental Data (MS Excel 26k).

Verification



The technical information included in the UK Environment section of the 2002 Corporate Responsibility Report has been independently reviewed and verified by our ISO 14001 third-party certification body, AFAQ-EAQA Ltd.